COMPLETE MONOGRAPH

2021 GROUP A PUBLIC COMMENT AGENDA

SEPTEMBER 21 - 28, 2021
DAVID L. LAWRENCE CONVENTION CENTER
PITTSBURGH, PA

ICC
INTERNATIONAL CODE COUNCIL®

2021 Public Comment Agenda

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INTRODUCTION

This publication contains the Public Comment Agenda for consideration at the Public Comment Hearings of the International Code Council on September 21 – 26 at the David L. Lawrence Convention Center, Pittsburgh, PA (see page 1). See page xxxvii for the hearing schedule.

This publication contains information necessary for consideration of public comments on the proposed code changes which have been considered at the ICC Committee Action Hearings held virtually on April 11 – May 4, 2021, from Country Club Hills, IL. This agenda addresses hearings on public comments on proposed code changes to the *International Building Code (Egress, Fire Safety General and portions of Structural), ICC Performance Code, International Fire Code, International Fuel Gas Code, International Mechanical Code, International Plumbing Code, International Property Maintenance Code, International Residential Code (Mechanical* and *Plumbing)*, *International Swimming Pool and Spa Code,* and the *International Wildland-Urban Interface Code.*

The Public Comment Hearings will be conducted in person only and will be webcast. There will not be any virtual participation.

ICC GOVERNMENTAL MEMBER REPRESENTATIVES

Council Policy #28, Code Development (page xiii) requires that applications for Governmental Membership must have been received by March 12 of this year in order for the representatives of the Governmental Member to be eligible to vote at this Public Comment Hearing and the Online Governmental Consensus Vote, which occurs approximately two weeks after the hearings. Further, *CP#28* requires that ICC Governmental Member Voting Representatives reflect the eligible voters **30 days prior** to the start of the Public Comment Hearings. This includes new, as well as changes, to voting status. Sections 9.1 and 9.2 of *CP#28 (page xxxii) read as follows:*

> **9.1 Eligible Final Action Voters:** Eligible Final Action voters include ICC Governmental Member Voting Representatives and Honorary Members in good standing who have been confirmed by ICC in accordance with the Electronic Voter Validation System. Such confirmations are required to be revalidated annually. Eligible Final Action voters in attendance at the Public Comment Hearing and those participating in the Online Governmental Consensus Vote shall have one vote per eligible voter on all Codes. Individuals who represent more than one Governmental Member shall be limited to a single vote.
>
> **9.2 Applications:** Applications for Governmental Membership must be received by the ICC at least 30 days prior to the Committee Action Hearing in order for its designated representatives to be eligible to vote at the Public Comment Hearing or Online Governmental Consensus Vote. Applications, whether new or updated, for Governmental Member Voting Representative status must be received by the Code Council 30 days prior to the commencement of the first day of the Public Comment Hearing in order for any designated representative to be eligible to vote. An individual designated as a Governmental Member Voting Representative shall provide sufficient information to establish eligibility as defined in the ICC Bylaws. The Executive Committee of the ICC Board, in its discretion, shall have the authority to address questions related to eligibility.

As such, new and updated eligible voter status must be received by ICC's Member Services Department **by August 21, 2021**. This applies to both voting at the Public Comment Hearings as well as the Online Governmental Consensus Vote. This must be done via the Electronic Voter Designation System. Access the Electronic Voter Designation System directly by logging on to www.iccsafe.org/EVDS and using the email address and password connected to your Primary Representative account. The online form can also be accessed by logging onto "My ICC" and selecting "Designate Voters" or through the Electronic Voter Designation link in the left hand menu on the ICC home page at www.iccsafe.org. These records will be used to verify eligible voter status for the Public Comment Hearing and the Online Governmental Consensus Vote. Voting members are strongly encouraged to review their membership record for accuracy so that any necessary changes are made prior to the August 21 deadline. **Representatives of any Governmental Member that has made application for membership after March 12, 2021 will not be able to vote.**

ICC POLICY ON FINANCIAL ASSISTANCE FOR GOVERNMENTAL MEMBER VOTING REPRESENTATIVES

ICC Council Policy 36 Financial Assistance defines the circumstances under which it is permissible for Governmental Member Voting Representatives to accept funds to enable a Governmental Member Voting Representative to attend ICC code hearings. The policy seeks to prohibit, or appropriately regulate financial assistance which is designed to increase participation by a particular interest group or by those supporting a particular position on a proposed code change.

As part of the registration process (see below), eligible voting members are required to verify their voting status in order to receive a voting device. Improper acceptance of financial assistance, or misrepresentation by a Governmental Member Voting Representative about compliance with CP 36, which are discovered after a code hearing, may result in sanctions regarding voting at future hearings by the Governmental Member Voting Representative or by other Governmental Member Voting Representatives from the same governmental member. CP 36 provides, in pertinent Part:

> **2.0. Contributions.** To allow industry and the public to contribute to the goals of the ICC in transparent and accountable processes, organizations and individuals are permitted to contribute financial assistance to Governmental Members to further ICC Code Development Activities provided that:
>
> **2.1** Contributions of financial assistance to Governmental Member Voting Representatives for the purposes of enabling participation in ICC Code Development Activities are prohibited except for reimbursements by the ICC or its subsidiaries, a regional, state, or local chapter of the ICC, or the local, state or federal unit of government such Governmental Member Voting Representative is representing. For the purposes of this policy financial assistance includes the payment of expenses on behalf of the Governmental Member or Governmental Member Voting Representative. Governmental Member Voting Representatives may self-fund for purposes of participating in ICC Activities.
>
> **2.2** A Governmental Member accepting contributions of financial assistance from industry or other economic interests shall do so by action of its elected governing body or chief administrative authority. A Governmental Member Voting Representative may not directly accept financial assistance from industry or other economic interests.
>
> **2.3** Any contributions to a Governmental Member of the ICC shall comply with applicable law, including but not limited to a Governmental Member's ethics, conflict of interest or other similar rules and regulations.

ADVANCE REGISTRATION

The Public Comment Hearings are only one component of the 2021 ICC Annual Conference and Group A Public Comment Hearings. **All attendees to the Public Comment Hearings are required to register. Registration for the Public Comment Hearings is FREE and is necessary to verify voting status (see above). You are encouraged to register prior to the Public Comment Hearings. To register for the full Conference, the Education Program, or the Public Comment Hearings, go to https://www.iccsafe.org/events/conference/register-ac21/.**

NOTICE: If you or your companion require special accommodations to participate fully, please advise ICC of your needs.

ANTITRUST COMPLIANCE

ICC brings together numerous government officials and industry members to participate in the code and standard development process. ICC provides basic guidance on the antitrust laws that may be applicable to these and other activities sponsored by ICC ("ICC Activities"). Click here to view ICC's policy on Antitrust Compliance.

AGENDA FORMAT

This Public Comment Hearing Agenda includes the Consent Agenda and the Individual Consideration Agenda for the code change proposals that comprise the 2021 Code Development Cycle. This will complete the Public Comment Hearings for the 2021 Code Development Cycle.

The Consent Agenda is comprised of proposed changes to the *International Building Code (Egress, Fire Safety, General, and Structural), ICC Performance Code, International Fire Code, International Fuel Gas Code, International Mechanical Code, International Plumbing Code, International Private Sewage Disposal Code, International Property Maintenance Code, International Residential Code (Mechanical* and *Plumbing)*, *International Swimming Pool and Spa Code, International Wildland-Urban Interface Code* and the *International Zoning Code,* which did not receive a public comment, and therefore are not listed on the Individual Consideration Agenda.

The Individual Consideration Agenda is comprised of proposed changes that received a public comment in response to the Code Committee's action at the Committee Action Hearings.

Items on the Individual Consideration Agenda are published with information as originally published for the Committee Action Hearing as well as the published hearing results. Following the hearing results is the reason that the item is on the Individual Consideration Agenda followed by the public comments, which were received.

Public testimony will follow the procedures given in *CP#28-05 Code Development* as published on page xiii. Refer to the tentative hearing order on page xxxviii.

MODIFICATIONS & PUBLIC COMMENTS

Modifications at the Public Comment Hearing may include those made by the Code Committee at the Committee Action Hearing as wells as those proposed in the form of a public comment following the hearing. The Public Comment deadline was July 2, 2021 and all Public Comments received have been incorporated into this document. **Further modifications are not permitted beyond those published in this agenda.**

Proposed changes on the Individual Consideration Agenda at the Public Comment Hearings may have up to four possible motions - Approval as Submitted, Approval as Modified by the Code Committee, Approval as Modified by a Public Comment, or Disapproval. A Public Comment Hearings Discussion Guide will be posted and copies available at the hearing which includes a list of allowable motions for each code change proposal.

CONSENT AGENDA

The Public Comment Consent Agenda consists of proposals, which have not received a public comment. The Public Comment Consent Agenda for each code will be placed before the assembly at the beginning of each code with a motion and vote to ratify final action in accordance with the results of the Committee Action Hearing.

INDIVIDUAL CONSIDERATION AGENDA

The Public Comment Hearing Individual Consideration Agenda is comprised of proposals, which have a public comment. For each code, the proposed changes on the Individual Consideration Agenda shall be placed before the assembly for individual consideration of each item. The hearing order is found on page xxxix and the agenda starts on page 1.

ICC PUBLIC COMMENT HEARING PROCESS

The hearing process will follow CP #28. The process is summarized as follows and will occur for each code noted in the hearing order (CP #28 sections noted):

1. At the start of each of the individual hearings for the respective code (see page xxxvii):
   - Requests to withdraw code changes
   - Requests to withdraw public comments
   - Requests to revise the hearing order
   - Consent Agenda voted (Section 7.5.5)

2. The first code change on the hearing order brought to the floor with a standing motion to sustain the committee action.

3. If the Committee Action is not Disapproval, a motion to approve a modification by a public comment may be presented (Section 7.5.9.6).

4. Public testimony on either the Committee Action (if Disapproval) or the public comment (Section 5.5.1)

5. ICC Governmental Member Voting Representatives and Honorary Members ("eligible voters") in attendance vote on the motion under consideration. (See page ii)

6. Depending on the motion and action determined by the vote, subsequent allowable motions in accordance with Sections 7.5.9.8 can be considered or voting on the main motion in accordance with 7.5.9.7 is taken. (A Public Comment Hearing Discussion Guide will be posted and copies available at the hearing, which includes a listing of allowable motions.)

7. The public comment hearing result on the code change determined by a vote of the eligible voters is announced. In accordance with Section 7.5.7, reconsideration is not permitted. This result will be placed on the Online Governmental Consensus Vote (Section 8.0), which will be open approximately two weeks after the hearings are complete (see page v).

8. Repeat 2 – 7 for subsequent code changes

9. Go the next code indicated on the hearing order and repeat 1 – 8.

ELECTRONIC VOTING
PUBLIC COMMENT HEARING FOLLOWED BY ONLINE GOVERNMENTAL CONSENSUS VOTE

The public comment hearing is the first step in the process to arrive at Final Action on code changes – Public Comment Hearing (PCH) voting followed by the Online Governmental Consensus Vote (OGCV) utilizing cdpACCESS®. Be sure to review the deadlines and eligible voter information on page i. The sections noted below are the applicable sections of CP #28 which is published on page xiii.

In accordance with Section 7.9.5.7 electronic voting will be used for voting at the PCH. Electronic voting devices will be available for all eligible voters and can be picked up at a designated area at the entrance to the hearing room after registration. **Once you pick up your voting device, including for use at the Annual Business Meeting (ABM), please keep the device until you are done voting on all matters, both the ABM and the PCH and return the device to the designated area. The ABM and the PCH will be held in the same room.**

Public Comment Hearing Vote

The first step is the voting that will occur at the Public Comment Hearing. This process is regulated by Section 7.5.9 of CP #28.

The Consent Agenda will be voted with a motion to ratify the action taken at the Committee Action Hearings. This will be the Final Action on those code changes and they will not be considered in the Online Governmental Consensus Vote (Section 7.5.5).

As part of the Individual Consideration Agenda, individual motions for modifications to the main motion will be dealt with by a hand vote followed by the electronic vote if the moderator cannot determine the outcome of the hand vote. However, in accordance with Section 7.5.9.7, the vote on the main motion to determine the PCH action must be taken electronically with the vote recorded since this is necessary for the second step in the process (see below). As noted in Section 7.5.9.8, if the motion is not successful, motions for Approval as Submitted or Approval as Modified are in order. A motion for Disapproval is not in order. The voting majorities are indicated in Section 7.6. As in the past, if the code change proposal does not receive any of the required majorities in accordance with Section 7.6, Section 7.5.9.9 stipulates that the PCH action will be Disapproval. However, the vote recorded will be the vote count on the main motion in accordance with Section 7.5.9.7.

Online Governmental Consensus Vote

The second step in the final action process is the Online Governmental Consensus Vote (OGCV). This process was first used in the 2014 Cycle, and is built into cdpACCESS and is regulated by Section 8.0. It is anticipated that the ballot period will start approximately two weeks after the Public Comment Hearings and will be open for two weeks. **Be sure to review new Section 8.2 in CP28 for a new voter acknowledgment statement which is part of the OGCV procedure.**

The results of the PCH set the agenda and ballot options for the OGCV. This is stipulated in Section 8.1. For example, if the action taken at the PCH is AMPC 1, 3, 7 (Approved as Modified by Public Comments 1,3 and 7) then the OGCV ballot will be structured to allow eligible voters to vote for either AMPC 1,3, 7 or Disapproval in accordance with the table. The voting majority required for AMPC 1, 3, 7 at the PCH was a 2/3 majority which is the same majority that applies to the OGCV. The vote tally from the PCH will be combined with the vote tally from the OGCV to determine the Final Action. In the example cited, the combined vote tally would be required to meet the 2/3 majority in order for the final action to be AMPC 1, 3, 7. If the voting majority is less than the 2/3 required, Section 10.3 stipulates the Final Action to be Disapproval.

Be sure to review Section 8.3 which identifies the composition of the ballot. Of note is item 4 where the PCH action is Approved as Modified. The resulting text will be presented in the ballot with the modification(s) incorporated into the original code change in order for the voter to see how the text would appear in the code. A key part of this ballot is also item 10 where the voter will have access to the hearing video from both hearings.

Non-eligible voters will also be able to login and view the OGCV ballot, but will not be permitted to vote.

Final Action on Proposed Code Changes

Section 10.0 regulates the tabulation, certification and posting of the final action results. In accordance with Section 10.4, the Final Action will be published as soon as practicable and will include the action and vote counts from both the PCH and OGCV.

VIEW THE PUBLIC COMMENT HEARINGS ON YOUR PC

The Public Comment Hearings are scheduled to be "webcast". Streaming video broadcast over the Internet will provide a gateway for all International Code Council members, the construction industry and other interested parties anywhere in the world to view and listen to the hearings. Logging on to the Internet broadcast will be as simple as going to the International Code Council web site, www.iccsafe.org and clicking on a link. [Actual site to be determined - be sure to check the ICC web site for further details].

The hearings can be seen free by anyone with Internet access. Minimum specifications for viewing the hearings are an Internet connection, sound card and Microsoft Windows Media Player. DSL, ISDN, Cable Modems or other leased-line connections are recommended for the best viewing experience. A dial-up modem connection will work, but with reduced video performance.

All hearing videos are now posted following the hearings at http://hearingvideos.iccsafe.org/.

PROPONENT REVIEW OF PUBLIC COMMENTS

While great care has been exercised in the publication of this document, there may be errata posted for the Public Comment Agenda. As indicated in the cdpACCESS automated response to public comment proposals, public comment proponents are encouraged to carefully review their comments and email errata to dbroadnax@iccsafe.org by August 25, 2021 to be included in our published errata to the Public Comment Hearing Agenda in order to be included in the agenda for consideration at the Public Comment Hearings. Errata, if any, identified prior to the Public Comment Hearings will be posted as updates to the Public Comment Hearing Agenda on the ICC website at https://www.iccsafe.org/products-and-services/i-codes/code-development/current-code-development-cycle/. Users are encouraged to periodically review the ICC Website for updates to the 2021 Public Comment Hearing Agenda.

EDITORIAL CODE CHANGES - CODE CORRELATION COMMITTEE

In a typical code change cycle, there are code change proposals that are considered strictly editorial. Section 4.4 of CP 28 (see below) establishes a process by which the Code Correlation Committee (CCC) considers such proposal.

> 4.4 Editorial Code Change Proposals. When a code change proposal is submitted that proposes an editorial or format change that, in the opinion of the Secretariat, does not affect the scope or application of the code, the proposal shall be submitted to the Code Correlation Committee who shall deem the code change proposal as editorial or send the proposal back to the Secretariat to be considered by the appropriate code development committee. To be deemed editorial, such proposal shall require a majority vote of the Code Correlation Committee. Editorial proposals shall be published in the Code Change Agenda. Such proposals shall be added to the hearing agenda for consideration by the appropriate code development committee upon written request to ICC by any individual. The deadline to submit such requests shall be 14 days prior to the first day of the Committee Action Hearing. Code Correlation Committee proposals that are not added to a code development committee hearing agenda shall be published in the next edition of the code with no further consideration.

Since a public comment, by extension, is part of a code change proposal, ICC has applied the purpose and intent of Section 4.4 to public comments. There is one such public comment in the current 2021 Cycle. The comment is located after the last code change in the PCH Agenda and is identified by a code change prefix of CCC. As noted in Section 4.4, anyone may request that this proposals (public comment) be added to the hearing agenda, in this case for individual consideration. The deadline to make such a request is 11: 59 pm Pacific on Tuesday, September 7, 2021 via email. Be sure to identify the code change number noted above. Such requests must be sent to: Ed Wirtschoreck Director, Codes ewirtschoreck@iccsafe.org

ICC WEBSITE - WWW.ICCSAFE.ORG

While great care has been exercised in the publication of this document, there may be errata posted for the Public Comment Agenda. Errata, if any, identified prior to the Public Comment Hearings will be posted as updates to the Public Comment Hearing Agenda on the ICC website at www.iccsafe.org. Users are encouraged to periodically review the ICC Website for updates to the 2021 Public Comment Hearing Agenda.

2021/2022 ICC CODE DEVELOPMENT SCHEDULE

(Posted March 17, 2020)

(Updated December 1, 2020 - red)

(Updated May 24, 2021- see Notes 1 & 2)

STEP IN CODE DEVELOPMENT CYCLE	DATE	
	2021 – Group A Codes (see pg. 2) **IBC- E, IBC - FS, IBC -G, IFC, IFGC, IMC, IPC, IPMC, IPSDC, IRC – M, IRC- P, ISPSC, IWUIC, IZC**	**2022 – Group B Codes (see pg. 2)** **Admin, IBC-S, IEBC, IgCC (Ch. 1), IRC – B** **(see note 2)**
2021 EDITION OF I-CODES PUBLISHED	IMC and IPC are published. Remaining I-Codes in the Fall/2020 (See Group B Codes on page 2 for the 2021 IgCC)	
DEADLINE FOR RECEIPT OF APPLICATIONS FOR ALL CODE COMMITTEES	June 1, 2020 for the 2021/2022 Cycle. Call for Committee posted in March/2020.	
DEADLINE FOR cdpACCESS ONLINE RECEIPT OF CODE CHANGE PROPOSALS	January 11, 2021	January 10, 2022
WEB POSTING OF "PROPOSED CHANGES TO THE I-CODES"	March 1, 2021*	February 23, 2022*
COMMITTEE ACTION HEARING (CAH)	2021 CAH to be held virtually during the period of April 11 – May 5, 2021 See notes	March 27 – April 6, 2022 Rochester Riverside Convention Center Rochester, NY
~~ONLINE CAH ASSEMBLY FLOOR MOTION VOTE~~	Assembly consideration removed from process. See CP 28 dated 12/3/20; Section 5.7 (see notes)	Assembly consideration removed from process. See CP 28 dated 12/3/20; Section 5.7 (see notes)
WEB POSTING OF "REPORT OF THE COMMITTEE ACTION HEARING"	May 24, 2021	May 9, 2022
DEADLINE FOR cdpACCESS ONLINE RECEIPT OF PUBLIC COMMENTS	July 2, 2021	June 20, 2022
WEB POSTING OF "PUBLIC COMMENT AGENDA"	August 13, 2021*	August 4, 2022*
PUBLIC COMMENT HEARING (PCH) ANNUAL CONFERENCE DATES NOTED BY AC	September 21 – 28, 2021 David L Lawrence Convention Center Pittsburgh, PA AC: September 19 – 22 (see note 1)	September 14 - 21, 2022 Kentucky International Convention Center Louisville, KY AC: September 11 - 14
ONLINE GOVERNMENTAL CONSENUS VOTE (OGCV)	Starts approx. two weeks after last day of the PCH. Open for 2 weeks.	Starts approx. two weeks after last day of the PCH. Open for 2 weeks.
WEB POSTING OF FINAL ACTION	Following Validation Committee certification of OGCV and ICC Board confirmation.	Following Validation Committee certification of OGCV and ICC Board confirmation.

*Web posting of the "Proposed Changes to the I-Codes" and "Public Comment Agenda" will be posted nolater than scheduled. ICC will make every effort to post these documents earlier, subject to code change/public comment volume and processing time.

2021/2022 Cycle notes referenced from the table:

Note 1: PCH dates revised from the original schedule dates of September 22 – 29 to September 21 – 28

Note 2: The 2022 Group B codes noted in the table reflect the Code Council Board of Directors decision to update the energy provisions of the 2021 International Energy Conservation Code and Chapter 11 of the International Residential Code by utilizing ICC's Consensus Procedures for developing and updating standards. Both codes will be published with the remaining I-Codes in the fall of 2023. Based on this new development, the CAH dates of March 27 – April 6 are subject to change.

SEE NEXT PAGE FOR IDENTIFICATION OF THE 2021 GROUP A & 2022 GROUP B CODES/CODE COMMITTEES AS WELL AS OTHER CODE DEVELOPMENT PROCESS NOTES.

2021 Group A Codes/Code committees:

- IBC-E: IBC Egress provisions. Chapters 10 and 11.
- IBC-FS: IBC Fire Safety provisions. Chapters 7, 8, 9 (partial), 14 and 26. Majority of IBC Chapter 9 is maintained by the IFC. See notes.
- IBC-G: IBC General provisions. Chapters 3 – 6, 12, 13, 27 – 33.
- IFC: The majority of IFC Chapter 10 is maintained by IBC-E. See notes.
- IFGC
- IMC
- IPC
- IPMC: Code changes heard by the IPM/ZC (combined IPMC & IZC code committee)
- IPSDC (code changes heard by the IPC code committee)
- IRC-M: IRC Mechanical provisions. Chapters 12 – 23 (code changes heard by the IRC - MP code committee)
- IRC-P: IRC Plumbing provisions. Chapters 25 – 33 (code changes heard by the IRC - MP code committee)
- ISPSC
- IWUIC (code changes heard by the IFC code committee)
- IZC: Code changes heard by the IPM/ZC (combined IPMC & IZC code committee)

2022 Group B Codes/Code committees:

- Admin: Chapter 1 of all the I-Codes except the IECC, IgCC and IRC. Also includes the update of currently referenced standards in all of the 2021 Codes, except the IgCC.
- IBC-S: IBC Structural provisions. IBC Chapters 15 – 25 and IEBC structural provisions. See notes.
- IEBC: IEBC Non-structural provisions. See notes.
- IgCC: Chapter 1 of the IgCC. Remainder of the code is based on the provisions of ASHRAE Standard 189.1 *Standard for the Design of High-Performance Green Buildings, Except Low-Rise Residential Buildings*. The 2021 IgCC is scheduled to be published in the Spring/2021.
- IRC-B: IRC Building provisions. Chapters 1 – 10.

Process Notes:

- **2021 Virtual CAH**: The 2021 CAH, originally scheduled for April 11 – 21, 2021 in Rochester, NY has been rescheduled to be held virtually. The hearings will be held in two consecutive tracks, with a break in between. The tentative schedule is as follows:
    - Track 1: April 11 – 21, 2021: IBC – E; IBC – FS; IBC – G; IPMC/IZC; ISPSC
    - No Hearings: April 22 – 24
    - Track 2: April 25 – May 5, 2021: IFC/IWUIC; IFGC; IMC; IPC/IPSDC; IRC – M; IRC - P

  Definitive tracks, codes, order of codes and track end date(s) may change based on code change volume and the creation of the hearing schedule. This document as well as all other updates are posted on a dedicated webpage to keep participants apprised of the virtual CAH progress/logistics. The webpage is also linked from the top of the 2021/2022 Cycle webpage.

Be sure to consult updated Council Policy 28 (12/3/20) for procedural revisions applicable to the 2021 Virtual CAH (noted in CP 28 section titles as “2021 virtual CAH only”).

- Be sure to review the document entitled “2021/2022 Code Committee Responsibilities” which will be posted. This identifies responsibilities which are different than Group A and B codes and committees which may impact the applicable code change cycle and resulting code change deadline. As an example, throughout Chapter 9 of the IBC (IBC- Fire Safety), there are numerous sections which include the designation “[F]” which indicates that the provisions of the section are maintained by the IFC code committee. Similarly, there are numerous sections in the IEBC which include the designation “[BS]”. These are structural provisions which will be heard by the IBC – Structural committee. The designations in the code are identified in the Code Committee Responsibilities document.
- I-Code Chapter 1: Proposed changes to the provisions in Chapter 1 of the majority of the I-Codes are heard in Group B (see Admin above for exceptions). Be sure to review the brackets ([ ]) of the applicable code.
- Definitions. Be sure to review the brackets ([ ]) in Chapter 2 of the applicable code and the Code Committee Responsibilities document to determine which code committee will consider proposed changes to the definitions.
- Proposed changes to the ICC Performance Code will be heard by the code committee noted in brackets ([ ]) in the section of the code and in the Code Committee Responsibilities document

2021 - 2022 STAFF SECRETARIES

GROUP A (2021)

IBC – Egress Chapters 10, 11	IBC – Fire Safety Chapters 7, 8, 9, 14, 26	IBC – General Chapters 1-6, 12, 13, 27-34	IFC	IFGC
Kim Paarlberg Indianapolis, IN Ext 4306 kpaarlberg@iccsafe.org	Samhar Hoz Central Regional Office Ext 4344 shoz@iccsafe.org	Kim Paarlberg Indianapolis, IN Ext 4306 kpaarlberg@iccsafe.org Lawrence Novak Central Regional Office Ext 4405 lnovak@iccsafe.org	Beth Tubbs Northbridge, MA Ext 7708 btubbs@iccsafe.org Keith Enstrom Central Regional Office Ext 4342 kenstrom@iccsafe.org	Jason Toves Birmingham District Office Ext 5681 jtoves@iccsafe.org
IMC	**IPC/IPSDC**	**ICC Performance**	**IPMC**	**IRC Mechanical**
LaToya Carraway Central Regional Office Ext 4347 lcarraway@iccsafe.org	Fred Grable Central Regional Office Ext 4359 fgrable@iccsafe.org	Beth Tubbs Northbridge, MA Ext 7708 btubbs@iccsafe.org	Ed Wirtschoreck Central Regional Office Ext 4317 ewirtschoreck@iccsafe.org	Jason Toves Birmingham District Office Ext 5681 jtoves@iccsafe.org
IRC Plumbing	**ISPSC**	**IWUIC**	**IZC**	
Fred Grable Central Regional Office Ext 4359 fgrable@iccsafe.org	Fred Grable Central Regional Office Ext 4359 fgrable@iccsafe.org	Keith Enstrom Central Regional Office Ext 4342 kenstrom@iccsafe.org	Ed Wirtschoreck Central Regional Office Ext 4317 ewirtschoreck@iccsafe.org	

GROUP B (2022)

ADMINISTRATIVE Chapter 1 All Codes except the IECC, IgCC, and IRC	IBC- Structural Chapters 15-25 IEBC Structural	IEBC	IgCC (Chapter 1 Only)	ICC Performance	IRC-Building
Kim Paarlberg Indianapolis, IN Ext 4306 kpaarlberg@iccsafe.org	Lawrence Novak Central Regional Office Ext 4405 lnovak@iccsafe.org	Beth Tubbs Northbridge, MA Ext 7708 btubbs@iccsafe.org Keith Enstrom Central Regional Office Ext 4342 kenstrom@iccsafe.org	Ed Wirtschoreck Central Regional Office Ext 4317 ewirtschoreck@iccsafe.org	Beth Tubbs Northbridge, MA Ext 7708 btubbs@iccsafe.org	Samhar Hoz Central Regional Office Ext 4344 shoz@iccsafe.org Kim Paarlberg Indianapolis, IN Ext 4306 kpaarlberg@iccsafe.org

CP#28-05 – Code Development

Approved: 09/24/05 **|** **Revised:** 07/16/21

1.0 Introduction

1.1 Purpose of Council Policy: The purpose of this Council Policy is to prescribe the Rules of Procedure utilized in the continued development and maintenance of the International Codes (Codes).

1.2 Objectives: The ICC Code Development Process has the following objectives:

1.2.1 The timely evaluation and recognition of technological developments pertaining to construction regulations.
1.2.2 The open discussion of code change proposals by all parties desiring to participate.
1.2.3 The final determination of Code text by public officials actively engaged in the administration, formulation or enforcement of laws, ordinances, rules or regulations relating to the public health, safety and welfare and by honorary members.
1.2.4 The increased participation of all parties desiring to participate through an online submittal and voting process that includes opportunities for online collaboration.

1.3 Code Publication: The ICC Board of Directors (ICC Board) shall determine the title and the general purpose and scope of each Code published by the ICC.

1.3.1 Code Correlation: The provisions of all Codes shall be consistent with one another so that conflicts between the Codes do not occur. A Code Scoping Coordination Matrix shall determine which Code shall be the primary document, and therefore which code development committee shall be responsible for maintenance of the code text where a given subject matter or code text could appear in more than one Code. The Code Scoping Coordination Matrix shall be administered by the Code Correlation Committee as approved by the ICC Board. Duplication of content or text between Codes shall be limited to the minimum extent necessary for practical usability of the Codes, as determined in accordance with Section 4.5.

1.4 Process Maintenance: The review and maintenance of the Code Development Process and these Rules of Procedure shall be by the ICC Board. The manner in which Codes are developed embodies core principles of the organization. One of those principles is that the final content of the Codes is determined by a majority vote of the governmental and honorary members. It is the policy of the ICC Board that there shall be no change to this principle without the affirmation of two-thirds of the governmental and honorary members responding.

1.5 Secretariat: The Chief Executive Officer shall assign a Secretariat for each of the Codes. All correspondence relating to code change proposals and public comments shall be addressed to the Secretariat. The Secretariat shall have the authority to facilitate unforeseen situations which arise in the implementation of this council policy. Staff shall maintain a record of such actions.

1.6 Recording: Individuals requesting permission to record any meeting or hearing, or portion thereof, shall be required to provide the ICC with a release of responsibility disclaimer and shall acknowledge that ICC shall retain sole ownership of the recording, and that they have insurance coverage for liability and misuse of recording materials. Equipment and the process used to record shall, in the judgment of the ICC Secretariat, be conducted in a manner that is not disruptive to the meeting. The ICC shall not be responsible for equipment, personnel or any other provision necessary to accomplish the recording. An unedited copy of the recording shall be forwarded to ICC within 30 days of the meeting. Recordings shall not otherwise be copied, reproduced or distributed in any manner. Recordings shall be returned to ICC or destroyed upon the request of ICC.

2.0 Code Development Cycle

2.1 Intent: The code development cycle shall consist of the complete consideration of code change proposals in accordance with the procedures herein specified, commencing with the deadline for submission of code change proposals (see Section 3.5) and ending with publication of the Final Action on the code change proposals (see Section 10.4).

2.2 New Editions: The ICC Board shall determine the schedule for publishing new editions of the Codes. Each new edition shall incorporate the results of the code development activity since the previous edition.

2.3 Supplements: The results of code development activity between editions may be published.

2.4 Interim Code Amendments: All revisions to the International Codes shall be processed in accordance with other sections of this Council Policy except for Emergency Actions by the ICC Board complying with Section 2.4.1 and Interim Critical Amendments (ICA) complying with Section 2.4.2.

2.4.1 Emergency Actions by the ICC Board: Emergency actions by the ICC Board are limited to those issues representing an immediate threat to health and safety that warrant a more timely response than allowed by the Code Development Process schedule.

2.4.1.1 Initial Request: A request for an emergency action shall be based upon perceived immediate threats to health and safety and shall be reviewed by the Codes and Standards Council for referral to the ICC Board for action with their analysis and recommendation.

2.4.1.2 Board and Member Action: In the event that the ICC Board determines that an emergency amendment to any Code or supplement thereto is warranted, the same may be adopted by the ICC Board. Such action shall require an affirmative vote of at least two-thirds of the ICC Board.

The ICC membership shall be notified within ten days after the ICC Boards' official action of any emergency amendment. At the next Annual Business Meeting, any emergency amendment shall be presented to the members for ratification by a majority of the Governmental Member Voting Representatives and Honorary Members present and voting.

All code revisions pursuant to these emergency procedures and the reasons for such corrective action shall be published as soon as practicable after ICC Board action. Such revisions shall be identified as an emergency amendment.

Emergency amendments to any Code shall not be considered as a retro-active requirement to the Code. Incorporation of the emergency amendment into the adopted Code shall be subjected to the process established by the adopting authority.

2.4.2 Interim Critical Amendments (ICA)

2.4.2.1 Submittal. Anyone may propose an ICA by providing the following information:

a) Name of submitter
b) Contact information
c) Submitters representation
d) Date
e) Relevant section(s) and code edition(s) under consideration
f) Proposed modifications with text changes identified using underlines for new

text and strikethroughs for deleted text

g) A statement that substantiates the need for proposed changes and why the proposed submission is of such a critical nature in accordance with Section 2.4.2.3 that it cannot be left to be addressed during the next code development cycle.

h) Written endorsement of the proposed ICA by not less than two members of the Code Development Committee(s) responsible for maintaining the affected code section(s)

2.4.2.2 Preliminary Review. An ICA will only be processed if the Codes and Standards Council determines that the proposed ICA appears to be of a critical nature requiring prompt action based on the criteria specified in Section 2.4.2.3. If processed, the question of critical nature shall be further considered by the responsible Code Development Committee(s) and the Codes and Standards Council. The text of a proposed ICA shall be processed as submitted or shall be changed with the approval of the submitter. The Codes and Standards Council shall process their preliminary "critical nature" determination within 45 days of the ICA submission.

2.4.2.3 Determination of Critical Nature. Qualification for critical nature shall be based on one or more of the following factors:

a) The proposed ICA corrects an error or an omission that was overlooked during a regular code development process.

b) The proposed ICA resolves a conflict within an individual code or a conflict involving two or more ICC codes.

c) The proposed ICA mitigates a previously unknown hazard.

2.4.2.4 Code Development Committee. A proposed ICA that meets the provisions in Sections 2.4.2.2 and 2.4.2.3 shall be submitted to the Code Development Committee(s) responsible for the affected section(s) for a ballot and comment period of 30 calendar days. The committee(s) shall be separately balloted on both the technical merit of the ICA and whether the ICA satisfies the critical nature criteria. Negative votes in the initial ballot, if any, shall require a reason statement and shall be circulated to the full committee(s) to allow initial ballot votes to be changed.

A committee recommendation for approval shall require an affirmative vote of at least three-fourths of members who voted, on both technical merit and critical nature. The following shall be omitted from the three-fourths vote calculation:

a) Committee members who have abstained.

b) Committee members whose negative ballots do not include a statement conveying the reason for casting a negative vote.

c) Committee members who do not return their ballots prior to the announced ballot return deadline.

In addition to the three-fourths majority described above, the number of affirmative votes shall be not less than 50% of all committee members who are eligible to vote. Committee members eligible to vote shall be the total number of individuals who are members of the committee on the date of ballot distribution and shall not be adjusted based on abstentions or ballots that were not returned.

ICAs that achieve the required number of affirmative votes on both technical merit and critical nature are approved for further processing in accordance with Sections 2.4.2.5 through 2.4.2.9. ICAs that do not achieve the required number of affirmative votes on both technical merit and critical nature are rejected.

2.4.2.5 Publication of Proposed ICA for Public Comment. An ICA that is approved in accordance with Section 2.4.2.4 shall be published by ICC in appropriate media with a notice inviting public comments on the proposed ICA. The public comment period shall be open for at least 30 calendar days from the date of posting of the notice.

When a proposed ICA revises text that was changed in the most recent code development cycle, the ICA public comment notice shall also be directly provided to submitters of proposals and public comments to the affected section in the most recent code development cycle.

2.4.2.6 Additional Code Development Committee Review. All public comments shall be circulated to the responsible Code Development Committee(s) for a 30-calendar day ballot and comment period allowing an opportunity for committee members to change votes taken prior to the public comment period. If any votes are changed to negative, negative votes shall be circulated to the full committee, followed by a final ballot following the voting procedures Section 2.4.2.4.

Approved ICAs shall be forwarded to the Codes and Standards Council with a staff report that includes all public comments, ballots, committee member comments on ballots and concurrence by staff on which code editions should be affected by the ICA.

2.4.2.7 Action of the Codes and Standards Council. The Codes and Standards Council shall review the material submitted in accordance with Section 2.4.2.6 at the next Codes and Standards Council meeting. Approval of an ICA shall require an affirmative vote of at least two-thirds of the Codes and Standards Council members who cast a vote at the meeting.

2.4.2.8 Effective Date and Publication. ICAs that are approved by the Codes and Standards Council shall become effective 30 calendar days after approval, or in the case of an appeal in accordance with Section 2.4.2.9, 30 calendar days after a decision by the ICC Board upholding a Codes and Standards Council decision to issue an ICA.

An ICA shall apply to code editions specified by the ICC Codes and Standards Council, and ICC staff shall, by an appropriate method, publish approved ICAs and ensure that approved ICAs are distributed with future sales of affected codes. ICAs shall be distributed as a separate document and shall not be incorporated into the text of a published code until such time that the ICA has been approved by the full code development process, following submittal as a proposal in accordance with Section 2.4.2.11.

2.4.2.9 Appeals. A decision of the Codes and Standards Council to approve an ICA shall be appealable to the ICC Board in accordance with Council Policy 1.

2.4.2.10Applicability. ICAs shall not be considered retroactive requirements.

2.4.2.11Subsequent Processing. An approved ICA shall automatically become a code change proposal from the Codes and Standards Council in the following code cycle.

2.5 Code Development Record. The code development record shall include the official documents and records developed in support of the given code development cycle. This includes the following:

1. Code Change Agenda (Section 4.8)
2. Audio and video recording of the Committee Action Hearing (Section 5.1)
3. Report of the Committee Action Hearing (Section 5.8)
4. Public Comment Agenda (Section 6.6)
5. Public Comment Hearing results (Section 7.5.8.10)
6. Audio and video recording of the Public Comment Hearing (Section 7.1)
7. The Online Governmental Consensus Ballot (Section 8.2)
8. Final Action results (Section 10.4)
9. Errata to the documents noted above

The information resulting from online collaboration between interested parties shall not be part of the code development record.

3.0 Submittal of Code Change Proposals

3.1 Intent: Any interested person, persons or group may submit a code change proposal which will be duly considered when in conformance to these Rules of Procedure.

3.2 Withdrawal of Proposal: A code change proposal may be withdrawn by the proponent (WP) at any time prior to membership action on the consent agenda at the Public Comment Hearing or prior to testimony on the code change proposal on the individual consideration agenda at the Public Comment Hearing. All actions on the code change proposal shall cease immediately upon the withdrawal of the code change proposal.

3.3 Form and Content of Code Change Submittals: Each code change proposal shall be submitted separately and shall be complete in itself. Each submittal shall contain the following information:

3.3.1 Proponent: Each code change proposal shall include the name, title, mailing address, telephone number, and email address of the proponent. Email addresses shall be published with the code change proposals unless the proponent otherwise requests on the submittal form.

3.3.1.1 If a group, organization or committee submits a code change proposal, an individual with prime responsibility shall be indicated.

3.3.1.2 If a proponent submits a code change proposal on behalf of a client, group, organization or committee, the name and mailing address of the client, group, organization or committee shall be indicated.

3.3.2 Code Reference: Each code change proposal shall relate to the applicable code sections(s) in the latest edition of the Code.

3.3.2.1 If more than one section in the Code is affected by a code change proposal, appropriate proposals shall be included for all such affected sections.

3.3.2.2 If more than one Code is affected by a code change proposal, appropriate proposals shall be included for all such affected Codes and appropriate cross referencing shall be included in the supporting information.

3.3.3 Multiple Code Change Proposals to a Code Section. A proponent shall not submit multiple code change proposals to the same code section. When a proponent submits multiple code change proposals to the same section, the proposals shall be considered as incomplete proposals and processed in accordance with Section 4.3. This restriction shall not apply to code change proposals that attempt to address differing subject matter within a code section.

3.3.4 Text Presentation: The text of the code change proposal shall be presented in the specific wording desired with deletions shown struck out with a single line and additions shown underlined with a single line.

3.3.4.1 A charging statement shall indicate the referenced code section(s) and whether the code change proposal is intended to be an addition, a deletion or a revision to existing Code text.

3.3.4.2 Whenever practical, the existing wording of the text shall be preserved with only such deletions and additions as necessary to accomplish the desired change.

3.3.4.3 Each code change proposal shall be in proper code format and terminology.

3.3.4.4 Each code change proposal shall be complete and specific in the text to eliminate unnecessary confusion or misinterpretation.

3.3.4.5 The proposed text shall be in mandatory terms.

3.3.5 Supporting Information: Each code change proposal shall include sufficient supporting information to indicate how the code change proposal is intended to affect the intent and application of the Code.

3.3.5.1 Purpose: The proponent shall clearly state the purpose of the code change proposal (e.g. clarify the Code; revise outdated material; substitute new or revised material for current provisions of the Code; add new requirements to the Code; delete current requirements, etc.)

3.3.5.2 **Reasons:** The proponent shall justify changing the current Code provisions, stating why the code change proposal is superior to the current provisions of the Code. Code change proposals which add or delete requirements shall be supported by a logical explanation which clearly shows why the current Code provisions are inadequate or overly restrictive, specifies the shortcomings of the current Code provisions and explains how such code change proposals will improve the Code.

3.3.5.3 **Substantiation:** The proponent shall substantiate the code change proposal based on technical information and substantiation. Substantiation provided which is reviewed in accordance with Section 4.2 and determined as not germane to the technical issues addressed in the code change proposal may be identified as such. The proponent shall be notified that the code change proposal is considered an incomplete proposal in accordance with Section 4.3 and the proposal shall be held until the deficiencies are corrected. The proponent shall have the right to appeal this action in accordance with the policy of the ICC Board. The burden of providing substantiating material lies with the proponent of the code change proposal. Supporting documentation may be provided via a link to a website provided by the proponent and included in the reason statement. The reason statement shall include the date the link was created. All substantiating material published by ICC is material that has been provided by the proponent and in so publishing ICC makes no representations or warranties about its quality or accuracy.

3.3.5.4 **Bibliography (2021 virtual CAH only):** The proponent shall submit a bibliography of any substantiating material submitted with the code change proposal. The bibliography shall be published with the code change proposal and the proponent shall submit the substantiating materials electronically to the appropriate ICC office. The substantiating information will be posted on the ICC website. Supporting documentation may be provided via a link to a website provided by the proponent and included in the bibliography. The reason statement shall include the date the link was created.

3.3.5.4.1 Bibliography (2022 CAH and after): The proponent shall submit a bibliography of any substantiating material submitted with the code change proposal. The bibliography shall be published with the code change proposal and the proponent shall make the substantiating materials available for review at the appropriate ICC office and during the public hearing. Supporting documentation may be provided via a link to a website provided by the proponent and included in the bibliography. The reason statement shall include the date the link was created.

3.3.5.5 **Copyright Release:** The proponent of code change proposals, floor modifications and public comments shall sign a copyright release developed and posted by ICC.

3.3.5.6 **Cost Impact:** The proponent shall indicate one of the following regarding the cost impact of the code change proposal:

1) The code change proposal will increase the cost of construction;
2) The code change proposal will decrease the cost of construction; or
3) The code change proposal will not increase or decrease the cost of construction.

The proponent shall submit information which substantiates such assertion. This information will be considered by the code development committee and will be included in the published code change proposal. Supporting documentation may be provided via a link to a website provided by the proponent and included in the cost substantiation statement. The cost substantiation statement shall include the date the link was created.

Any proposal submitted which does not include the requisite cost impact information shall be considered incomplete and shall not be processed.

3.4 Online Submittal: Each code change proposal and all substantiating information shall be submitted online at the website designated by ICC. Two copies of each proposed new referenced standard in hard copy or one copy in electronic form shall be submitted. Additional copies may be requested when determined necessary by the Secretariat to allow such information to be distributed to the code development committee. Where such additional copies are requested, it shall be the responsibility of the proponent to send such copies to the respective code development committee.

3.5 Submittal Deadline: ICC shall establish and post the submittal deadline for each cycle. The posting of the deadline shall occur no later than 120 days prior to the code change deadline. Each code change proposal shall be submitted online at the website designated by ICC by the posted deadline. The submitter of a code change proposal is responsible for the proper and timely receipt of all pertinent materials by the Secretariat.

3.6 Referenced Standards: In order for a standard to be considered for reference or to continue to be referenced by the Codes, a standard shall meet the following criteria:

3.6.1 Code References:

3.6.1.1 The standard, including title and date, and the manner in which it is to be utilized shall be specifically referenced in the Code text.
3.6.1.2 The need for the standard to be referenced shall be established.

3.6.2 Standard Content:

3.6.2.1 A standard or portions of a standard intended to be enforced shall be written in mandatory language.
3.6.2.2 The standard shall be appropriate for the subject covered.
3.6.2.3 All terms shall be defined when they deviate from an ordinarily accepted meaning or a dictionary definition.
3.6.2.4 The scope or application of a standard shall be clearly described.
3.6.2.5 The standard shall not have the effect of requiring proprietary materials.
3.6.2.6 The standard shall not prescribe a proprietary agency for quality control or testing.
3.6.2.7 The test standard shall describe, in detail, preparation of the test sample, sample selection or both.
3.6.2.8 The test standard shall prescribe the reporting format for the test results. The format shall identify the key performance criteria for the element(s) tested.
3.6.2.9 The measure of performance for which the test is conducted shall be clearly defined in either the test standard or in Code text.
3.6.2.10 The standard shall not state that its provisions shall govern whenever the referenced standard is in conflict with the requirements of the referencing Code.
3.6.2.11 The preface to the standard shall announce that the standard is promulgated according to a consensus procedure.

3.6.3 Standard Promulgation:

3.6.3.1 Code change proposals with corresponding changes to the code text which include a reference to a proposed new standard or a proposed update of an existing referenced standard shall comply with this section.

3.6.3.1.1 Proposed New Standards. In order for a new standard to be considered for reference by the Code, such standard shall be submitted in at least a consensus draft form in accordance with Section 3.4. If the proposed new standard is not submitted in at least consensus draft form, the code change proposal shall be considered incomplete and shall not be processed. The code change proposal shall be considered at the Committee Action

Hearing by the applicable code development committee responsible for the corresponding proposed changes to the code text. If the committee action at the Committee Action Hearing is either As Submitted or As Modified and the standard is not completed, the code change proposal shall automatically be placed on the Public Comment Agenda with the recommendation stating that in order for the public comment to be considered, the new standard shall be completed and readily available prior to the Public Comment Hearing. If the committee action at the Committee Action Hearing is Disapproval, further consideration on the Public Comment Agenda shall include a recommendation stating that in order for the public comment to be considered, the new standard shall be completed and readily available prior to the Public Comment Hearing.

3.6.3.1.2 Update of Existing Standards. Code change proposals which include technical revisions to the code text to coordinate with a proposed update of an existing referenced standard shall include the submission of the proposed update to the standard in at least a consensus draft form in accordance with Section 3.4. If the proposed update of the existing standard is not submitted in at least consensus draft form, the code change proposal shall be considered incomplete and shall not be processed. The code change proposal, including the update of the existing referenced standard, shall be considered at the Committee Action Hearing by the applicable code development committee responsible for the corresponding changes to the code text. If the committee action at the Committee Action Hearing is either As Submitted or As Modified and the updated standard is not completed, the code change proposal shall automatically be placed on the Public Comment Agenda with the recommendation stating that in order for the public comment to be considered, the updated standard shall be completed and readily available prior to the Public Comment Hearing. If the committee action at the Committee Action Hearing is Disapproval, further consideration on the Public Comment Agenda shall include a recommendation stating that in order for the public comment to be considered, the updated standard shall be completed and readily available prior to the Public Comment Hearing.

Updating of standards without corresponding code text changes shall be accomplished administratively in accordance with Section 4.6.

3.6.3.2 The standard shall be developed and maintained through a consensus process such as ASTM or ANSI.

4.0 Processing of Code Change Proposals

4.1 Intent: The processing of code change proposals is intended to ensure that each proposal complies with these Rules of Procedure and that the resulting published code change proposal accurately reflects that proponent's intent.

4.2 Review: Upon receipt in the Secretariat's office, the code change proposals will be checked for compliance with these Rules of Procedure as to division, separation, number of copies, form, language, terminology, supporting statements and substantiating data. Where a code change proposal consists of multiple parts which fall under the maintenance responsibilities of different code committees, the Secretariat shall determine the code committee responsible for determining the committee action in accordance with Section 5.6 and the Code Scoping Coordination Matrix (see Section 1.3.1).

4.3 Incomplete Code Change Proposals: When a code change proposal is submitted with incorrect format, without the required information or judged as not in compliance with these Rules of Procedure, the Secretariat shall notify the proponent of the specific deficiencies and the proposal shall be held until the deficiencies are corrected, with a final date set for receipt of a corrected submittal. If the Secretariat receives the corrected code change proposal after the final date, the proposal shall be held over until the next code development cycle. Where there are otherwise no deficiencies addressed by this section, a code change proposal that incorporates a new referenced standard shall be processed with an analysis of the referenced standard's compliance with the criteria set forth in Section 3.6.

4.4 **Editorial Code Change Proposals.** When a code change proposal is submitted that proposes an editorial or format change that, in the opinion of the Secretariat, does not affect the scope or application of the code, the proposal shall be submitted to the Code Correlation Committee who shall deem the code change proposal as editorial or send the proposal back to the Secretariat to be considered by the appropriate code development committee. To be deemed editorial, such proposal shall require a majority vote of the Code Correlation Committee. Editorial proposals shall be published in the Code Change Agenda. Such proposals shall be added to the hearing agenda for consideration by the appropriate code development committee upon written request to ICC by any individual. The deadline to submit such requests shall be 14 days prior to the first day of the Committee Action Hearing. Code Correlation Committee proposals that are not added to a code development committee hearing agenda shall be published in the next edition of the code with no further consideration.

4.5 **Copy Editing Code Text:** The Chief Executive Officer shall have the authority at all times to make editorial style and format changes to the Code text, or any approved changes, consistent with the intent, provisions and style of the Code. Such editorial style or format changes shall not affect the scope or application of the Code requirements.

4.6 **Updating Standards Referenced in the Codes:** Standards referenced by the Codes that do not require coordination with a code change proposal to the code text shall be updated administratively by the Administrative Code Development Committee in accordance with these full procedures except that the deadline for availability of the updated standard and receipt by the Secretariat shall be December 1 of the third year of each code cycle. The published version of the new edition of the Code which references the standard will refer to the updated edition of the standard. If the standard is not available by the December 1st deadline, the edition of the standard as referenced by the newly published Code shall revert back to the reference contained in the previous edition and an errata to the Code issued. Multiple standards to be updated may be included in a single proposal.

4.6.1 **Updating ICC Standards Referenced in the Codes.** All standards developed by ICC and referenced by the Codes which are undergoing an update shall be announced by ICC to allow stakeholders to participate in the update process. Where the updated standard is completed and available by December 1 of the third year of the code cycle, the published version of the new edition of the Code which references the standard shall refer to the updated edition of the standard. If the standard is not available by the December 1st deadline, the edition of the standard as referenced by the newly published Code shall revert back to the reference contained in the previous edition and an errata to the Code issued.

4.7 **Preparation:** All code change proposals in compliance with these procedures shall be prepared in a standard manner by the Secretariat and be assigned separate, distinct and consecutive numbers. The Secretariat shall coordinate related proposals submitted in accordance with Section 3.3.2 to facilitate the hearing process.

4.8 **Code Change Agenda:** All code change proposals shall be posted on the ICC website at least 30 days prior to the Committee Action Hearing on those proposals and shall constitute the agenda for the Committee Action Hearing. Any errata to the Code Change Agenda shall be posted on the ICC website as soon as possible. Code change proposals which have not been published in the original posting or subsequent errata shall not be considered.

5.0 Committee Action Hearing

5.1 **Intent:** The intent of the Committee Action Hearing is to permit interested parties to present their views including the cost and benefits on the code change proposals on the published agenda. The code development committee will consider such comments as may be presented in the development of their action on the disposition of such code change proposals.

5.2 **Committee:** The Codes and Standards Council shall review all applications and make committee appointment recommendations to the ICC Board. The Code Development Committees shall be appointed by the ICC Board.

5.2.1 **Chairman/Moderator:** The Chairman and Vice-Chairman shall be appointed by the Codes and Standards Council from the appointed members of the committee. The ICC President shall appoint one or more Moderators who shall act as presiding officer for the Committee Action Hearing.

5.2.2 **Conflict of Interest:** A committee member shall withdraw from and take no part in those matters with which the committee member has an undisclosed financial, business or property interest. The committee member shall not participate in any committee discussion or any committee vote on the matter in which they have an undisclosed interest. A committee member who is a proponent of a code change proposal shall not participate in any committee discussion on the matter or any committee vote. Such committee member shall be permitted to participate in the floor discussion in accordance with Section 5.5 by stepping down from the dais.

5.2.3 **Representation of Interest:** Committee members shall not represent themselves as official or unofficial representatives of the ICC except at regularly convened meetings of the committee.

5.2.4 **Committee Composition:** The committee may consist of representation from multiple interests. A minimum of thirty-three and one-third percent (33.3%) of the committee members shall be regulators.

5.3 **Date and Location:** The date and location of the Committee Action Hearing shall be announced not less than 60 days prior to the date of the hearing.

5.4 **General Procedures:** *The Robert's Rules of Order* shall be the formal procedure for the conduct of the Committee Action Hearing except as a specific provision of these Rules of Procedure may otherwise dictate. A quorum shall consist of a majority of the voting members of the committee.

5.4.1 **Chair Voting:** The Chairman of the committee shall vote only when the vote cast will break a tie vote of the committee.

5.4.2 **Open Hearing:** The Committee Action Hearing is an open hearing. Any interested person may attend and participate in the floor discussion. Only code development committee members may participate in the committee action portion of the hearings (see Section 5.6). Participants shall not advocate a position on specific code change proposals with committee members other than through the methods provided in this policy.

5.4.3 **Presentation of Material at the Public Hearing (2021 virtual CAH only):** Information to be provided at the hearing shall be limited to verbal presentations and modifications submitted in accordance with Section 5.5.2. Each individual presenting information at the hearing shall state their name and affiliation, and shall identify any entities or individuals they are representing in connection with their testimony. Audio-visual presentations are not permitted. Substantiating material submitted in accordance with Section 3.3.5.3 and other material submitted in response to a code change proposal shall be submitted electronically to the appropriate ICC office. The material will be posted on the ICC website..

5.4.3.1 Presentation of Material at the Public Hearing (2022 CAH and after): Information to be provided at the hearing shall be limited to verbal presentations and modifications submitted in accordance with Section 5.5.2. Each individual presenting information at the hearing shall state their name and affiliation, and shall identify any entities or individuals they are representing in connection with their testimony. Audio-visual presentations are not permitted. Substantiating material submitted in accordance with Section 3.3.5.3 and other material submitted in response to a code change proposal shall be located in a designated area in the hearing room and shall not be distributed to the code development committee at the public hearing.

5.4.4 **Agenda Order:** The Secretariat shall publish a Code Change Agenda for the Committee Action Hearing, placing individual code change proposals in a logical order to facilitate the hearing. Any public hearing attendee may move to revise the agenda order as the first order of business at the public hearing, or at any time during the hearing except while another code change proposal is being discussed. Preference shall be given to grouping like subjects together, and for moving items back to a later position on the agenda as opposed to moving items forward to an earlier position.

5.4.4.1 Proponent Approval (2021 virtual CAH only): A motion to revise the agenda order is considered in order unless the proponent(s) of the moved code change proposals are participating in the virtual hearing and object to the move. Where such objections are raised, the motion to revise the hearing order shall be ruled out of order by the Moderator. The ruling of the Moderator shall be final and not subject to a point of order in accordance with Section 5.4.8. The motion to change the hearing order is not debatable.

5.4.4.2 Proponent Approval (2022 CAH and after): A motion to revise the agenda order is considered in order unless the proponent(s) of the moved code change proposals are in attendance in the hearing room and object to the move. Where such objections are raised, the motion to revise the hearing order shall be ruled out of order by the Moderator. The ruling of the Moderator shall be final and not subject to a point of order in accordance with Section 5.4.8. The motion to change the hearing order is not debatable.

5.4.4.3 Revised Agenda Order Approved (2021 virtual CAH only): If the motion to revise the agenda order is not ruled out of order, the Moderator shall declare the motion approved.

5.4.4.4 Revised Agenda Order Approved (2022 CAH and after): A motion to revise the agenda order is subject to a 2/3 vote of those present.

5.4.5 Tabling (2021 virtual CAH only): Tabling of code change proposals shall be permitted. The motion to table is considered in order unless the proponent(s) of the tabled code change proposals are participating in the virtual hearing and object to the tabling. Where such objections are raised, the motion to table shall be ruled out of order by the Moderator. The ruling of the Moderator shall be final and not subject to a point of order in accordance with Section 5.4.8. The motion to table is not debatable.

The motion to table must identify one of the following as to the location in the agenda when or where the code change proposal(s) will be considered:

1. To a specific date and time within the timeframe of the Code Change Agenda for the code change proposals under consideration, or
2. To a specific location in the Code Change Agenda for the code change proposals under consideration.

5.4.5.1 Tabling (2022 CAH and after): Tabling of code change proposals shall be permitted. The motion to table is considered in order unless the proponent(s) of the tabled code change proposals are in attendance at the hearing and object to the tabling. Where such objections are raised, the motion to table shall be ruled out of order by the Moderator. The ruling of the Moderator shall be final and not subject to a point of order in accordance with Section 5.4.8. The motion to table is not debatable.

The motion to table must identify one of the following as to the location in the agenda when or where the code change proposal(s) will be considered:

1. To a specific date and time within the timeframe of the Code Change Agenda for the code change proposals under consideration, or
2. To a specific location in the Code Change Agenda for the code change proposals under consideration.

5.4.5.2 Tabling approved (2021 virtual CAH only): If the motion to table is not ruled out of order, the Moderator shall declare the motion approved.

5.4.5.3 Tabling approved (2022 CAH and after): A motion to table is subject to a 2/3 vote of those present.

5.4.5.4 Tabled code change proposals back to the floor: The Moderator shall bring the tabled code change proposal(s) back to the floor at the applicable time/agenda location in accordance with Section 5.4.5 Items 1 or 2. The testimony on the code change proposal shall resume at the point in the process where the tabling occurred.

5.4.6 Reconsideration: There shall be no reconsideration of a code change proposal after it has been voted on by the committee in accordance with Section 5.6.

5.4.7 Time Limits: Time limits shall be established as part of the agenda for testimony on all code change proposals at the beginning of each hearing session. Each person requesting to testify on a code change proposal shall be given equal time. In the interest of time and fairness to all hearing participants, the Moderator shall have limited authority to modify time limitations on debate. The Moderator shall have the authority to adjust time limits as necessary in order to complete the hearing agenda.

5.4.7.1 Time Keeping: Keeping of time for testimony by an individual shall be by an automatic timing device. Remaining time shall be evident to the person testifying. Interruptions during testimony shall not be tolerated. The Moderator shall maintain appropriate decorum during all testimony.

5.4.7.2 Proponent Testimony: The Proponent is permitted to waive an initial statement. The Proponent shall be permitted to have the amount of time that would have been allocated during the initial testimony period plus the amount of time that would be allocated for rebuttal. Where the code change proposal is submitted by multiple proponents, this provision shall permit only one proponent of the joint submittal to be allotted additional time for rebuttal.

5.4.8 Points of Order (2021 virtual CAH): Any person participating in the public hearing may challenge a procedural ruling of the Moderator or the Chairman. The decision on such challenges shall be determined by a vote of the committee, which requires a majority vote.

5.4.8.1 Points of Order (2022 CAH and after): Any person participating in the public hearing may challenge a procedural ruling of the Moderator or the Chairman. A majority vote of ICC Members in attendance shall determine the decision.

5.5 Floor Discussion: The Moderator shall place each code change proposal before the hearing for discussion by identifying the proposal and by regulating discussion as follows:

5.5.1 Discussion Order:

1. Proponents. The Moderator shall begin by asking the proponent and then others in support of the code change proposal for their comments.
2. Opponents*.* After discussion by those in support of a code change proposal, those opposed hereto, if any, shall have the opportunity to present their views.
3. Rebuttal in support. Proponents shall then have the opportunity to rebut points raised by the opponents.
4. Re-rebuttal in opposition. Opponents shall then have the opportunity to respond to the proponent's rebuttal.

5.5.2 Modifications: Modifications to code change proposals may be suggested from the floor by any person participating in the public hearing. The person proposing the modification, or his/her designee, is deemed to be the proponent of the modification.

5.5.2.1 Submission. All modifications shall be submitted electronically to the ICC Secretariat in a format determined by ICC unless determined by the Chairman to be either editorial or minor in nature. The modification will be forwarded electronically to the members of the code development committee during the hearing and will be projected on the screen in the hearing room.

5.5.2.2 Criteria. The Chairman shall rule proposed modifications in or out of order before they are discussed on the floor. A proposed modification shall be ruled out of order if it:

1. changes the scope of the original code change proposal; or

2. is not readily understood to allow a proper assessment of its impact on the original code change proposal or the Code.

The ruling of the Chairman on whether or not the modification is in or out of order shall be final and is not subject to a point of order in accordance with Section 5.4.8.

5.5.2.3 **Testimony.** When a modification is offered from the floor and ruled in order by the Chairman, a specific floor discussion on that modification is to commence in accordance with the procedures listed in Section 5.5.1.

5.6 **Committee Action:** Following the floor discussion of each code change proposal, one of the following motions shall be made and seconded by members of the committee:

1. Approve the code change proposal As Submitted (AS) or
2. Approve the code change proposal As Modified with specific modifications (AM), or
3. Disapprove the code change proposal (D)

Discussion on this motion shall be limited to code development committee members. If a committee member proposes a modification which had not been proposed during floor discussion, the Chairman shall rule on the modification in accordance with Section 5.5.2.2. If a committee member raises a matter of issue, including a proposed modification, which has not been proposed or discussed during the floor discussion, the Moderator shall suspend the committee discussion and shall reopen the floor discussion for comments on the specific matter or issue. Upon receipt of all comments from the floor, the Moderator shall resume committee discussion.

The code development committee shall vote on each motion with the majority dictating the committee's action. Committee action on each code change proposal shall be completed when one of the motions noted above has been approved. Each committee vote shall be supported by a reason.

The code development committee shall maintain a record of its proceedings including the action on each code change proposal.

5.7 *[Deleted as part of November 2, 2020 Revision]*

5.8 **Report of the Committee Action Hearing:** The results of the Committee Action Hearing, including committee action and reason, shall be posted on the ICC website not less than 60 days prior to the Public Comment Hearing, except as approved by the ICC Board.

6.0 Public Comments

6.1 **Intent:** The public comment process gives attendees at the Public Comment Hearing an opportunity to consider specific objections to the results of the Committee Action Hearing and more thoughtfully prepare for the discussion for public comment consideration. The public comment process expedites the Public Comment Hearing by limiting the items discussed to consideration of items for which a public comment has been submitted.

6.2 **Deadline:** The deadline for receipt of a public comment to the results of the Committee Action Hearing shall be announced at the Committee Action Hearing but shall not be less than 30 days subsequent to the availability of the Report of the Committee Action Hearing (see Section 5.8).

6.3 **Withdrawal of Public Comment:** A public comment may be withdrawn by the public commenter at any time prior to public comment consideration of that comment. A withdrawn public comment shall not be subject to public comment consideration. If the only public comment to a code change proposal is withdrawn by the public commenter prior to the vote on the consent agenda in accordance with Section 7.5.5, the proposal shall be considered as part of the consent agenda. If the only public comment to a code change proposal is withdrawn by the public commenter after the vote on the consent agenda in accordance with Section 7.5.5, the proposal shall continue as part of the individual consideration agenda in accordance with Section 7.5.6, however the public comment shall not be subject to public comment consideration.

6.4 Form and Content of Public Comments: Any interested person, persons, or group may submit a public comment to the results of the Committee Action Hearing which will be considered when in conformance to these requirements. Each public comment to a code change proposal shall be submitted separately and shall be complete in itself. Each public comment shall contain the following information:

6.4.1 Public comment: Each public comment shall include the name, title, mailing address, telephone number and email address of the public commenter. Email addresses shall be published with the public comments unless the commenter otherwise requests on the submittal form.

If a group, organization, or committee submits a public comment, an individual with prime responsibility shall be indicated. If a public comment is submitted on behalf a client, group, organization or committee, the name and mailing address of the client, group, organization or committee shall be indicated. The scope of the public comment shall be consistent with the scope of the original code change proposal or committee action. Public comments which are determined as not within the scope of the code change proposal or committee action shall be identified as such. The public commenter shall be notified that the public comment is considered an incomplete public comment in accordance with Section 6.5.1 and the public comment shall be held until the deficiencies are corrected. A copyright release in accordance with Section 3.3.5.5 shall be provided with the public comment.

6.4.2 Code Reference: Each public comment shall include the code change proposal number.

6.4.3 Multiple public comments to a code change proposal. A proponent shall not submit multiple public comments to the same code change proposal. When a proponent submits multiple public comments to the same code change proposal, the public comments shall be considered as incomplete public comments and processed in accordance with Section 6.5.1. This restriction shall not apply to public comments that attempt to address differing subject matter within a code section.

6.4.4 Desired Final Action: In order for a public comment to be considered, the public comment shall indicate the desired Final Action as one of the following:

1. Approve the code change proposal As Submitted (AS), or
2. Approve the code change proposal As Modified by the committee modification published in the Report of the Committee Action Hearing (AM) or published in a public comment in the Public Comment Agenda (AMPC), or
3. Disapprove the code change proposal (D)

6.4.5 Supporting Information: The public comment shall include a statement containing a reason and justification for the desired Final Action on the code change proposal. Reasons and justification which are reviewed in accordance with Section 6.5 and determined as not germane to the technical issues addressed in the code change proposal or committee action may be identified as such. The public commenter shall be notified that the public comment is considered an incomplete public comment in accordance with Section 6.5.1 and the public comment shall be held until the deficiencies are corrected. The public commenter shall have the right to appeal this action in accordance with the policy of the ICC Board. A bibliography of any substantiating material submitted with a public comment shall be published with the public comment and the substantiating material shall be made available at the Public Comment Hearing. Supporting documentation may be provided via a link to a website provided by the public commenter and included in the reason statement and bibliography. The reason statement shall include the date the link was created. All substantiating material published by ICC is material that has been provided by the proponent and in so publishing ICC makes no representations or warranties about its quality or accuracy.

6.4.6 Cost Impact: The proponent of the public comment shall indicate one of the following regarding the cost impact of the public comment to the code change proposal:

1) The net effect of the public comment and code change proposal will increase the cost of construction;
2) The net effect of the public comment and code change proposal will decrease the cost of construction; or
3) The net effect of the public comment and code change proposal will not increase or decrease the cost of construction.

The public commenter shall submit information which substantiates such assertion. This information will be considered at the Public Comment Hearing and will be included in the published public comment. Supporting documentation may be provided via a link to a website provided by the public commenter and included in the cost substantiation statement. The cost substantiation statement shall include the date the link was created.

Any public comment submitted which does not include the requisite cost impact information shall be considered incomplete and shall not be processed.

6.4.7 Online submittal: Each public comment and substantiating information shall be submitted online at the website designated by ICC. Additional copies may be requested when determined necessary by the Secretariat.

6.4.8 Submittal Deadline: ICC shall establish and post the submittal deadline for each cycle. The posting of the deadline shall occur no later than 120 days prior to the public comment deadline. Each public comment shall be submitted online at the website designated by ICC by the posted deadline. The submitter of a public comment is responsible for the proper and timely receipt of all pertinent materials by the Secretariat.

6.5 Review: The Secretariat shall be responsible for reviewing all submitted public comments from an editorial and technical viewpoint similar to the review of code change proposals (see Section 4.2).

6.5.1 Incomplete Public Comment: When a public comment is submitted with incorrect format, without the required information or judged as not in compliance with these Rules of Procedure, the public comment shall not be processed. The Secretariat shall notify the public commenter of the specific deficiencies and the public comment shall be held until the deficiencies are corrected, or the public comment shall be returned to the public commenter with instructions to correct the deficiencies with a final date set for receipt of the corrected public comment.

6.5.2 Duplications: On receipt of duplicate or parallel public comments, the Secretariat may consolidate such public comments for public comment consideration. Each public commenter shall be notified of this action when it occurs.

6.5.3 Deadline: Public comments received by the Secretariat after the deadline set for receipt shall not be published and shall not be considered as part of the public comment consideration. This deadline shall not apply to public comments submitted by the Code Correlation Committee. In order to correlate submitted public comments with action taken at the Committee Action Hearing on code change proposals that did receive a public comment, the Code Correlation Committee, in conjunction with staff processing of public comments, shall review the submitted public comments and submit the necessary public comments in order to facilitate the coordination of code change proposals. Such review and submittal shall not delay the posting of the Public Comment Agenda as required in Section 6.6.

6.6 Public Comment Agenda: The Committee Action Hearing results on code change proposals that have not received a public comment and code change proposals which received public comments shall constitute the Public Comment Agenda. The Public Comment Agenda shall be posted on the ICC website at least 30 days prior the Public Comment Hearing. Any errata to the Public Comment Agenda shall be posted on the ICC website as soon as possible. Code change proposals and public comments which have not been published in the original posting or subsequent errata shall not be considered.

7.0 Public Comment Hearing

7.1 Intent: The Public Comment Hearing is the first of two steps to make a final determination on all code change proposals which have been considered in a code development cycle by a vote cast by eligible voters (see Section 9.0). The second step, which follows the Public Comment Hearing, is the Online Governmental Consensus Vote that is conducted in accordance with Section 8.0.

7.2 Date and Location: The date and location of the Public Comment Hearing shall be announced not less than 60 days prior to the date of the hearing.

7.3 Moderator: The ICC President shall appoint one or more Moderators who shall act as presiding officer for the Public Comment Hearing.

7.4 Public Comment Agenda: The Public Comment Consent Agenda shall be comprised of code change proposals which have not received a public comment. The agenda for public testimony and individual consideration shall be comprised of proposals which have a public comment (see Section 6.1).

7.5 Procedure: *The Robert's Rules of Order* shall be the formal procedure for the conduct of the Public Comment Hearing except as these Rules of Procedure may otherwise dictate.

7.5.1 Open Hearing: The Public Comment Hearing is an open hearing. Any interested person may attend and participate in the floor discussion.

7.5.2 Agenda Order: The Secretariat shall publish a Public Comment Agenda for the Public Comment Hearing, placing individual code change proposals and public comments in a logical order to facilitate the hearing. The proponents or opponents of any code change proposal or public comment may move to revise the agenda order as the first order of business at the public hearing, or at any time during the hearing except while another proposal is being discussed. Preference shall be given to grouping like subjects together and for moving items back to a later position on the agenda as opposed to moving items forward to an earlier position.

7.5.2.1 Proponent Approval: A motion to revise the agenda order is considered in order unless the proponent(s) of the moved code change proposals are in attendance at the hearing and object to the move. Where such objections are raised, the motion to revise the hearing order shall be ruled out of order by the Moderator. The ruling of the Moderator shall be final and not subject to a point of order in accordance with Section 5.4.8. The motion to change the hearing order is not debatable.

7.5.2.2 Revised Agenda Order Approved: A motion to revise the agenda order is subject to a 2/3 vote of those present.

7.5.3 Tabling: Tabling of code change proposals shall be permitted. The motion to table is considered in order unless the proponent(s) of the tabled code change proposals are in attendance at the hearing and object to the tabling. Where such objections are raised, the motion to table shall be ruled out of order by the Moderator. The ruling of the Moderator shall be final and not subject to a point of order in accordance with Section 5.4.8. The motion to table is not debatable.

The motion to table must identify one of the following as to the location in the agenda when or where the code change proposal(s) will be considered:

1. To a specific date and time within the timeframe of the Public Comment Agenda for the code change proposals under consideration, or
2. To a specific location in the Public Comment Agenda for the code change proposals under consideration.

7.5.3.1 Tabling approved: A motion to table is subject to a 2/3 vote of those present.

7.5.3.2 Tabled code change proposals back to the floor: The Moderator shall bring the tabled code change proposal(s) back to the floor at the applicable time/agenda location in accordance with Section 7.5.3 Items 1 or 2. The testimony on the code change proposal shall resume at the point in the process where the tabling occurred.

7.5.4 **Presentation of Material at the Public Comment Hearing:** Information to be provided at the hearing shall be limited to verbal presentations. Each individual presenting information at the hearing shall state their name and affiliation, and shall identify any entities or individuals they are representing in connection with their testimony. Audio-visual presentations are not permitted. Substantiating material submitted in accordance with Section 6.4.5 and other material submitted in response to a code change proposal or public comment shall be located in a designated area in the hearing room.

7.5.5 **Public Comment Consent Agenda:** The Public Comment Consent Agenda (see Section 7.4) shall be placed before the assembly with a single motion for Final Action in accordance with the results of the Committee Action Hearing. When the motion has been seconded, the vote shall be taken with no testimony being allowed. A simple majority (50% plus one) based on the number of votes cast by eligible voters shall decide the motion. This action shall not be subject to the Online Governmental Consensus Vote following the Public Comment Hearing (see Section 8.0).

7.5.6 **Public Comment Individual Consideration Agenda:** Upon completion of the Public Comment Consent Agenda vote, all code change proposals not on the Public Comment Consent Agenda shall be placed before the assembly for individual consideration of each item (see Section 7.4).

7.5.7 **Reconsideration:** There shall be no reconsideration of a code change proposal after it has been voted on in accordance with Section 7.5.9.

7.5.8 **Time Limits:** Time limits shall be established as part of the agenda for testimony on all code change proposals at the beginning of each hearing session. Each person requesting to testify on a code change proposal shall be given equal time. In the interest of time and fairness to all hearing participants, the Moderator shall have limited authority to modify time limitations on debate. The Moderator shall have the authority to adjust time limits as necessary in order to complete the hearing agenda.

7.5.8.1 **Time Keeping:** Keeping of time for testimony by an individual shall be by an automatic timing device. Remaining time shall be evident to the person testifying. Interruptions during testimony shall not be tolerated. The Moderator shall maintain appropriate decorum during all testimony.

7.5.9 **Discussion and Voting:** Discussion and voting on code change proposals being individually considered shall be in accordance with the following procedures and the voting majorities in Section 7.6:

7.5.9.1 **Proponent testimony:** The Proponent of a public comment is permitted to waive an initial statement. The Proponent of the public comment shall be permitted to have the amount of time that would have been allocated during the initial testimony period plus the amount of time that would be allocated for rebuttal. Where a public comment is submitted by multiple proponents, this provision shall permit only one proponent of the joint submittal to waive an initial statement.

7.5.9.2 **Points of Order:** Any person participating in the public hearing may challenge a procedural ruling of the Moderator. A majority vote of ICC Members in attendance shall determine the decision.

7.5.9.3 **Eligible voters:** Voting shall be limited to eligible voters in accordance with Section 9.0.

7.5.9.4 **Allowable Final Action Motions:** The only allowable motions for Final Action are Approval as Submitted (AS), Approval as Modified by the committee (AM) or by one or more modifications published in the Public Comment Agenda (AMPC), and Disapproval (D).

7.5.9.5 **Initial Motion:** The code development committee action shall be the initial motion considered.

7.5.9.6 **Motions for Modifications:** Whenever a motion under consideration is for Approval as Submitted or Approval as Modified, a subsequent motion and second for a modification published in the Public Comment Agenda may be made (see Section 6.4.4). Each subsequent motion for modification, if any, shall be individually discussed and voted before returning to the main motion. A two-thirds majority based on the number of votes cast by eligible voters shall be required for a successful motion on all modifications.

7.5.9.7 **Voting:** After dispensing with all motions for modifications, if any, and upon completion of discussion on the main motion, the Moderator shall then ask for the vote on the main motion. The vote on the main motion shall be taken electronically with the vote recorded and each vote assigned to the eligible voting member. In the event the electronic voting system is determined not to be used by ICC, a hand/standing count will be taken by the Moderator. If the motion fails to receive the majority required in Section 7.6, the Moderator shall ask for a new motion.

7.5.9.8 **Subsequent Motion:** If the initial motion is unsuccessful, a motion for either Approval as Submitted or Approval as Modified by one or more published modifications is in order. A motion for Disapproval is not in order. The vote on the main motion shall be taken electronically with the vote recorded and each vote assigned to the eligible voting member. In the event the electronic voting system is determined not to be used by ICC, a hand/standing count will be taken by the Moderator. If a successful vote is not achieved, Section 7.5.9.9 shall apply.

7.5.9.9 **Failure to Achieve Majority Vote at the Public Comment Hearing.** In the event that a code change proposal does not receive any of the required majorities in Section 7.6, the results of the Public Comment Hearing for the code change proposal in question shall be Disapproval. The vote count that will be reported as the Public Comment Hearing result will be the vote count on the main motion in accordance with Section 7.5.9.7.

7.5.9.10 **Public Comment Hearing Results:** The result and vote count on each code change proposal considered at the Public Comment Hearing shall be announced at the hearing. In the event the electronic voting system is not utilized and a hand/standing count is taken in accordance with Sections 7.5.9.7 and 7.5.9.8, the vote count will not be announced if an individual standing vote count is not taken. The results shall be posted and included in the Online Governmental Consensus Ballot (see Section 8.2).

7.6 **Majorities for Final Action:** The required voting majority for code change proposals individually considered shall be based on the number of votes cast of eligible voters at the Public Comment Hearing shall be in accordance with the following table:

Committee Action	**Desired Final Action**		
	AS	**AM/AMPC**	**D**
AS	Simple Majority	2/3 Majority	Simple Majority
AM	2/3 Majority	Simple Majority to sustain the Committee Action or; 2/3 Majority on each additional modification and 2/3 Majority on entire code change proposal for AMPC	Simple Majority
D	2/3 Majority	2/3 Majority	Simple Majority

8.0 Online Governmental Consensus Vote

8.1 **Public Comment Hearing Results:** The results from the Individual Consideration Agenda at the

Public Comment Hearing (see Sections 7.5.6 and 7.5.9.10) shall be the basis for the Online Governmental Consensus Vote. The ballot shall include the voting options in accordance with the following table:

Committee Action	Public Comment Hearing result and Voting Majority	Online Governmental Consensus Ballot and Voting Majority	
AS	**AS:** Simple Majority	**AS:** Simple Majority	**D:** Simple Majority
	AMPC: 2/3 Majority	**AMPC:** 2/3 Majority	**D:** Simple Majority
	D: Simple Majority	**AS:** Simple Majority	**D:** Simple Majority
AM	**AS:** 2/3 Majority	**AS:** 2/3 Majority	**D:** Simple Majority
	AM: Simple Majority	**AM:** Simple Majority	**D:** Simple Majority
	AMPC: 2/3 Majority	**AMPC:** 2/3 Majority	**D:** Simple Majority
	D: Simple Majority	**AM:** Simple Majority	**D:** Simple Majority
D	**AS:** 2/3 Majority	**AS:** 2/3 Majority	**D:** Simple Majority
	AMPC: 2/3 Majority	**AMPC:** 2/3 Majority	**D:** Simple Majority
	D: Simple Majority	**AS:** 2/3 Majority	**D:** Simple Majority

8.2 Online Governmental Consensus Vote Voter Statement: In order to vote on the Online Governmental Consensus Vote, the eligible voter is required to acknowledge the following in order to proceed to the ballot:

1. I am currently an employee or public official actively engaged either full or part time in the administration, formulation, implementation or enforcement of laws, ordinances, rules or regulations relating to the public health, safety and welfare, or have Honorary Member status.
2. I am participating in this ICC activity in compliance with the ICC Code of Ethics, and I will avoid any circumstance that could create the appearance of a conflict of interest or otherwise compromise professional integrity.
3. As an eligible voting member, I have done my due diligence to become an informed voter on the matters that I am voting on, or as a representative of an ICC Governmental Member, my vote is being directed by the Governmental Member.
4. I am aware that voter guides that seek to influence or recommend voter positions are not endorsed by the International Code Council, and I understand that I am under no obligation to vote in accordance with any such voter guides.
5. I will not vote on any code change that would provide me with a direct personal financial benefit.
6. I will not vote on any code change that would provide a direct financial benefit to any individual or company with which I have a business interest or relationship.

8.3 Online Governmental Consensus Ballot: The ballot for each code change proposal considered at the Public Comment Hearing will include:

1. The Public Comment Hearing result and vote count.
2. The allowable Online Governmental Consensus Vote actions in accordance with Section 8.1.
3. Where the Public Comment Hearing result is As Submitted (AS) or Disapproval (D), the original code change proposal will be presented.
4. Where the Public Comment Hearing result is As Modified by the committee (AM) or As Modified by one or more Public Comments (AMPC), the original code change and approved modification(s) will be presented.
5. The committee action taken at the Committee Action Hearing.
6. ICC staff identification of correlation issues.

7. For those who voted at the Public Comment Hearing, the ballot will indicate how they voted, unless an electronic vote count is not taken in accordance with Section 7.5.9.10.
8. An optional comment box to provide comments.
9. Access to the Public Comment Agenda which includes: the original code change, the report of the committee action and the submitted public comments.
10. Access to the audio and video of the Committee Action and Public Comment Hearing proceedings.
11. Identification of the ballot period for which the online balloting will be open.

8.4 **Voting process:** Voting shall be limited to eligible voters in accordance with Section 9.0. Eligible voters are authorized to vote during the Public Comment Hearing and during the Online Governmental Consensus Vote; however, only the last vote cast will be included in the final vote tabulation. The ballot period will not be extended beyond the published period except as approved by the ICC Board.

8.4.1 **Participation requirement**: A minimum number of participants to conduct the Online Governmental Consensus Vote shall not be required unless the code change proposal(s) were not voted upon utilizing the electronic voting devices at the Public Comment Hearing and the resulting vote was not assigned to each eligible voting member in accordance with Sections 7.5.9.7 and 7.5.9.8 . If this occurs, a minimum number of participants shall be required for those code change proposal(s) based on an assessment of the minimum number of votes cast during the entire Public Comment Hearing and the Online Governmental Consensus Vote shall determine the final on action on the code change proposal(s) in accordance with Section 10.1.

9.0 Eligible Final Action Voters

9.1 **Eligible Final Action Voters:** Eligible Final Action voters include ICC Governmental Member Voting Representatives and Honorary Members in good standing who have been confirmed by ICC in accordance with the Electronic Voter Validation System. Such confirmations are required to be revalidated once each code development cycle. After initial validation, changes to the list of GMVRs for the remainder of the code development cycle shall be made in accordance with Section 9.2. Eligible Final Action voters in attendance at the Public Comment Hearing and those participating in the Online Governmental Consensus Vote shall have one vote per eligible voter on all Codes. Individuals who represent more than one Governmental Member shall be limited to a single vote.

9.2 **Applications:** Applications for Governmental Membership must be received by the ICC at least 30 days prior to the Committee Action Hearing in order for its designated representatives to be eligible to vote at the Public Comment Hearing or Online Governmental Consensus Vote. Applications, whether new or updated, for Governmental Member Voting Representative status must be received by the Code Council 30 days prior to the commencement of the first day of the Public Comment Hearing in order for any designated representative to be eligible to vote. An individual designated as a Governmental Member Voting Representative shall provide sufficient information to establish eligibility as defined in the ICC Bylaws. The Executive Committee of the ICC Board, in its discretion, shall have the authority to address questions related to eligibility.

10.0 Tabulation, certification and posting of results

10.1 **Tabulation and Validation:** Following the closing of the online ballot period, the votes received will be combined with the vote tally at the Public Comment Hearing to determine the final vote on the code change proposal. If a hand/standing count is utilized per Subsection 7.5.9.7 or 7.5.9.8, those votes of the Public Comment Hearing will not be combined with the online ballot. ICC shall retain a record of the votes cast and the results shall be certified by a validation committee appointed by the ICC Board. The validation committee shall report the results to the ICC Board, either confirming a valid voting process and result or citing irregularities in accordance with Section 10.2.

10.2 **Voting Irregularities:** Where voting irregularities or other concerns with the Online Governmental Consensus Voting process which are material to the outcome or the disposition of a code change proposal(s) are identified by the validation committee, such irregularities or concerns shall be immediately brought to the attention of the ICC Board. The ICC Board shall take whatever action necessary to ensure a fair and impartial Final Action vote on all code change proposals, including but not limited to:

1. Set aside the results of the Online Governmental Consensus Vote and have the vote taken again.
2. Set aside the results of the Online Governmental Consensus Vote and declare the Final Action on all code change proposals to be in accordance with the results of the Public Comment Hearing.
3. Other actions as determined by the ICC Board.

10.3 Failure to Achieve Majority Vote: In the event a code change proposal does not receive any of the required majorities for Final Action in Section 8.0, Final Action on the code change proposal in question shall be Disapproval.

10.4 Final Action Results: The Final Action on all code change proposals shall be published as soon as practicable after certification of the results. The results shall include the Final Action taken, including the vote tallies from both the Public Comment Hearing and Online Governmental Consensus Vote, as well the required majority in accordance with Section 8.0. ICC shall maintain a record of individual votes for auditing purposes, however, the record shall not be made public. The exact wording of any resulting text modifications shall be made available to any interested party.

11.0 Code Publication

11.1 Next Edition of the Codes: The Final Action results on code change proposals shall be the basis for the subsequent edition of the respective Code.

11.2 Code Correlation: The Code Correlation Committee is authorized to resolve technical or editorial inconsistencies resulting from actions taken during the code development process by making appropriate changes to the text of the affected code. The process to resolve technical or editorial inconsistencies shall be conducted in accordance with CP#44 Code Correlation Committee.

12.0 Appeals

12.1 Right to Appeal: Any person may appeal an action or inaction in accordance with Council Policy 1 Appeals. Any appeal made regarding voter eligibility, voter fraud, voter misrepresentation or breach of ethical conduct must be supported by credible evidence and must be material to the outcome of the final disposition of a code change proposal(s).

The following actions are not appealable:

1. Variations of the results of the Public Comment Hearing compared to the Final Action result in accordance with Section 10.4.
2. Denied requests to extend the voter balloting period in accordance with Sections 5.7.4 or 8.3.
3. Lack of access to the internet based online collaboration and voting platform to submit a code change proposal, to submit a public comment or to vote.
4. Code Correlation Committee changes made in accordance with Section 11.2.

13.0 Violations

13.1 ICC Board Action on Violations: Violations of the policies and procedures contained in this Council Policy shall be brought to the immediate attention of the ICC Board for response and resolution. Additionally, the ICC Board may take any actions it deems necessary to maintain the integrity of the code development process.

Sections revised in July 16, 2021 revision to CP-28:
8.2

Sections revised in December 3, 2020 revision to CP-28:
3.3.5.4
3.3.5.4.1
5.4.3

5.4.3.1
5.4.4.1
5.4.4.2
5.4.4.3
5.4.4.4
5.4.5
5.4.5.1
5.4.5.2
5.4.5.3
5.4.5.4
5.4.8
5.4.8.1

Sections revised in November 2, 2020 revisions to CP-28:
5.7 (removal of entire section)
2.5
5.1
5.4.2
5.8
6.1
6.4.1
6.6
7.4

Section revised in January 1, 2019 revision to CP-28:
9.1

Sections revised in October 20, 2018 revision to CP-28:
2.4
2.4.1
2.4.1.1
2.4.1.2
2.4.2
2.4.2.1
2.4.2.2
2.4.2.3
2.4.2.4
2.4.2.5
2.4.2.6
2.4.2.7
2.4.2.8
2.4.2.9
2.4.2.10
2.4.2.11

Sections revised in July 27, 2018 revision to CP-28:

4.6.1

Sections revised in December 8, 2017 revision to CP-28:

3.3.5.5
8.3.1

Sections revised in September 9, 2017 revision to CP-28:

3.2
3.3.5.3
3.3.5.4
3.3.5.6
3.6.3.1.1

3.6.3.1.2
4.6
5.4.4
5.4.4.1
5.4.4.2
5.4.5
5.4.5.1
5.4.5.2
5.5.2
5.5.2.2
6.4.5
6.4.6
7.5.2
7.5.2.1
7.5.2.2
7.5.3
7.5.3.1
7.5.3.2
7.5.9.10
8.2 – Number 7
11.2

WITHDRAWN CODE CHANGE PROPOSALS

The following code change proposals were withdrawn subsequent to the Committee Action Hearings:

RM7-21

Code change proposals withdrawn prior to the end of the committee action hearings are indicated as such in the 2021 Report of Committee Action Hearings.

2021 PUBLIC COMMENT HEARING SCHEDULE
September 21 - 26, 2021
David L. Lawrence Convention Center
Pittsburgh, PA

The upcoming 2021 ICC Annual Conference & Group A Public Comment Hearings will include Membership Council Meetings and Education Programs on Sunday, September 19th and the Annual Business Meeting on Monday, September 20th. Click here for the conference website.

The Public Comment Hearings will start on Tuesday, September 21st at 8:00 am. The schedule anticipates that the hearings will be completed no later than 7:00 pm on Sunday, September 26th. This may require adjustments to the daily start/end times based on hearing progress. The hearings will start with the Plumbing/Mechanical/Fuel Gas (PMG) codes, followed by the Fire Code and then the building related codes, starting with the Property Maintenance Code and then the Building Code.

Unless noted by "Start no earlier than 8:00 am", the hearing on each code will begin immediately upon completion of the hearing for the prior code. This includes moving the code up or back from the day indicated based on hearing progress. Actual start times for each code cannot be stipulated due to uncertainties in hearing progress. Be sure to review the tentative hearing order in the Public Comment Agenda (to be posted by August 13st) for code changes that are heard with a code other than that indicated by the code change prefix (see note 4).

Tuesday September 21	Wednesday September 22	Thursday September 23	Friday September 24	Saturday September 25	Sunday September 26
Start 8 am	**Start 8 am**	**Start 8 am**	**Start 8 am**	**Start 8 am**	**Start 10 am**
ISPSC	**IMC**	**IFC**	**IBC – FS**	**IBC - G**	**IBC – E**
IFGC	**IWUIC/IFC (Start no earlier than 8:00 am)**	**IPMC (Start no earlier than 8:00 am)**	**IBC - G**	**IBC – E**	
IPC					
IRC – P		**IBC – FS**			
IRC – M					
IMC					
End 5 pm	**End 7 pm**	**End 7 pm**	**End 7 pm**	**End 7 pm**	**Finish 7 pm**

SEE NEXT PAGE FOR SCHEDULE NOTES AND LIST OF CODES

Hearing Schedule Notes:

1. Daily start and end hearing times are subject to change based on progress.

2. Mid-morning, lunch and mid-afternoon breaks to be announced. The hearings are scheduled to recess for dinner and resume the following day.

3. Due to the uncertainties in the hearing process, the start time indicated as “Start no earlier than 8:00 am" is conservatively estimated and is not intended to be a scheduled target.

4. Consult the hearing order for code changes to be heard with a code other than the code under which the code change is designated. See also the note below concerning code changes submitted to IBC – Structural and the ICC Performance Code.

Codes: (be sure to consult the Cross Index of Proposed Code Changes with Public Comments for changes heard with a different code)

IBC – E: International Building Code – Egress provisions (Chs. 10 and 11)

IBC – FS: International Building Code – Fire Safety provisions (Chs. 7, 8, 9, 14, 26)

IBC – G: International Building Code – General provisions (Chs. 3 – 6, 12, 13, 27 – 33)

IFC/IWUIC: International Fire and Wildland-Urban Interface Codes

IFGC: International Fuel Gas Code

IMC: International Mechanical Code

IPC: International Plumbing Code. (No public comments received to the IPSDC.)

IPMC: International Property Maintenance Code. (No public comments received to the IZC.)

IRC – M: Mechanical provisions in the International Residential Code (Chs. 12 – 23)

IRC – P: Plumbing provisions in the International Residential Code (Chs. 25 – 33)

ISPSC: International Swimming Pool and Spa Code

In addition, there is one IBC – Structural code change on the IBC – FS agenda and 2 ICC Performance Code changes on the IBC – G agenda.

TENTATIVE HEARING ORDER
FOR EACH INDIVIDUAL CONSIDERATION AGENDA

Note: Code changes to be heard out of numerical order or to be heard with a different code designation are indented. Be sure to review the cross index on page xlii for code change which affect codes other than those under their respective code change number prefix.

ISPSC
(See page 1)
SP5-21
SP14-21
SP17-21
SP18-21
SP21-21
SP24-21
SP30-21
SP31-21
SP33-21

IFGC
(See page 22)
FG1-21
FG2-21
FG4-21

IPC
(See page 29)
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P9-21
P11-21
P22-21
P25-21
P26-21
P35-21
P37-21 Part I
P37-21 Part II
P39-21 Part I
P39-21 Part II
P42-21
P44-21
P46-21
P48-21
P50-21
P58-21
P59-21
P61-21 Part I
P61-21 Part II
P62-21 Part I
P63-21 Part I
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P87-21 Part I
P87-21 Part II
P88-21
P102-21
P103-21
P111-21
P129-21 Part I
P129-21 Part II
P133-21 Part I
P133-21 Part II
P147-21 Part I

IRC - PLUMBING
(See page 158)
RP10-21

IRC – MECHANICAL
(See page 160)
  M4-21 Part II
  M66-21 Part II
RM1-21
RM3-21
RM7-21
RM8-21
RM9-21
RM12-21
RM15-21
RM16-21
RM17-21
RM19-21
RM20-21
RM26-21

IMC
(See pages 196)
M3-21
M16-21
M18-21
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M50-21
M52-21
M54-21
M56-21
M60-21
M73-21
M80-21

IWUIC
(See page 258)
WUIC1-21
WUIC2-21
WUIC3-21
WUIC6-21
WUIC9-21
WUIC10-21
WUIC11-21
WUIC13-21
WUIC15-21
WUIC18-21

IFC
(See page 293)
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  F236-21
  F237-21
F9-21
F12-21
F15-21 Part I
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F20-21
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F25-21
F27-21
F28-21
F30-21
F43-21
F49-21
F50-21
F55-21
  F1-21
F63-21
F68-21
F69-21
F72-21
F73-21
F74-21
F76-21
F80-21
F86-21
  G126-21 Part II
F90-21
F94-21
  G50-21
  G204-21
  G83-21
  G84-21
F102-21
  F116-21
F103-21
F107-21 Part I
F110-21
F111-21
F117-21 Part I
F117-21 Part II
F118-21 Part I
F119-21 Part I
F119-21 Part II
F122-21
F123-21
F124-21
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- F140-21
- F143-21
- F144-21
- F145-21
- F146-21
- F150-21
- F151-21
- F153-21
- F154-21
- F155-21
- F157-21
- F158-21
  - G92-21
- F165-21
- F170-21
- F174-21
- F175-21
- F183-21
- F184-21
- F186-21 Part I
- F186-21 Part II
  - G38-21
  - G36-21
  - G40-21
- F204-21
- F205-21
- F210-21
- F211-21
- F212-21
- F214-21
- F219-21
- F225-21
- F228-21
- F229-21
- F230-21
- F231-21
- F233-21

IPMC
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- PM4-21
- PM12-21
- PM14-21
- PM16-21

IBC - FIRE SAFETY
(Includes
IBC - Structural)
(See page 599)

  - G7-21 Part I
  - G7-21 Part II
- FS3-21
- FS9-21
- FS12-21
- FS18-21
- FS19-21
- FS23-21
- FS25-21
- FS29-21
- FS31-21
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- FS34-21
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- FS123-21
- FS124-21
- FS125-21
- FS129-21
- FS144-21
- FS146-21
- FS147-21
- FS150-21
  - S10-21
  - F60-21 Part II

IBC – GENERAL
(Includes
ICC-Performance
Code)
(See page 717)

  - PC5-21
  - PC6-21
- G1-21 Part I
- G1-21 Part IV
- G12-21
- G15-21
- G16-21
- G20-21 Part I
- G20-21 Part II
- G34-21
- G42-21
- G44-21 Part I
- G44-21 Part II
- G44-21 Part III
- G44-21 Part IV
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- G54-21
- G64-21
- G66-21
- G67-21
- G68-21
- G74-21
- G99-21 Part II
- G99-21 Part III
- G99-21 Part VII
- G99-21 Part IX
- G99-21 Part X
- G99-21 Part XI
- G99-21 Part XII
- G100-21 Part I
- G100-21 Part II
- G101-21
- G102-21
- G103-21
- G104-21
- G105-21
- G106-21 Part I
- G106-21 Part II
- G109-21
- G112-21 Part I
- G112-21 Part II
- G112-21 Part III
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- G122-21 Part I
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- G135-21
- G142-21
- G143-21
- G147-21
- G154-21
- G155-21
- G162-21
- G163-21
- G164-21
  - G203-21
- G165-21
- G170-21
- G172-21
- G174-21
- G176-21
- G177-21
- G179-21
- G181-21 Part I
- G181-21 Part II
- G185-21
- G191-21
- G193-21
- G196-21
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IBC - EGRESS
(See page 1169)

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- E8-21
- E9-21
- E13-21
- E14-21
- E15-21
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- E28-21
- E33-21
- E40-21
- E43-21
- E45-21
- E49-21
- E55-21
- E60-21
- E61-21
- E64-21
- E66-21
  - G200-21
- E68-21
- E70-21
- E71-21
- E72-21
- E73-21
- E76-21
- E80-21
- E81-21
- E82-21
- E86-21
- E90-21
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- E97-21
- E98-21
- E100-21
- E102-21
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E141-21
E142-21

2021 GROUP A ICC CODE DEVELOPMENT CYCLE
CROSS INDEX OF PROPOSED CODE CHANGES ON THE PUBLIC COMMENT AGENDA FOR INDIVIDUAL CONSIDERATION

Some of the proposed code changes include sections that are outside of the scope of the chapters or the code listed in the table of 2021-2022 Staff Secretaries on page xii. This is done in order to facilitate coordination among the International Codes which is one of the fundamental principles of the International Codes.

Listed in this cross index are proposed code changes that include sections of codes or codes other than those listed on page viii. For example, IBC Section 1704.2.2 is proposed for revision in code change G1-21 Part I, which is found in the IBC-General section of the code change proposal book. This section of the IBC is typically the responsibility of the IBC-Structural Committee as listed in the table of 2021-2022 Staff Secretaries. It is therefore identified in this cross index. Another example is Section 607.6.2.1.2 of the International Mechanical Code. The International Mechanical Code is maintained by the IMC Committee, but Section 607.6.2.1.2 will be considered for revision in proposed code change FS93-21 and FS95-21 which will be on the IBC-Fire Safety Committee agenda. In some instances, there are other subsections that are revised by an identified code change that is not included in the cross index.

This information is provided to assist users in locating all of the proposed code changes that would affect a certain section or chapter. For example, to find all of the proposed code changes that would affect Chapter 4 of the IBC, review the proposed code changes in the portion of the monograph for the IBC-General Code Development Committee (listed with a G prefix) then review this cross reference for Chapter 4 of the IBC for proposed code changes published in other code change groups. While care has been taken to be accurate, there may be some omissions in this list.

Letter prefix: Each proposed change number has a letter prefix that will identify where the proposal is published. The letter designations for proposed changes and the corresponding publications are as follows:

PREFIX	**PROPOSED CHANGE GROUP (see monograph table of contents for location)**
E	International Building Code - Means of Egress
F	International Fire Code
FG	International Fuel Gas Code
FS	International Building Code - Fire Safety
G	International Building Code – General
M	International Mechanical Code
PC	ICC Performance Code
P	International Plumbing Code
PSD	International Private Sewage Disposal Code
S	International Building Code – Structural
SP	International Swimming Pool and Spa Code
WUIC	International Wildland-Urban Interface Code
IZC	International Zoning Code

INTERNATIONAL BUILDING CODE	
Section #	**Code Change #**
Chapter 2	
Animal housing facility	F69
Automatic flush bolt(new)	E43-21
Automatic sprinkler system	F1
Constant latching bolt(new)	E43-21
Continuity Head-of-Wall Joint System (new)	FS45-21
Control Vestibule(new)	E55-21
Dead bolt(new)	E43-21
Energy Storage Systems (ESS) (new)	E26-21 Part I
Engineering Analysis (new)	FS124-21
F Rating	FS45-21
Health care laboratory (new)	F175
Laboratory suite	F175
Landscaped roof	F15 Part II
Living area	F103
Manual Bolt(new)	E43-21
Rainscreen (new)	FS151-21, FS144-21
T Rating	FS45-21
Vegetative roof	F15 Part II
Chapter 3	
306.2	F186 PART II
306.3	F186 PART II
311.2	F186 PART II
311.3	F186 PART II
Chapter 4	
414.2	F175
428.1	F175
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703.5	G1-21 Part I
711.2.4.1	G121-21
716.2.6.1	G44-21 Part I
Chapter 10	
1004.7	G20-21 Part I
1004.8	G33-21
1006.1	G20-21 Part I
1006.3	G20-21 Part I
1006.3.1	G20-21 Part I
1006.3.2	G20-21 Part I
1006.3.3	G20-21 Part I
1006.3.4	G20-21 Part I
1009.2.1	G20-21 Part I
1010.1.2	G44-21 Part
1010.2.9.1	G99-21 Part VII
1011.12	G20-21 Part I
1011.12.2	G20-21 Part I
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1011.15	G20-21 Part I
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1015.2	G106-21 Part II, G112-21 Part II

1015.3	G112-21 Part II
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[P]1210.2.2	P39 Part II
1210.2.3 (new)	P37 Part II
Chapter 15	
1505.10	F15 PART II
1507.15.1	F15 PART II
Chapter 16	
1607.9.1	G1-21 Part 1
1607.14.4.4	G1-21 Part 1
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2111.3.1	G1-21 Part I
2113.9.2	G1-21 Part I
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2405.3	G1-21 Part I
2406.4.3	G1-21 Part I
Chapter 27	
2701.1.1 (New)	F119 Part II
Chapter 29	
Table [P]2902.1	P22
[P]2902.1.1	P25, P26
[P]2902.3.6	P35
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3007.2.2	F75 Part I
3008.9	G1-21 Part I
Chapter 31	
3103.1	E107-21 Part II
3103.5(New)	E107-21 Part II
3103.5.1(New)	E107-21 Part II
Appendix C	
C103	G121-21
C103.1	G121-21
Appendix E	
E104.2.1	G44-21 Part I

Appendix F	
F101.5	G1-21 Part I
Appendix H	
H110.1	G1-21 Part I
INTERNATIONAL FIRE CODE	
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Automatic flush bolt(new)	E43-21
Constant latching bolt(new)	E43-21
Control Vestibule(new)	E55-21
Dead bolt(new)	E43-21
Electrical equipment	M77-21 Part II
Energy Storage Systems (ESS) (new)	E26-21 Part I
Exit stairway(New)	G6-21 Part II
Fire performance(New)	G7-21 Part II
Live Fire Training Building (New)	G100-21 Part II
Manual Bolt(new)	E43-21
Multiple-level booth	G1-21 Part II
Occupiable Roof(New)	G20-21 Part II
Chapter 3	
308.4.1	G44-21 Part II
322 (New)	G100-21 Part II
322.1 (New)	G100-21 Part II
Chapter 4	
403.9.1.1	G44-21 Part II
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604.3.4	G181-21 Part II
608.9.1	G99-21 Part IX
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903.2.1.6	G20-21 Part II
907.2.8.1	G44-21 Part II
907.2.8.2	G44-21 Part II
907.2.11.1	G44-21 Part II, G112-21 Part III
907.2.11.2	G112-21 Part III
Table 907.5.2.3.2	G44-21 Part II
Chapter 10	See IBC Chapter 10
1020.2.1	FS83-21
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1103.7.5.1	G44-21 Part II
1103.7.5.1.1	G44-21 Part II
1103.7.5.2	G44-21 Part II
1103.7.5.2.1	G44-21 Part II
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3103.11.1(New)	E107-21 Part III

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3303.1.1	G199-21 Part II
3303.3	G199-21 Part II
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Table 5003.1.1(1)	G36-21
Table 5003.1.1(2)	G36-21
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Data Center (New)	G99-21 Part X
Information Technology Equipment (ITE) (New)	G99-21 Part X
Information Technology Equipment Facilities (ITEF) (New)	G99-21 Part X
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607.6.2.1.2	FS93-21, FS95-21
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1104.2.3 (New)	G99-21 Part XII
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Table 403.1	G44-21 Part III
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606.2	G44-21 Part II
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1302.9	G1-21 Part IV
INTERNATIONAL PROPERTY MAINTENANCE CODE	
Chapter 3	
307.1	F117-21 PART II, F118 PART II
307.1.1 (New)	F118 PART II
307.2 (New)	F118 PART II
307.2.1 (New)	F118 PART II
Chapter 7	
703.3	G1-21 Part I
INTERNATIONAL RESIDENTIAL CODE	
Chapter 2	
Cured-in-place pipe (new)	P129 Part II
Heat Pump	M4-21 Part II
Sanitary waste valve (new)	P133 Part II
Chapter 26	
P2603.2.1.1 (new)	P6 Part II
Chapter 29	

P2902.6	P96 Part II
Table P2903.2	P87 Part II
Table P2903.9.4	P68 Part II
Table P2906.4	P61 Part II
Table P2906.5	P62 Part II
Chapter 30	
P3012 (New)	P129-21 Part II
Chapter 32	
P3202 (New)	P133-21 Part II
INTERNATIONAL PERFORMANCE CODE	
Chapter 12	
1204.3.3	G1-21 Part IV
INTERNATIONAL EXISTING BUILDING CODE	
Chapter 15	
1501.1	G199-21 Part I
1501.2	G199-21 Part I
1501.2.1	G199-21 Part I
1501.3	G199-21 Part I
1501.4	G199-21 Part I
1501.5	G199-21 Part I
1501.7	G199-21 Part I
1502(New)	G199-21 Part I
1502.1(New)	G199-21 Part I
1502.1.1(New)	G199-21 Part I
1502.2(New)	G199-21 Part I
1502.3(New)	G199-21 Part I
1502.3.1(New)	G199-21 Part I
1503(New)	G199-21 Part I
1504(New)	G199-21 Part I
INTERNATIONAL ZONING CODE	
Chapter 2	
Motel, Hotel	G44-21 Part IV
Chapter 8	
Table 801.2.1	G44-21 Part IV

2021 PUBLIC COMMENTS TO THE PROPOSED CHANGES TO THE 2021 INTERNATIONAL CODES

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IRC – Mechanical	**160**
IMC	**196**
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IPMC	**589**
IBC – Fire Safety	**599**
IBC – Structural *(Heard with IBC-Fire Safety)*	**712**
IBC – General	**717**
ICCPC *(Heard with IBC-General)*	**1165**
IBC – Egress	**1169**
CCC	**1357**

SP5-21

Proposed Change as Submitted

Proponents: Hope Medina, representing Self (hmedina@coloradocode.net); Gil Rossmiller, representing Self (gilrossmiller@coloradocode.net)

2021 International Swimming Pool and Spa Code

Revise as follows:

303.1 Energy consumption of pools and permanent spas. The energy consumption of pools and permanent spas shall ~~be controlled by the requirements in Sections 303.1.1 through 303.1.3.~~ conform to the requirements of the *International Energy Conservation Code.*

~~**303.1.1 Heaters.** The electric power to heaters shall be controlled by a readily accessible on-off switch that is an integral part of the heater, mounted on the exterior of the heater or external to and within 3 feet (914 mm) of the heater. Operation of such switch shall not change the setting of the heater thermostat. Such switches shall be in addition to a circuit breaker for the power to the heater. Gas-fired heaters shall not be equipped with continuously burning ignition pilots.~~

~~**303.1.2 Time switches**~~**.**

~~Time switches or other control methods that can automatically turn off and on heaters and pump motors according to a preset schedule shall be installed for heaters and pump motors. Heaters and pump motors that have built-in time switches shall be in compliance with this section.~~

~~**Exceptions:**~~

1. ~~Where public health standards require 24-hour pump operation.~~
2. ~~Pumps that operate solar- or waste-heat recovery pool heating systems.~~

~~**303.1.3 Covers.** Outdoor heated pools and outdoor permanent spas shall be provided with a vapor-retardant cover or other *approved* vapor-retardant means in accordance with Section 104.12.~~

~~**Exception:** Where more than 70 percent of the energy for heating, computed over an operating season, is from a heat pump or solar energy source, covers or other vapor-retardant means shall not be required.~~

~~**303.2 Portable spas.** The energy consumption of electric-powered portable spas shall be controlled by the requirements of APSP 14.~~

~~**303.3 Residential pools and permanent residential spas.** The energy consumption of *residential* swimming pools and permanent *residential* spas shall be controlled in accordance with the requirements of APSP 15.~~

Reason: The I-codes are a family of codes. Something that many of us say probably on a daily basis, and there is a reason for that. The individual code books are based on a specific component of a building. You have the IBC that focuses on the physical construction of commercial buildings. The IPC that focuses on the plumbing of that commercial building. The IMC that focuses on the mechanical systems of that commercial building. IECC that focuses on the energy conservation of that commercial building. All of these individual codes work together to create a safe structure to be occupied. The one thing these codes also have in common is that they allow the other codes to be the lead for their strong suit. Chapter 13 of the IBC refers you to the IECC for your energy requirements. Even though the IECC has requirements dealing with the mechanical equipment and the IMC has requirements for duct insulation they do not impede on the others forte. The IECC provides guidance on energy conservation for the mechanical equipment and not that fire dampers shall be installed. Section 604 of the IMC has duct insulation requirements such as flame spread index and smoke development index, but the first sentence of this section refers you to the IECC for the actual energy requirements for the duct insulation.
The 2012 ISPSC was the first edition of this code which was heard in the code cycle year c, the year after the proposals were heard for the 2012 IRC. For the 2012 edition there resided several locations for the requirements of swimming pools and spas. The 2015 IRC code cycle rectified this by removed appendix G, Swimming Pools, Spas, and Hot Tubs, and created a new section R326. Section R326 stated only that the design and construction of pools and spas shall comply with the International Swimming Pool and Spa Code.

The International Energy Conservation Code has had energy requirements for swimming pools since the 1998 edition of the International codes. We are asking that the ISPSC follow the precedent set forth by the other I-codes and allow the IECC to address the energy requirements for swimming pools and spas rather than having competing energy requirements.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The requirements are already existing. Just referring to the correct code to follow.

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: Although the Committee understands that the I-Codes function well with correlation with and referencing other I-codes, in this instance, removing energy requirements in this code (and forcing the reader to go to another I-Code) would not be beneficial to the pool and spa industry at this time. The pool and spa industry is just now beginning to understand how codes affect the industry. There is significant training and education underway to bring everyone up to speed with the code so now is not the time to take the focus on energy out of the ISPSC. Also, the next IECC might become much difficult than what it currently is because of changing the technical part over to standards committee. The pool and spa industry needs to have everything about pools and spa in one book to help with the education efforts currently underway. (10-1)

SP5-21

Individual Consideration Agenda

Public Comment 1:

ISPSC: 303.1.3 (New)

Proponents: Nicholas Capezza, representing Pool & Hot Tub Alliance (ncapezza@phta.org); Jennifer Hatfield, representing Pool & Hot Tub Alliance (jen@jhatfieldandassociates.com) requests As Modified by Public Comment

Replace as follows:

2021 International Swimming Pool and Spa Code

303.1.3 Covers . Outdoor heated pools and outdoor permanent spas shall be provided with a vapor-retardant cover or other approved vapor-retardant means in accordance with Section 104.12.

> **Exception:** Where more than ~~70~~ 75 percent of the energy for heating, computed over an operating season of not fewer than 3 calendar months, is from a heat pump or ~~solar energy source~~ an on-site renewable energy system, covers or other vapor-retardant means shall not be required.

Commenter's Reason: This public comment aligns language in the *International Swimming Pool and Spa Code* with language in the *International Energy Conservation Code*, to ensure consistency between the codes. Aligning the language, versus a reference, creates a more user-friendly method for pool contractors who may not be familiar with or have access to the *International Energy Conservation Code.*

Cost Impact: The net effect of the public comment and code change proposal will not increase or decrease the cost of construction
This proposal will not increase the cost of construction because no additional labor, materials, equipment, appliances, or devices are mandated beyond what is currently required by the code.

Public Comment# 2428

Public Comment 2:

ISPSC: 303.1

Proponents: Hope Medina, representing Self (hmedina@coloradocode.net) requests As Modified by Public Comment

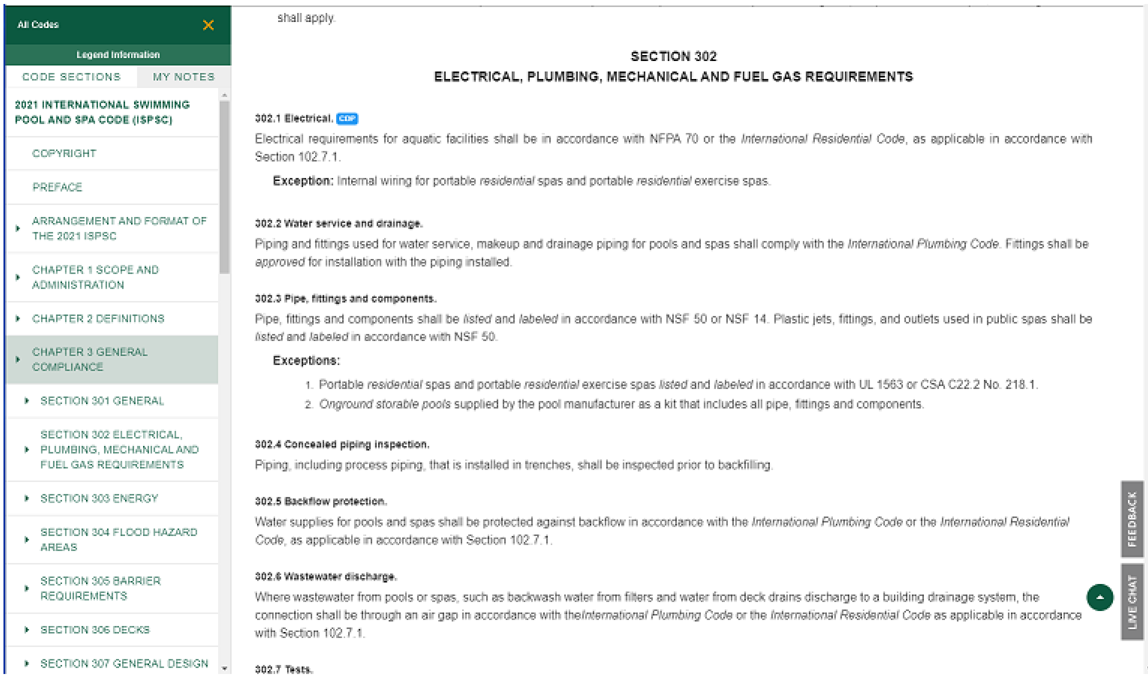
Further modify as follows:

2021 International Swimming Pool and Spa Code

303.1 Energy consumption of pools and permanent spas . The energy consumption of pools and permanent spas shall ~~conform to~~ comply with the requirements of the *International Energy Conservation Code.*

Commenter's Reason: Currently the energy code requirements found in the ISPSC do differ from what the pool and spa energy code requirements found in the IECC, and they have for cycles. This is what happens when two books contain similar requirements they have the possibility of divergence. That is what has happened between the ISPC and the IECC. Which requirements is a jurisdiction going to enforce? Why create this conflict within the I-codes family intentionally? Everyone involved in the code development process whether testifying at the code hearings or voting on cdpACCESS does their best to not intentionally create a conflict in our family of I-codes. Currently we have a known conflict between the two codes that we need to address to keep our code usable, enforceable, and relevant. Until the provisions for swimming pools and spas found within the IECC are just duplicated into ISPSC as they are in Chapter 11 of the IRC, we have to do what is needed to be done to keep us from intentionally creating conflict between requirements and two code books. We need to have the ISPSC refer to the IECC for the energy requirements.

This is not unheard of for other codes to reference the specific code to oversee the provisions. Section 604.1 of the International Mechanical Code refer to the IECC for duct insulation. The ISPSC is no different, and refers you to the other codes to govern the various construction and Code specific to that discipline. Currently this code refers you to the NEC(NFPA 70), IPC, IRC, IMC, IFGC, and the IECC. This code already refers to the IECC for the installation of the heaters in section 316.4. With all due respect to the committee's reason for disapproving this proposal stating the need of keeping all of the requirements with in this one code is not a current possibility. The ISPSC already refers you to the previously stated codes and various standards.



shall apply.

SECTION 302
ELECTRICAL, PLUMBING, MECHANICAL AND FUEL GAS REQUIREMENTS

302.1 Electrical. CDP

Electrical requirements for aquatic facilities shall be in accordance with NFPA 70 or the *International Residential Code*, as applicable in accordance with Section 102.7.1.

Exception: Internal wiring for portable *residential* spas and portable *residential* exercise spas.

302.2 Water service and drainage.

Piping and fittings used for water service, makeup and drainage piping for pools and spas shall comply with the *International Plumbing Code*. Fittings shall be *approved* for installation with the piping installed.

302.3 Pipe, fittings and components.

Pipe, fittings and components shall be *listed* and *labeled* in accordance with NSF 50 or NSF 14. Plastic jets, fittings, and outlets used in public spas shall be *listed* and *labeled* in accordance with NSF 50.

Exceptions:

1. Portable *residential* spas and portable *residential* exercise spas *listed* and *labeled* in accordance with UL 1563 or CSA C22.2 No. 218.1.
2. *Onground storable pools* supplied by the pool manufacturer as a kit that includes all pipe, fittings and components.

302.4 Concealed piping inspection.

Piping, including process piping, that is installed in trenches, shall be inspected prior to backfilling.

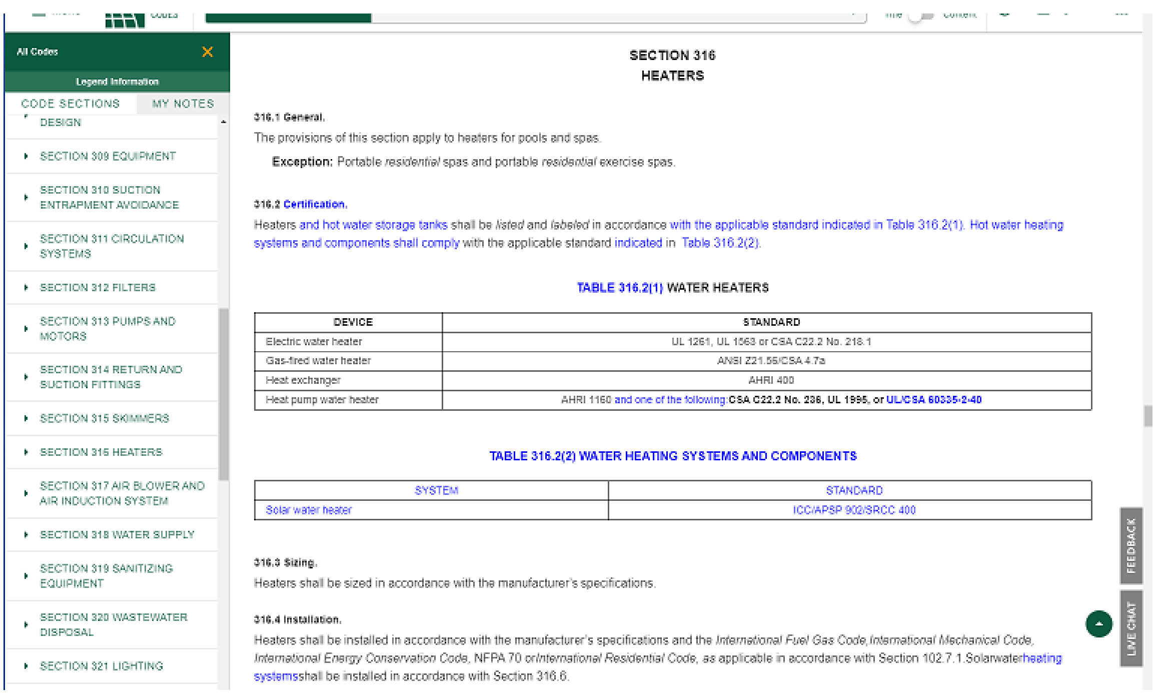
302.5 Backflow protection.

Water supplies for pools and spas shall be protected against backflow in accordance with the *International Plumbing Code* or the *International Residential Code*, as applicable in accordance with Section 102.7.1.

302.6 Wastewater discharge.

Where wastewater from pools or spas, such as backwash water from filters and water from deck drains discharge to a building drainage system, the connection shall be through an air gap in accordance with the*International Plumbing Code* or the *International Residential Code* as applicable in accordance with Section 102.7.1.

302.7 Tests.



SECTION 316
HEATERS

316.1 General.

The provisions of this section apply to heaters for pools and spas.

Exception: Portable *residential* spas and portable *residential* exercise spas.

316.2 Certification.

Heaters and hot water storage tanks shall be *listed* and *labeled* in accordance with the applicable standard indicated in Table 316.2(1). Hot water heating systems and components shall comply with the applicable standard indicated in Table 316.2(2).

TABLE 316.2(1) WATER HEATERS

DEVICE	STANDARD
Electric water heater	UL 1261, UL 1563 or CSA C22.2 No. 218.1
Gas-fired water heater	ANSI Z21.56/CSA 4.7a
Heat exchanger	AHRI 400
Heat pump water heater	AHRI 1160 and one of the following: **CSA C22.2 No. 236, UL 1995, or UL/CSA 60335-2-40**

TABLE 316.2(2) WATER HEATING SYSTEMS AND COMPONENTS

SYSTEM	STANDARD
Solar water heater	ICC/APSP 902/SRCC 400

316.3 Sizing.

Heaters shall be sized in accordance with the manufacturer's specifications.

316.4 Installation.

Heaters shall be installed in accordance with the manufacturer's specifications and the *International Fuel Gas Code*,*International Mechanical Code*, *International Energy Conservation Code*, NFPA 70 or*International Residential Code*, as applicable in accordance with Section 102.7.1.Solarwaterheating systemsshall be installed in accordance with Section 316.6.

Cost Impact: The net effect of the public comment and code change proposal will not increase or decrease the cost of construction
This is a coordination of the already existing requirements within two code books.

Public Comment# 2844

Public Comment 3:

Proponents: Hope Medina, representing Self (hmedina@coloradocode.net) requests As Submitted

Commenter's Reason: Currently the energy code requirements found in the ISPSC do differ from what the pool and spa energy code requirements found in the IECC, and they have for cycles. This is what happens when two books contain similar requirements they have the possibility of divergence. That is what has happened between the ISPC and the IECC. Which requirements is a jurisdiction going to enforce? Why create this conflict within the I-codes family intentionally? Everyone involved in the code development process whether testifying at the code hearings or voting on cdpACCESS does their best to not intentionally create a conflict in our family of I-codes. Currently we have a known conflict between the two codes that we need to address to keep our code usable, enforceable, and relevant. Until the provisions for swimming pools and spas found within the IECC are just duplicated into ISPSC as they are in the IRC we have to do what needs to be done to keep us from intentionally creating conflict between requirements and two code books. We need to have the ISPSC refer to the IECC for the energy requirements.

Cost Impact: The net effect of the public comment and code change proposal will not increase or decrease the cost of construction
This is a coordination between two codes.

Public Comment# 2665

SP14-21

Proposed Change as Submitted

Proponents: Glenn Mathewson, representing North American Deck and Railing Association (glenn@glennmathewson.com)

2021 International Swimming Pool and Spa Code

Revise as follows:

306.5 Slope. The minimum slope of decks shall be in accordance with Table 306.5 ~~except where an alternative drainage method is provided that prevents the accumulation or pooling of water. The slope for decks, other than wood decks,~~ The maximum slope of decks shall be not greater than $^1/_2$ inch per foot (1 mm per 24 mm) ~~except for ramps. The slope for wood and wood/plastic composite decks shall be not greater than $^1/_4$ inch per 1 foot (1 mm per 48 mm). Decks shall be sloped so that standing water will not be deeper than $^1/_8$ inch (3.2 mm), 20 minutes after the cessation of the addition of water to the deck.~~

Exceptions:

1. The minimum slope of decks in Table 306.5 shall not be required where an alternative drainage method is provided that prevents the accumulation or pooling of water deeper than 1/8 inch (3.2 mm), 20 minutes after the cessation of the addition of water to the deck.
2. The minimum slope of decks in Table 306.5 shall not be required where the decking is gapped in accordance with Section 306.6

Reason: The single paragraph of text is confusing and appears to embed exceptions within the general requirements. This proposal restructures the section to provide the general minimum and maximum slopes for decks. Exceptions then provide clarity for when the general provisions are not required due to more specific conditions. We are not aware of the justification for why wood decks would be permitted to slope more than decks of any other material. “wood” and “non-wood” are not sufficiently descriptive of the performance differences that would allow for differing slopes. There is no reason to include “except for ramps”. The IRC provides specific provisions for construction of ramps and it is clear what a ramp is. This is an elementary clarification that is unnecessary to the professional interpretation of this code.
The final statement “Deck shall be sloped so that standing water will not be deeper than 1/8 inch, 20 minutes after the cessation of the addition of water to the deck.” is not appropriate for the design community. This statement is “more specific” than the reference to the maximum slope table 306.5, and will therefore rule in a conflict. However, it is a performance metric that cannot be evaluated until after project completion. The result may be a designer and contractor adhering to the provisions of Table 306.5 only to find disapproval of the completed project at the time of inspection. Retaining this provision, but as an exception, is more appropriate. If a designer chooses not to use the prescriptive and definitive slopes in Table 306.5, they can make the choice to use the exception and chose to have the drainage verified after project completion.

There is no reason to require a drainage slope of a deck when the decking is gapped for drainage. The use of gaps between decking materials has been an effective way to drain precipitation from decks for decades. Installing a hot tub or pool adjacent to an existing deck with gapped decking constructed level (as is standard practice) would cause said deck to become non-compliant under this code. Existing, level decks with gapped decking have no history of inhibited drainage. A reference to 306.6 for gapped decking is an appropriate exception to required slope.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
Cost of construction will be unchanged or possibly reduced. Providing the design community reliable provisions they can design and construct under provides more assurance that completed work will not need to be modified due to an in-situ drainage testing protocol. Similarly, existing decks constructed level and with gapped decks (as is standard) will not require modification due to the installation of an adjacent pool or hot tub

SP14-21

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The maximum of a 1/2 inch per foot slope should have been addressed in the proposal. The Committee wants the stakeholders to get together to create a public comment that addresses the various types of decking currently available and to find a solution for the maximum of a 1/2 inch per foot slope. (7-4)

SP14-21

Individual Consideration Agenda

Public Comment 1:

Proponents: Glenn Mathewson, representing North American Deck and Railing Association (glenn@glennmathewson.com) requests As Submitted

Commenter's Reason: This proposal is designed to work with the modifications approved "as submitted" in SP16-21 (306.6), but was disapproved during the committee hearings out of concern that a 1/2-inch in 12-inch slope for wood decks was too great.
However, the 1/2-inch slope was already permitted in the 2021 ISPSC Section 306.5 for all decks other than wood and wood/plastic composite, which are limited to 1/4-inch slope. No characteristics of wood or wood/plastic surface texture or slipperiness are included in this provision and thus the reduced allowable slope for any surface except wood and composite is without justification. In the published committee action reason statement, there was a universal concern for a 1/2" slope that was voiced, but this proposal did not attempt to change that maximum.

As the original proponent and per request of the committee, we reached out the the Pool & Hot Tub Alliance and asked for their assistance in selecting an appropriate maximum slope, as their members are more familiar with building sloped decks for pools. Unfortunately, together, we were unable to develop a way to address the committee concerns, as the tolerances between the minimum slopes in Table 306.5 and the maximum slope of 1/2-inch are so minimal. It is important to note that no other hearing participants spoke in opposition to this proposal. The concerns were from the committee only.

The proposal includes an exception to slope when the decking is gapped in accordance with the committee-approved modifications in SP16-21 (306.6). Wood decking is typically installed level and with gaps and would meet the exception. Wood/plastic decking is required to be installed in accordance with the manufacturer's installation instructions, and we are not aware of any such product that can be installed without drainage gaps between decking members.

We ask for approval of this proposal as submitted so that the intended and prepared modifications can work in tandem with the changes in SP16-21 (306.6). We ask that our proposal be evaluated for what we have proposed, rather than what we have not proposed.

We will continue to work with the pool industry to determine what maximum slopes they believe are acceptable for the relatively rare condition where a wood or composite deck is built with a slope and without drainage between boards. However, at this time, approval of this proposal will make positive changes to Section 306.5

Cost Impact: The net effect of the public comment and code change proposal will not increase or decrease the cost of construction
This public comment does not modify the original proposal, therefore the cost impact is unchanged as originally provided:

Cost of construction will be unchanged or possibly reduced. Providing the design community reliable provisions they can design and construct under provides more assurance that completed work will not need to be modified due to an in-situ drainage testing protocol. Similarly, existing decks constructed level and with gapped decks (as is standard) will not require modification due to the installation of an adjacent pool or hot tub

Public Comment# 2676

SP17-21

Proposed Change as Submitted

Proponents: Nicholas Capezza, representing Pool & Hot Tub Alliance (ncapezza@phta.org); Jennifer Hatfield, representing Pool & Hot Tub Alliance (jhatfield@phta.org)

2021 International Swimming Pool and Spa Code

Revise as follows:

307.1.2 Colors and finishes. For other than *residential* pools and *residential* spas, the colors, patterns, or finishes of the pool and spa interiors shall not obscure objects or surfaces within the pool or spa. The interior finish coating floors and walls shall be white or light-colored.

307.1.2.1 Munsell ~~color value~~ grey scale. Finishes shall be not less than ~~6.5~~ 8.0 on the Munsell ~~color value~~ grey scale.

Exceptions: The following shall not be required to comply with this section:

1. Competitive lane markings.
2. Floors of dedicated competitive diving wells.
3. Step or bench edge markings.
4. Pools shallower than 24 inches (609.6 mm).
5. Water line tiles.
6. Wave and surf pool depth change indicator tiles.
7. Depth change indicator tiles where a rope and float line is provided.
8. Features such as rock formations, as *approved*.

Reason: Use of 6.5 as the minimum requirement is obsolete as the current aim by professionals is at least 8.0 or equivalent. This update removes the ambiguous mandatory minimum lightness. The 8.0 Munsell grey scale (80 CIE L.a.b. lightness equivalent) requirement represents the more common lightness minimum for commercial work found in the industry, along with guidance to accurately reflect how the lightness system should be used.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal will not increase the cost of construction because no additional labor, materials, equipment, appliances, or devices are mandated beyond what is currently required by the code.

SP17-21

Public Hearing Results

Committee Action: **As Submitted**

Committee Reason: This revision provides a better method for light finishes that is independent of color choice. (9-2)

SP17-21

Individual Consideration Agenda

Public Comment 1:

ISPSC: 307.1.3 (New)

Proponents: Nicholas Capezza, representing Pool & Hot Tub Alliance (ncapezza@phta.org); Jennifer Hatfield, representing Pool & Hot Tub Alliance (jen@jhatfieldandassociates.com) requests As Modified by Public Comment

Modify as follows:

2021 International Swimming Pool and Spa Code

307.1.3 Designs or Logos. . Any design or logos on the pool floor or walls shall be such that it will not hinder the detection of a human in distress, algae, sediment, or other objects in the pool.

Commenter's Reason: This public comment addresses a concern raised by the International Swimming Pool and Spa Code Committee that the original proposal did not address designs and logos, when used. This comment simply adds a new subsection in addition to what was originally proposed and approved by the committee, to provide guidance for designs and logos.

Cost Impact: The net effect of the public comment and code change proposal will not increase or decrease the cost of construction
This proposal will not increase the cost of construction because no additional labor, materials, equipment, appliances, or devices are mandated beyond what is currently required by the code.

Public Comment# 2426

SP18-21

Proposed Change as Submitted

Proponents: Nicholas Capezza, representing Pool & Hot Tub Alliance (ncapezza@phta.org); Jennifer Hatfield, representing Pool & Hot Tub Alliance (jhatfield@phta.org)

2021 International Swimming Pool and Spa Code

Revise as follows:

TABLE 307.2.2 RESERVOIRS AND SHELLS

MATERIAL	STANDARD
Fiberglass reinforced plastic	IAPMO Z124.7
Plastic	IAPMO Z124.7
Stainless steel (Types 316, 316L, 304, 304L)	ASTM A240
Reinforced concrete	ACI 318
Reinforced shotcrete	ACI 318
Tile	ANSI A108/A118/A136.1
Vinyl	ASTM D1593

Add new definition as follows:

SHOTCRETE. Concrete placed by a high velocity pneumatic projection from a nozzle.

Add new text as follows:

ACI

American concrete Institute
38800 Country Club Drive
Farmington Hills, MI 48331-3439

Add new standard(s) as follows:

ACI 318-19.
Building Code Requirements for Structural Concrete

Reason: Concrete is not identified for use currently in the *International Swimming Pool and Spa Code* and a literal interpretation would suggest that concrete is not permitted as a building material. This proposal seeks to add concrete and shotcrete as materials with the relevant ACI standard referenced within Table 307.2.2. A definition of shotcrete is also added. The ACI 318 standard is already referenced in other I-Codes including the *International Building Code* and *International Residential Code*.

Bibliography: See the 2021 IRC sections that reference the 2019 edition of the ACI 318 in Chapter 44 and the 2021 IBC sections that reference the 2019 edition of the ACI 318 in Chapter 35.

Cost Impact: The code change proposal will increase the cost of construction
Additional concrete use will be necessary for new construction that would not meet psi requirements of the referenced ACI standard. This minor increase in the cost of construction is estimated at $20-$25 per yard of material, $150-$250 per average pool. This increase is offset by an anticipated increased lifespan and lack of secondary issues requiring repair.

Staff Analysis: ACI 318-19, Building Code Requirements for Structural Concrete, is currently referenced in the 2021 IBC and IRC.

SP18-21

Public Hearing Results

Committee Action: **As Modified**

Committee Modification:

SHOTCRETE. Concrete, wet or dry, placed by a high velocity pneumatic projection from a nozzle.

Committee Reason: For the modification: A simple clarification that shotcrete can be either a wet or dry product.
For the proposal as modified: This is a necessary addition to the pool shell materials table. However, the proponent needs to bring this back in public comment to address the issue that ACI 318 requires the use of 4000 psi concrete and this can be problematic. Use of a lower strength material needs to be accommodated. (11-00

SP18-21

Individual Consideration Agenda

Public Comment 1:

ISPSC: 307.2.2

Proponents: Nicholas Capezza, representing Pool & Hot Tub Alliance (ncapezza@phta.org); Jennifer Hatfield, representing Pool & Hot Tub Alliance (jen@jhatfieldandassociates.com) requests As Modified by Public Comment

Further modify as follows:

2021 International Swimming Pool and Spa Code

307.2.2 Materials and structural design . Pools and spas shall conform to one or more of the standards indicated in Table 307.2.2. The structural design of pools and spas shall be in accordance with the *International Building Code* or the *International Residential Code*, as applicable in accordance with Section 102.7.1 of this code.

> <u>**Exception:** Pools and spas constructed with reinforced concrete or reinforced shotcrete with a minimum compressive strength of 2500 psi as designed by a design professional and approved shall be permitted.</u>

Commenter's Reason: This public comment simply provides an exception to the ACI 318 Standard to provide flexibility to builders and engineers, a concern mentioned by the *International Swimming Pool and Spa Code* Committee, who requested this be addressed in public comment.

Cost Impact: The net effect of the public comment and code change proposal will increase the cost of construction
Additional concrete use will be necessary for new construction that would not meet psi requirements of the proposal and public comment. This increase is offset by an anticipated increased lifespan and lack of secondary issues requiring repair.

Public Comment# 2290

SP21-21

Proposed Change as Submitted

Proponents: Nicholas Capezza, representing Pool & Hot Tub Alliance (ncapezza@phta.org); Jennifer Hatfield, representing Pool & Hot Tub Alliance (jhatfield@phta.org)

2021 International Swimming Pool and Spa Code

Add new definition as follows:

INCREASED RISK AQUATIC VENUE. An aquatic venue which has an increased risk of microbial contamination due to its primary users being children under the age of 5 or people more susceptible to infection, such as therapy patients with open wounds. Examples of increased risk aquatic venues include spray pads, wading pools, therapy pools, and other aquatic venues designed primarily for children under the age of 5.

SECONDARY DISINFECTION SYSTEM. Disinfection processes or systems installed in increased risk aquatic venues in addition to the required primary disinfection system.

Add new text as follows:

319.3 Secondary disinfection systems.
Secondary disinfection systems shall be installed for the following increased risk aquatic venues in addition to the required primary disinfection system:

1. Wading Pools.
2. Interactive Water Play Features.
3. Therapy Pools.
4. Other aquatic venues designed primarily for children under the age of 5.

The secondary disinfection system shall be listed and labeled to NSF 50 and installed in accordance with the manufacturer's specifications.

319.4 Supplemental Treatment Systems.
Supplemental treatment systems shall be certified to NSF 50 and installed in accordance with the manufacturer's specifications.

Reason: This proposal seeks to harmonize the ANSI/APSP (PHTA)/ICC-11, upcoming ANSI/PHTA/ICC-2 Standard, Model Aquatic Health Code, and NSF 50 with the *International Swimming Pool and Spa Code*. These additions are consistent with, and will not require modification of, Section 612.
The Model Aquatic Health Code and the ANSI/APSP (PHTA)/ICC-11 Standard delineated the type of disinfection systems required in an aquatic venue based on a stratified risk model. The *International Swimming Pool and Spa Code* addresses interactive water play features in Section 612 but there are additional increased risk aquatic venues which the Code is currently silent on. Since non-halogen-based disinfection systems are installed and maintained in these venues, it is important to apply Code requirements to other high-risk venues.

Secondary disinfection systems are currently defined in the ANSI/APSP (PHTA)/ICC-11 Standard, the Model Aquatic Health Code, and NSF 50 to be those non-halogen disinfection systems designed to achieve a minimum 3-log reduction in the number of infective *Cryptosporidium parvum* oocysts per pass through the secondary disinfection system at the maximum flow. Those systems that reduce pathogens, but do not necessarily meet the 3-log reduction criteria for Secondary Disinfection Systems are termed Supplemental Treatment Systems.

Many public aquatic venues elect to install supplemental treatment systems to improve water quality, enhance system performance, and reduce overall maintenance costs. A definition is not currently in the *International Swimming Pool and Spa Code* but is a term used in the Model Aquatic Health Code and in ANSI/APSP (PHTA)/ICC-11.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal will not increase the cost of construction because no additional labor, materials, equipment, appliances, or devices are mandated beyond what is currently required by the code.

SP21-21

Public Hearing Results

Committee Action: **As Modified**

Committee Modification:

319.3 Secondary disinfection systems. Secondary disinfection systems shall be installed for the following increased risk aquatic venues in addition to the required primary disinfection system:

1. Wading Pools.
2. Interactive Water Play Features.
3. Therapy Pools.
4. Other aquatic venues designed primarily for children under the age of 5.

The secondary disinfection system shall be listed and labeled to NSF 50 and installed in accordance with the manufacturer's specifications. Where electrically-powered, such equipment shall additionally be listed and labeled in accordance with UL 1563 or UL 1081.

319.4 Supplemental Treatment Systems.
Supplemental treatment systems in public pools and spas shall be certified to NSF 50 and installed in accordance with the manufacturer's specifications.

Where electrically-powered, such equipment shall additionally be listed and labeled in accordance with UL 1563 or UL 1081.

Committee Reason: For the modification: A needed clarification that this is only required for public pools and spas. The electrical safety standards are consistent with other I-Code requirements.
For the proposal as modified: The Committee agreed with the published reason statment. The committee would appreciate a public comment to change "aquatic venue" term to be "pool or spa" to be in alignment with what the ISPSC currently uses. (11-0)

SP21-21

Individual Consideration Agenda

Public Comment 1:

ISPSC: (New)

Proponents: Nicholas Capezza, representing Pool & Hot Tub Alliance (ncapezza@phta.org); Jennifer Hatfield, representing Pool & Hot Tub Alliance (jen@jhatfieldandassociates.com) requests As Modified by Public Comment

Further modify as follows:

2021 International Swimming Pool and Spa Code

AQUATIC VENUE . A constructed structure or modified natural structure containing water and intended for recreational or therapeutic use. Exposure to water in these structures may occur by contact, ingestion, or aerosolization. Examples include swimming pools, wave pools, lazy rivers, surf pools, spas, hot tubs, therapy pools, spray pads, waterpark pools, and other interactive water venues.

Commenter's Reason: This public comment adds a needed definition to the *International Swimming Pool and Spa Code* (ISPSC) to address a concern from the ISPSC Committee that the term is used in the proposal without being defined. The Code Committee suggested removing the term "aquatic venue" and replacing it with "pool or spa" but by adding the definition and continuing to use "aquatic venue" within this proposal, it will align with the PHTA-1 Public Pool and Spa Standard and the PHTA-11 Water Quality in Public Pools and Spas Standard which both use the term. In addition, an "aquatic venue" can be something beyond a pool or spa, such as an interactive water feature; therefore, this term is needed to ensure all types of venues are captured.

Cost Impact: The net effect of the public comment and code change proposal will not increase or decrease the cost of construction
This proposal will not increase the cost of construction because no additional labor, materials, equipment, appliances, or devices are mandated beyond what is currently required by the code.

Public Comment# 2427

SP24-21

Proposed Change as Submitted

Proponents: Nicholas Capezza, representing Pool & Hot Tub Alliance (ncapezza@phta.org); Jennifer Hatfield, representing Pool & Hot Tub Alliance (jhatfield@phta.org)

2021 International Swimming Pool and Spa Code

Add new definition as follows:

ELEVATED POOL. Any pool, spa, cold plunge, water feature, catch basin, overflow trough, or body of water that is 1) inside a weather envelope or 2) outside a weather envelope, and installed over occupied/conditioned space, or installed over occupiable space (mechanical room, crawlspace, etc.), or installed over unoccupied/non-conditioned spaces (parking garages), or installed in an above-grade with no occupied, occupiable or unoccupied space below.

Add new text as follows:

SECTION 308
ELEVATED POOLS

308.1 Design of elevated pools.
Elevated pools shall be designed and constructed in accordance with PHTA 10.

Add new standard(s) as follows:

APSP

Pool & Hot Tub Alliance (formerly The Association of Pool & Spa Professionals)
2111 Eisenhower Avenue, Suite 500
Alexandria, VA 22314

ANSI/PHTA/ICC 10 - 2021 American National Standard for Elevated Pools and Spas

Reason: This proposal seeks to recognize elevated pools and spas in the *International Swimming Pool and Spa Code* with a reference to the upcoming ANSI/PHTA (formerly APSP)/ICC-10. There is currently no code guidance on this type of structure. The reasoning for the creation of an ANSI/PHTA/ICC Standard on elevated pools and spas stems from multiple sources. Jurisdictions and regulators seek guidance on this issue as the number of elevated pools and spas constructed and installed has increased greatly in recent years. Various issues including leaking and other consumer issues has led to litigation. The specialized construction of an elevated pool or spa including materials, piping, values, waterproof systems, and leak detection equipment should be addressed. Design and construction guidelines in this Standard - and in the *International Swimming Pool and Spa Code* - seeks to diminish these issues.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal will not increase the cost of construction because no additional labor, materials, equipment, appliances, or devices are mandated beyond what is currently required by the code.

Staff Analysis: A review of the standard proposed for inclusion in the code, ANSI/PHTA/ICC 10 - 2021, American National Standard for Elevated Pools and Spas, with regard to some of the key ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before March 20, 2021.

SP24-21

Public Hearing Results

Committee Action: **As Modified**

Committee Modification:

ELEVATED POOL. Any pool, spa, cold plunge, water feature, catch basin, overflow trough, or body of water that is over a habitable, occupiable, or unoccupied space that is 1) inside a ~~weather~~ thermal envelope or 2) outside a ~~weather~~ thermal envelope, or 3) a combination of inside and outside the thermal envelope ~~and installed over occupied/conditioned space, or installed over occupiable space (mechanical room, crawlspace, etc.), or installed over unoccupied/non-conditioned spaces (parking garages), or installed in an above-grade with no occupied, occupiable or unoccupied space below~~.

Committee Reason: For the modification: This better clarifies exactly what spaces are below an elevated pool.
For the proposal as modified: Pools are being built in areas where the real estate is free such as above parking garages, on roofs and other areas previously having no purpose. Standards for this type of construction are needed as iit is currently unregulated and many problems have been occurred. (11-0)

SP24-21

Individual Consideration Agenda

Public Comment 1:

ISPSC: SECTION 202

Proponents: Nicholas Capezza, representing Pool & Hot Tub Alliance (ncapezza@phta.org); Jennifer Hatfield, representing Pool & Hot Tub Alliance (jen@jhatfieldandassociates.com) requests As Modified by Public Comment

Further modify as follows:

2021 International Swimming Pool and Spa Code

~~**ELEVATED POOL.** Any pool, spa, cold plunge, water feature, catch basin, overflow trough, or body of water that is over a habitable, occupiable, or unoccupied space that is 1) inside a thermal envelope or 2) outside a thermal envelope, or 3) a combination of inside and outside the thermal envelope.~~

<u>**ELEVATED POOL .** Any permanently installed pool, spa, cold plunge, catch basin, overflow trough, including any connected water feature, or body of water water feature, that is over a habitable, occupiable or unoccupied space that is 1) inside a thermal envelope or 2) envelope or , outside a thermal envelope, or 3) a combination of inside and outside the thermal envelope. envelope.</u>

Commenter's Reason: This public comment makes further updates to the definition of an "elevated pool" to align with the definition found in the PHTA-10 Standard for Elevated Pools and Spas. This new standard was part of the original proposal approved by the committee to add to the ISPSC, as currently no code requirements exist within the ISPSC for these type of pools.

Cost Impact: The net effect of the public comment and code change proposal will not increase or decrease the cost of construction
This proposal will not increase the cost of construction because no additional labor, materials, equipment, appliances, or devices are mandated beyond what is currently required by the code.

Public Comment# 2429

Public Comment 2:

Proponents: CP28 Administration

Commenter's Reason: The administration of ICC Council Policy 28 (CP28) is not taking a position on this code change. This public comment is being submitted to bring a procedural requirement to the attention of the ICC voting membership. In accordance with Section 3.6.3.1.1 of ICC Council Policy 28 (partially reproduced below), the new referenced standard(s) ANSI/PHTA/ICC-10-2021 must be completed and readily available prior to the Public Comment Hearing in order for this public comment to be considered.
(CP28) 3.6.3.1.1 Proposed New Standards. In order for a new standard to be considered for reference by the Code, such standard shall be submitted in at least a consensus draft form in accordance with Section 3.4. If the proposed new standard is not submitted in at least consensus draft form, the code change proposal shall be considered incomplete and shall not be processed. The code change proposal shall be considered at the Committee Action Hearing by the applicable code development committee responsible for the corresponding proposed changes to the code text. If the committee action at the Committee Action Hearing is either As Submitted or As Modified and the standard is not completed, the code change proposal shall automatically be placed on the Public Comment Agenda with the recommendation stating that in order for the public comment to be considered, the new standard shall be completed and readily available prior to the Public Comment Hearing.

Public Comment# 2992

SP30-21

Proposed Change as Submitted

Proponents: Nicholas Capezza, representing Pool & Hot Tub Alliance (ncapezza@phta.org); Jennifer Hatfield, representing Pool & Hot Tub Alliance (jhatfield@phta.org)

2021 International Swimming Pool and Spa Code

Revise as follows:

UNDERWATER BENCH. An underwater seat that can be recessed into the pool wall or placed completely inside the perimeter shape of the pool, such as a sun shelf.

809.2 Entry and exit. Pools shall have a means of entry and exit in all shallow areas where the design water depth of the shallow area at the shallowest point exceeds 24 inches (610 mm). Where a vanishing edge catch basin has a water depth exceeding 24 inches (610 mm) when the edge system is off, an exit shall be provided. Entries and exits shall consist of one or a combination of the following: steps, stairs, ladders, treads, ramps, beach entries, underwater seats, *underwater benches*, swimouts, and other *approved* designs. The means of entry and exit shall be located on the shallow side of the first slope change.

Reason: This proposal seeks to add additional safety needs to permanent inground residential swimming pools to ensure ample exits under certain conditions. The proposed language stems from a current draft for the next update to the ANSI/APSP (PHTA)/ICC-5 Standard. The *International Swimming Pool and Spa Code* adopts language from this Standard where appropriate. This proposal also seeks to clarify that a sun shelf is an underwater bench as the term is used in Section 411.5.2.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal will not increase the cost of construction because no additional labor, materials, equipment, appliances, or devices are mandated beyond what is currently required by the code.

SP30-21

Public Hearing Results

Committee Action: **As Modified**

Committee Modification:

809.2 Entry and exit.
Pools shall have a means of entry and exit in all shallow areas where the design water depth of the shallow area at the shallowest point exceeds 24 inches (610 mm). ~~Where a vanishing edge catch basin has a water depth exceeding 24 inches (610 mm) when the edge system is off, an exit shall be provided.~~ Entries and exits shall consist of one or a combination of the following: steps, stairs, ladders, treads, ramps, beach entries, underwater seats, *underwater benches*, swimouts, and other *approved* designs. The means of entry and exit shall be located on the shallow side of the first slope change.

809.2.1. Catch Basins. Where a vanishing edge catch basin has a water depth exceeding 24 inches (610 mm) when the edge system is off, an exit shall be provided.

Committee Reason: For the modification: This is needed to provide better clarification for the catch basin application.
For the proposal as modified: The Committee agreed with the published reason statement. (11-0)

SP30-21

Individual Consideration Agenda

Public Comment 1:

ISPSC: (New)

Proponents: Nicholas Capezza, representing Pool & Hot Tub Alliance (ncapezza@phta.org); Jennifer Hatfield, representing Pool & Hot Tub Alliance (jen@jhatfieldandassociates.com) requests As Modified by Public Comment

Modify as follows:

2021 International Swimming Pool and Spa Code

SUN SHELF. . An area of a pool that adjoins the pool wall with a water depth less than 12 inches (305 mm) and is used for seating and play.

Commenter's Reason: This public comment simply adds a needed definition to the initial proposal approved by the *International Swimming Pool and Spa Code* (ISPSC) Committee to address a concern from that Committee that the term sun shelf is used in the proposal without being defined. The definition used comes from the Florida Building Code's definition of sunshelf.

Cost Impact: The net effect of the public comment and code change proposal will not increase or decrease the cost of construction
This proposal will not increase the cost of construction because no additional labor, materials, equipment, appliances, or devices are mandated beyond what is currently required by the code.

Public Comment# 2430

SP31-21

Proposed Change as Submitted

Proponents: Nicholas Capezza, representing Pool & Hot Tub Alliance (ncapezza@phta.org); Jennifer Hatfield, representing Pool & Hot Tub Alliance (jhatfield@phta.org)

2021 International Swimming Pool and Spa Code

Revise as follows:

809.6 Beach and sloping entries. The slope of beach and sloping entries used as a pool entrance shall not exceed 1 unit vertical in 7 units horizontal (14-percent slope).The entrance shall not have any step transition from deck to sloping entry. There shall be a zero height riser from sloped floor to deck. The slope from shallowest point to deepest point shall be comprised of straight lines to form a plane or linear cone surface; the lines defining the slope surface shall not be convex or concave with a tolerance ±1/2 inch (12.7 mm).

809.7 Steps and sloping entries. Where steps and benches are used in conjunction with sloping entries, the vertical riser distance shall not exceed 12 inches (305 mm). The slope from the shallowest point to deepest point shall be comprised of straight lines to form a plane or a linear cone surface; the lines forming the slope surface shall not be convex or concave with a tolerance of ± 1/2 inch (12.7 mm). For steps used in conjunction with sloping entries, the requirements of Section 809.6 shall apply.

Reason: This proposal looks to address safety matters on sloping entries. Industry stakeholders have suggested concerns regarding entries and wish to ensure the safest sloping entries possible. The language comes from a draft proposal for the next update of the ANSI/APSP (PHTA)/ICC-5 Standard. The *International Swimming Pool and Spa Code* typical adopts language from this Standard where appropriate.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal will not increase the cost of construction because no additional labor, materials, equipment, appliances, or devices are mandated beyond what is currently required by the code.

SP31-21

Public Hearing Results

Committee Action: **As Submitted**

Committee Reason: This area in a beach entry pool is especially problematic as the code didn't provide any guidance. (11-0)

SP31-21

Individual Consideration Agenda

Public Comment 1:

ISPSC: 809.6, 809.7

Proponents: Nicholas Capezza, representing Pool & Hot Tub Alliance (ncapezza@phta.org); Jennifer Hatfield, representing Pool & Hot Tub Alliance (jen@jhatfieldandassociates.com) requests As Modified by Public Comment

Modify as follows:

2021 International Swimming Pool and Spa Code

809.6 Beach and sloping entries . The slope of the floor in beach and sloping entries used as a pool entrance shall not exceed 1 unit vertical in 7 units horizontal (14-percent slope). ~~entrance shall not have any step transition from deck to sloping entry. There shall be a zero height riser from sloped floor to deck. The slope from shallowest point to deepest point shall be comprised of straight lines to form a plane or linear cone surface; the lines defining the slope surface shall not be convex or concave with a tolerance ±1/2 inch (12.7 mm).~~ The top of the slope of the entry floor shall be at a uniform elevation. Where the top of the slope is a straight line, the floor slope shall be developed from lines that are perpendicular or uniformly skew to the top of slope. Where the top of the slope is a curved line, the floor slope shall be developed from lines perpendicular to tangents to the curved line. The length of the development lines shall be equal except for those lines that intersect longer slope development lines. The flatness of the sloping entry floor, across the width of the slope and from the top of the slope to the toe of the slope, shall be within +/- ½ inch (13 mm.) The top of the slope of the floor shall transition uniformly at the same or lesser slope of the sloped entry and without a step, to the top of the deck adjacent.

809.7 Steps and sloping entries . Where steps or benches are ~~used~~ located adjacent to the side of a sloped floor of a beach or sloping entry~~used in conjunction with sloping entries,~~ the vertical ~~riser~~ distance from the top of the step or bench to the sloped floorshall not exceed 12 inches (305 mm). Steps and benches shall not be located along the top of the slope of a beach or sloping entry.~~For steps used in conjunction with sloping entries, the requirements of Section 809.6 shall apply. and The slope from the shallowest point to deepest point shall be comprised of straight lines to form a plane or a linear cone surface; the lines forming the slope surface shall not be convex or concave with a tolerance of ± 1/2 inch (12.7 mm). For steps used in conjunction with sloping entries, the requirements of Section 809.6 shall apply.and~~

Commenter's Reason: This public comment continues to address the original proposal's concern that the Code Committee agreed with but goes further to provide guidance on curved bowl entries. This is being done based on the suggestion of a Code Committee member who encouraged some type of clarity be submitted as a public comment on the proposed language, to ensure it was clear for the code user on how to address curved bowl entries.

Cost Impact: The net effect of the public comment and code change proposal will not increase or decrease the cost of construction
This proposal will not increase the cost of construction because no additional labor, materials, equipment, appliances, or devices are mandated beyond what is currently required by the code.

Public Comment# 2432

SP33-21

Proposed Change as Submitted

Proponents: Nicholas Capezza, representing Pool & Hot Tub Alliance (ncapezza@phta.org); Jennifer Hatfield, representing Pool & Hot Tub Alliance (jhatfield@phta.org)

2021 International Swimming Pool and Spa Code

Add new text as follows:

Appendix B
PUBLIC POOL AND SPA OPERATIONS AND MAINTENANCE

SECTION B101
GENERAL

B101.1 Scope.
Public pool and spa operations and maintenance shall comply with PHTA 2.

Add new standard(s) as follows:

APSP

Pool & Hot Tub Alliance (formerly The Association of Pool & Spa Professionals)
2111 Eisenhower Avenue, Suite 500
Alexandria, VA 22314

ANSI/PHTA/ICC 2 - 2021 American National Standard for Public Pool and Spa Operations and Maintenance

Reason: This proposal would add the ANSI/PHTA/ICC-2 *Standard for Public Pool and Spa Operations and Maintenance,* which is intended to cover public/commercial aquatic venues operation and maintenance, as a resource for jurisdictions seeking guidance on this topic. This Standard can then be used by state and local authorities as a health and safety guidance document for the operation and maintenance of all types of public aquatic venues. Industry partners such as commercial pool and spa service companies, water park operators and public pool operators can also use this Standard as the benchmark for the minimum standards to operate and maintain public aquatic venues. Further, public health officials can adopt this Standard through adoption of the ISPSC by specifically referencing the appendix when adopting the Code by rule or ordinance. In many states building and health officials regulate public pools and spas together, by adding this Standard into the ISPSC, we are providing one document that covers design, construction, operation and maintenance. This will make it easier for the building and health officials by having all requirements in one place.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal will not increase the cost of construction because no additional labor, materials, equipment, appliances, or devices are mandated beyond what is currently required by the code.

Staff Analysis: A review of the standard proposed for inclusion in the code, PHTAANSI/PHTA/ICC-2 2021 Standard for Public Pool and Spa Operations and Maintenance, with regard to some of the key ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before March 20, 2021.

SP33-21

Public Hearing Results

Committee Action: **As Submitted**

Committee Reason: Water efficiency is becoming more important in the industry and the code does not provide any guidance because operations is not within the scope of the code. However, this information is useful in an appendix. (11-0)

SP33-21

Individual Consideration Agenda

Public Comment 1:

Proponents: CP28 Administration

Commenter's Reason: The administration of ICC Council Policy 28 (CP28) is not taking a position on this code change. This public comment is being submitted to bring a procedural requirement to the attention of the ICC voting membership. In accordance with Section 3.6.3.1.1 of ICC Council Policy 28 (partially reproduced below), the new referenced standard(s) ANSI/PHTA/ICC-2-2021 must be completed and readily available prior to the Public Comment Hearing in order for this public comment to be considered.

(CP28) 3.6.3.1.1 Proposed New Standards. In order for a new standard to be considered for reference by the Code, such standard shall be submitted in at least a consensus draft form in accordance with Section 3.4. If the proposed new standard is not submitted in at least consensus draft form, the code change proposal shall be considered incomplete and shall not be processed. The code change proposal shall be considered at the Committee Action Hearing by the applicable code development committee responsible for the corresponding proposed changes to the code text. If the committee action at the Committee Action Hearing is either As Submitted or As Modified and the standard is not completed, the code change proposal shall automatically be placed on the Public Comment Agenda with the recommendation stating that in order for the public comment to be considered, the new standard shall be completed and readily available prior to the Public Comment Hearing.

Public Comment# 2993

FG1-21

Proposed Change as Submitted

Proponents: Julie Furr, Rimkus Consulting Group, Inc., representing Federal Emergency Management Agency/Applied Technology Council - Seismic Code Support Committee, representing Federal Emergency Management Agency/Applied Technology Council - Seismic Code Support Committee (jfurr@rimkus.com); Kelly Cobeen, Wiss Janney Elstner Associates, Inc., representing Federal Emergency Management Agency/Applied Technology Council - Seismic Code Support Committee (kcobeen@wje.com); Michael Mahoney, Federal Emergency Management Agency, representing Federal Emergency Management Agency (mike.mahoney@fema.dhs.gov)

2021 International Fuel Gas Code

Revise as follows:

301.12 Seismic resistance. Where earthquake loads are applicable in accordance with the *International Building Code* ,~~ the~~ supports, anchorage, and bracing shall be designed and installed for the seismic forces in accordance with Chapter 16 of the *International Building Code*.~~ that code.~~

Reason: Summary
This proposal aligns the IFGC with current language in the IPC and IMC and identifies where seismic loads are actually defined. This proposal preserves the ability of one- and two-family dwellings to comply solely with the IRC and does not impose any new requirements for an engineered solution for nonstructural components.

2021 IFGC

This proposal aligns the IFGC with current language in the IPC (Section 308.2) and IMC (Section 301.18) and clarifies which IBC chapter defines seismic load requirements for commercial applications. Proper specification of seismic design loads is consistent with the intent to "prevent failures of nonstructural components or systems, where such failures would endanger life", as stated in the 2020 NEHRP Recommended Provisions Section 1.1.2.

The pointer to IBC Chapter 16 is necessary to ensure users know where to find appropriate seismic criteria. Titled “Structural Design”, IBC Chapter 16 is easily overlooked by anyone working with "nonstructural" elements and/or unfamiliar with seismic criteria. IBC Section 1613.1 references ASCE 7, Chapter 13 for specific detailing criteria and formulas utilized to calculate seismic design loads, thus eliminating any ambiguity on seismic requirements for nonstructural components.

Absent this modification, getting to the applicable seismic criteria requires in-depth knowledge of IBC Chapter 16 and its contents. Although the IFGC points back to the IBC for information not explicitly provided, IBC Chapter 28 “Mechanical Systems” points directly back to the IFGC, with no mention of other IBC sections. This becomes a circular reference between the IFGC and IBC without clear direction on seismic design requirements.

2021 IRC

The text in Chapter 24 of the IRC is pulled directly from the IFGC by ICC staff, with appropriate modifications to section references and the removal of commercial-only applications. As such, unlike most I-Code chapters, IRC Chapter 24 cannot be edited by direct proposals.

The IFGC proposal will continue to allow one- and two-family dwellings to comply with the IRC seismic provisions and is not intended to override applicable IRC fuel gas support seismic requirements.

The exception to IFGC Section 101.2 states that one- and two-family dwellings "shall comply with this code [IFGC] or the *International Residential Code*." As such, one- and two-family dwellings are only required to globally comply with either the IFGC or IRC, not both. This provision will remain unchanged by this proposal.

We anticipate the resulting IRC language would read as follows:

- **2021 IRC G2404.8 (301.12) Seismic resistance.** “Where earthquake loads are applicable in accordance with this code, ~~the~~ supports, anchorage, and bracing shall be designed and installed for seismic forces in accordance with this code.”

Bibliography: NEHRP Recommended Seismic Provisions for New Buildings and Other Structures, 2020 Edition (FEMA P-2082-1)

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The proposed wording clarifies the intent of the code, provides specific guidance on where to find seismic design criteria, and does not impose additional requirements that are not already required by applicable design standards.

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The proposed language would require IRC buildings to comply with the IBC earthquake requirements. The IRC already has specific bracing and earthquake requirements without needing IBC chapter 16 and ASCE requirements. (11-0)

FG1-21

Individual Consideration Agenda

Public Comment 1:

Proponents: Julie Furr, representing Federal Emergency Management Agency/Applied Technology Council - Seismic Code Support Committee (jfurr@rimkus.com); Michael Mahoney, representing Federal Emergency Management Agency (mike.mahoney@fema.dhs.gov) requests As Submitted

Commenter's Reason: This proposal includes anchorage and bracing in the designated seismic resistance system, which are critical components necessary to provide a functioning system. The resulting IRC language, after being extracted by the ICC staff, would read as follows:

- **2021 IRC G2404.8 (301.12) Seismic resistance.** “Where earthquake loads are applicable in accordance with this code, ~~the~~ supports, anchorage, and bracing shall be designed and installed for seismic forces in accordance with this code.”

The Committee disapproved this proposal due to stated concerns that IRC buildings would be required to comply with IBC earthquake requirements and that the proposed language would require design professionals for residential buildings. The Committee's disapproval did not appear to consider the fact that IFGC language is extracted directly into the IRC by ICC staff, who make appropriate modifications to the extracted language to keep the text within the IRC scope.

The proposed seismic reference is identical to the current wind resistance reference in IRC G2404.6 (301.10), where ICC staff has modified the referenced "International Building Code" to "this code".

In Summary:

- This IRC language keeps DOES NOT require compliance with the IBC.
- Design professionals WILL NOT be required as a result of this modification.
- The IRC currently specifies earthquake requirements for supports only.
- The IRC DOES NOT specify requirements for anchorage and bracing.

Cost Impact: The net effect of the public comment and code change proposal will not increase or decrease the cost of construction
The proposed language clarifies specific critical components that have always been required to construct a functioning system.

Public Comment# 2285

FG2-21

Proposed Change as Submitted

Proponents: Ted Williams, American Gas Association, representing American Gas Association (twilliams@aga.org)

2021 International Fuel Gas Code

Delete and substitute as follows:

~~**404.6 Underground penetrations prohibited.** Gas *piping* shall not penetrate building foundation walls at any point below grade. Gas *piping* shall enter and exit a building at a point above grade and the annular space between the pipe and the wall shall be sealed.~~

404.6 Piping through foundation wall. Underground piping where installed below grade through the foundation or basement wall of a building shall be encased in a protective pipe sleeve. The annular space between the gas piping and the sleeve shall be sealed.

Reason: The current text for Section 404.6, adopted into the 2015 edition, prohibits gas piping from penetrating a foundation or basement wall below grade. This text, a change from previous editions of the IFGC, was adopted without substantial or data-based evidence that such penetrations have resulted in a safety concern. Below grade penetrations have a long been permitted and have proven to be a safe installation method. The revised language would reinstate this allowance. At least one U. S. state, Georgia, has amended the IFGC to delete the prohibition and allow below grade penetration as previously permitted and as proposed in this revised text. The State of Georgia code text is as follows: "404.6 Piping through foundation wall. Underground piping where installed below grade through the foundation or basement wall of a building, shall be encased is a protective pipe sleeve. The annular space between the gas piping and the sleeve shall be sealed." Additionally, allowing below grade penetrations removes a potential safety hazard introduced by requiring exposed pipe work exterior to the building when it would otherwise not be required and where it might be ruptured upon contact.

Cost Impact: The code change proposal will decrease the cost of construction
The return to allowing below grade foundation penetrations will reduce costs by avoiding more expensive piping runs from below grade outside of the foundation to above grade wall penetrations, and return of piping to below grade elevation within the building to serve appliances and equipment. Below grade installation of appliances and equipment is a predominant installation location for buildings with basements.

FG2-21

Public Hearing Results

Committee Action: **As Submitted**

Committee Reason: This requirement has been in the code since the 2009 edition and no evidence was provided for the need to change the requirement. (7-4)

FG2-21

Individual Consideration Agenda

Public Comment 1:

Proponents: Guy McMann, representing Colorado Association of Plumbing and Mechanical Officials (CAPMO) (gmcmann@jeffco.us) requests Disapprove

Commenter's Reason: This important requirement has been in the code since 2009 and provides protection against gas migration into buildings. Relying on a caulked joint is in-effective as they are subject to to deterioration, poor workmanship, expansive soil, etc. This code change is also seriously **flawed** in that it does not address the sealing of the sleeve to the wall, which is critical in completing an installation correctly. Privacy does not permit addresses of properties to be divulged that may have been impacted. The cost of a few fitting is good insurance in gas migration prevention. This requirement needs to remain in the code. Georgia testified in support of this change. What may be good for Georgia may not be good for the rest of the country.

Cost Impact: The net effect of the public comment and code change proposal will not increase or decrease the cost of construction
Because there are no new requirements there are no additional costs.

FG4-21

Proposed Change as Submitted

Proponents: Jonathan Sargeant, representing Omegaflex (jonathan.sargeant@omegaflex.com)

2021 International Fuel Gas Code

Revise as follows:

REGULATOR. A device for controlling and maintaining a uniform supply pressure~~, either pounds-to-inches water column (MP regulator) or inches-to-inches water column (*appliance* regulator)~~.

Delete without substitution:

~~**REGULATOR, MEDIUM-PRESSURE (MP Regulator).** A line pressure regulator that reduces gas pressure from the range of greater than 0.5 psig (3.4 kPa) and less than or equal to 5 psig (34.5 kPa) to a lower pressure.~~
~~REGULATOR, MEDIUM-PRESSURE (MP Regulator). A line pressure regulator that reduces gas pressure from the range of greater than 0.5 psig (3.4 kPa) and less than or equal to 5 psig (34.5 kPa) to a lower pressure.~~

Add new definition as follows:

VENT LIMITING DEVICE. A device, installed in the vent port of a pressure regulator, designed to limit the amount of gas escapement in the event of a diaphragm failure within the regulator.

Revise as follows:

408.4 Sediment trap. Where a sediment trap is not incorporated as part of the *appliance*, a sediment trap shall be installed downstream of the *appliance* shutoff valve as close to the inlet of the *appliance* as practical. A sediment trap shall also be installed upstream of the line pressure regulator and downstream of the shutoff valve serving the regulator. The sediment trap shall be either a tee fitting having a capped nipple of any length installed vertically in the bottommost opening of the tee as illustrated in Figure 408.4 or other device *approved* as an effective sediment trap. Illuminating appliances, ranges, clothes dryers, decorative vented appliances for installation in vented *fireplaces*, gas fireplaces and outdoor grills need not be so equipped.

410.1 Pressure regulators. A line pressure regulator shall be installed where the *appliance* is designed to operate at a lower pressure than the supply pressure. Line gas pressure regulators shall be *listed* as complying with ANSI Z21.80/CSA 6.22. *Access* shall be provided to pressure regulators. Pressure regulators shall be protected from physical damage. Regulators installed on the exterior of the building shall be *approved* for outdoor installation.

1. The line pressure regulator shall maintain a reduced outlet pressure under lock-up (no-flow) conditions.
2. The capacity of the line pressure regulator, determined by published ratings of its manufacturer, shall be adequate to supply the appliances served.

409.4 ~~MP~~ Line pressure regulator valves. A *listed* shutoff valve shall be installed immediately ahead of each ~~MP~~ line pressure regulator.

410.2 ~~MP regulators~~ Regulator Installation. ~~MP~~ Line pressure regulators shall comply with the following:

1. The ~~MP~~ line pressure regulator shall be listed ~~*approved*~~ and shall be suitable for the inlet and outlet gas pressures for the application.
2. ~~The MP regulator shall maintain a reduced outlet pressure under lock-up (no-flow) conditions.~~
3. ~~The capacity of the MP regulator, determined by published ratings of its manufacturer, shall be adequate to supply the *appliances* served.~~

42. The ~~MP~~ line pressure regulator shall be provided with *access.* Where located indoors, the regulator shall be vented to the outdoors or shall be equipped with a vent ~~leak-~~limiting device, in either case complying with Section 410.3.

3. Means shall be provided both upstream and downstream of the line pressure regulator for the connection of a pressure measuring device.

5. ~~A tee fitting with one opening capped or plugged shall be installed between the MP regulator and its upstream shutoff valve. Such tee fitting shall be positioned to allow connection of a pressure-measuring instrument and to serve as a sediment trap.~~
6. ~~A tee fitting with one opening capped or plugged shall be installed not less than 10 pipe diameters downstream of the MP regulator outlet. Such tee fitting shall be positioned to allow connection of a pressure-measuring instrument. The tee fitting is not required where the MP regulator serves an *appliance* that has a pressure test port on the gas control inlet side and the *appliance* is located in the same room as the MP regulator.~~

7.4. ~~Where connected to rigid *piping*, a~~ A union shall be installed within 1 foot (304 mm) of either side of the ~~MP~~ line pressure regulator.

Reason: 408.4 is changed to add the requirement, now in 410.2 (5), for a sediment trap upstream of the line pressure regulator.

The term “MP regulator” is deleted and replaced with “line pressure regulator.” As used in the IFGC line pressure regulator and a MP regulator are the same thing.

1. 402.7 limits pressure in most buildings to 5 psig. Higher pressure is allowed where pipe is installed in a chase, welded, or in industrial occupancies
2. Line pressure regulators can be rated for up to 10 psig, but 402.7 limits the inlet pressure to 5 psig in most installations.
3. There is no standard for MP regulators. It is believed that line pressure regulators listed to ANSI Z21.80 are being used.

Existing paragraphs 2 and 3 are moved to 410.1 for clarity and 410.2 is reworked to include only regulator installation requirements.

Existing paragraph 7 (now 4) is revised to require a union on all piping not just on rigid piping.

Existing paragraphs 5 and 6 are replaced by paragraph 3 to be less prescriptive while still meeting the intent of the code to enable the measurement of pressure on both sides of the regulator.

Deleted Regulator, Medium Pressure definition - the term is deleted from Section 410.2.

Revised Regulator definition - The definition is revised for consistency with the revised text which eliminates the use of MP. Inlet and outlet pressures of regulators, where needed, should be in the code and not in a definition.

Added Vent Limiting Device definition - To define a term added to section 410.2 that is consistent with the listing standard Z21.80.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
While the requirement for a union on non-rigid piping systems would slightly increase the installed cost of those piping systems the proponent believes that the less proscriptive requirements for provision of pressure measuring ports will more than offset this increase.

FG4-21

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: There wasn't enough justification provided for changing the code nor do the changes clarify the code. (11-0)

FG4-21

Individual Consideration Agenda

Public Comment 1:

IFGC: 410.2

Proponents: Jonathan Sargeant, representing Omegaflex (jonathan.sargeant@omegaflex.com); Bob Torbin, representing OmegaFlex (bob.torbin@omegaflex.net) requests As Modified by Public Comment

Replace as follows:

2021 International Fuel Gas Code

410.2 MP regulators . MP pressure regulators shall comply with the following:

1. The MP regulator shall be *approved* and shall be suitable for the inlet and outlet gas pressures for the application.
2. The MP regulator shall maintain a reduced outlet pressure under lock-up (no-flow) conditions.
3. The capacity of the MP regulator, determined by published ratings of its manufacturer, shall be adequate to supply the *appliances* served.
4. The MP pressure regulator shall be provided with *access*. Where located indoors, the regulator shall be vented to the outdoors or shall be equipped with a leak-limiting device, in either case complying with Section 410.3.
5. A tee fitting with one opening capped or plugged shall be installed between the MP regulator and its upstream shutoff valve. Such tee fitting

shall be positioned to allow connection of a pressure-measuring instrument and to serve as a sediment trap.

6. ~~A tee fitting with one opening capped or plugged shall be installed not less than 10 pipe diameters downstream of the MP regulator outlet. Such tee fitting shall be positioned to allow connection of a pressure-measuring instrument. The tee fitting is not required where the MP regulator serves an *appliance* that has a pressure test port on the gas control inlet side and the *appliance* is located in the same room as the MP regulator.~~ Means shall be provided downstream of the MP regulator for the connection of a pressure measuring instrument. Means for connection of a pressure measuring instrument shall be permitted to be a dedicated test port on a regulator, gas control, or manifold, or a plugged tee fitting or plugged manifold port.
7. Where connected to rigid *piping*, a union shall be installed within 1 foot (304 mm) of either side of the MP regulator.

Commenter's Reason: This proposal expands the list of acceptable pressure test ports beyond a simple tee fitting by recognizing that regulator, appliance gas control, and pre-fabricated manifold manufacturers provide integral test ports in their devices that meet the intent of the code. This proposal eliminates unnecessary fittings, joints, and potential leak paths in the gas piping system.

Cost Impact: The net effect of the public comment and code change proposal will decrease the cost of construction
This proposal will reduce the cost of construction by eliminating unnecessary fittings in the gas piping system.

Public Comment# 2552

P1-21

Proposed Change as Submitted

Proponents: Julius Ballanco, representing Self (JBENGINEER@aol.com)

2021 International Plumbing Code

Revise as follows:

BATHROOM GROUP. A group of fixtures consisting of a water closet, lavatory, bathtub or shower, including or excluding a bidet, an *emergency floor drain* or both. Such fixtures are located together on the same floor level.
Half Group. A group of fixtures consisting of a water closet and lavatory, including or excluding a bidet, located in the same room.

709.1 Values for fixtures. *Drainage fixture unit* values as given in Table 709.1 (1) and 709.1(2) designate the relative load weight of different kinds of fixtures that shall be employed in estimating the total load carried by a soil or waste pipe, and shall be used in connection with Tables 710.1(1) and 710.1(2) of sizes for soil, waste and vent pipes for which the permissible load is given in terms of fixture units.

TABLE 709.1(1) DRAINAGE FIXTURE UNITS FOR FIXTURES AND GROUPS

FIXTURE TYPE	DRAINAGE FIXTURE UNIT VALUE AS LOAD FACTORS	MINIMUM SIZE OF TRAP (inches)
Automatic clothes washers, commercial[a, g]	3	2
Automatic clothes washers, residential[g]	2	2
~~Bathroom group as defined in Section 202 (1.6 gpf water closet)[f]~~	~~5~~	—
~~Bathroom group as defined in Section 202 (water closet flushing greater than 1.6 gpf)[f]~~	~~6~~	—
Bathtub[b] (with or without overhead shower or whirlpool attachments)	2	$1^1/_2$
Bidet	1	$1^1/_4$
Combination sink and tray	2	$1^1/_2$
Dental lavatory	1	$1^1/_4$
Dental unit or cuspidor	1	$1^1/_4$
Dishwashing machine[c], domestic	2	$1^1/_2$
Drinking fountain	$^1/_2$	$1^1/_4$
Emergency floor drain	0	2
Floor drains[h]	2[h]	2
Floor sinks	Note h	2
Kitchen sink, domestic	2	$1^1/_2$
Kitchen sink, domestic with food waste disposer, dishwasher or both	2	$1^1/_2$
Laundry tray (1 or 2 compartments)	2	$1^1/_2$
Lavatory	1	$1^1/_4$
Shower (based on the total flow rate through showerheads and body sprays) flow rate: 5.7 gpm or less Greater than 5.7 gpm to 12.3 gpm Greater than 12.3 gpm to 25.8 gpm Greater than 25.8 gpm to 55.6 gpm	 2 3 5 6	 $1^1/_2$ 2 3 4
Service sink	2	$1^1/_2$
Sink	2	$1^1/_2$
Urinal	4	Note d
Urinal, 1 gallon per flush or less	2[e]	Note d
Urinal, nonwater supplied	$^1/_2$	Note d
Wash sink (circular or multiple) each set of faucets	2	$1^1/_2$
Water closet, flushometer tank, public or private	4[e]	Note d
Water closet, private (1.6 gpf)	3[e]	Note d
Water closet, private (flushing greater than 1.6 gpf)	4[e]	Note d
Water closet, public (1.6 gpf)	4[e]	Note d
Water closet, public (flushing greater than 1.6 gpf)	6[e]	Note d

For SI: 1 inch = 25.4 mm, 1 gallon = 3.785 L, gpf = gallon per flushing cycle, 1 gallon per minute (gpm) = 3.785 L/m.

a. For traps larger than 3 inches, use Table 709.2.

b. A showerhead over a bathtub or whirlpool bathtub attachment does not increase the drainage fixture unit value.

c. See Sections 709.2 through 709.4.1 for methods of computing unit value of fixtures not listed in this table or for rating of devices with intermittent flows.

d. Trap size shall be consistent with the fixture outlet size.

e. For the purpose of computing loads on building drains and sewers, water closets and urinals shall not be rated at a lower drainage fixture unit unless the lower values are confirmed by testing.

f. ~~For fixtures added to a bathroom group, add the dfu value of those additional fixtures to the bathroom group fixture count.~~

g. See Section 406.2 for sizing requirements for fixture drain, branch drain and drainage stack for an automatic clothes washer standpipe.

h. See Sections 709.4 and 709.4.1.

Add new text as follows:

TABLE 709.1(2) DRAINAGE FIXTURE UNITS FOR BATHROOM GROUPS

FIXTURE GROUP	DRAINAGE FIXTURE UNIT - INDIVIDUAL DWELLING UNIT[1]	DRAINAGE FIXTURE UNIT - 3 OR GREATER DWELLING UNITS
Bathroom group as defined in Section 202 (1.6 gpf or less water closet)		
Half Group	3.5	2.5
1 Bathroom Group	5	3
1-1/2 Bathroom Groups	6	3.5
2 Bathroom Groups	7	4.5
2-1/2 Bathroom Groups	8	5
3 Bathroom Groups	9	5.5
Each Addition Half Group	0.5	0.5
Each Additional Bathroom Group	1	1
Bathroom group as defined in Section 202 (greater than 1.6 gpf water closet		
Half Group	3.5	2.5
1 Bathroom Group	6	4
1-1/2 Bathroom Groups	8	5.5
2 Bathroom Groups	10	6.5
2-1/2 Bathroom Groups	11	7.5
3 Bathroom Groups	12	8
Each Addition Half Group	0.5	0.5
Each Additional Bathroom Group	1	1

a. Individual dwelling units includes guest rooms, patient rooms, and single user bathrooms in other buildings. For multiple family dwelling units greater than 3 dwelling units, the drainage fixture unit within the dwelling unit shall be based on the individual dwelling drainage fixture unit value. The drainage fixture unit value for the system, shall be based on the greater than 3 dwelling units drainage fixture unit value.

Reason: The late Tom Konen did extensive research on the impact of flows in drainage systems using low flow fixtures. The proposed new table of fixture unit values was published by Tom Konen in 1994. While going through the history of changes to the International Plumbing Code, there has never been a proposal to introduce the table Konen developed in his research. By the time the report was published, the first edition of the International Plumbing Code was already completed and published. For the last 25 years, there hasn't been any consideration of adding the modified fixture unit table.
What Konen identified in his paper is that families are getting smaller and houses are getting bigger with more bathrooms. Using the queuing theory developed by Dr. Roy B. Hunter, Konen determined that the use of fixtures varies based on the number of fixture installed in a dwelling unit. A five bathroom home occupied by 3 people could not possibly have a peak demand whereby half of the fixture are used simultaneously. Konen's data identified the frequency of use. The data resulted in a revised fixture unit table for bathroom groups. This table has been included in the IAPMO National Standard Plumbing Code (formerly known as the PHCC National Standard Plumbing Code) for the last 25 years. The history of using these revised fixture unit values have been proven out in states such as New Jersey and Maryland.

The International Plumbing Code should be updated to reflect the research and field experience with revised fixture units for dwelling unit bathroom groups.

Bibliography: Impact of Water Conservation on Interior Plumbing, Thomas P. Konen, P.E., Stevens Institute of Technology, ASPE 1994 Convention Technical Proceedings, Copyright 1995, American Society of Plumbing Engineers

Cost Impact: The code change proposal will decrease the cost of construction
This change will lower the cost of construction by allowing lower drainage fixture unit values for larger dwelling units. The result can be smaller diameter drainage pipes.

P1-21

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The Committee was not opposed to the principle and concept. However, the presentation and format leaves a lot to be desired. No one is going to know how to use the right column of the new table because it refers to the system that seems to be addressing building sewer, building drains and stacks. This is a new concept that is not intuitive and code users are not going to understand it. A number of other problems such as 1) the definition half-bath has a misplaced phrase "including or excluding a bidet," (should be after "group of fixtures" 2) new table refers to greater than 1.6 gpf water closets (1.6 gpf exceeds code limitation), 3) the entire new table depends 100% on a footnote in the table, 4) the first sentence of the footnote addresses "guest rooms, patient rooms, and single user bathrooms in other buildings" in the context of individual dwelling units (confusing applications) 4) the table title of the right column speaks to 3 or greater water closets (does the table not apply dwelling units with 2 water closets?) and the last sentence of the footnote indicates that the values apply to the system (no definition of what that means). The resultant effect of this table will be some reduction of the size of piping and that might have unknown consequences to overall system venting. (8-6)

P1-21

Individual Consideration Agenda

Public Comment 1:

IPC: 709.1, TABLE 709.1(2)

Proponents: Julius Ballanco, representing Self (jbengineer@aol.com); Dan Buuck, representing National Association of Home Builders (dbuuck@nahb.org) requests As Modified by Public Comment

Modify as follows:

2021 International Plumbing Code

709.1 Values for fixtures . *Drainage fixture unit* values as given in Table 709.1(1) and 709.1(2) designate the relative load weight of different kinds of fixtures that shall be employed in estimating the total load carried by a soil or waste pipe, and shall be used in connection with Tables 710.1(1) and 710.1(2) of sizes for soil, waste and vent pipes for which the permissible load is given in terms of fixture units. <u>Column A of Table 709.1(2) shall be used to determine the *drainage fixture unit* values for one and two family dwellings, individual dwelling units in multifamily dwellings, guest rooms, patient rooms, and single user bathrooms in other buildings. Column B of Table 709.1(2) shall be used to determine the *drainage fixture unit* values for piping systems receiving the discharge of 3 or more dwelling units.</u>

TABLE 709.1(2) DRAINAGE FIXTURE UNITS FOR BATHROOM GROUPS

FIXTURE GROUP	COLUMN A -DRAINAGE FIXTURE UNIT - ONE AND TWO FAMILY DWELLINGS AND INDIVIDUAL DWELLING UNIT OR ROOMS~~[a]~~	COLUMN B -DRAINAGE FIXTURE UNIT - 3 OR GREATER DWELLING UNITS
Bathroom group as defined in Section 202 (1.6 gpf or less water closet)		
Half Group	3.5	2.5
1 Bathroom Group	5	3
1-1/2 Bathroom Groups	6	3.5
2 Bathroom Groups	7	4.5
2-1/2 Bathroom Groups	8	5
3 Bathroom Groups	9	5.5
Each Addition Half Group	0.5	0.5
Each Additional Bathroom Group	1	1
Bathroom group as defined in Section 202 (greater than 1.6 gpf water closet		
Half Group	3.5	2.5
1 Bathroom Group	6	4
1-1/2 Bathroom Groups	8	5.5
2 Bathroom Groups	10	6.5
2-1/2 Bathroom Groups	11	7.5
3 Bathroom Groups	12	8
Each Addition Half Group	0.5	0.5
Each Additional Bathroom Group	1	1

~~a. Individual dwelling units includes guest rooms, patient rooms, and single user bathrooms in other buildings. For multiple family dwelling units greater than 3 dwelling units, the drainage fixture unit within the dwelling unit shall be based on the individual dwelling drainage fixture unit value. The drainage fixture unit value for the system, shall be based on the greater than 3 dwelling units drainage fixture unit value.~~

Commenter's Reason: The Committee expressed concerns with the understanding of the difference between the two columns listing fixture unit values. That has been clarified by a change to Section 709.1. The new text in Section 709.1 incorporates the comments in Note a. The note to Table 709.1(2) has been deleted as a result of the modification to Section 709.1.

Another concern expressed by the Committee was the inclusion of water closets having a flush volume of greater than 1.6 gpf. The current Table 709.1 has a listing for water closet having a flush volume of greater than 1.6 gpf. Since this change is regarding the research on the proper fixture unit values, no change has been made to delete the row on water closets having a flush volume greater than 1.6 gpf. Such a change should be made separately to the table if one is inclined.

Cost Impact: The net effect of the public comment and code change proposal will not increase or decrease the cost of construction
The change will lower the cost of construction. However, this Public Comment only clarifies the original intent of the change.

Public Comment# 2706

P9-21

Proposed Change as Submitted

Proponents: Ted Williams, representing American Gas Association (twilliams@aga.org)

2021 International Plumbing Code

Add new text as follows:

306.2.4 Tracer wire.
For plastic sewer piping, an insulated copper tracer wire or other approved conductor shall be installed adjacent to and over the full length of the piping. Access shall be provided to the tracer wire or the tracer wire shall terminate at the cleanout between the building drain and building sewer. The tracer wire size shall be not less than 14 AWG and the insulation type shall be listed for direct burial.

Reason: The new provision that applies to buried plastic sewer piping requires a tracer wire in close proximity of the non-metallic sewer piping to assist in identifying the location of the buried pipe to avoid damaging the pipe when digging in the area of the underground pipe. This will help ensure that there will be no 3rd party damage during excavation in the area where the piping is located along with other utilities that may be in the same trench.

Cost Impact: The code change proposal will increase the cost of construction
Adding tracer wire to installations will contribute a minor cost of line installation.

P9-21

Public Hearing Results

Committee Action: **As Submitted**

Committee Reason: The Committee believes this is an enhancement for safety at minimal expense. There have been many instances of gas lines being cross-bored through through plastic sewer lines. Subsequent clearing of a blockage in the sewer can result in a disaster.(9-5)

P9-21

Individual Consideration Agenda

Public Comment 1:

Proponents: Michael Cudahy, representing PPFA (mikec@cmservices.com) requests Disapprove

Commenter's Reason: This was a divided vote for good reason. The requirement for new building plastic sewer piping to have a buried tracer wire is going to have minimal use, as building sewer lines on the property line are easy to locate, and the majority of existing sewer lines - plastic or otherwise, would still require manual marking prior to excavation. One could even just run a wire thru the sewer line on the property or use another methodology, if ever needed.

Bibliography: none

Cost Impact: The net effect of the public comment and code change proposal will not increase or decrease the cost of construction
No change to code.

Public Comment# 2810

Public Comment 2:

Proponents: Gary Kozan, representing self (garyk@ridgewayplumbing.com) requests Disapprove

Commenter's Reason: Plastic sewers have been around for over fifty years, and every utility locating service has the capability to find them easily without resorting to tracer wires. They've been doing so for years. Unlike some other buried non-metallic piping such as gas lines and water mains, sewer cleanouts allow for the easy insertion of a metal fish tape, or a sewer camera equipped with a sonde/beacon, to pinpoint the pipe's location and depth with greater precision than a tracer wire. These products are ubiquitous in today's marketplace. Additionally, ground penetrating radar (GPR) has become increasingly popular, and can provide accurate results in 2D and 3D. With today's technology, locating plastic sewers is just not a problem. If a sewer line gets damaged during excavation or cross-boring, it's either the fault of the locator or the operator, not a weakness in the code. There's just no need to start requiring tracer wires on plastic sewer lines now.

Cost Impact: The net effect of the public comment and code change proposal will not increase or decrease the cost of construction
No change to code.

Public Comment# 2261

P11-21

Proposed Change as Submitted

Proponents: James Walls, CISPI, representing CISPI (jwalls@cispi.org)

2021 International Plumbing Code

Revise as follows:

308.6 Sway bracing. Where *horizontal* drainage or waste *pipes* 4 inches (102 mm) and larger are suspended in excess of 18 inches measured from the top of the horizontal piping being supported to the point of support,- these pipes and fittings shall be braced to prevent horizontal movement. ~~convey drainage or waste, and where a pipe fitting in that piping changes the flow direction greater than 45 degrees (0.79 rad), rigid bracing or other rigid support arrangements shall be installed to resist movement of the upstream pipe in the direction of pipe flow. A change of flow direction into a vertical pipe shall not require the upstream pipe to be braced.~~

Reason: This proposed change removes language not related to sway bracing. Section 308.7 and 308.7.1 of this code includes thrust restraints at changes of direction for piping greater than 4 inches. This change removes conflicting information and clarifies the intent of sway bracing requirements.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
There are no additional cost with this change.

P11-21

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The language proposed to be removed is important to retain in the code. (14-0)

P11-21

Individual Consideration Agenda

Public Comment 1:

IPC: 308.6 (New), 308.6.1 (New), 308.6.2 (New)

Proponents: James Walls, representing CISPI (cispi@flash.net) requests As Modified by Public Comment

Replace as follows:

2021 International Plumbing Code

308.6
Sway Bracing and Restraint

308.6.1 **Sway Bracing .** Where horizontal pipes 4 inches (102mm) and larger convey drainage or waste, and where a pipe fitting changes the flow direction greater than 45 degrees (0.79 rad), rigid bracing or other rigid support arrangements shall be installed to resist movement. Sway bracing as a component of piping seismic supports shall be installed in accordance with Section 308.2.

308.6.2 **Restraint .** Where horizontal pipe sizes greater than 4 inches (102mm) convey drainage or waste shall be restrained at all changes in direction 45 degrees or greater.

Commenter's Reason: There is a great deal of confusion between sway bracing and restraint of pipe joints. This helps to clarify this information to the code official, installer, and other users of the code by making it clear what is required to accomplish each, as they are not the same thing. Information can be inserted on what each is and what each is meant to do and why it needs to be delineated in this fashion.

Cost Impact: The net effect of the public comment and code change proposal will not increase or decrease the cost of construction

There is no cost increase with these code change proposals.

Public Comment# 2468

P22-21

Proposed Change as Submitted

Proponents: Joseph Summers, Chair, representing Chair of PMGCAC (PMGCAC@iccsafe.org)

2021 International Plumbing Code

Revise as follows:

TABLE 403.1 MINIMUM NUMBER OF REQUIRED PLUMBING FIXTURES[a] (See Sections 403.1.1 and 403.2)

NO.	CLASSIFICATION	DESCRIPTION	WATER CLOSETS (URINALS: SEE SECTION 424.2)		LAVATORIES		BATHTUBS/ SHOWERS	DRINKING FOUNTAIN (SEE SECTION 410)	OTHER
			MALE	FEMALE	MALE	FEMALE			
1	Assembly	Theaters and other buildings for the performing arts and motion pictures[d]	1 per 125	1 per 65	1 per 200		—	1 per 500	1 service sink
		Nightclubs, bars, taverns, dance halls and buildings for similar purposes[d]	1 per 40	1 per 40	1 per 75		—	1 per 500	1 service sink
		Restaurants, banquet halls and food courts[d]	1 per 75	1 per 75	1 per 200		—	1 per 500	1 service sink
		Casino gaming areas	1 per 100 for the first 400 and 1 per 250 for the remainder exceeding 400	1 per 50 for the first 400 and 1 per 150 for the remainder exceeding 400	1 per 250 for the first 750 and 1 per 500 for the remainder exceeding 750		—	1 per 1,000	1 service sink
		Auditoriums without permanent seating, art galleries, exhibition halls, museums, lecture halls, libraries, arcades and gymnasiums[d]	1 per 125	1 per 65	1 per 200		—	1 per 500	1 service sink
		Passenger terminals and transportation facilities[d]	1 per 500	1 per 500	1 per 750		—	1 per 1,000	1 service sink
		Places of worship and other religious services[d]	1 per 150	1 per 75	1 per 200		—	1 per 1,000	1 service sink
		Coliseums, arenas, skating rinks, pools and tennis courts for indoor sporting events and activities	1 per 75 for the first 1,500 and 1 per 120 for the remainder exceeding 1,500	1 per 40 for the first 1,520 and 1 per 60 for the remainder exceeding 1,520	1 per 200	1 per 150	—	1 per 1,000	1 service sink
		Stadiums, amusement parks, bleachers and grandstands for outdoor sporting events and activities[f]	1 per 75 for the first 1,500 and 1 per 120 for the remainder exceeding 1,500	1 per 40 for the first 1,520 and 1 per 60 for the remainder exceeding 1,520	1 per 200	1 per 150	—	1 per 1,000	1 service sink
2	Business	Buildings for the transaction of business, professional services, other services involving merchandise, office buildings, banks, ambulatory care, light industrial and similar uses	1 per 25 for the first 50 and 1 per 50 for the remainder exceeding 50		1 per 40 for the first 80 and 1 per 80 for the remainder exceeding 80		—	1 per 100	1 service sink[e]
3	Educational	Educational facilities	1 per 50		1 per 50		—	1 per 100	1 service sink
4	Factory and industrial	Structures in which occupants are engaged in work fabricating, assembly or processing of products or materials	1 per 100		1 per 100		—	1 per 400	1 service sink
									1 service

NO.	CLASSIFICATION	DESCRIPTION	WATER CLOSETS (URINALS: SEE SECTION 424.2)		LAVATORIES		BATHTUBS/ SHOWERS	DRINKING FOUNTAIN (SEE SECTION 410)	OTHER
			MALE	FEMALE	MALE	FEMALE			
		Custodial care facilities	1 per 10		1 per 10		1 per 8	1 per 100	sink
		Medical care recipients in hospitals and nursing homes	1 per room[c]		1 per room[c]		1 per 15	1 per 100	1 service sink per floor
5	Institutional	Employees in hospitals and nursing homes[b]	1 per 25		1 per 35		—	1 per 100	—
		Visitors in hospitals and nursing homes	1 per 75		1 per 100		—	1 per 500	—
		Prisons[b]	1 per cell		1 per cell		1 per 15	1 per 100	1 service sink
		Reformatories, detention centers, and correctional centers[b]	1 per 15		1 per 15		1 per 15	1 per 100	1 service sink
		Employees in reformitories, detention centers and correctional centers[b]	1 per 25		1 per 35		—	1 per 100	—
		Adult day care and child day care	1 per 15		1 per 15		1	1 per 100	1 service sink
6	Mercantile	Retail stores, service stations, shops, salesrooms, markets and shopping centers	1 per 500		1 per 750		—	1 per 1,000	1 service sink[e]
7	Residential	Hotels, motels, boarding houses (transient)	1 per sleeping unit		1 per sleeping unit		1 per sleeping unit	—	1 service sink
		Dormitories, fraternities, sororities and boarding houses (not transient)	1 per 10		1 per 10		1 per 8	1 per 100	1 service sink
		Apartment house	1 per dwelling unit		1 per dwelling unit		1 per dwelling unit	—	1 kitchen sink per dwelling unit; 1 automatic clothes washer connection per 20 dwelling units
		Congregate living facilities with 16 or fewer persons	1 per 10		1 per 10		1 per 8	1 per 100	1 service sink
		One- and two-family dwellings and lodging houses with five or fewer guestrooms	1 per dwelling unit		1 per dwelling unit		1 per dwelling unit	—	1 kitchen sink per dwelling unit; 1 automatic clothes washer connection per dwelling unit
		Congregate living facilities with 16 or fewer persons	1 per 10		1 per 10		1 per 8	1 per 100	1 service sink
8	Storage	Structures for the storage of goods, warehouses, storehouse and freight depots. Low and Moderate Hazard.	1 per 100		1 per 100		—	1 per 1,000	1 service sink
					1 per 40 for the				

NO.	CLASSIFICATION	DESCRIPTION	WATER CLOSETS (URINALS: SEE SECTION 424.2)		LAVATORIES		BATHTUBS/ SHOWERS	DRINKING FOUNTAIN (SEE SECTION 410)	OTHER
			MALE	FEMALE	MALE	FEMALE			
9.	Shelters	Shelters for day or overnight use	1 per 25 for the first 50 and 1 per 50 for the remainder exceeding 50		first 80 and 1 per 80 for the remainder exceeding 80		1 per 40	1 per 100	1 service sink

a. The fixtures shown are based on one fixture being the minimum required for the number of persons indicated or any fraction of the number of persons indicated. The number of occupants shall be determined by the *International Building Code*.

b. Toilet facilities for employees shall be separate from facilities for inmates or care recipients.

c. A single-occupant toilet room with one water closet and one lavatory serving not more than two adjacent patient sleeping units shall be permitted provided that each patient sleeping unit has direct access to the toilet room and provision for privacy for the toilet room user is provided.

d. The occupant load for seasonal outdoor seating and entertainment areas shall be included when determining the minimum number of facilities required.

e. For business and mercantile classifications with an occupant load of 15 or fewer, service sinks shall not be required.

f. The required number and type of plumbing fixtures for outdoor public swimming pools shall be in accordance with Section 609 of the International Swimming Pool and Spa Code.

410.4 Substitution. Where restaurants provide drinking water in a container free of charge, drinking fountains shall not be required in those restaurants. In other *occupancies* except shelters, where three or more drinking fountains are required, *water dispensers* shall be permitted to be substituted for not more than 50 percent of the required number of drinking fountains. In shelters, alternative sources of drinking water such as bottle-supplied water dispensing units shall be permitted to be substituted for 100 percent of the required number of drinking fountains.

Reason: More and more municipalities are being tasked with providing shelter facilities for homeless persons. Some of these shelters are only temporary (180 days or less) because the need only exists in winter months. The existing code requirements are difficult to apply and provide less than adequate services for this population. The proposed requirements comes from experience in providing services in Fort Collins, CO.
This proposal is submitted by the ICC Plumbing/Mechanical/Gas Code Action Committee (PMG CAC). The PMG CAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2020, the PMG CAC has held several virtual meetings open to any interested party. Numerous interested parties attended the committee meetings and offered their input. Related documentation and reports are posted on the PMG CAC website at: https://www.iccsafe.org/products-and-services/i-codes/code-development-process/pmg-code-action-committee-pmgcac/ Reference PMGCAC Working Document Item 27.

Cost Impact: The code change proposal will increase the cost of construction
Adding requirements to the code for shelter facilities (where no requirements existed before) will likely require more fixtures and the associated labor to provide/install than what a municipality might believe as needed for such facilities. In the majority of cases, shelter facilities are temporary and as such, the required plumbing fixtures are also temporary because the vacant buildings chosen for shelters such as a warehouses, large assembly halls , do not have enough permanent fixtures. Thus, the added costs would be for potable rental units as needed.

P22-21

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The concept is well-supported however, there needs to be a residential row added for this to be in, add the term "homeless" to shelter, and change "bottled-supplied water dispenser" to "bottle filling station". This is not a temporary shelter because everything in Table 403.1 is permanent. (14-0)

P22-21

Individual Consideration Agenda

Public Comment 1:

IPC: TABLE 403.1, 410.4

Proponents: Joseph J. Summers, representing Chair of PMGCAC (pmgcac@iccsafe.org) requests As Modified by Public Comment

Modify as follows:

2021 International Plumbing Code

TABLE 403.1 MINIMUM NUMBER OF REQUIRED PLUMBING FIXTURES[a] (See Sections 403.1.1 and 403.2)

NO.	CLASSIFICATION	DESCRIPTION	WATER CLOSETS (URINALS: SEE SECTION 424.2)		LAVATORIES		BATHTUBS/ SHOWERS	DRINKING FOUNTAIN (SEE SECTION 410)	OTHER
			MALE	FEMALE	MALE	FEMALE			
1	Assembly	Theaters and other buildings for the performing arts and motion pictures[d]	1 per 125	1 per 65	1 per 200		—	1 per 500	1 service sink
		Nightclubs, bars, taverns, dance halls and buildings for similar purposes[d]	1 per 40	1 per 40	1 per 75		—	1 per 500	1 service sink
		Restaurants, banquet halls and food courts[d]	1 per 75	1 per 75	1 per 200		—	1 per 500	1 service sink
		Casino gaming areas	1 per 100 for the first 400 and 1 per 250 for the remainder exceeding 400	1 per 50 for the first 400 and 1 per 150 for the remainder exceeding 400	1 per 250 for the first 750 and 1 per 500 for the remainder exceeding 750		—	1 per 1,000	1 service sink
		Auditoriums without permanent seating, art galleries, exhibition halls, museums, lecture halls, libraries, arcades and gymnasiums[d]	1 per 125	1 per 65	1 per 200		—	1 per 500	1 service sink
		Passenger terminals and transportation facilities[d]	1 per 500	1 per 500	1 per 750		—	1 per 1,000	1 service sink
		Places of worship and other religious services[d]	1 per 150	1 per 75	1 per 200		—	1 per 1,000	1 service sink
		Coliseums, arenas, skating rinks, pools and tennis courts for indoor sporting events and activities	1 per 75 for the first 1,500 and 1 per 120 for the remainder exceeding 1,500	1 per 40 for the first 1,520 and 1 per 60 for the remainder exceeding 1,520	1 per 200	1 per 150	—	1 per 1,000	1 service sink
		Stadiums, amusement parks, bleachers and grandstands for outdoor sporting events and activities[f]	1 per 75 for the first 1,500 and 1 per 120 for the remainder exceeding 1,500	1 per 40 for the first 1,520 and 1 per 60 for the remainder exceeding 1,520	1 per 200	1 per 150	—	1 per 1,000	1 service sink
2	Business	Buildings for the transaction of business, professional services, other services involving merchandise, office buildings, banks, ambulatory care, light industrial and similar uses	1 per 25 for the first 50 and 1 per 50 for the remainder exceeding 50		1 per 40 for the first 80 and 1 per 80 for the remainder exceeding 80		—	1 per 100	1 service sink[e]
3	Educational	Educational facilities	1 per 50		1 per 50		—	1 per 100	1 service sink
4	Factory and industrial	Structures in which occupants are engaged in work fabricating, assembly or processing of products or materials	1 per 100		1 per 100		—	1 per 400	1 service sink
									1 service

NO.	CLASSIFICATION	DESCRIPTION	WATER CLOSETS (URINALS: SEE SECTION 424.2)		LAVATORIES		BATHTUBS/ SHOWERS	DRINKING FOUNTAIN (SEE SECTION 410)	OTHER
			MALE	FEMALE	MALE	FEMALE			
5	Institutional	Custodial care facilities	1 per 10		1 per 10		1 per 8	1 per 100	sink
		Medical care recipients in hospitals and nursing homes	1 per room[c]		1 per room[c]		1 per 15	1 per 100	1 service sink per floor
		Employees in hospitals and nursing homes[b]	1 per 25		1 per 35		—	1 per 100	—
		Visitors in hospitals and nursing homes	1 per 75		1 per 100		—	1 per 500	—
		Prisons[b]	1 per cell		1 per cell		1 per 15	1 per 100	1 service sink
		Reformatories, detention centers, and correctional centers[b]	1 per 15		1 per 15		1 per 15	1 per 100	1 service sink
		Employees in reformitories, detention centers and correctional centers[b]	1 per 25		1 per 35		—	1 per 100	—
		Adult day care and child day care	1 per 15		1 per 15		1	1 per 100	1 service sink
6	Mercantile	Retail stores, service stations, shops, salesrooms, markets and shopping centers	1 per 500		1 per 750		—	1 per 1,000	1 service sink[e]
7	Residential	Hotels, motels, boarding houses (transient)	1 per sleeping unit		1 per sleeping unit		1 per sleeping unit	—	1 service sink
		Dormitories, fraternities, sororities and boarding houses (not transient)	1 per 10		1 per 10		1 per 8	1 per 100	1 service sink
		Apartment house	1 per dwelling unit		1 per dwelling unit		1 per dwelling unit	—	1 kitchen sink per dwelling unit; 1 automatic clothes washer connection per 20 dwelling units
		Congregate living facilities with 16 or fewer persons	1 per 10		1 per 10		1 per 8	1 per 100	1 service sink
		One- and two-family dwellings and lodging houses with five or fewer guestrooms	1 per dwelling unit		1 per dwelling unit		1 per dwelling unit	—	1 kitchen sink per dwelling unit; 1 automatic clothes washer connection per dwelling unit
		Congregate living facilities with 16 or fewer persons	1 per 10		1 per 10		1 per 8	1 per 100	1 service sink
		Homeless shelters for day or overnight use	1 per 25 for the first 50 and 1 per 50 for the remainder exceeding 50		1 per 40 for the first 80 and 1 per 80 for the remainder exceeding 80		1 per 40	1 per 40	1 service sink

NO.	CLASSIFICATION	DESCRIPTION	WATER CLOSETS (URINALS: SEE SECTION 424.2)		LAVATORIES		BATHTUBS/ SHOWERS	DRINKING FOUNTAIN (SEE SECTION 410)	OTHER
			MALE	FEMALE	MALE	FEMALE			
8	Storage	Structures for the storage of goods, warehouses, storehouse and freight depots. Low and Moderate Hazard.	1 per 100		1 per 100			1 per 1,000	1 service sink
~~9.~~	~~Shelters~~	~~Shelters for day or overnight use~~	~~1 per 25 for the first 50 and 1 per 50 for the remainder exceeding 50~~		~~1 per 40 for the first 80 and 1 per 80 for the remainder exceeding 80~~		~~1 per 40~~	~~1 per 100~~	~~1 service sink~~

a. The fixtures shown are based on one fixture being the minimum required for the number of persons indicated or any fraction of the number of persons indicated. The number of occupants shall be determined by the *International Building Code*.

b. Toilet facilities for employees shall be separate from facilities for inmates or care recipients.

c. A single-occupant toilet room with one water closet and one lavatory serving not more than two adjacent patient sleeping units shall be permitted provided that each patient sleeping unit has direct access to the toilet room and provision for privacy for the toilet room user is provided.

d. The occupant load for seasonal outdoor seating and entertainment areas shall be included when determining the minimum number of facilities required.

e. For business and mercantile classifications with an occupant load of 15 or fewer, service sinks shall not be required.

f. The required number and type of plumbing fixtures for outdoor public swimming pools shall be in accordance with Section 609 of the International Swimming Pool and Spa Code.

410.4 Substitution . Where restaurants provide drinking water in a container free of charge, drinking fountains shall not be required in those restaurants. In other *occupancies* except shelters, where three or more drinking fountains are required, *water dispensers* shall be permitted to be substituted for not more than 50 percent of the required number of drinking fountains. In shelters, alternative sources of drinking water such as ~~bottle-supplied water dispensing units units~~ bottle filling stations shall be permitted to be substituted for 100 percent of the required number of drinking fountains.

Commenter's Reason: This public comment revises the proposal in accordance with the Committee's directions. The PMGCAC agrees with the changes as they improve the intent for coverage for these needed shelters.

Cost Impact: The net effect of the public comment and code change proposal will increase the cost of construction
The public comment only clarifies the original proposal. The cost impact for the original proposal ("an increase in the cost of construction") remains the same.

Public Comment# 2454

P25-21

Proposed Change as Submitted

Proponents: Emma Gonzalez-Laders, NYS DOS Division of Building Standards and Codes, representing NYS DOS Division of Building Standards and Codes (emma.gonzalez-laders@dos.ny.gov); China Clarke, New York State Dept of State, representing New York State Dept of State (china.clarke@dos.ny.gov); David Collins, The American Institute of Architects, representing The American Institute of Architects (dcollins@preview-group.com)

2021 International Plumbing Code

Revise as follows:

403.1.1 Fixture calculations. To determine the occupant load of each sex, the total occupant load shall be divided in half. To determine the required number of fixtures, the fixture ratio or ratios for each fixture type shall be applied to the occupant load of each sex in accordance with Table 403.1. Fractional numbers resulting from applying the fixture ratios of Table 403.1 shall be rounded up to the next whole number. For calculations involving multiple *occupancies*, such fractional numbers for each *occupancy* shall first be summed and then rounded up to the next whole number.

Exceptions:

1. The total occupant load shall not be required to be divided in half where *approved* statistical data indicate a distribution of the sexes of other than 50 percent of each sex.
2. Where multiple-user facilities are designed to serve all genders, the minimum fixture count shall be calculated 100 percent, based on total occupant load. In such multiple-user facilities, each fixture type shall be in accordance with ICC A117.1 and each urinal that is provided shall be located in a stall.
3. ~~Distribution of the sexes is not required where single-user water closets and bathing room fixtures are provided in accordance with Section 403.1.2.~~

403.1.2 Single-user toilet and bathing room fixtures. The plumbing fixtures located in single-user toilet and bathing rooms, including family or assisted-use toilet and bathing rooms~~ that are required by Section 1110.2.1 of the International Building Code~~, shall contribute toward the total number of required plumbing fixtures for a building or tenant space<u>, and shall be deducted proportionately from the required gender ratios of Table 403.1</u>. Single-user toilet and bathing rooms, and family or assisted-use toilet rooms and bathing rooms shall be identified as being available for use by all persons regardless of ~~their~~ sex.
The total number of fixtures shall be permitted to be based on the required number of separate facilities or based on the aggregate of any combination of single-user or ~~separate~~ <u>multi-user</u> facilities.

Reason: Exception 3 to Section 2902.1.1 of the 2021 IBC was added during the last code cycle and it indicates that *“distribution of the sexes is not required where single-user water closets and bathing room fixtures are provided in accordance with Section 2902.1.2.”* Section 403.1.1 of the 2021 IPC is nearly identical. The section referenced (2902.1.1) pertains to single-user facilities and how their number contributes to the total required fixture counts. Neither Section, however, provides any guidance on how the required gender rations are to be maintained in accordance with Table 2902.1. This ambiguity may lead some code users to assume that the lower ratios can be used, while other code users would assume that the more restrictive requirement should apply (in accordance with Section 102.1). In either scenario, the resulting number of fixtures would be either too low and not serve the needs of facility users or too high and not serve the needs of developers by unreasonably increasing cost.
Also, this exception may suggest that proportionality in the distribution of toilet fixtures by gender is not required. This is contrary to the intent of the proponents, based on conversations with one of them, and also contrary to the intent of the different Table values found in the Plumbing Code and the Building Code as stated in the commentary, which is to provide *“an ‘equality of fixture availability’ in those particular occupancies”* with *“historically […] long lines of females waiting to use toilet facilities while male facilities had no lines.”*

A better way to address the issue of proportionate distribution and how single-user facilities are to be deducted from the total required number of fixtures is to explicitly say so in Section 2902.1.2, and we, therefore, propose that the language *"and shall be deducted proportionately from the required gender ratios of Table 2902.1"* be added to that section.

Additionally, the reference in Section 2902.1.2 of the IBC and Section 403.1.2 of the IPC to *"family or assisted-use toilet and bathing rooms that are required by Section 1110.2.1"* is unnecessary and may incorrectly suggest that ONLY those facilities required by Section 1110.2.1 of the IBC can be counted and *"contribute toward the total number of required plumbing fixtures,"* where we believe that the intent is to have ALL single-user fixtures contribute to those totals, regardless of being required or provided voluntarily, therefore, we propose that the reference to Section 1110.2.1 be deleted.

And, to say "single-user and separated facilities" may incorrectly suggest that single-user facilities could be separated by gender, contrary to the 2nd sentence in the Section. We believe the intent to be for ALL facilities, single- or multi-user, separated or not, to contribute to the total fixture count. Therefore, we propose that the word *"separated"* in the last sentence of the code provision be replaced with the word *"multi-user."*

Cost Impact: The code change proposal will not increase or decrease the cost of construction

This proposal does not eliminate any existing code provisions, nor does it create new provisions. Instead, it provides consistency across related code sections.

P25-21

Public Hearing Results

This proposal includes unpublished errata
In the Committee Action Hearing version of the proposal, in Section 403.1.2, the reference to IBC Section 1109.2.1 was corrected to Section 1110.2.1.

Committee Action: **As Modified**

Committee Modification:

403.1.2Single-user toilet and bathing room fixtures. The plumbing fixtures located in single-user toilet or single-user ~~and~~ bathing rooms, including family or assisted-use toilet and bathing rooms, shall contribute toward the total number of required plumbing fixtures for a building or tenant spac~~e, and~~ . The number of fixtures in single-user toilets, single-user bathing fixtures and family or assisted-use toilets shall be deducted proportionately from the required gender ratios of Table 403.1. Single-user toilet and bathing rooms, and family or assisted-use toilet rooms and bathing rooms shall be identified as being available for use by all persons regardless of sex.

The total number of fixtures shall ~~be permitted to~~ be based on the required number of separate facilities or based on the aggregate of any combination of single-user or male and female designated ~~multi-user~~ facilities.

Committee Reason: For the modification: The clarifies the section to make sure that requirement covers all facilities. (14-0)
For the proposal As Modified: Exception No. 3 was always out of place. There has always been a problem with how to count the fixtures. This clears up the confusion. (14-0)

P25-21

Individual Consideration Agenda

Public Comment 1:

IPC: 403.1.2

Proponents: Emma Gonzalez-Laders, representing NYS DOS Division of Building Standards and Codes (emma.gonzalez-laders@dos.ny.gov); David Collins, representing The American Institute of Architects (dcollins@preview-group.com); China Clarke, representing New York State Dept of State (china.clarke@dos.ny.gov) requests As Modified by Public Comment

Further modify as follows:

2021 International Plumbing Code

403.1.2 Single-user toilet and bathing room fixtures . The plumbing fixtures located in single-user toilet or single-user bathing rooms, including family or assisted-use toilet and bathing rooms, shall contribute toward the total number of required plumbing fixtures for a building or tenant space. The number of fixtures in single-user toilets, single-user bathing fixtures and family or assisted-use toilets shall be deducted proportionately from the required gender ratios of Table 403.1. Single-user toilet and bathing rooms, and family or assisted-use toilet rooms and bathing rooms shall be identified as being available for use by all persons regardless of sex.
The total number of fixtures shall be based on the required number of separate facilities or based on the aggregate of any combination of single-user or ~~male and female designated~~ multiple-user facilities.

Commenter's Reason: A seemingly simple word change had an unintended misapplication. The intent of the last sentence is to indicate that all plumbing fixtures available for public use count regardless of whether provided in single- or multi-user facilities and regardless of whether those multi-user facilities are separated by gender or not. As currently written, the wording "male and female designated facilities" would suggest that the fixtures located in multi-user facilities designed to serve all persons regardless of sex should not be counted, which is incorrect and was not the intent of the proponent.
A simple fix to substitute the words "male and female designated" with "multi-user" resolves that unintended misaplication.

Cost Impact: The net effect of the public comment and code change proposal will not increase or decrease the cost of construction

This proposal is editorial and a matter of clarification. It has no cost implication.

Public Comment# 2403

P26-21

Proposed Change as Submitted

Proponents: Eirene Knott, BRR Architecture, representing Metropolitan Kansas City Chapter of the ICC (eirene.knott@brrarch.com)

2021 International Plumbing Code

Revise as follows:

403.1.1 Fixture calculations. To determine the occupant load of each sex, the total occupant load shall be divided in half. To determine the required number of fixtures, the fixture ratio or ratios for each fixture type shall be applied to the occupant load of each sex in accordance with Table 403.1. Fractional numbers resulting from applying the fixture ratios of Table 403.1 shall be rounded up to the next whole number. For calculations involving multiple *occupancies*, such fractional numbers for each *occupancy* shall first be summed and then rounded up to the next whole number.

Exceptions:

1. The total occupant load shall not be required to be divided in half where *approved* statistical data indicate a distribution of the sexes of other than 50 percent of each sex.
2. Where multiple-user facilities are designed to serve all genders, the minimum fixture count shall be calculated 100 percent, based on total occupant load<u>, applying the more restrictive fixture requirements to at least 50 percent of the total occupant load</u>. In such multiple-user facilities, each fixture type shall be in accordance with ICC A117.1 and each urinal that is provided shall be located in a stall.
3. Distribution of the sexes is not required where single-user water closets and bathing room fixtures are provided in accordance with Section 403.1.2.

Reason: Based on the language as written, the water closets counts for a sporting arena could be calculated at one per 75 for the first 1,500 and then 1 per 120. What does this do for potty parity that has been a code debate for a number of years? I believe one way to solve for this is to apply the fixture requirements for the female fixture counts for 50 percent of the occupant load.

Cost Impact: The code change proposal will increase the cost of construction
Based on the language in the 2021 IPC, this code change will increase the cost of construction as it will require more fixtures. The increase in fixtures will provide for the potty parity to be more in line with previous fixture count requirements.

P26-21

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The proposal makes it more difficult to understand what fixture ratio must be applied. (13-1)

P26-21

Individual Consideration Agenda

Public Comment 1:

IPC: 403.1.1

Proponents: Eirene Knott, representing Metropolitan Kansas City Chapter of the ICC (eirene.knott@brrarch.com); Misty Guard, Regulosity LLC, representing Regulosity LLC (misty.guard@regulosity.com) requests As Modified by Public Comment

Modify as follows:

2021 International Plumbing Code

403.1.1 Fixture calculations . To determine the occupant load of each sex, the total occupant load shall be divided in half. To determine the required number of fixtures, the fixture ratio or ratios for each fixture type shall be applied to the occupant load of each sex in accordance with Table

403.1. Fractional numbers resulting from applying the fixture ratios of Table 403.1 shall be rounded up to the next whole number. For calculations involving multiple *occupancies*, such fractional numbers for each *occupancy* shall first be summed and then rounded up to the next whole number.

Exceptions:

1. The total occupant load shall not be required to be divided in half where *approved* statistical data indicate a distribution of the sexes of other than 50 percent of each sex.
2. Where multiple-user facilities are designed to serve all genders, the minimum fixture count shall be calculated 100 percent, based on total occupant load~~, applying the more restrictive fixture requirements to at least 50 percent of the total occupant loadload.~~ . Fixture ratios for water closets and lavatories shall be based on the female fixture requirements unless the occupant load meets Exception 1. In such multiple-user facilities, each fixture type shall be in accordance with ICC A117.1 and each urinal that is provided shall be located in a stall.
3. Distribution of the sexes is not required where single-user water closets and bathing room fixtures are provided in accordance with Section 403.1.2.

Commenter's Reason: The committee stated that the original code language made the fixture ratio confusing; I agree it did. Now it should be clearly noted that the number of fixtures provided must be based on the higher fixture count, which will always be the female fixtures.

Cost Impact: The net effect of the public comment and code change proposal will increase the cost of construction
This code change may very well increase the cost of construction as it will require more fixtures. The increase in fixtures will provide for the potty parity to be more in line with the correct required fixture counts.

Public Comment# 2337

P35-21

Proposed Change as Submitted

Proponents: John Woestman, Kellen Company, representing Builders Hardware Manufacturers Assoc. (BHMA) (jwoestman@kellencompany.com)

2021 International Plumbing Code

Revise as follows:

403.3.6 Door locking. Where a toilet room is provided for the use of multiple occupants, the egress door for the room shall not be lockable from the inside of the room. This section does not apply to family or assisted-use toilet rooms.

Exception: The egress door of a multiple occupant toilet room shall be permitted to be lockable from inside the room where all the following criteria are met:

1. The egress door shall be lockable from the inside of the room only by authorized personnel by the use of a key or other approved means.
2. The egress door shall be readily openable from the egress side with not more than one releasing motion and without the use of a key or special knowledge or effort.
3. The egress door shall be capable of being unlocked from outside the room with a key or other approved means.

Reason: Complementing the requirements in 2021 IBC Section 1010.2.8 regarding locking arrangements in educational occupancies, the proposed exception would facilitate door locking of multiple occupant toilet rooms in emergency situations by authorized personnel. Our BHMA members are recognizing that schools desire the same intruder protection in multiple occupant toilet rooms as classrooms – but the code explicitly does not permit locking of the egress doors of multiple occupant toilet rooms.
Proposed Criteria 1 limits the ability to lock the egress doors of a multiple occupant toilet room to authorized individuals provided with the key or other approved means.

Proposed Criteria 2 is consistent with long standing requirements in the IBC to require doors in the means of egress to, from the egress side, be openable (unlock and unlatch) with not more than one releasing motion and without using a key, or special knowledge or effort.

Proposed Criteria 3 is consistent with locks permitted on classroom doors per IBC Section 1010.2.8.

An additional benefit of this proposed exception is the proposed exception would allow, for example, a male custodian to lock the door when cleaning the women's restroom, and prevent "surprise" use of the restroom.

The proposed exception prevents unauthorized personnel from locking the door from the inside, which meets the original intent of this section.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The exception is "shall be permitted" and non-mandatory. Of course, if building owners choose to install locks on egress doors from multiple occupant toilet rooms, a cost would be incurred.

P35-21

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The proposal seems to be all over the map. For example, how can be required for key locking from the inside of the door where the door must be unlockable from the inside of the door without the use of a key? (12-2)

P35-21

Individual Consideration Agenda

Public Comment 1:

IPC: 403.3.6

Proponents: John Woestman, representing Builders Hardware Manufacturers Assoc. (BHMA) (jwoestman@kellencompany.com) requests As Modified by Public Comment

Modify as follows:

2021 International Plumbing Code

403.3.6 Door locking . Where a toilet room is provided for the use of multiple occupants, the egress door for the room shall not be lockable from the inside of the room. This section does not apply to family or assisted-use toilet rooms.

> **Exception:** The egress door of a multiple occupant toilet room shall be permitted to be lockable from inside the room where all the following criteria are met:
>
> 1. The egress door shall be lockable from the inside of the room only by authorized personnel by the use of a key or other approved means.
> 2. The egress door shall be readily openable from ~~the egress side with not more than one releasing motion and without the use of a key or special knowledge or efforteffort.~~ the toilet room in accordance with IBC Section 1010.2.
> 3. The egress door shall be capable of being unlocked from outside the room with a key or other approved means.

Commenter's Reason: The proponent for this proposal failed to inform the committee members of the need and benefits of the proposed revisions, and failed to communicate the similarities of the proposed revisions to existing requirements in the IBC for door locking.
The current IPC requires the egress door of a multiple occupant toilet room to not be lockable from inside the toilet room. For many occupancies, that’s appropriate.

However, considering active shooter situations in K-12 schools, for example, there’s a real concern that teachers with their students would not have a safe refuge from a shooter in a multi-occupant toilet room if the toilet room door cannot be lockable from inside the room. Picture a kindergarten teacher leading the class to the cafeteria when shots ring out, and the multi-occupant toilet room is the nearest potential place of refuge and safety.

This proposal, improved with the public comment modification, provides appropriate requirements via the proposed exception to 403.3.6 for building owners that wish to provide the ability for authorized personnel to lock the door from the inside of a multi-occupant toilet room. This proposed option is not limited to K-12 schools as the ability for authorized personnel to lock the door from inside of a toilet room may be desired in other occupancies.

The criteria for permitting the egress door of a multi-occupant toilet room to be lockable from inside the room includes:

1. Requiring the use of a key, or other approved means, to lock the door from the inside.

   a. This restricts the ability to lock the door from the inside to only those authorized to do so. In a K-12 school, that could be teachers, administrators, and custodians. The provision for “other approved means” would permit, for example, electronic remote locking of doors for a building-wide lockdown.

2. Revising Item 2, and requiring the egress door to be openable from inside the toilet room in accordance with IBC Section 1010.2 – which is a current requirement for egress doors – is repeated here to stress the importance. IBC Section 1010.2 and subsections requires egress doors to be openable with a single motion, and without the use of a key or special knowledge or effort, and includes requirements for hardware height, locks and latches, etc.

   a. Door hardware is readily available from multiple manufacturers that is lockable from inside the room only by authorized personnel (by a key, etc.), and unlockable by anybody inside the room without using a key, tool, special knowledge or effort.

3. Requiring the door to the multi-occupant toilet room to be unlockable from outside of the room by a key or other approved means ensures authorized personnel have the ability to gain access to the toilet room, should that need arise.

   a. This requirement is consistent with current requirements in the IBC for Group E and Group B occupancies for locks permitted on classrooms, offices, and other occupied rooms per IBC Section 1010.2.8.

Cost Impact: The net effect of the public comment and code change proposal will not increase or decrease the cost of construction
The exception is “shall be permitted” and non-mandatory. Of course, if building owners choose to install locks on egress doors from multiple occupant toilet rooms, a cost would be incurred.

Public Comment# 2797

P37-21 Part I

Proposed Change as Submitted

Proponents: Julius Ballanco, representing Adult Changing Table Committee (JBEngineer@aol.com)

THIS IS A 2 PART CODE CHANGE. BOTH PARTS WILL BE HEARD BY THE PLUMBING CODE COMMITEE. SEE THE TENTATIVE HEARING ORDER FOR THESE COMMITTEES.

2021 International Plumbing Code

Add new text as follows:

403.7 Adult changing station.
Where adult changing stations are provided in addition to the requirements of the *International Building Code*, such stations shall be located in accordance with one of the following:

1. The adult changing station shall be installed in a single-user toilet room or bathing room.
2. The adult changing station shall be installed in a family or assisted-use toilet room or bathing room.
3. The adult changing station shall be installed in a toilet room or bathing room with multiple compartments. The adult changing station shall be provided with privacy by a curtain or wall or be installed within a privacy compartment. Where separate facilities are provided for each sex, the adult changing station shall be installed in both toilet rooms or bathing rooms.
4. The adult changing station shall be installed in a separate room.

403.7.1 Lavatory location.
Where an adult changing station is installed in a privacy compartment or separate room, a lavatory shall be provided within that space. The lavatory shall comply with the accessibility requirement of ICC A117.1.

Exception: Where an adult changing station is located in a separate room,
a lavatory shall not be required in the room provided that an alcohol-based hand sanitizer dispenser is installed in the room.

403.7.2 Floor drain required.
Toilet rooms and bathing rooms with an adult changing station shall have a floor drain installed.

Reason: The Adult Changing Table Committee of ICC A117.1 developed this code change to address the installation of adult changing stations that are installed on a voluntary basis. There is no mandate within this code change. A companion code change being proposed to Chapter 11 of the Building Code would mandate adult changing stations in certain buildings. This proposed change is consistent with the proposed change to mandate adult changing stations. This proposal will supplement the requirements being proposed to Chapter 11. However, this proposed change can also stand on its own if the proposed change to Chapter 11 is not accepted. If this change is accepted, Chapter 29 of the Building Code would be correlated with the addition of the requirements to the existing sections. If an adult changing station is installed, this code change provides the requirements for public access, cleanliness, and sanitation. The access to an adult changing station is outlined in the first section which lists the rooms in which an adult changing station can be installed. The first two options are obvious in that they would be installed in an individual toilet or bathing room. The third option would allow the changing station to be installed in a men's or ladies room or all gender toilet room having multiple fixtures. Privacy requirements are specified to allow the adult diaper changing to take place out of public view. The fourth option would be a separate room similar to a lactating room in a commercial building or nurses station in a school.
The initial sanitation requirements are specified in the proposed new section 1210.2.3. This section would require surround material similar to the requirement for urinals. It would provide a surface that is readily cleanable and not impacted by moisture.

Every toilet or bathing room has a lavatory. The new requirement would stipulate that when an adult changing station is installed in a privacy compartment or separate room a lavatory would be required for that room to allow for cleanup during and after diaper changing. If there is a separate room without plumbing located in the close proximity, an alcohol-based hand sanitizer dispenser could be used as a substitute for a lavatory.

Since the adult changing station involves the changing of adult diapers, a waste receptacle is required to dispose of the diaper. To minimize the odor from the diaper, the waste receptacle is required to be self-closing. While the Committee considered mandating ventilation for the waste receptacle, it was decided to at a minimum require self closing.

A floor drain is also required to facilitate the washing of the area in the event of an accident during the diaper changing operation. While floor drains are common in toilet rooms and bathing rooms, the Plumbing Code does not mandate the fixture. This section would result in mandating the floor drain when an adult changing station is installed.

It is intended that Section 1210.2.3 be scoped to the IPC committee.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This change is adding optional requirements if someone choses to install an adult changing station. There are no mandates for such an installation in this change. As such, there is no impact to the cost of construction.

P37-21 Part I

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: This is a good proposal in principle. However, installing a floor drain in an existing building might be very difficult thus leading to a decision to not install the adult changing table. The exception for allowing hand sanitizer instead of a lavatory is not appropriate for this application. The Committee encourages the proponent to bring this back in a Public Comment. (13-1)

P37-21 Part I

Individual Consideration Agenda

Public Comment 1:

IPC: 403.7, 403.7.1, 403.7.2

Proponents: Julius Ballanco, representing Adult Changing Table Committee (jbengineer@aol.com); Gene Boecker, representing Code Consultants, Inc. (geneb@codeconsultants.com); Marsha Mazz, representing United Spinal Association (mmazz@accessibility-services.com); Lawrence Perry, representing self (lperryaia@aol.com); Laurel Wright, representing self (lwwright8481@icloud.com) requests As Modified by Public Comment

Modify as follows:

2021 International Plumbing Code

403.7 Adult changing station . Where adult changing stations are provided in addition to ~~the requirements of~~ those requiredby the *International Building Code*, such stations shall be located in accordance with one of the following:

1. The adult changing station shall be installed in a single-user toilet room or bathing room.
2. The adult changing station shall be installed in a family or assisted-use toilet room or bathing room.
3. The adult changing station shall be installed in a toilet room or bathing room with multiple compartments. The adult changing station shall be provided with privacy by a curtain or wall or be installed within a privacy compartment. Where separate facilities are provided for each sex, the adult changing station shall be installed in both toilet rooms or bathing rooms.
4. The adult changing station shall be installed in ~~a separate room.~~ other than a toilet or bathing room.

403.7.1 Lavatory location . Where an adult changing station is installed in a privacy compartment or separate room, a lavatory shall be provided within that space. The lavatory shall comply with the accessibility requirement of ICC A117.1.

Exception: Where an adult changing station is located in ~~a separate room~~ other than a toilet or bathing room,
a lavatory shall not be required in the room provided that an alcohol-based hand sanitizer dispenser is installed in the room.

~~**403.7.2 Floor drain required .** Toilet rooms and bathing rooms with an adult changing station shall have a floor drain installed.~~

Commenter's Reason: The Plumbing Code Committee was concerned with the allowance for alcohol based hand sanitizer dispensers in place of a lavatory. E142-21 was approved, which will require a lavatory and a water closet where adult changing tables are required. However, there are many locations, such as school nurse's offices and special education classrooms, that have these tables and do not have a lavatory within the room. Adding the plumbing could be cost prohibitive. Since these requirements are for where tables are provided, this option needs to remain in the exception in Section 402.7.1.In order to clarify that the allowance of alcohol based hand sanitizer dispensers, the term "separate room" is being replaced with "other than a toilet or bathing room." Of course, in toilet or bathing rooms a lavatory will be available. The allowance of alcohol based hand sanitizer dispensers only applies when adult changing tables are provided in these other rooms when not required by the Building Code. Similarly, the Plumbing Code Committee was concerned about a requirement for a floor drain in an existing building when an adult changing station is added. Floor drains are not required in toilet and bathing rooms, therefore, the modification deletes the floor drain associated with an adult changing table.

There was testimony that the first statement was not clear regarding these requirements applying to the adult changing stations that are not mandate by the Building Code. There is a minor change in wording to clarify that the requirements apply when the adult changing station is not required by the Building Code.

Cost Impact: The net effect of the public comment and code change proposal will decrease the cost of construction
The removal of a requirement for a floor drain in an existing building will lower the cost of construction.

Public Comment# 2268

P37-21 Part II

Proposed Change as Submitted

Proponents: Julius Ballanco, representing Adult Changing Table Committee (jbengineer@aol.com)

2021 International Building Code

Add new text as follows:

1210.2.3 Adult changing table surround.
Walls and partitions within 2 feet (610 mm) of the adult changing table shall have a smooth, hard, nonabsorbent surface, to a height of not less than 72 inches (1829 mm) above the floor, and except for structural elements, the materials used in such walls shall be of a type that is not adversely affected by moisture.

Reason: The Adult Changing Table Committee of ICC A117.1 developed this code change to address the installation of adult changing stations that are installed on a voluntary basis. There is no mandate within this code change. A companion code change being proposed to Chapter 11 of the Building Code would mandate adult changing stations in certain buildings. This proposed change is consistent with the proposed change to mandate adult changing stations. This proposal will supplement the requirements being proposed to Chapter 11. However, this proposed change can also stand on its own if the proposed change to Chapter 11 is not accepted. If this change is accepted, Chapter 29 of the Building Code would be correlated with the addition of the requirements to the existing sections. If an adult changing station is installed, this code change provides the requirements for public access, cleanliness, and sanitation. The access to an adult changing station is outlined in the first section which lists the rooms in which an adult changing station can be installed. The first two options are obvious in that they would be installed in an individual toilet or bathing room. The third option would allow the changing station to be installed in a men's or ladies room or all gender toilet room having multiple fixtures. Privacy requirements are specified to allow the adult diaper changing to take place out of public view. The fourth option would be a separate room similar to a lactating room in a commercial building or nurses station in a school.
The initial sanitation requirements are specified in the proposed new section 1210.2.3. This section would require surround material similar to the requirement for urinals. It would provide a surface that is readily cleanable and not impacted by moisture.

Every toilet or bathing room has a lavatory. The new requirement would stipulate that when an adult changing station is installed in a privacy compartment or separate room a lavatory would be required for that room to allow for cleanup during and after diaper changing. If there is a separate room without plumbing located in the close proximity, an alcohol-based hand sanitizer dispenser could be used as a substitute for a lavatory.

Since the adult changing station involves the changing of adult diapers, a waste receptacle is required to dispose of the diaper. To minimize the odor from the diaper, the waste receptacle is required to be self-closing. While the Committee considered mandating ventilation for the waste receptacle, it was decided to at a minimum require self closing.

A floor drain is also required to facilitate the washing of the area in the event of an accident during the diaper changing operation. While floor drains are common in toilet rooms and bathing rooms, the Plumbing Code does not mandate the fixture. This section would result in mandating the floor drain when an adult changing station is installed.

It is intended that Section 1210.2.3 be scoped to the IPC committee.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This change is adding optional requirements if someone choses to install an adult changing station. There are no mandates for such an installation in this change. As such, there is no impact to the cost of construction.

P37-21 Part II

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The part about "within 2 feet" doesn't indicate which direction. Is it horiontally? (8-6)

P37-21 Part II

Individual Consideration Agenda

Public Comment 1:

IBC: 1210.2.3

Proponents: Julius Ballanco, representing Adult Changing Table Committee (jbengineer@aol.com); Marsha Mazz, representing United Spinal Association (mmazz@accessibility-services.com); Lawrence Perry, representing self (lperryaia@aol.com); Gene Boecker, representing Code Consultants, Inc. (geneb@codeconsultants.com); Laurel Wright, representing self (lwwright8481@icloud.com) requests As Modified by Public Comment

Modify as follows:

2021 International Building Code

1210.2.3 Adult changing table surround . Walls and partitions within 2 feet (610 mm) measured horizontally from each end of the adult changing table and to a height of not less than 72 inches (1829 mm) above the floor shall have a smooth, hard, nonabsorbent surface~~, to a height of not less than 72 inches (1829 mm) above the floor,~~ and except for structural elements, the materials used in such walls shall be of a type that is not adversely affected by moisture.

Commenter's Reason: The Plumbing code committee wanted clearer language for where the nonabsorbent surface would be provided. This public comment addresses that concern.

Cost Impact: The net effect of the public comment and code change proposal will not increase or decrease the cost of construction
This change is only a clarification of the original intent.

Public Comment# 2269

P39-21 Part I

Proposed Change as Submitted

Proponents: Julius Ballanco, representing Bradley Corp. (JBENGINEER@aol.com)

THIS IS A 2 PART CODE CHANGE. BOTH PARTS WILL BE HEARD BY THE IPC COMMITTEE.

2021 International Plumbing Code

Revise as follows:

405.3.4 Water closet compartment. Each water closet utilized by the *public* or employees shall occupy a separate compartment with walls or partitions and a door enclosing the fixtures to ensure privacy. Partitions for water closets located in separate gender toilet or bathing rooms shall comply with the Type B security requirements of IAPMO Z124.XX. Partitions for water closets located in all gender toilet rooms shall comply with the Type A security requirements of IAPMO Z124.XX or the water closet shall be located in separate room with a lockable door.

Exceptions:

1. Water closet compartments shall not be required in a single-occupant toilet room with a lockable door.
2. Toilet rooms located in child day care facilities and containing two or more water closets shall be permitted to have one water closet without an enclosing compartment.
3. This provision is not applicable to toilet areas located within Group I-3 housing areas.

405.3.5 Urinal partitions. Each urinal utilized by the *public* or employees shall occupy a separate area with walls or partitions to provide privacy. The horizontal dimension between walls or partitions at each urinal shall be not less than 30 inches (762 mm). Partitions for urinals located in separate gender toilet or bathing rooms shall comply with the Type C security requirements of IAPMO Z124.XX. Partitions for urinals located in all gender toilet rooms shall comply with the Type A security requirements of IAPMO Z124.XX or the urinal shall be located in separate room with a lockable door. The walls ~~or partitions~~ shall begin at a height not greater than 12 inches (305 mm) from and extend not less than 60 inches (1524 mm) above the finished floor surface. ~~The walls or partitions~~ Walls shall extend from the wall surface at each side of the urinal not less than 18 inches (457 mm) or to a point not less than 6 inches (152 mm) beyond the outermost front lip of the urinal measured from the finished backwall surface, whichever is greater.

Exceptions:

1. Urinal partitions shall not be required in a single occupant or family/assisted-use toilet room with a lockable door.
2. Toilet rooms located in child day care facilities and containing two or more urinals shall be permitted to have one urinal without partitions.

Add new standard(s) as follows:

IAPMO

IAPMO Group
4755 E. Philadelphia Street
Ontario, CA 91761 USA

Z124.XX-21 Toilet Room Partitions

Reason: This proposed change is a follow up to multiple changes during the last cycle. All gender toilet rooms were added as being permitted in the International Plumbing Code. At the same time, a new requirement regarding privacy from outside the entry or exit door was added to the code. The two proposals are inconsistent since a toilet room for all genders does not need any privacy from outside the entry or exit door since anyone can enter the room. The real concern is the privacy of the user of water closets and urinals. Thus, the outside entry and exit privacy statement is proposed for deletion with an added requirement specifying the privacy of water closets and urinals.
The important aspect of the change is to clarify the level of privacy assured the user of water closets and urinals. The need for privacy has been well established and a part of the Plumbing Code. The new standard being developed, IAPMO Z124.XX identifies privacy requirements for water closets and urinals. There are three levels of privacy identified in the draft of the standard, Type A, Type B, and Type C. Type A privacy requires partitions to prevent visual observation and security of the user. The current draft lists the partitions starting at 4 inches above the floor and extending to a height of 7 feet. The door must be the full height of the partition with both sides of the door sealed to prevent visual observation. The doors must also be lockable from the inside with visual observation on the outside that the compartment is in use.

Type B privacy is equivalent to the common water closet partition that has been used for many years. The doors to the partitions will allow a standard 1/2 inch gap.

Type C privacy are for urinals in separate gender toilet rooms. The partition requirements are equivalent to the current code requirements regarding the size of the partition.

IAPMO Z124.XX also has material requirements for plastic partitions. The IAPMO Z124 series of standards are for plastic plumbing fixtures. Hence, the requirements for plastic partitions are similar to the requirements for plastic shower enclosures. There are also structural loading requirements for plastic partitions. While this new standard has not been finalized by the deadline for code change submittal, the standard will be completed before the publication of the 2024 ICC Codes.

The proposed change will still allow water closets and urinals to be located in separate rooms within the toilet or bathing room. This is included in the privacy requirement for partitions.

The other part of the change is the correlation in the International Building Code. The privacy partition requirements appear in both Chapter 12 and 29. However, the requirements for urinal partitions differs between the two chapters. This change deletes the sections in Chapter 29 while modifying the requirements in Chapter 12 to add the missing statement regarding urinal partition spacing.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This change provides options for providing privacy for water closets and urinals. It also contains material requirements for plastic urinal and water closet partitions. There is no added cost of construction if the design professional and install select the options available currently in the code. If all gender toilet rooms are selected, there could be an increase in the cost of the partitions to provide security, however, the overall cost will be lower by allowing a single room as opposed to two rooms.

Staff Analysis: A review of the standard proposed for inclusion in the code, Z124.XX-21 with regard to the ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before March 20, 2021.

P39-21 Part I

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The new standard is not yet complete. (14-0)

P39-21 Part I

Individual Consideration Agenda

Public Comment 1:

IPC: 405.3.4, 405.3.5,

Proponents: Julius Ballanco, representing Bradley Corp. (jbengineer@aol.com) requests As Modified by Public Comment

Modify as follows:

2021 International Plumbing Code

405.3.4 Water closet compartment . Each water closet utilized by the *public* or employees shall occupy a separate compartment with walls or partitions and a door enclosing the fixtures to ensure privacy. Partitions for water closets located in separate gender toilet or bathing rooms shall comply with the Type B security requirements of IAPMO ~~Z124.XX.~~ Partitions for water closets located in all gender toilet rooms shall comply with the Type A security requirements of IAPMO ~~Z124.XX or~~ Z124.10 or the water closet shall be located in separate room with a lockable door.

Exceptions:

1. Water closet compartments shall not be required in a single-occupant toilet room with a lockable door.
2. Toilet rooms located in child day care facilities and containing two or more water closets shall be permitted to have one water closet without an enclosing compartment.
3. This provision is not applicable to toilet areas located within Group I-3 housing areas.

405.3.5 Urinal partitions . Each urinal utilized by the *public* or employees shall occupy a separate area with walls or partitions to provide privacy. The horizontal dimension between walls or partitions at each urinal shall be not less than 30 inches (762 mm). Partitions for urinals located in separate gender toilet or bathing rooms shall comply with the Type C security requirements of IAPMO ~~Z124.XX.~~ Z124.10. Partitions for urinals located in all gender toilet rooms shall comply with the Type A security requirements of IAPMO ~~Z124.XX or~~ Z124.10 or the urinal shall be located in separate room with a lockable door. The walls shall begin at a height not greater than 12 inches (305 mm) from and extend not less than 60 inches (1524 mm) above the finished floor surface. Walls shall extend from the wall surface at each side of the urinal not less than 18 inches (457 mm) or to a point not less than 6 inches (152 mm) beyond the outermost front lip of the urinal measured from the finished backwall surface, whichever is greater.

Exceptions:

1. Urinal partitions shall not be required in a single occupant or family/assisted-use toilet room with a lockable door.
2. Toilet rooms located in child day care facilities and containing two or more urinals shall be permitted to have one urinal without partitions.

,

~~Z124.XX-21~~ Z124.10-21 Toilet Room Partitions

Commenter's Reason: This change was disapproved because the standard was not completed at the time of first hearing. At the deadline for the public comment (July 2), the number has been assigned to the standard and the consensus draft is being balloted. Ballots are due back the second week of July. The standard will be completed within the time limits identified in the ICC procedures. The only modification being made is to add the correct number for the partitions standard.

Cost Impact: The net effect of the public comment and code change proposal will not increase or decrease the cost of construction
The modification proposed is only to add the number for the standard. That does not impact the cost analysis originally presented for the code change.

Staff Analysis: In accordance with Section 3.6.3.1 of ICC Council Policy 28, the new referenced standard IAPMO Z124.XX Toilet Partitions, must be completed and readily available prior to the Public Comment Hearing in order for this public comment to be considered.

Public Comment# 2349

P39-21 Part II

Proposed Change as Submitted

Proponents: Julius Ballanco, representing Bradley Corp. (jbengineer@aol.com)

2021 International Building Code

Revise as follows:

[P] 1210.2.2 Walls and partitions. Walls and partitions within 2 feet (610 mm) of service sinks, urinals and water closets shall have a smooth, hard, nonabsorbent surface, to a height of not less than 4 feet (1219 mm) above the floor, and except for structural elements, the materials used in such walls shall be of a type that is not adversely affected by moisture. Plastic partitions shall comply with IAPMO Z124.XX.

Exception: This section does not apply to the following buildings and spaces:

1. Dwelling units and *sleeping units*.
2. Toilet rooms that are not accessible to the public and that have not more than one water closet.

Accessories such as grab bars, towel bars, paper dispensers and soap dishes, provided on or within walls, shall be installed and sealed to protect structural elements from moisture.

[P] 1210.3 Privacy. Public restrooms shall ~~be visually screened from outside entry or exit doorways to ensure user privacy within the restroom. This provision shall also apply where mirrors would compromise personal privacy. Privacy at~~ provide privacy for the user of water closets and urinals ~~shall be provided~~ in accordance with Sections 1210.3.1 and 1210.3.2.

~~**Exception:** Visual screening shall not be required for single-occupant toilet rooms with a lockable door.~~

[P] 1210.3.1 Water closet compartment. Each water closet utilized by the public or employees shall occupy a separate compartment with walls or partitions and a door enclosing the fixtures to ensure privacy. Partitions for water closets located in separate gender toilet or bathing rooms shall comply with the Type B security requirements of IAPMO Z124.XX. Partitions for water closets located in all gender toilet rooms shall comply with the Type A security requirements of IAPMO Z124.XX or the water closet shall be located in separate room with a lockable door.

Exceptions:

1. Water closet compartments shall not be required in a single-occupant toilet room with a lockable door.
2. Toilet rooms located in child day care facilities and containing two or more water closets shall be permitted to have one water closet without an enclosing compartment.
3. This provision is not applicable to toilet areas located within Group I-3 occupancy housing areas.

[P] 1210.3.2 Urinal partitions. Each urinal utilized by the public or employees shall occupy a separate area with walls or partitions to provide privacy. The horizontal dimension between walls or partitions at each urinal shall be not less than 30 inches (762 mm). Partitions for urinals located in separate gender toilet or bathing rooms shall comply with the Type C security requirements of IAPMO Z124.XX. Partitions for urinals located in all gender toilet rooms shall comply with the Type A security requirements of IAPMO Z124.XX or the urinal shall be located in separate room with a lockable door. The walls ~~or partitions~~ shall begin at a height not more than 12 inches (305 mm) from and extend not less than 60 inches (1524 mm) above the finished floor surface. ~~The walls or partitions~~ Walls shall extend from the wall surface at each side of the urinal not less than 18 inches (457 mm) or to a point not less than 6 inches (152 mm) beyond the outermost front lip of the urinal measured from the finished backwall surface, whichever is greater.

Exceptions:

1. Urinal partitions shall not be required in a single-occupant or family or assisted-use toilet room with a lockable door.
2. Toilet rooms located in child day care facilities and containing two or more urinals shall be permitted to have one urinal without partitions.

Delete without substitution:

~~**[P] 2903.1.4 Water closet compartment.** Each water closet utilized by the public or employees shall occupy a separate compartment with walls or partitions and a door enclosing the fixtures to ensure privacy.~~

~~**Exceptions:**~~

~~1. Water closet compartments shall not be required in a single-occupant toilet room with a lockable door.~~

2. ~~Toilet rooms located in child day-care facilities and containing two or more water closets shall be permitted to have one water closet without an enclosing compartment.~~
3. ~~This provision is not applicable to toilet areas located within Group I-3 housing areas.~~

~~[P] 2903.1.5 Urinal partitions.~~ ~~Each urinal utilized by the public or employees shall occupy a separate area with walls or partitions to provide privacy. The horizontal dimension between walls or partitions at each urinal shall be not less than 30 inches (762 mm). The walls or partitions shall begin at a height not greater than 12 inches (305 mm) from and extend not less than 60 inches (1524 mm) above the finished floor surface. The walls or partitions shall extend from the wall surface at each side of the urinal not less than 18 inches (457 mm) or to a point not less than 6inches (152 mm) beyond the outermost front lip of the urinal measured from the finished backwall surface, whichever is greater.~~

~~Exceptions:~~

1. ~~Urinal partitions shall not be required in a single-occupant or family/assisted-use toilet room with a lockable door.~~
2. ~~Toilet rooms located in child day-care facilities and containing two or more urinals shall be permitted to have one urinal without partitions.~~

Reason: This proposed change is a follow up to multiple changes during the last cycle. All gender toilet rooms were added as being permitted in the International Plumbing Code. At the same time, a new requirement regarding privacy from outside the entry or exit door was added to the code. The two proposals are inconsistent since a toilet room for all genders does not need any privacy from outside the entry or exit door since anyone can enter the room. The real concern is the privacy of the user of water closets and urinals. Thus, the outside entry and exit privacy statement is proposed for deletion with an added requirement specifying the privacy of water closets and urinals.
The important aspect of the change is to clarify the level of privacy assured the user of water closets and urinals. The need for privacy has been well established and a part of the Plumbing Code. The new standard being developed, IAPMO Z124.XX identifies privacy requirements for water closets and urinals. There are three levels of privacy identified in the draft of the standard, Type A, Type B, and Type C. Type A privacy requires partitions to prevent visual observation and security of the user. The current draft lists the partitions starting at 4 inches above the floor and extending to a height of 7 feet. The door must be the full height of the partition with both sides of the door sealed to prevent visual observation. The doors must also be lockable from the inside with visual observation on the outside that the compartment is in use.

Type B privacy is equivalent to the common water closet partition that has been used for many years. The doors to the partitions will allow a standard 1/2 inch gap.

Type C privacy are for urinals in separate gender toilet rooms. The partition requirements are equivalent to the current code requirements regarding the size of the partition.

IAPMO Z124.XX also has material requirements for plastic partitions. The IAPMO Z124 series of standards are for plastic plumbing fixtures. Hence, the requirements for plastic partitions are similar to the requirements for plastic shower enclosures. There are also structural loading requirements for plastic partitions. While this new standard has not been finalized by the deadline for code change submittal, the standard will be completed before the publication of the 2024 ICC Codes.

The proposed change will still allow water closets and urinals to be located in separate rooms within the toilet or bathing room. This is included in the privacy requirement for partitions.

The other part of the change is the correlation in the International Building Code. The privacy partition requirements appear in both Chapter 12 and 29. However, the requirements for urinal partitions differs between the two chapters. This change deletes the sections in Chapter 29 while modifying the requirements in Chapter 12 to add the missing statement regarding urinal partition spacing.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This change provides options for providing privacy for water closets and urinals. It also contains material requirements for plastic urinal and water closet partitions. There is no added cost of construction if the design professional and install select the options available currently in the code. If all gender toilet rooms are selected, there could be an increase in the cost of the partitions to provide security, however, the overall cost will be lower by allowing a single room as opposed to two rooms.

P39-21 Part II

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The new standard is not yet complete. The Committee encourages the proponent to bring back in Public Comment (if the standard is completed) and change "all gender toilet rooms" to "toilet rooms for all persons regardless of sex". (11-3)

Individual Consideration Agenda

Public Comment 1:

IBC: [P] 1210.2.2, [P] 1210.3.1, [P] 1210.3.2

Proponents: Julius Ballanco, representing Bradley Corp. (jbengineer@aol.com) requests As Modified by Public Comment

Modify as follows:

2021 International Building Code

[P] 1210.2.2 Walls and partitions . Walls and partitions within 2 feet (610 mm) of service sinks, urinals and water closets shall have a smooth, hard, nonabsorbent surface, to a height of not less than 4 feet (1219 mm) above the floor, and except for structural elements, the materials used in such walls shall be of a type that is not adversely affected by moisture. ~~Plastic partitions~~ Partitions shall comply with IAPMO ~~Z124.XX.~~ Z124.10 .

Exception: This section does not apply to the following buildings and spaces:

1. Dwelling units and *sleeping units*.
2. Toilet rooms that are not accessible to the public and that have not more than one water closet.

Accessories such as grab bars, towel bars, paper dispensers and soap dishes, provided on or within walls, shall be installed and sealed to protect structural elements from moisture.

[P] 1210.3.1 Water closet compartment . Each water closet utilized by the public or employees shall occupy a separate compartment with walls or partitions and a door enclosing the fixtures to ensure privacy. Partitions for water closets located in separate gender toilet or bathing rooms shall comply with the Type B security requirements of IAPMO ~~Z124.XX.~~ Z124.10. Partitions for water closets located in all gender toilet rooms shall comply with the Type A security requirements of IAPMO ~~Z124.XX~~ Z124.10 or the water closet shall be located in separate room with a lockable door.

Exceptions:

1. Water closet compartments shall not be required in a single-occupant toilet room with a lockable door.
2. Toilet rooms located in child day care facilities and containing two or more water closets shall be permitted to have one water closet without an enclosing compartment.
3. This provision is not applicable to toilet areas located within Group I-3 occupancy housing areas.

[P] 1210.3.2 Urinal partitions . Each urinal utilized by the public or employees shall occupy a separate area with walls or partitions to provide privacy. The horizontal dimension between walls or partitions at each urinal shall be not less than 30 inches (762 mm). Partitions for urinals located in separate gender toilet or bathing rooms shall comply with the Type C security requirements of IAPMO ~~Z124.XX.~~ Z124.10. Partitions for urinals located in all gender toilet rooms shall comply with the Type A security requirements of IAPMO ~~Z124.XX~~ Z124.10 or the urinal shall be located in separate room with a lockable door. The walls shall begin at a height not more than 12 inches (305 mm) from and extend not less than 60 inches (1524 mm) above the finished floor surface. Walls shall extend from the wall surface at each side of the urinal not less than 18 inches (457 mm) or to a point not less than 6 inches (152 mm) beyond the outermost front lip of the urinal measured from the finished backwall surface, whichever is greater.

Exceptions:

1. Urinal partitions shall not be required in a single-occupant or family or assisted-use toilet room with a lockable door.
2. Toilet rooms located in child day care facilities and containing two or more urinals shall be permitted to have one urinal without partitions.

Commenter's Reason: There are two modification proposed. When the code change was submitted, the number for the standard had not yet been assigned. With the assignment of the number, the standard is now identified as IAPMO Z124.10. The second change was the removal of the word "Plastic." The standard addresses partitions constructed of any material. This was an expansion of the standard during the development stage of the standard. The main reason for not accepting this change was because the standard was not completed. At the time of this public comment, the consensus draft standard is out for review. The deadline for comments is the second week of July. Thus, the standard will be completed within the time limits established by ICC procedures.
The Committee also suggested considering changing "all gender toilet rooms" to "toilet rooms for all persons regardless of sex". That change is not

being proposed because the standard uses the term "all gender toilet rooms." To be consistent with the standard, this term is used in the code change. Also, in working with the transgender community, they have indicated a preference for the term "all gender" since this does not rely on identifying "sex." While this may appear innoccuous, all gender is considered more politically correct. It is also used on the signs for these restrooms. Most recently, at Midway Airport in Chicago a sign was added stating "All Gender."

Cost Impact: The net effect of the public comment and code change proposal will not increase or decrease the cost of construction
The change adding the standard number does not change the cost impact statement originally submitted with the code change.

Staff Analysis: In accordance with Section 3.6.3.1 of ICC Council Policy 28, the new referenced standard IAPMO Z124.XX Toilet Partitions, must be completed and readily available prior to the Public Comment Hearing in order for this public comment to be considered.

Public Comment# 2350

P42-21

Proposed Change as Submitted

Proponents: Erica Spayd, Warby Parker, representing Self

2021 International Plumbing Code

Revise as follows:

410.2 Small occupancies. Drinking fountains shall not be required for an occupant load of ~~15~~ 30 or fewer.

Reason: Drinking fountains are underutilized fixtures that take up valuable space and resources in small occupancies. The California Plumbing Code, which offers a progressive approach to fixture counts, limits the drinking fountain requirement to occupant loads above 30, and serves as a proven test for the success of this proposed revision.
Further, given the increasing rate of vacancy in retail spaces across the country due to the ongoing COVID-19 pandemic, revising cumbersome restrictions like this could allow new businesses to open more quickly and with less expense, contributing positively to our nation's economic recovery.

Bibliography: California Building Code 2019, Section 415.2.

Cost Impact: The code change proposal will decrease the cost of construction
$5,000-$6,000 for occupant loads of 16-30.

P42-21

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: There is no supporting data for lessening occupants access to drinking water. (13-1)

P42-21

Individual Consideration Agenda

Public Comment 1:

Proponents: Eirene Knott, representing Metropolitan Kansas City Chapter of the ICC (eirene.knott@brrarch.com) requests As Submitted

Commenter's Reason: The committee's reason for disapproval was that there was essentially no justification from the proponent in lessening the occupants access to drinking water.
For those not familiar with the California Plumbing Code, they utilized a separate occupant load factor when determining plumbing fixture counts. For mercantile, they use a value of 200 square feet per person. So to have an occupant load of 30 or fewer would require that a space be no more than 6,000 square feet.

If we apply the occupant load factor of retail to the same size store under the IBC, that same 6,000 square foot retail space would result in an occupant load of 100, which I would agree would be a stretch to not require a drinking fountain.

However, an occupant load of 30 for a retail setting under the IBC would be limited to 1800 square feet, which would be a fairly tiny facility. Under most occupant load conditions, 30 occupants would only require one means of egress, which would imply it is a relatively small space. The California Plumbing Code recognizes this and allows for tenants with an occupant load of 30 or less to not require a drinking fountain.

Bibliography: 2019 California Plumbing Code, Table A and Section 415.2

Cost Impact: The net effect of the public comment and code change proposal will decrease the cost of construction
This would reduce the construction cost as the drinking fountain and plumbing associated with it in a small tenant space could be removed.

P44-21

Proposed Change as Submitted

Proponents: Eirene Knott, BRR Architecture, representing Metropolitan Kansas City Chapter of the ICC (eirene.knott@brrarch.com)

2021 International Plumbing Code

Revise as follows:

410.4 Substitution. Where restaurants <u>or other establishments providing food</u> provide drinking water in a container free of charge, drinking fountains shall not be required in those ~~restaurants~~ <u>establishments</u>. In other *occupancies* where three or more drinking fountains are required, *water dispensers* shall be permitted to be substituted for not more than 50 percent of the required number of drinking fountains.

Reason: Many convenience stores offer water free of charge through the use of a beverage dispenser. These stores will also have food available for purchase, which makes them comparable to a restaurant, though it may be grab and go.
These establishments should not be penalized by having to provide an additional drinking fountain when they have the ability to provide water to their customers.

Cost Impact: The code change proposal will decrease the cost of construction
This proposal could decrease the cost of construction as drinking fountains would not need to be provided in an establishment that already offers water free of charge through a beverage dispenser.

P44-21

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: Most convenience stores fall under the 15 persons occupant load. The language is too broad for other applications. This could be abused in large stores. (14-0)

P44-21

Individual Consideration Agenda

Public Comment 1:

IPC: 410.4, 410.4.1 (New), 410.4.2 (New), 410.4.3 (New)

Proponents: Eirene Knott, representing Metropolitan Kansas City Chapter of the ICC (eirene.knott@brrarch.com); Misty Guard, Regulosity LLC, representing Regulosity LLC (misty.guard@regulosity.com) requests As Modified by Public Comment

Modify as follows:

2021 International Plumbing Code

410.4 Substitution . ~~Where restaurants or other establishments providing food provide drinking water in a container free of charge, drinking fountains shall not be required in those establishments. In other *occupancies* where three or more drinking fountains are required, *water dispensers* shall be permitted to be substituted for not more than 50 percent of the required number of drinking fountains.~~ <u>Drinking fountains are permitted to be substituted per Sections 410.4.1 through 410.4.3 and shall conform to the requirements of Section 403.5.</u>

<u>**410.4.1** **Restaurants** .</u> <u>Where restaurants provide drinking water in a container free of charge, drinking fountains shall not be required in those restaurants.</u>

<u>**410.4.2** **Group M Occupancies** .</u> <u>Where Group M occupancies provide public beverage dispensing equipment that dispenses water free of charge, drinking fountains shall not be required in those occupancies. Beverage dispensing equipment shall conform to the requirements of Section 420.</u>

<u>**410.4.3** **Other Occupancies** .</u> <u>In other *occupancies* where three or more drinking fountains are required, *water dispensers* shall be permitted to be substituted for not more than 50 percent of the required number of drinking fountains.</u>

Commenter's Reason: The committee said that most convenience stores have an occupant load of 15 or less. I don't know where they see convenience stores that small, but the smallest convenience store plan we work with for our clients is at least 3000 square feet, which provides an occupant load of at least 50 people. These convenience stores provide soda fountains which dispense water free of charge. Why do they need to also provide a drinking fountain? In light of Covid-19, most people are now carrying a beverage holder with them, such as a Yeti, and refill it as the opportunity presents. Why do we need to penalize establishments that offer water free of charge which are not classified as a restaurant?
The committee also suggested concern for a situation like having a Starbucks within a Target or Walmart in that the Target or Walmart would not be required to provide the drinking fountains since the Starbucks would meet the proposed exception. Unless that free water is available at all times the Target or Walmart is open, they would not qualify for this exception and would have to provide drinking fountains based on the occupant load of the store.

With the modification in this public comment to reference Section 420, there should be no confusion as to what can be allowed in lieu of a drinking fountain.

By calling out specifically what is permitted in an M occupancy, now the change clearly associates the requirement to be applicable only to that occupancy group.

Cost Impact: The net effect of the public comment and code change proposal will decrease the cost of construction
This proposal could decrease the cost of construction as drinking fountains would not need to be provided in places which already offer water free of charge.

Public Comment# 2339

Public Comment 2:

IPC: 410.4, 410.4.1 (New), 410.4.2 (New), 410.4.3 (New)

Proponents: Eirene Knott, representing Metropolitan Kansas City Chapter of the ICC (eirene.knott@brrarch.com); Misty Guard, Regulosity LLC, representing Regulosity LLC (misty.guard@regulosity.com) requests As Modified by Public Comment

Modify as follows:

2021 International Plumbing Code

410.4 Substitution . ~~Where restaurants or other establishments providing food provide drinking water in a container free of charge, drinking fountains shall not be required in those establishments. In other *occupancies* where three or more drinking fountains are required, *water dispensers* shall be permitted to be substituted for not more than 50 percent of the required number of drinking fountains.~~
Drinking fountains are permitted to be substituted per Sections 410.4.1 through 410.4.1 and shall conform to the requirements of Section 403.5.

410.4.1 Restaurants . Where restaurants provide drinking water in a container free of charge, drinking fountains shall not be required in those restaurants.

410.4.2 Group M Occupancies . Where Group M occupancies provide public beverage dispensing equipment that dispenses water and a beverage container free of charge, drinking fountains shall not be required in those occupancies.

410.4.3 Other Occupancies . In other *occupancies* where three or more drinking fountains are required, *water dispensers* shall be permitted to be substituted for not more than 50 percent of the required number of drinking fountains.

Commenter's Reason: The committee said that most convenience stores have an occupant load of 15 or less. I don't know where they see convenience stores that small, but the smallest convenience store plan we work with for our clients is at least 3000 square feet, which provides an occupant load of at least 50 people. These convenience stores provide soda fountains which dispense water free of charge. Why do they need to also provide a drinking fountain? In light of Covid-19, most people are now carrying a beverage holder with them, such as a Yeti, and refill it as the opportunity presents. Why do we need to penalize establishments that offer water free of charge which are not classified as a restaurant?
The committee also suggested concern for a situation like having a Starbucks within a Target or Walmart in that the Target or Walmart would not be required to provide the drinking fountains since the Starbucks would meet the proposed exception. Unless that free water is available at all times the Target or Walmart is open, they would not qualify for this exception and would have to provide drinking fountains based on the occupant load of the store.

With the modification in this public comment to reference Section 420, there should be no confusion as to what can be allowed in lieu of a drinking fountain.

By calling out specifically what is permitted in an M occupancy, now the change clearly associates the requirement to be applicable only to that occupancy group.

Cost Impact: The net effect of the public comment and code change proposal will decrease the cost of construction
The proposal could decrease the cost of construction as drinking fountains would not need to be provided in places which already offer water free of charge.

Public Comment# 2477

P46-21

Proposed Change as Submitted

Proponents: Jason Shank, ASSE International, representing ASSE International (jshank@plumbers55.com)

2021 International Plumbing Code

Revise as follows:

412.10 Head shampoo sink faucets. Head shampoo sink faucets shall be supplied with hot water that is limited to not more than 120°F (49°C). Each faucet shall have integral check valves to prevent crossover flow between the hot and cold water supply connections. The means for regulating the maximum temperature shall be one of the following:

1. A limiting device conforming to ASSE 1070/ASME A112.1070/CSA B125.70.
2. A water heater conforming to ASSE ~~1082~~ 1084.
3. A temperature-actuated, flow-reduction device conforming to ASSE 1062.

Reason: ASSE 1082 is designed for the following - This standard is for water heaters that control the outlet temperature to specific limits and are installed within a hot water distribution system but not at point-of-use.
Being this code section is in regards to point of use the ASSE 1082 is the wrong application. The correct application is the ASSE 1084 which is designed for the following - Water heaters covered by this standard have a cold water inlet connection, a means of heating the water, a means of controlling the water temperature, a means of limiting the temperature to a maximum of 120 °F (48.9 °C), and have an outlet connection to connect to downstream fixture fittings.
This water heater is intended to supply tempered water at point of use in order to reduce and control the risks of scalding. This water heater is not intended to limit thermal shock. This water heater is not a substitute for an automatic compensative valve complying with ASSE 1016 / ASME A112.1016 / CSA B125.16.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The change still is requiring a TLD.

P46-21

Public Hearing Results

Committee Action: **As Modified**

Committee Modification:

412.10 Head shampoo sink faucets. Head shampoo sink faucets shall be supplied with hot water that is limited to not more than 120°F (49°C). Each faucet shall have integral check valves to prevent crossover flow between the hot and cold water supply connections. The means for regulating the maximum temperature shall be one of the following:

1. A limiting device conforming to ASSE 1070/ASME A112.1070/CSA B125.70.
2. A water heater conforming to ASSE <u>1082 or</u> 1084.
3. A temperature-actuated, flow-reduction device conforming to ASSE 1062.

Committee Reason: For the modification: An ASSE 1082 water heater is not limited to serving multiple shampoo sinks. (14-0)
For the proposal As Modified: Both types of water heaters are acceptable for the application. (14-0)

P46-21

Individual Consideration Agenda

Public Comment 1:

Proponents: Jason Shank, representing ASSE International (jshank@plumbers55.com) requests As Submitted

Commenter's Reason: P46-21 should be approved as submitted and not modified to include ASSE 1082. The ASSE 1082 and 1084 standards are developed by industry experts using the ANSI process. Both standards were developed by 31 industry experts and was subjected to an ANSI public review period.
The ASSE 1082 – Water Heaters with Integral Temperature Control Devices for Hot Water Distribution Systems has the following scope. The standard is for water heaters that control the outlet temperature to specific limits and are installed within a hot water distribution system but not at point of use. Head shampoo sink faucets are point of use fitting therefore this standard is not appropriate. The ASSE 1082 scope defines the outlet temperature range to be 105 degrees F to **125 degrees F**. However, Section 412.10 of the IPC limits the hot water to a maximum of **120 degrees F**. There are no assurances that products compliant to ASSE 1082 can meet this code requirement.

The ASSE 1084 – Water Heaters with Temperature Limiting Capacity have the following scope.This water heater is intended to supply tempered water at a point of use to reduce and control the risks of scalding. This water heater is not intended to limit thermal shock.While both standards require water heaters to pass the following tests - maximum flow and conditioning test, temperature control test; the 1084 also requires the pressure and temperature variation test. The purpose of the 1084 pressure and temperature variation test is to determine whether the outlet temperature is maintained within a set temperature and to a maximum of 120 degrees when the inlet temperature and pressure are varied. After the initial 5 seconds following the decrease in flow rate, the outlet temperature shall not exceed 120 degrees. During the linear increase in water temperature, the outlet water temperature shall not exceed 120 degrees. The 1082 requires no such test which means there is no proven scald limiting protection to limit the outlet temperature to a maximum of 120 degrees.

Cost Impact: The net effect of the public comment and code change proposal will not increase or decrease the cost of construction
The net effect of the public comment and code change proposal will not add to the cost of construction. The ASSE 1084 listed water heaters will be able to provide hot water with temperature control and scald protection. The installation of the 1082 heater would still require the installation of an ASSE 1070 valve to provide scald protection to the end user.

Public Comment# 2593

P48-21

Proposed Change as Submitted

Proponents: Jason Shank, ASSE International, representing ASSE International

2021 International Plumbing Code

Revise as follows:

412.5 Bathtub and whirlpool bathtub valves. Bathtubs and whirlpool bathtub valves shall have or be supplied by a water-temperature-limiting device that conforms to ASSE 1070/ASME A112.1070/CSA B125.70 or by a water heater complying with ~~ASSE 1082 or~~ ASSE 1084, except where such valves are combination tub/shower valves in accordance with Section 412.3. The water-temperature-limiting device required by this section shall be equipped with a means to limit the maximum setting of the device to 120°F (49°C), and, where adjustable, shall be field adjusted in accordance with the manufacturer's instructions to provide hot water at a temperature not to exceed 120°F (49°C). Access shall be provided to water-temperature-limiting devices that conform to ASSE 1070/ASME A112.1070/CSA B125.70.

Exception: *Access* shall not be required for nonadjustable water-temperature-limiting devices that conform to ASSE 1070/ASME A112.1070/CSA B125.70 and are integral with a fixture fitting, provided that the fixture fitting itself can be accessed for replacement.

Reason: ASSE 1082 is designed for the following - This standard is for water heaters that control the outlet temperature to specific limits and are installed within a hot water distribution system but not at point-of-use.
ASSE 1082 is not for point of use which is what this section of the Code is addressing.

Bibliography: N/A

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This change will still require an TLD.

P48-21

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: An ASSE 1082 water heater is appropriate for the application. Also, based on action of P46-21. (14-0)

P48-21

Individual Consideration Agenda

Public Comment 1:

Proponents: Jason Shank, representing ASSE International (jshank@plumbers55.com) requests As Submitted

Commenter's Reason: P48-21 should be approved as submitted. The ASSE 1082 and 1084 standards are developed by industry experts using the ANSI process. Both standards were developed by 31 industry experts and was subjected to an ANSI public review period. The ASSE 1082 – Water Heaters with Integral Temperature Control Devices for Hot Water Distribution Systems has the following scope. The standard is for water heaters that control the outlet temperature to specific limits and are installed within a hot water distribution system but not at point of use. Bathtub and whirlpool bathtub valves are point of use fittings and therefore this standard is not appropriate. The ASSE 1082 scope defines the outlet temperature range to be 105 degrees F to **125 degrees F**. However, Section 412.5 of the IPC limits the hot water to a maximum of **120 degrees F**. There are no assurances that products compliant to ASSE 1082 can meet this code requirement.
The ASSE 1084 – Water Heaters with Temperature Limiting Capacity have the following scope.

This water heater is intended to supply tempered water at a point of use to reduce and control the risks of scalding. This water heater is not intended to limit thermal shock.

While both standards require water heaters to pass the following tests - maximum flow and conditioning test, temperature control test; the 1084 also requires the pressure and temperature variation test. The purpose of the 1084 pressure and temperature variation test is to determine whether the outlet temperature is maintained within a set temperature and to a maximum of 120 degrees when the inlet temperature and pressure are varied.

After the initial 5 seconds following the decrease in flow rate, the outlet temperature shall not exceed 120 degrees. During the linear increase in water temperature, the outlet water temperature shall not exceed 120 degrees. The 1082 requires no such test which means there is no proven scald limiting protection to limit the outlet temperature to a maximum of 120 degrees.

Cost Impact: The net effect of the public comment and code change proposal will not increase or decrease the cost of construction
The net effect of the public comment and code change proposal will not add to the cost of construction. The ASSE 1084 listed water heaters will be able to provide hot water with temperature control and scald protection. The installation of the 1082 heater would still require the installation of an ASSE 1070 valve to provide scald protection to the end user.

Public Comment# 2595

P50-21

Proposed Change as Submitted

Proponents: Jason Shank, ASSE International, representing ASSE International

2021 International Plumbing Code

Revise as follows:

423.3 Footbaths and pedicure baths. The water supplied to specialty plumbing fixtures, such as pedicure chairs having an integral foot bathtub and footbaths, shall be limited to not greater than 120ºF (49ºC) by a water-temperature-limiting device that conforms to ASSE 1070/ASME A112.1070/CSA B125.70 or by a water heater complying with ASSE ~~1082~~ 1084.

Reason: ASSE 1082 is designed for the following - This standard is for water heaters that control the outlet temperature to specific limits and are installed within a hot water distribution system but not at point-of-use. Being this code section is in regards to point of use the ASSE 1082 is the wrong application. The correct application is the ASSE 1084 which is designed for the following - Water heaters covered by this standard have a cold water inlet connection, a means of heating the water, a means of controlling the water temperature, a means of limiting the temperature to a maximum of 120 °F (48.9 °C), and have an outlet connection to connect to downstream fixture fittings. This water heater is intended to supply tempered water at point of use in order to reduce and control the risks of scalding. This water heater is not intended to limit thermal shock. This water heater is not a substitute for an automatic compensative valve complying with ASSE 1016 / ASME A112.1016 / CSA B125.16.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The code change proposal will not increase or decrease the cost of construction

The change still is requiring a TLD.

P50-21

Public Hearing Results

Committee Action: **As Modified**

Committee Modification:

423.3 Footbaths and pedicure baths. The water supplied to specialty plumbing fixtures, such as pedicure chairs having an integral foot bathtub and footbaths, shall be limited to not greater than 120ºF (49ºC) by a water-temperature-limiting device that conforms to ASSE 1070/ASME A112.1070/CSA B125.70 or by a water heater complying with ASSE 1082 or 1084.

Committee Reason: For the modification: An ASSE 1082 water heater can serve multiple pedicure baths. (12-2)
For the proposal As Modified: Action is consistent with actions on P46-21 and P48-21. (12-2)

P50-21

Individual Consideration Agenda

Public Comment 1:

Proponents: Jason Shank, representing ASSE International (jshank@plumbers55.com) requests As Submitted

Commenter's Reason: P50-21 should be approved as submitted and not modified to include ASSE 1082. The ASSE 1082 and 1084 standards are developed by industry experts using the ANSI process. Both standards were developed by 31 industry experts and was subjected to an ANSI public review period.
The ASSE 1082 – Water Heaters with Integral Temperature Control Devices for Hot Water Distribution Systems has the following scope. The standard is for water heaters that control the outlet temperature to specific limits and are installed within a hot water distribution system but not at point of use. Foot baths and pedicure baths are point of use fittings and therefore this standard is not appropriate. The ASSE 1082 scope defines the outlet temperature range to be 105 degrees F to **125 degrees F**. However, Section 423.3 of the IPC limits the hot water to a maximum of **120 degrees F**. There are no assurances that products compliant to ASSE 1082 can meet this code requirement.

The ASSE 1084 – Water Heaters with Temperature Limiting Capacity have the following scope.

This water heater is intended to supply tempered water at a point of use to reduce and control the risks of scalding. This water heater is not intended to limit thermal shock.

While both standards require water heaters to pass the following tests - maximum flow and conditioning test, temperature control test; the 1084 also requires the pressure and temperature variation test. The purpose of the 1084 pressure and temperature variation test is to determine whether the outlet temperature is maintained within a set temperature and to a maximum of 120 degrees when the inlet temperature and pressure are varied. After the initial 5 seconds following the decrease in flow rate, the outlet temperature shall not exceed 120 degrees. During the linear increase in water temperature, the outlet water temperature shall not exceed 120 degrees. The 1082 requires no such test which means there is no proven scald limiting protection to limit the outlet temperature to a maximum of 120 degrees.

Cost Impact: The net effect of the public comment and code change proposal will not increase or decrease the cost of construction
The net effect of the public comment and code change proposal will not add to the cost of construction. The ASSE 1084 listed water heaters will be able to provide hot water with temperature control and scald protection. The installation of the 1082 heater would still require the installation of an ASSE 1070 valve to provide scald protection to the end user.

Public Comment# 2596

P58-21

Proposed Change as Submitted

Proponents: Erin Coffman, Water Systems Council, representing Water Systems Council

2021 International Plumbing Code

Revise as follows:

602.3.1 Sources. Dependent on geological and soil conditions and the amount of rainfall, individual water supplies are of the following types: drilled well, driven well, dug well, bored well, spring, stream, or cistern. Surface bodies of water and land cisterns shall not be sources of individual water supply unless properly treated by approved means to prevent contamination. Individual water supplies shall be constructed and installed in accordance with the applicable state and local laws. Where such laws do not address all of the requirements set forth in NGWA-01, individual water supplies shall comply with NGWA-01 for those requirements not addressed by state and local laws. Pitless adapters, pitless units, and sanitary well caps shall be installed in accordance with the manufacturer's installation instructions and supported in accordance with the building code. Pitless adapters, pitless units, and sanitary well caps intended to supply drinking water shall comply with ASSE 1093/WSC PAS-97.

Add new text as follows:

602.3.6 Well connections.
Pitless adapters, pitless units, and sanitary well caps shall be installed in accordance with the manufacturer's instructions and supported in accordance with the *International Building Code*. Pitless adapters, pitless units, and sanitary well caps intended to supply drinking water shall comply with ASSE 1093/WSC PAS-97.

Revise as follows:

608.18.7 ~~Cover~~ Covers, pitless adapters, pitless units, and sanitary well caps. Potable water wells shall be equipped with a pitless adapters, pitless units, and sanitary well caps or an overlapping watertight cover at the top of the well casing or pipe sleeve . ~~such that contaminated water or other substances are prevented from entering the well through the annular opening at the top of the well casing, wall or pipe sleeve. Covers shall extend downward not less than 2 inches (51 mm) over the outside of the well casing or wall. A dug well cover shall be provided with a pipe sleeve permitting the withdrawal of the pump suction pipe, cylinder or jet body without disturbing the cover. Where pump sections or discharge pipes enter or leave a well through the side of the casing, the circle of contact shall be watertight.~~

Add new text as follows:

608.18.7.1 Pitless adapters, pitless units, and sanitary well caps.
Pitless adapters, pitless units, and sanitary well caps shall comply with ASSE 1093/WSC PAS-97.

608.18.7.2 Covers.
Covers shall be such that contaminated water or other substances are prevented from entering the well through the annular opening at the top of the well casing, wall, or pipe sleeve. Covers shall extend downward not less than 2 inches (51 mm) over the outside of the well casing or wall. A dug well cover shall be provided with a pipe sleeve that allows for the withdrawal of the pump suction pipe, cylinder, or jet body without disturbing the cover. Where pump sections or discharge pipes enter or leave a well through the side of the casing, the circle of contact shall be watertight.

Add new definition as follows:

PITLESS ADAPTER. A device designed to attach to one or more openings through a well casing. Such devices shall be constructed so as to prevent the entrance of contaminants or pollutants into the well or potable water supply through such opening(s) to conduct water from the well, to protect the water from freezing or extremes of temperature, and to provide access to water system parts within the well.

PITLESS UNIT. An assembly that extends the upper end of the well casing from below the frostline to not less than 12 in (305mm) above grade. Such assemblies shall be constructed to prevent the entrance of contaminants or pollutants into the well or potable water supply, to conduct water from the well, to protect the water from freezing or extremes of temperature, and to provide full access to the well and to water system parts within the well. The assembly shall provide a sanitary well cap for the top terminal of the well.

SANITARY WELL CAP. A device that covers and encloses the upper termination of a pitless unit or the well casing and provides protection to the top, exposed portion of the well casing by being tamper resistant, forming a protective cover from the elements, that allows for atmospheric venting of the well, and being resistant to the entry of vermin or contaminants or pollutants.

Add new standard(s) as follows:

ASSE

ASSE International
18927 Hickory Creek Drive, Suite 220
Mokena, IL 60448

ASSE 1093-2019 / WSC PAS-97(2019) Performance Requirements for Pitless Adapters, Pitless Units, and Well Caps

WSC

Water Systems Council
1101 30th St. NW - Suite 500
Washington, DC 20007
USA

WSC Water Systems Council.
ASSE 1093/WSC PAS-97 -2019 Performance Requirements for Pitless Adapters, Pitless Units, and Well Caps

Reason: The current code language does not provide requirements for pitless adapters, pitless units, and sanitary well caps. These are components that are critical to water well supply systems. Requirements are necessary for safety aspects and dependable performance standards.

Bibliography: I do not have any.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The equipment that is currently being installed on projects already complies with the standard. Therefore, requiring compliance to the standard doesn't affect the cost of construction.

Staff Analysis: A review of the standard(s) proposed for inclusion in the code, ASSE 1093-2019/WSC PAS-97(2019) with regard to the ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before March 20, 2021.

P58-21

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: Section 602.3.1 indicates in accordance with the "building code". What building code? Section 602.3.6 indicates that those items need to be supported in accordance with the IBC. The IBC doesn't have anything specific with respect to these items.
All three new definitions have requirements. Definitions should not contain requirements. Section 608.18.7.1 by itself would have been a good proposal. (13-1)

P58-21

Individual Consideration Agenda

Public Comment 1:

IPC: (New), 608.7.1, ASSE Chapter 15 (New)

Proponents: Terry Burger, representing ASSE International; Erin Coffman, representing Water Systems Council (ecoffman@watersystemscouncil.org) requests As Modified by Public Comment

Replace as follows:

2021 International Plumbing Code

PITLESS ADAPTER . A device designed to attach to one or more openings through a well casing. to provide access to water system parts within the well.

PITLESS UNIT. . An assembly that extends the upper end of the well casing from below the frostline to above grade. Its purpose is to prevent the entrance of contaminants or pollutants into the well water supply, to conduct water from the well, to protect the water from freezing or extremes of temperature, and to provide full access to the well and to water system parts within the well.

SANITARY WELL CAP. . A device that covers and encloses the upper termination of a pitless unit or the well casing to provides protection to the top, exposed portion of the well casing.

608.7.1 Private water supplies . Cross connections between a private water supply and a potable public supply shall be prohibited. Pitless adapters, pitless units, and sanitary well caps shall comply with ASSE 1093/WSC PAS-97.

ASSE

ASSE International
18927 Hickory Creek Drive, Suite 220
Mokena, IL 60448

ASSE 1093/WSC PAS-97 -2019 Performance Requirements for Pitless Adapters, Pitless Units, and Well Caps

Commenter's Reason: The committee voted to disapprove because they stated that the proposal made reference to IBC for which the reference was invalid. And that the definitions had requirement within them. The committee also recommended that this proposal was better placed in Section 608.18.7.1. The committee's comments and reasons have been taken into consideration to this proposal.
The current code language does not provide requirements for pitless adapters, pitless units, and sanitary well caps. These are components that are critical to water well supply systems. Requirements are necessary for safety aspects and dependable performance standards.

We urge membership approval to prevent inappropriate connection methods which might not be safe.

Cost Impact: The net effect of the public comment and code change proposal will not increase or decrease the cost of construction
These components (that comply with the standard) are what has been used for years. Having the code call out the standard isn't going to cost more as these are the same items that have been installed all along.

Public Comment# 2418

P59-21

Proposed Change as Submitted

Proponents: Chris Haldiman, representing Watts Water Technologies (chris.haldiman@wattswater.com)

2021 International Plumbing Code

Revise as follows:

604.8 Water pressure-reducing valve or regulator. Where static water pressure in the water supply piping ~~within a building~~ exceeds 80 psi (552 kPa) ~~static~~, an *approved-type* strainer and ~~water~~ pressure ~~-reducing valve~~ regulator conforming to ASSE 1003 or CSA B356 and NSF 61. ~~with strainer~~ shall be installed to reduce the pressure in the building water distribution piping to not greater than 80 psi (552 kPa) static. Pressure regulator sizes equal to or greater than 1 1/2 inches (40mm) shall not require a strainer. For line sizes greater than 3 inches {76 mm), an automatic control such as a pressure regulating valve shall be utilized. Such regulators shall control the pressure to water outlets in the building except where otherwise approved by the code official.

> **Exception:** Service lines to sill cocks and outside hydrants, and main supply risers where pressure from the mains is reduced to 80 psi (552 kPa) or less at individual fixtures.

Reason: Adding of "and NSF61" – For consistency purposes when stating the requirements for components being used in potable water distribution systems. An example of this are 608.12, "Where in contact with potable water intended for drinking water, water tanks, coatings for the inside of tanks and liners for water tanks shall conform to NSF 61."
Adding of "For line sizes greater than 3", an Automatic Control (Pressure Regulating) Valve shall be utilized." – For line sizes 3" or larger, Direct Acting Valves are not cost conducive nor the optimized device for this application. Where direct acting regulators will have volume losses and introduce a turbulent flow path, ACV's will sustain

Cost Impact: The code change proposal will increase the cost of construction
This proposal would require the use of automatic pressure regulators for larger piping designs. This would improve the operating conditions of the system and increase safety from pressure fluctuations.

P59-21

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The reason statement didn't indicate why a regulator larger than 1-1/2 inches isn't required to have a strainer. The beginning of the last sentence repeats what the original section is requiring and is therefore, redundant. The last part of the last sentence appears to allow the code official to override the requirements of the section but offers no advice for the code official to make that decision. There are 4 inch pressure regulators available so this proposal might eliminate some products that are currently available. (14-0)

P59-21

Individual Consideration Agenda

Public Comment 1:

IPC: 604.8

Proponents: Chris Haldiman, representing Watts Water Technologies (chris.haldiman@wattswater.com) requests As Modified by Public Comment

Replace as follows:

2021 International Plumbing Code

604.8 Water pressure~~-reducing valve or regulator~~ control. Where water pressure within a building exceeds 80 psi (552 kPa) static, an ~~*approved*~~ water pressure-reducing valve that complies with ~~conforming to~~ ASSE 1003 or CSA B356 ~~with strainer~~ shall be installed to reduce the pressure in the building water distribution piping to not greater than 80 psi (552 kPa) static. Such valves shall be provided with a strainer and both the valve and the strainer shall comply with NSF 61.

~~**Exception**~~ **Exceptions:**

1. Where the required size of water pressure-reducing valve is not made, an automatic control valve shall be installed provided that the valve complies with NSF 61 and is *approved.*
2. Service lines to sill cocks and outside hydrants, and main supply risers where pressure from the mains is reduced to 80 psi (552 kPa) or less at individual fixtures.

Commenter's Reason: ASSE Standard 1003 currently only includes sizes ½" through 4", and currently the largest size that is certified is 3". Where building water supply piping sizes exceed 4 inches, the code falls short on what to do. For installations that require the supply piping to be larger than 4", and pressure control is required or needed, the use of parallel water pressure-regulator valves may be required. This is not only expensive but requires more space and increased maintenance costs.
The new exception offers another method of pressure control: an automatic control valve. Such valves are currently available in sizes up to 12 inches. This type of valve is available from numerous manufacturers and has been installed in a variety of commercial and industrial applications needing water pressure control in high flow (and low flow) situations. They are cost effective and easy to adjust and service.

The inclusion of strainers in any water system equipped with any type of pressure control valve prevents clogging of internal ports and damage to mechanisms that could render the valve inoperative (i.e., failure to control high pressures.) This is especially important if piping work is performed upstream of the pressure control valve such as when a public utility system experiences a water main breakage that might allow debris to flow into a building water service. Strainers have the added benefit of protecting backflow prevention assemblies that are downstream of the strainers.

Bibliography: None.

Cost Impact: The net effect of the public comment and code change proposal will not increase or decrease the cost of construction
Having an option for a different method for pressure control where the size of the code-required device does not exist, doesn't impact cost. Where building water pressure control is needed to be installed, the code was not clear on what could be used for the larger sizes not currently addressed in the code.

Public Comment# 2700

P61-21 Part I

Proposed Change as Submitted

Proponents: Lisa Reiheld, Viega LLC, representing Viega LLC (lisa.reiheld@viega.us)

THIS IS A 2 PART PROPOSAL. PART I WILL BE HEARD BY THE IPC COMMITTEE. PART II WILL BE HEARD BY THE IRC-P&M COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THESE COMMITTEES.

2021 International Plumbing Code

Revise as follows:

TABLE 605.3 WATER SERVICE PIPE

MATERIAL	STANDARD
Acrylonitrile butadiene styrene (ABS) plastic pipe	ASTM D1527; ASTM D2282
Chlorinated polyvinyl chloride (CPVC) plastic pipe	ASTM D2846; ASTM F441; ASTM F442; CSA B137.6
Chlorinated polyvinyl chloride/aluminum/chlorinated polyvinyl chloride (CPVC/AL/CPVC)	ASTM F2855
Copper or copper-alloy pipe	ASTM B42; ASTM B43; ASTM B302
Copper or copper-alloy tubing (Type K, WK, L, WL, M or WM)	ASTM B75; ASTM B88; ASTM B251; ASTM B447
Cross-linked polyethylene (PEX) plastic pipe and tubing	ASTM F876; AWWA C904; CSA B137.5
Cross-linked polyethylene/aluminum/cross-linked polyethylene (PEX-AL-PEX) pipe	ASTM F1281; ASTM F2262; CSA B137.10
Cross-linked polyethylene/aluminum/high-density polyethylene (PEX-AL-HDPE)	ASTM F1986
Ductile iron water pipe	AWWA C151/A21.51; AWWA C115/A21.15
Galvanized steel pipe	ASTM A53
Polyethylene (PE) plastic pipe	ASTM D2239; ASTM D3035; AWWA C901; CSA B137.1
Polyethylene (PE) plastic tubing	ASTM D2737; AWWA C901; CSA B137.1
Polyethylene/aluminum/polyethylene (PE-AL-PE) pipe	ASTM F1282; CSA B137.9
Polyethylene of raised temperature (PE-RT) plastic tubing	ASTM F2769; CSA B137.18
Polypropylene (PP) plastic pipe or tubing	ASTM F2389; CSA B137.11
Polyvinyl chloride (PVC) plastic pipe	ASTM D1785; ASTM D2241; ASTM D2672; CSA B137.3
Stainless steel pipe (Type 304/304L)	ASTM A269/A269M; ASTM A312; <u>ASTM A554;</u> ASTM A778
Stainless steel pipe (Type 316/316L)	ASTM A269/A269M; ASTM A312; <u>ASTM A554;</u> ASTM A778
<u>Stainless steel tubing (Type 304/304L)</u>	<u>ASTM A269; ASTM A312; ASTM A554; ASTM A778</u>
<u>Stainless steel tubing (Type 316/316L)</u>	<u>ASTM A269; ASTM A312; ASTM A554; ASTM A778</u>

Add new standard(s) as follows:

ASTM

ASTM International
100 Barr Harbor Drive, P.O. Box C700
West Conshohocken, PA 19428-2959

<u>A554-16</u> <u>Standard Specification for Welded Stainless Steel Mechanical Tubing</u>

Reason: Adding Stainless Steel tubing to account for both pipe and tubing materials. ASTM A554 Standard Specification for Welded Stainless Steel Mechanical Tubing is equivalent to other standards ASTM A269/A269M; ASTM A312; ASTM A778 already included in this table and should be added to increase the options for materials to be used in water service pipe installations.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
Adding an additional standard option for stainless steel pipe to be listed to will not increase or decrease the cost of construction. If anything, it has potential to decrease the cost since this increases the number of suppliers of pipe that can be purchased.

Staff Analysis: A review of the standard(s) proposed for inclusion in the code, ASTM A554-16 with regard to the ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before March 20, 2021.

P61-21 Part I

<u>Public Hearing Results</u>

Committee Action: As Submitted

Committee Reason: Stainless steel tubing is indicated in several product standards. (13-0)

Individual Consideration Agenda

Public Comment 1:

IPC: TABLE 605.3

Proponents: Lisa Reiheld, representing Viega LLC (lisa.reiheld@viega.us) requests As Modified by Public Comment

Modify as follows:

2021 International Plumbing Code

TABLE 605.3 WATER SERVICE PIPE

MATERIAL	STANDARD
Acrylonitrile butadiene styrene (ABS) plastic pipe	ASTM D1527; ASTM D2282
Chlorinated polyvinyl chloride (CPVC) plastic pipe	ASTM D2846; ASTM F441; ASTM F442; CSA B137.6
Chlorinated polyvinyl chloride/aluminum/chlorinated polyvinyl chloride (CPVC/AL/CPVC)	ASTM F2855
Copper or copper-alloy pipe	ASTM B42; ASTM B43; ASTM B302
Copper or copper-alloy tubing (Type K, WK, L, WL, M or WM)	ASTM B75; ASTM B88; ASTM B251; ASTM B447
Cross-linked polyethylene (PEX) plastic pipe and tubing	ASTM F876; AWWA C904; CSA B137.5
Cross-linked polyethylene/aluminum/cross-linked polyethylene (PEX-AL-PEX) pipe	ASTM F1281; ASTM F2262; CSA B137.10
Cross-linked polyethylene/aluminum/high-density polyethylene (PEX-AL-HDPE)	ASTM F1986
Ductile iron water pipe	AWWA C151/A21.51; AWWA C115/A21.15
Galvanized steel pipe	ASTM A53
Polyethylene (PE) plastic pipe	ASTM D2239; ASTM D3035; AWWA C901; CSA B137.1
Polyethylene (PE) plastic tubing	ASTM D2737; AWWA C901; CSA B137.1
Polyethylene/aluminum/polyethylene (PE-AL-PE) pipe	ASTM F1282; CSA B137.9
Polyethylene of raised temperature (PE-RT) plastic tubing	ASTM F2769; CSA B137.18
Polypropylene (PP) plastic pipe or tubing	ASTM F2389; CSA B137.11
Polyvinyl chloride (PVC) plastic pipe	ASTM D1785; ASTM D2241; ASTM D2672; CSA B137.3
Stainless steel pipe (Type 304/304L)	ASTM A269/A269M; ASTM A312; ~~ASTM A554;~~ ASTM A778
Stainless steel pipe (Type 316/316L)	ASTM A269/A269M; ASTM A312; ~~ASTM A554;~~ ASTM A778
Stainless steel tubing (Type 304/304L)	ASTM A269; ASTM A312; ~~ASTM A554;~~ ASTM A778
Stainless steel tubing (Type 316/316L)	ASTM A269; ASTM A312; ~~ASTM A554;~~ ASTM A778

Commenter's Reason: Based on IPC Committee feedback and additional comments on other proposals, I suggest removing ASTM A554 from this proposal as it is deemed as a mechanical/structural tubing standard. With this modification, there will be consistency across similar tables in the IMC and IRC as well as other tables that were Accepted as Modified by the IPC Committee.

Cost Impact: The net effect of the public comment and code change proposal will not increase or decrease the cost of construction
Removal of this standard will have no impact on the cost of construction.

Public Comment# 2371

P61-21 Part II

Proposed Change as Submitted

Proponents: Lisa Reiheld, Viega LLC, representing Viega LLC (lisa.reiheld@viega.us)

2021 International Residential Code

Revise as follows:

TABLE P2906.4 WATER SERVICE PIPE

	STANDARD
Acrylonitrile butadiene styrene (ABS) plastic pipe	ASTM D1527; ASTM D2282
Chlorinated polyvinyl chloride (CPVC) plastic pipe	ASTM D2846; ASTM F441; ASTM F442/F442M; CSA B137.6
Chlorinated polyvinyl chloride/aluminum/chlorinated polyvinyl chloride (CPVC/AL/CPVC) plastic pipe	ASTM F2855
Copper or copper-alloy pipe	ASTM B42; ASTM B43; ASTM B302
Copper or copper-alloy tubing (Type K, WK, L, WL, M or WM)	ASTM B75/B75M; ASTM B88; ASTM B251; ASTM B447
Cross-linked polyethylene/aluminum/cross-linked polyethylene (PEX-AL-PEX) pipe	ASTM F1281; ASTM F2262; CSA B137.10
Cross-linked polyethylene/aluminum/high-density polyethylene (PEX-AL-HDPE) pipe	ASTM F1986
Cross-linked polyethylene (PEX) plastic tubing	ASTM F876; AWWA C904; CSA B137.5
Ductile iron water pipe	AWWA C115/A21.15; AWWA C151/A21.51
Galvanized steel pipe	ASTM A53
Polyethylene/aluminum/polyethylene (PE-AL-PE) pipe	ASTM F1282; CSA B137.9
Polyethylene (PE) plastic pipe	ASTM D2104; ASTM D2239; AWWA C901; CSA B137.1
Polyethylene (PE) plastic tubing	ASTM D2737; AWWA C901; CSA B137.1
Polyethylene of raised temperature (PE-RT) plastic tubing	ASTM F2769; CSA B137.18
Polypropylene (PP) plastic tubing	ASTM F2389; CSA B137.11
Polyvinyl chloride (PVC) plastic pipe	ASTM D1785; ASTM D2241; ASTM D2672; CSA B137.3
Stainless steel (Type304/304L) pipe	ASTM A269; ASTM A312; ASTM A554; ASTM A778
Stainless steel (Type 316/316L) pipe	ASTM A269; ASTM A312; ASTM A554; ASTM A778
Stainless steel (Type304/304L) tubing	ASTM A269; ASTM A312; ASTM A554; ASTM A778
Stainless steel (Type 316/316L) tubing	ASTM A269; ASTM A312; ASTM A554; ASTM A778

2021 International Plumbing Code

Add new standard(s) as follows:

ASTM

ASTM International
100 Barr Harbor Drive, P.O. Box C700
West Conshohocken, PA 19428-2959

A554-16 Standard Specification for Welded Stainless Steel Mechanical Tubing

Reason: Adding Stainless Steel tubing to account for both pipe and tubing materials. ASTM A269/A269M Standard Specification for Seamless and Welded Austenitic Stainless Steel Tubing for General Service and ASTM A554 Standard Specification for Welded Stainless Steel Mechanical Tubing are equivalent to other standards ASTM A312; ASTM A778 already included in this table and should be added to increase the options for materials to be used in water service pipe installations were corrosion resistance is important.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
Adding an additional standard options for stainless steel tubing to be listed to will not increase or decrease the cost of construction. If anything, it has potential to decrease the cost since this increases the options to use tubing in lieu of only pipe.

Staff Analysis: A review of the standard(s) proposed for inclusion in the code, ASTM A554-16 with regard to the ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before March 20, 2021.

P61-21 Part II

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The Committee doesn't see the need for this mechanical tubing for water service applications. (7-4)

Individual Consideration Agenda

Public Comment 1:

IRC: TABLE P2906.4

Proponents: Lisa Reiheld, representing Viega LLC (lisa.reiheld@viega.us) requests As Modified by Public Comment

Modify as follows:

2021 International Residential Code

TABLE P2906.4 WATER SERVICE PIPE

	STANDARD
Acrylonitrile butadiene styrene (ABS) plastic pipe	ASTM D1527; ASTM D2282
Chlorinated polyvinyl chloride (CPVC) plastic pipe	ASTM D2846; ASTM F441; ASTM F442/F442M; CSA B137.6
Chlorinated polyvinyl chloride/aluminum/chlorinated polyvinyl chloride (CPVC/AL/CPVC) plastic pipe	ASTM F2855
Copper or copper-alloy pipe	ASTM B42; ASTM B43; ASTM B302
Copper or copper-alloy tubing (Type K, WK, L, WL, M or WM)	ASTM B75/B75M; ASTM B88; ASTM B251; ASTM B447
Cross-linked polyethylene/aluminum/cross-linked polyethylene (PEX-AL-PEX) pipe	ASTM F1281; ASTM F2262; CSA B137.10
Cross-linked polyethylene/aluminum/high-density polyethylene (PEX-AL-HDPE) pipe	ASTM F1986
Cross-linked polyethylene (PEX) plastic tubing	ASTM F876; AWWA C904; CSA B137.5
Ductile iron water pipe	AWWA C115/A21.15; AWWA C151/A21.51
Galvanized steel pipe	ASTM A53
Polyethylene/aluminum/polyethylene (PE-AL-PE) pipe	ASTM F1282; CSA B137.9
Polyethylene (PE) plastic pipe	ASTM D2104; ASTM D2239; AWWA C901; CSA B137.1
Polyethylene (PE) plastic tubing	ASTM D2737; AWWA C901; CSA B137.1
Polyethylene of raised temperature (PE-RT) plastic tubing	ASTM F2769; CSA B137.18
Polypropylene (PP) plastic tubing	ASTM F2389; CSA B137.11
Polyvinyl chloride (PVC) plastic pipe	ASTM D1785; ASTM D2241; ASTM D2672; CSA B137.3
Stainless steel (Type304/304L) pipe	ASTM A269; ASTM A312; ~~ASTM A554;~~ ASTM A778
Stainless steel (Type 316/316L) pipe	ASTM A269; ASTM A312; ~~ASTM A554;~~ ASTM A778
Stainless steel (Type304/304L) tubing	ASTM A269; ASTM A312; ~~ASTM A554;~~ ASTM A778
Stainless steel (Type 316/316L) tubing	ASTM A269; ASTM A312; ~~ASTM A554;~~ ASTM A778

Commenter's Reason: This public comment addresses the committee's concerns with the suitability of ASTM A554 as a standard for this code and the reason for disapproval was the addition of ASTM A554. Based on Committee feedback and additional comments, this public comment removes ASTM A554 from this proposal as it is deemed as a mechanical/structural tubing standard. With this modification, there will be consistency across similar tables in the IMC and IPC. P61 Part 1 and P62 Part 1 included the addition of ASTM A269 and were approved by the IPC committee.

Cost Impact: The net effect of the public comment and code change proposal will not increase or decrease the cost of construction
Removal of this standard will have no impact on the cost of construction.

Public Comment# 2399

P62-21 Part I

Proposed Change as Submitted

Proponents: Lisa Reiheld, Viega LLC, representing Viega LLC (lisa.reiheld@viega.us)

THIS IS A 2 PART PROPOSAL. PART I WILL BE HEARD BY THE IPC COMMITTEE. PART II WILL BE HEARD BY THE IRC-P&M COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THESE COMMITTEES.

2021 International Plumbing Code

Revise as follows:

TABLE 605.4 WATER DISTRIBUTION PIPE

MATERIAL	STANDARD
Chlorinated polyvinyl chloride (CPVC) plastic pipe and tubing	ASTM D2846; ASTM F441; ASTM F442; CSA B137.6
Chlorinated polyvinyl chloride/aluminum/chlorinated polyvinyl chloride (CPVC/AL/CPVC)	ASTM F2855
Copper or copper-alloy pipe	ASTM B42; ASTM B43; ASTM B302
Copper or copper-alloy tubing (Type K, WK, L, WL, M or WM)	ASTM B75; ASTM B88; ASTM B251; ASTM B447
Cross-linked polyethylene (PEX) plastic tubing	ASTM F876; CSA B137.5
Cross-linked polyethylene/aluminum/cross-linked polyethylene (PEX-AL-PEX) pipe	ASTM F1281; ASTM F2262; CSA B137.10
Cross-linked polyethylene/aluminum/high-density polyethylene (PEX-AL-HDPE)	ASTM F1986
Ductile iron pipe	AWWA C115/A21.15; AWWA C151/A21.51
Galvanized steel pipe	ASTM A53
Polyethylene/aluminum/polyethylene (PE-AL-PE) composite pipe	ASTM F1282
Polyethylene of raised temperature (PE-RT) plastic tubing	ASTM F2769; CSA B137.18
Polypropylene (PP) plastic pipe or tubing	ASTM F2389; CSA B137.11
Stainless steel pipe (Type 304/304L)	ASTM A269; ASTM A312; ASTM A554; ASTM A778
Stainless steel pipe (Type 316/316L)	ASTM A269; ASTM A312; ASTM A554; ASTM A778
Stainless steel tubing (Type 304/304L)	ASTM A269; ASTM A312; ASTM A554; ASTM A778
Stainless steel tubing (Type 316/316L)	ASTM A269; ASTM A312; ASTM A554; ASTM A778

Add new standard(s) as follows:

ASTM

ASTM International
100 Barr Harbor Drive, P.O. Box C700
West Conshohocken, PA 19428-2959

A554-16 Standard Specification for Welded Stainless Steel Mechanical Tubing

Reason: Adding Stainless Steel tubing to account for both pipe and tubing materials. ASTM A229 and ASTM A554 is equivalent to other standards ASTM A312; ASTM A778 already included in this table and should be added to increase the options for materials to be used in water service pipe installations.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
Adding an additional standard option for stainless steel pipe to be listed to will not increase or decrease the cost of construction. If anything, it has potential to decrease the cost since this increases the number of suppliers of pipe that can be purchased.

Staff Analysis: A review of the standard(s) proposed for inclusion in the code, ASTM A554-16 with regard to the ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before March 20, 2021.

P62-21 Part I

Public Hearing Results

Committee Action: **As Submitted**

Committee Reason: The addition will provide more options available to the designer. (13-0)

P62-21 Part I

Individual Consideration Agenda

Public Comment 1:

IPC: TABLE 605.4

Proponents: Lisa Reiheld, representing Viega LLC (lisa.reiheld@viega.us) requests As Modified by Public Comment

Modify as follows:

2021 International Plumbing Code

TABLE 605.4 WATER DISTRIBUTION PIPE

MATERIAL	STANDARD
Chlorinated polyvinyl chloride (CPVC) plastic pipe and tubing	ASTM D2846; ASTM F441; ASTM F442; CSA B137.6
Chlorinated polyvinyl chloride/aluminum/chlorinated polyvinyl chloride (CPVC/AL/CPVC)	ASTM F2855
Copper or copper-alloy pipe	ASTM B42; ASTM B43; ASTM B302
Copper or copper-alloy tubing (Type K, WK, L, WL, M or WM)	ASTM B75; ASTM B88; ASTM B251; ASTM B447
Cross-linked polyethylene (PEX) plastic tubing	ASTM F876; CSA B137.5
Cross-linked polyethylene/aluminum/cross-linked polyethylene (PEX-AL-PEX) pipe	ASTM F1281; ASTM F2262; CSA B137.10
Cross-linked polyethylene/aluminum/high-density polyethylene (PEX-AL-HDPE)	ASTM F1986
Ductile iron pipe	AWWA C115/A21.15; AWWA C151/A21.51
Galvanized steel pipe	ASTM A53
Polyethylene/aluminum/polyethylene (PE-AL-PE) composite pipe	ASTM F1282
Polyethylene of raised temperature (PE-RT) plastic tubing	ASTM F2769; CSA B137.18
Polypropylene (PP) plastic pipe or tubing	ASTM F2389; CSA B137.11
Stainless steel pipe (Type 304/304L)	ASTM A269; ASTM A312; ~~ASTM A554;~~ ASTM A778
Stainless steel pipe (Type 316/316L)	ASTM A269; ASTM A312; ~~ASTM A554;~~ ASTM A778
Stainless steel tubing (Type 304/304L)	ASTM A269; ASTM A312; ~~ASTM A554;~~ ASTM A778
Stainless steel tubing (Type 316/316L)	ASTM A269; ASTM A312; ~~ASTM A554;~~ ASTM A778

Commenter's Reason: Based on IPC Committee feedback and additional comments on other proposals, I suggest removing ASTM A554 from this proposal as it is deemed as a mechanical/structural tubing standard. With this modification, there will be consistency across similar tables in the IMC and IRC as well as other tables that were Accepted as Modified by the IPC Committee.

Cost Impact: The net effect of the public comment and code change proposal will not increase or decrease the cost of construction
Removal of this standard will have no impact on the cost of construction.

Public Comment# 2392

P63-21 Part I

Proposed Change as Submitted

Proponents: Lisa Reiheld, Viega LLC, representing Viega LLC (lisa.reiheld@viega.us)

THIS IS A 2 PART PROPOSAL. PART I WILL BE HEARD BY THE IPC COMMITTEE. PART II WILL BE HEARD BY THE IRC-P&M COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THESE COMMITTEES.

2021 International Plumbing Code

Revise as follows:

TABLE 605.5 PIPE FITTINGS

MATERIAL	STANDARD
Acrylonitrile butadiene styrene (ABS) plastic	ASTM D2468
Cast iron	ASME B16.4
Chlorinated polyvinyl chloride (CPVC) plastic	ASSE 1061; ASTM D2846; ASTM F437; ASTM F438; ASTM F439; CSA B137.6
Copper or copper alloy	ASME B16.15; ASME B16.18; ASME B16.22; ASME B16.26; ASME B16.51; ASSE 1061; ASTM F1476; ASTM F1548; ASTM F3226
Cross-linked polyethylene/aluminum/high-density polyethylene (PEX-AL-HDPE)	ASTM F1986
Fittings for cross-linked polyethylene (PEX) plastic tubing	ASSE 1061; ASTM F877; ASTM F1807; ASTM F1960; ASTM F2080; ASTM F2098; ASTM F2159; ASTM F2434; ASTM F2735; CSA B137.5
Fittings for polyethylene of raised temperature (PE-RT) plastic tubing	ASSE 1061; ASTM D3261; ASTM F1807; ASTM F2098; ASTM F2159; ASTM F2735; ASTM F2769; CSA B137.18
Gray iron and ductile iron	ASTM F1476; ASTM F1548; AWWA C110/A21.10; AWWA C153/A21.53;
Insert fittings for polyethylene/aluminum/polyethylene (PE-AL-PE) and cross-linked polyethylene/aluminum/cross-linked polyethylene (PEX-AL-PEX)	ASTM F1281; ASTM F1282; ASTM F1974; CSA B137.9; CSA B137.10
Malleable iron	ASME B16.3
Metal (brass) insert fittings for polyethylene/aluminum/polyethylene (PE-AL-PE) and cross-linked polyethylene/aluminum/cross-linked polyethylene (PEX-AL-PEX)	ASTM F1974
Polyethylene (PE) plastic pipe	ASTM D2609; ASTM D2683; ASTM D3261; ASTM F1055; CSA B137.1
Polypropylene (PP) plastic pipe or tubing	ASTM F2389; CSA B137.11
Polyvinyl chloride (PVC) plastic	ASTM D2464; ASTM D2466; ASTM D2467; CSA B137.2; CSA B137.3
Stainless steel (Type 304/304L)	<u>ASTM A269;</u> ASTM A312; <u>ASTM A554;</u> ASTM A778; ASTM F1476; ASTM F1548; ASTM F3226
Stainless steel (Type 316/316L)	<u>ASTM A269;</u> ASTM A312; <u>ASTM A554;</u> ASTM A778; ASTM F1476; ASTM F1548; ASTM F3226
Steel	ASME B16.9; ASME B16.11; ASME B16.28; ASTM F1476; ASTM F1548<u>; ASTM F3226</u>

Add new standard(s) as follows:

ASTM

ASTM International
100 Barr Harbor Drive, P.O. Box C700
West Conshohocken, PA 19428-2959

<u>A554-16</u> <u>Standard Specification for Welded Stainless Steel Mechanical Tubing</u>

Reason: ASTM A269 and A554 are standards for Stainless tubing equivalent with existing ASTM A312 and A778 standards and should be included to allow for additional material standards. ASTM F3226 *Standard Specification for Metallic Press-Connect Fittings for Piping and Tubing Systems* is equivalent to other standards already listed for this material, is included for other materials in this table, and should be added to Steel to increase the options for materials to be used in water supply fitting installations.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
Adding an additional standard option for steel pipe fittings to be listed to will not increase or decrease the cost of construction. If anything, it has potential to decrease the cost since this increases the number of suppliers of fittings that can be purchased.

Staff Analysis: A review of the standard(s) proposed for inclusion in the code, ASTM A554-16 with regard to the ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before March 20, 2021.

P63-21 Part I

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The proposed standard ASTM A554 is for "ornamental and structural and exhaust applications". This is inappropriate for plumbing piping. (11-2)

P63-21 Part I

Individual Consideration Agenda

Public Comment 1:

IPC: TABLE 605.5

Proponents: Lisa Reiheld, representing Viega LLC (lisa.reiheld@viega.us) requests As Modified by Public Comment

Modify as follows:

2021 International Plumbing Code

TABLE 605.5 PIPE FITTINGS

MATERIAL	STANDARD
Acrylonitrile butadiene styrene (ABS) plastic	ASTM D2468
Cast iron	ASME B16.4
Chlorinated polyvinyl chloride (CPVC) plastic	ASSE 1061; ASTM D2846; ASTM F437; ASTM F438; ASTM F439; CSA B137.6
Copper or copper alloy	ASME B16.15; ASME B16.18; ASME B16.22; ASME B16.26; ASME B16.51; ASSE 1061; ASTM F1476; ASTM F1548; ASTM F3226
Cross-linked polyethylene/aluminum/high-density polyethylene (PEX-AL-HDPE)	ASTM F1986
Fittings for cross-linked polyethylene (PEX) plastic tubing	ASSE 1061; ASTM F877; ASTM F1807; ASTM F1960; ASTM F2080; ASTM F2098; ASTM F2159; ASTM F2434; ASTM F2735; CSA B137.5
Fittings for polyethylene of raised temperature (PE-RT) plastic tubing	ASSE 1061; ASTM D3261; ASTM F1807; ASTM F2098; ASTM F2159; ASTM F2735; ASTM F2769; CSA B137.18
Gray iron and ductile iron	ASTM F1476; ASTM F1548; AWWA C110/A21.10; AWWA C153/A21.53;
Insert fittings for polyethylene/aluminum/polyethylene (PE-AL-PE) and cross-linked polyethylene/aluminum/cross-linked polyethylene (PEX-AL-PEX)	ASTM F1281; ASTM F1282; ASTM F1974; CSA B137.9; CSA B137.10
Malleable iron	ASME B16.3
Metal (brass) insert fittings for polyethylene/aluminum/polyethylene (PE-AL-PE) and cross-linked polyethylene/aluminum/cross-linked polyethylene (PEX-AL-PEX)	ASTM F1974
Polyethylene (PE) plastic pipe	ASTM D2609; ASTM D2683; ASTM D3261; ASTM F1055; CSA B137.1
Polypropylene (PP) plastic pipe or tubing	ASTM F2389; CSA B137.11
Polyvinyl chloride (PVC) plastic	ASTM D2464; ASTM D2466; ASTM D2467; CSA B137.2; CSA B137.3
Stainless steel (Type 304/304L)	ASTM A269; ASTM A312; ~~ASTM A554;~~ ASTM A778; ASTM F1476; ASTM F1548; ASTM F3226
Stainless steel (Type 316/316L)	ASTM A269; ASTM A312~~; ASTM A554;~~ ASTM A778; ASTM F1476; ASTM F1548; ASTM F3226
Steel	ASME B16.9; ASME B16.11; ASME B16.28; ASTM F1476; ASTM F1548; ASTM F3226

Commenter's Reason: This public comment addresses the committee's concerns with the suitability of ASTM A554 as a standard for this code and the reason for disapproval was the addition of ASTM A554. Based on Committee feedback and additional comments, this public comment removes ASTM A554 from this proposal as it is deemed as a mechanical/structural tubing standard. With this modification, there will be consistency across similar tables in the IMC and IRC. P61 Part 1 and P62 Part 1 included the addition of ASTM A269 and were approved by the committee. ASTM F3226 is already included as a standard for Copper and Stainless materials in this table and should be included for Steel as well as the material is covered in the scope of this standard and is performance tested as other alloys in the standard.

Cost Impact: The net effect of the public comment and code change proposal will not increase or decrease the cost of construction
Removal of this standard will have no impact on the cost of construction.

Public Comment# 2395

NOTE: P63-21 PART II DID NOT RECEIVE A PUBLIC COMMENT AND IS REPRODUCED FOR INFORMATIONAL PURPOSES ONLY

P63-21 Part II

<u>Proposed Change as Submitted</u>

Proponents: Lisa Reiheld, Viega LLC, representing Viega LLC (lisa.reiheld@viega.us)

2021 International Residential Code

Revise as follows:

TABLE P2906.6 PIPE FITTINGS

MATERIAL	STANDARD
Acrylonitrile butadiene styrene (ABS) plastic	ASTM D2468
Cast iron	ASME B16.4
Chlorinated polyvinyl chloride (CPVC) plastic	ASSE 1061; ASTM D2846; ASTM F437; ASTM F438; ASTM F439; CSA B137.6
Copper or copper alloy	ASME B16.15; ASME B16.18; ASME B16.22; ASME B16.26; ASME B16.51; ASSE 1061; ASTM F3226
Cross-linked polyethylene/aluminum/high-density polyethylene (PEX-AL-HDPE)	ASTM F1986
Fittings for cross-linked polyethylene (PEX) plastic tubing	ASSE 1061; ASTM F877; ASTM F1807; ASTM F1960; ASTM F2080; ASTM F2098; ASTM F2159; ASTM F2434; ASTM F2735; CSA B137.5
Gray iron and ductile iron	AWWA C110/A21.10; AWWA C153/A21.53
Malleable iron	ASME B16.3
Insert fittings for Polyethylene/aluminum/polyethylene (PE-AL-PE) and cross-linked polyethylene/aluminum/cross-linked polyethylene (PEX-AL-PEX)	ASTM F1281; ASTM F1282; ASTM F1974; CSA B137.9; CSA B137.10
Polyethylene (PE) plastic	ASTM D2609; CSA B137.1
Fittings for polyethylene of raised temperature (PE-RT) plastic tubing	ASSE 1061; ASTM D2683; ASTM D3261; ASTM F1055; ASTM F1807; ASTM F2098; ASTM F2159; ASTM F2735; ASTM F2769; CSA B137.18
Polypropylene (PP) plastic pipe or tubing	ASTM F2389; CSA B137.11
Polyvinyl chloride (PVC) plastic	ASTM D2464; ASTM D2466; ASTM D2467; CSA B137.2; CSA B137.3
Stainless steel (Type 304/304L) pipe	ASTM A269; ASTM A312; ASTM A554; ASTM A778 ; ASTM F3226
Stainless steel (Type 316/316L) pipe	ASTM A269; ASTM A312; ASTM A554; ASTM A778; ASTM F3226
Steel	ASME B16.9; ASME B16.11; ASME B16.28; ASTM F3226

Add new standard(s) as follows:

ASTM

ASTM International
100 Barr Harbor Drive, P.O. Box C700
West Conshohocken, PA 19428

A554-16 Standard Specification for Welded Stainless Steel Mechanical Tubing

Reason: ASTM A269 and A554 are proposed Stainless Steel standards that are included in other nationally recognized codes and are commonly used in potable water applications. ASTM F3226 *Standard Specification for Metallic Press-Connect Fittings for Piping and Tubing Systems,* includes Steel and Stainless steel alloy, is currently included for copper and copper alloy in this table, and should be added to the others to increase the options for materials to be used in water supply fitting installations.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
ASTM A269, A554, and F3226 are additional optional standards to which press-connect fittings can be constructed and/or listed to. By providing the additional proposed standards, fittings made from these materials offer additional options for the specifier and/or installer with no additional cost impact as they are optional and not mandatory standard requirements.

Staff Analysis: A review of the standard(s) proposed for inclusion in the code, ASTM A554-16 with regard to the ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before March 20, 2021.

P63-21 Part II

Public Hearing Results

Committee Action: **As Modified**

Committee Modification:

TABLE P2906.6 PIPE FITTINGS	
Stainless steel (Type 304/304L) pipe	ASTM A269; ASTM A312; ~~ASTM A554;~~ ASTM A778; ASTM F3226
Stainless steel (Type 316/316L) pipe	ASTM A269; ASTM A312; ~~ASTM A554;~~ ASTM A778; ASTM F3226

Committee Reason: For the modification: The standard is not appropriate for water distribution piping material.
For the proposal as modified: This adds another option for water distribution piping. (11-0)

P63-21 Part II

P68-21 Part I

Proposed Change as Submitted

Proponents: Lisa Reiheld, Viega LLC, representing Viega LLC (lisa.reiheld@viega.us)

THIS IS A 2 PART PROPOSAL. PART I WILL BE HEARD BY THE IPC COMMITTEE. PART II WILL BE HEARD BY THE IRC-P&M COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THESE COMMITTEES.

2021 International Plumbing Code

Revise as follows:

TABLE 605.7 VALVES

MATERIAL	STANDARD
Chlorinated polyvinyl chloride (CPVC) plastic	ASME A112.4.14; ASME A112.18.1/CSA B125.1; ASTM F1970; CSA B125.3; IAPMO Z1157; MSS SP-122
Copper or copper alloy	ASME A112.4.14; ASME A112.18.1/CSA B125.1; ASME B16.34; CSA B125.3; IAPMO Z1157; MSS SP-67; MSS SP-80; MSS SP-110; MSS SP-139
Cross-linked polyethylene (PEX) plastic	ASME A112.4.14; ASME A112.18.1/CSA B125.1; CSA B125.3; IAPMO Z1157; NSF 359
Gray iron and ductile iron	AWWA C500; AWWA C504; AWWA C507; IAPMO Z1157; MSS SP-67; MSS SP-70; MSS SP-71; MSS SP-72; MSS SP-78
Polypropylene (PP) plastic	ASME A112.4.14; ASTM F2389; IAPMO Z1157
Polyvinyl chloride (PVC) plastic	ASME A112.4.14; ASTM F1970; IAPMO Z1157; MSS SP-122
Stainless steel (Type 304/304L)	IAPMO Z1157
Stainless steel (Type 316/316L)	IAPMO Z1157

Reason: Adding line items for Stainless steel pipe (Type 304/304L) and Stainless steel pipe (Type 316/316L) to make the table reflective of what is currently available in the market and widely used in commercial applications. Including IAPMO Z1157 *Ball Valves* as an appropriate standard which is equivalent to other standards already included in this table as well as already listed with other materials and should be added to both Stainless steel pipe (Type 304/304L) and Stainless steel pipe (Type 316/316L) to increase the options for valves to be used in water supply installations.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
Adding an additional standard option for stainless steel valves to be listed to will not increase or decrease the cost of construction. If anything, it has potential to decrease the cost since this increases the number of suppliers of valves that can be purchased.

P68-21 Part I

Public Hearing Results

Committee Action: **As Submitted**

Committee Reason: The Committee agreed with the published reason statement. (14-0)

P68-21 Part I

Individual Consideration Agenda

Public Comment 1:

IPC: TABLE 605.7

Proponents: Lisa Reiheld, representing Viega LLC (lisa.reiheld@viega.us) requests As Modified by Public Comment

Modify as follows:

2021 International Plumbing Code

TABLE 605.7 VALVES

MATERIAL	STANDARD
Chlorinated polyvinyl chloride (CPVC) plastic	ASME A112.4.14; ASME A112.18.1/CSA B125.1; ASTM F1970; CSA B125.3; IAPMO Z1157; MSS SP-122
Copper or copper alloy	ASME A112.4.14; ASME A112.18.1/CSA B125.1; ASME B16.34; CSA B125.3; IAPMO Z1157; MSS SP-67; MSS SP-80; MSS SP-110; MSS SP-139
Cross-linked polyethylene (PEX) plastic	ASME A112.4.14; ASME A112.18.1/CSA B125.1; CSA B125.3; IAPMO Z1157; NSF 359
Gray iron and ductile iron	AWWA C500; AWWA C504; AWWA C507; IAPMO Z1157; MSS SP-67; MSS SP-70; MSS SP-71; MSS SP-72; MSS SP-78
Polypropylene (PP) plastic	ASME A112.4.14; ASTM F2389; IAPMO Z1157
Polyvinyl chloride (PVC) plastic	ASME A112.4.14; ASTM F1970; IAPMO Z1157; MSS SP-122
Stainless steel (Type 304/304L)	IAPMO Z1157, ASME A112.4.14
Stainless steel (Type 316/316L)	IAPMO Z1157, ASME A112.4.14

Commenter's Reason: Add ASME A112.4.14 *Manually Operated Valves for Use in Plumbing Systems,* to Stainless Steel 304/304L and 316/316L in this table as this standard covers valves in stainless steel as well as other materials already covered by ASME A112.4.14 in this table.

Cost Impact: The net effect of the public comment and code change proposal will not increase or decrease the cost of construction
Adding this standard already included in this table for other materials does not increase or decrease the cost.

Public Comment# 2398

P68-21 Part II

Proposed Change as Submitted

Proponents: Lisa Reiheld, Viega LLC, representing Viega LLC (lisa.reiheld@viega.us)

2021 International Residential Code

Revise as follows:

TABLE P2903.9.4 VALVES

MATERIAL	STANDARD
Chlorinated polyvinyl chloride (CPVC) plastic	ASME A112.4.14, ASME A112.18.1/CSA B125.1, ASTM F1970, CSA B125.3, MSS SP-122
Copper or copper alloy	ASME A112.4.14, ASME A112.18.1/CSA B125.1, ASME B16.34, CSA B125.3, IAPMO Z1157, MSS SP-67, MSS SP-80, MSS SP-110, MSS SP-139
Gray and ductile iron	ASTM A126, AWWA C500, AWWA C504, AWWA C507, MSS SP-42, MSS SP-67, MSS SP-70, MSS SP-71, MSS SP-72, MSS SP-78
Cross-linked polyethylene (PEX) plastic	ASME A112.4.14, ASME A112.18.1/CSA B125.1, CSA B125.3, IAPMO Z1157, NSF 359
Polypropylene (PP) plastic	ASME A112.4.14, ASTM F2389
Polyvinyl chloride (PVC) plastic	ASME A112.4.14, ASTM F1970, MSS SP-122
Stainless Steel	IAPMO Z1157

Add new standard(s) as follows:

IAPMO

IAPMO Group
4755 E. Philadelphia Street
Ontario, CA 91761-USA

Z1157-2014e1 Ball Valves

Reason: The proposed IAPMO Z1157 ANSI accredited standard covers ball valves NPS-1/8 to NPS-4, with minimum rated working pressures of 125psi at 73°F, intended for use in water supply and distribution systems, and specifies requirements for materials, physical characteristics, performance, testing, and markings. The proposed standard is currently referenced in other nationally recognized codes such as the IPC and will provide the user the opportunity to choose additional valves listed to this standard for these applications.
Stainless steel material is proposed to be added for applications where stainless steel pipe, tubing and fittings are necessary for corrosion resistance. The proposed stainless steel standards are also referenced in other nationally recognized codes and are commonly used for potable water distribution and hydronic applications.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The addition of this standard into the IRC does not increase or decrease the cost of construction, but allows for an additional option for selecting valves that are listed for use in these applications. The inclusion of this standard does not mandate the use of an IAPMO Z1157 listed ball valve, it provides it as an option. Adding Stainless Steel as an option does not impact the cost but provides an additional material option for the specifier and/or installer.

Staff Analysis: A review of the standard(s) proposed for inclusion in the code, IAPMO Z1157-2014e1 with regard to the ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before March 20, 2021.

P68-21 Part II

Public Hearing Results

Committee Action: **As Submitted**

Committee Reason: The Committee agreed with the published reason statement. (11-0)

P68-21 Part II

Individual Consideration Agenda

Public Comment 1:

IRC: TABLE P2903.9.4

Proponents: Lisa Reiheld, representing Viega LLC (lisa.reiheld@viega.us) requests As Modified by Public Comment

Modify as follows:

2021 International Residential Code

TABLE P2903.9.4 VALVES

MATERIAL	STANDARD
Chlorinated polyvinyl chloride (CPVC) plastic	ASME A112.4.14, ASME A112.18.1/CSA B125.1, ASTM F1970, CSA B125.3, MSS SP-122
Copper or copper alloy	ASME A112.4.14, ASME A112.18.1/CSA B125.1, ASME B16.34, CSA B125.3, IAPMO Z1157, MSS SP-67, MSS SP-80, MSS SP-110, MSS SP-139
Gray and ductile iron	ASTM A126, AWWA C500, AWWA C504, AWWA C507, MSS SP-42, MSS SP-67, MSS SP-70, MSS SP-71, MSS SP-72, MSS SP-78
Cross-linked polyethylene (PEX) plastic	ASME A112.4.14, ASME A112.18.1/CSA B125.1, CSA B125.3, IAPMO Z1157, NSF 359
Polypropylene (PP) plastic	ASME A112.4.14, ASTM F2389
Polyvinyl chloride (PVC) plastic	ASME A112.4.14, ASTM F1970, MSS SP-122
Stainless Steel	IAPMO Z1157, ASME A112.4.14

Commenter's Reason: Add ASME A112.4.14 *Manually Operated Valves for Use in Plumbing Systems*, to Stainless Steel in this table as the standard covers valves in stainless steel as well as other materials already covered by ASME A112.4.14 in this table.

Cost Impact: The net effect of the public comment and code change proposal will not increase or decrease the cost of construction
Adding this standard already included in this table for other materials does not increase or decrease the cost.

Public Comment# 2400

P85-21

Proposed Change as Submitted

Proponents: Guy McMann, representing Colorado Association of Plumbing and Mechanical Officials (CAPMO) (gmcmann@jeffco.us)

2021 International Plumbing Code

Revise as follows:

606.1 Location of full-open valves. *Full-open valves* shall be installed in the following locations:

1. On the building water service pipe from the public water supply near the curb.
2. On the water distribution supply pipe at the entrance into the structure.

    2.1. In multiple-tenant buildings, three stories and fewer, where a common water supply piping system is installed to supply other than one- and two-family dwellings, a main shutoff valve shall be provided for each tenant.

3. On the discharge side of every water meter.
4. On the base of every water riser pipe in occupancies other than multiple-family residential *occupancies* that are two stories or less in height and in one- and two-family residential *occupancies*.
5. On the top of every water down-feed pipe in *occupancies* other than one- and two-family residential *occupancies*.
6. On the entrance to every water supply pipe to a dwelling unit, except where supplying a single fixture equipped with individual stops.
7. On the water supply pipe to a gravity or pressurized water tank.
8. On the water supply pipe to every water heater.

Reason: This new language clarifies that this was intended to apply to smaller strip malls and the like. It was not intended to apply to high rise buildings as the text suggests.

Cost Impact: The code change proposal will decrease the cost of construction
This language will eliminate the need for high rise building to have separate shutoffs.

P85-21

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The choice of 3 stories appears to be arbitrary. There isn't any indication that this exception was originally about strip malls. The committee believes that each tenant space should have a shutoff valve. (11-3)

P85-21

Individual Consideration Agenda

Public Comment 1:

IPC: 606.1

Proponents: Julius Ballanco, representing Self (jbengineer@aol.com); Dan Buuck, representing National Association of Home Builders (dbuuck@nahb.org) requests As Modified by Public Comment

Modify as follows:

2021 International Plumbing Code

606.1 Location of full-open valves . *Full-open valves* shall be installed in the following locations:

1. On the building water service pipe from the public water supply near the curb.
2. On the water distribution supply pipe at the entrance into the structure.

   2.1. In multiple-tenant buildings, three stories ~~and~~ <u>or less in height</u> ~~fewer~~, where a common water supply piping system is installed to supply other than one- and two-family dwellings, a main shutoff valve shall be provided for each tenant.

3. On the discharge side of every water meter.
4. On the base of every water riser pipe in occupancies other than multiple-family residential *occupancies* that are two stories or less in height and in one- and two-family residential *occupancies*.
5. On the top of every water down-feed pipe in *occupancies* other than one- and two-family residential *occupancies*.
6. On the entrance to every water supply pipe to a dwelling unit, except where supplying a single fixture equipped with individual stops.
7. On the water supply pipe to a gravity or pressurized water tank.
8. On the water supply pipe to every water heater.

Commenter's Reason: Once the plumbing design is four stories or more in height, there is a change from horizontal to vertical piping as a cost savings measure. When the piping is vertical, it is not possible to provide a separate shut off valve for the entire tenant space. This would add considerable cost to the water piping system. In a vertical piping arrangement, often times the fixture between tenants are back to back. Each fixture has a shut off as does the riser. Hence, there is adequate ability to isolate the water supply to plumbing fixtures.

Cost Impact: The net effect of the public comment and code change proposal will not increase or decrease the cost of construction
This Public Comment merely clarifies the original intent of the change.

Public Comment# 2710

P87-21 Part I

Proposed Change as Submitted

Proponents: Edward R. Osann, Natural Resources Defense Council, representing Natural Resources Defense Council (eosann@nrdc.org); sharon bonesteel, salt river project, representing salt river project (sharon.bonesteel@srpnet.com); David Collins, representing The Preview Group, Inc. (dcollins@preview-group.com); Anthony Floyd, City of Scottsdale, representing City of Scottsdale (afloyd@scottsdaleaz.gov)

THIS IS A 2 PART PROPOSAL. PART I WILL BE HEARD BY THE IPC COMMITTEE. PART II WILL BE HEARD BY THE IRC-P&M COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THESE COMMITTEES.

2021 International Plumbing Code

Revise as follows:

TABLE 604.4 MAXIMUM FLOW RATES AND CONSUMPTION FOR PLUMBING FIXTURES AND FIXTURE FITTINGS
Portions of table not shown remain unchanged.

PLUMBING FIXTURE OR FIXTURE FITTING	MAXIMUM FLOW RATE OR QUANTITY[b]
Shower head[a,c]	2.0 ~~2.5~~ gpm at 80 psi

For SI: 1 gallon = 3.785 L, 1 gallon per minute = 3.785 L/m, 1 pound per square inch = 6.895 kPa.

a. A hand-held shower spray is a shower head.

b. Consumption tolerances shall be determined from referenced standards.

c. Shower heads shall comply with USEPA WaterSense Specification for Showerheads.

Add new text as follows:

USEPA

United States Environmental Protection Agency
Ariel Rios Building
1200 Pennsylvania Avenue, NW
Washington, DC 20460

Add new standard(s) as follows:

USEPA WaterSense Specification for Showerheads Version 1.1, July 26, 2018

Reason: Showerheads operating at 2.0 gpm at 80 psi are commonly available and perform well. The U.S. EPA's WaterSense specification of 2.0 gpm was first adopted in 2010, along with criteria that ensure adequate spray pattern, spray force, and minimum flow at pressures less than 80 psi. Based on the most recent reports of participating manufacturers, more than 10,000 models from over 200 brands currently meet all WaterSense specifications, demonstrating the widespread availability and commercial viability of efficient showerheads. One factor in customer acceptance is the growing use of built-in pressure compensation, by which a showerhead will perform at its rated flow, even in buildings or portions of buildings with low water pressure.
For designers of plumbing systems, it is important to match the building's water distribution system with the anticipated performance of fixture fittings such as showerheads. Plumbing systems designed to meet the 2024 IPC should accommodate the nation's ongoing transition to high-efficiency showerheads. Water, energy, and materials will be saved if plumbing distribution systems are right-sized at the time of construction.

The WaterSense label is easily recognizable, and will allow building officials to easily verify compliance with this provision.

There are significant water, energy, and greenhouse gas savings that would accrue nationwide if all newly installed showerheads met the WaterSense specification beginning in 2025, the earliest practical application of the IPC as modified by this proposal. Even accounting for several states that have already require efficient showerheads, the potential for further savings are substantial. These savings, drawn from the supporting analysis of a November 2020 report by the Appliance Standards Awareness Project, would reach the following:

Estimated Savings from Efficient (2.0 gpm) Showerheads Effective 2025

Annual Savings in 2035

- Electricity (TWh) 4.1
- Nat gas & oil (TBtu) 25.8
- Water (billion gallons) 79.5
- Utility bills (billion 2019 $) 1.9
- CO2 reductions (MMT)
- --- Low-carbon grid scenario 1.9
- --- AEO reference case 2.7

Annual Savings in 2050

- Electricity (TWh) 4.1
- Nat gas & oil (TBtu) 25.8
- Water (billion gallons) 79.5
- Utility bills (billion 2019 $) 2.1
- CO2 reductions (MMT)
- --- Low-carbon grid scenario 1.7
- --- AEO reference case 2.5

Cumulative Savings through 2050

- Energy (Quads) 1.3
- Water (billion gallons) 1,669
- Utility bills (billion 2019 $) 41.4
- CO2 reductions (MMT)
- --- Low-carbon grid scenario 38.4
- --- AEO reference case 54.8

Cost-effectively reducing unnecessary water use is an integral part of the stated purpose of the International Plumbing Code. As noted in Chapter 1 of the 2021 Edition, "101.3 Purpose. The purpose of this code is to establish minimum requirements to provide a reasonable level of safety, health, property protection, and general welfare by regulating and controlling the design, construction, installation, quality of materials, location, operation and maintenance or use of plumbing equipment and systems." Nothing is more fundamental to health, safety, property protection, and general welfare than the maintenance of adequate water supplies. Water-saving technologies, such as showerheads meeting EPA WaterSense criteria, help building occupants save water, energy, and utility bills, while helping to ensure that drinking water supplies are maintained at safe and reliable levels, protecting human health and firefighting capability, as well as environmental resources.

Bibliography: U.S. Environmental Protection Agency, *WaterSense Specification for Showerheads, version 1.1*, July 26, 2018, available at <https://www.epa.gov/watersense/showerheads#Showerhead%20Specification>.
Mauer, J. and deLaski, A., *A Powerful Priority: How Appliance Standards Can Help Meet U.S. Climate Goals and Save Consumers Money,* Appliance Standards Awareness Project and American Council for an Energy-Efficient Economy, November 2020, available at <https://appliance-standards.org/document/report-overview-powerful-priority-how-appliance-standards-can-help-meet-us-climate-goals>.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
Showerheads that meet WaterSense criteria are widely available and competitively priced.

Staff Analysis: A review of the standard(s) proposed for inclusion in the code, USEPA WaterSense Specification for Showerheads Version 1.1, July 26, 2018 with regard to the ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before March 20, 2021.

P87-21 Part I

Public Hearing Results

Committee Action: **As Modified**

Committee Modification:

TABLE 604.4 MAXIMUM FLOW RATES AND CONSUMPTION FOR PLUMBING FIXTURES AND FIXTURE FITTINGS

PLUMBING FIXTURE OR FIXTURE FITTING	MAXIMUM FLOW RATE OR QUANTITY[b]
Shower head[a,c]	2.0 gpm at 80 psi

For SI: 1 gallon = 3.785 L, 1 gallon per minute = 3.785 L/m, 1 pound per square inch = 6.895 kPa.

a. A hand-held shower spray is a shower head.

b. Consumption tolerances shall be determined from referenced standards.

c. Shower heads shall comply with all requirements for high-efficiency showerheads in ASME A112.18.1/CSA B125.1 ~~USEPA WaterSense Specification for Showerheads~~.

~~USEPA~~

~~WaterSense Specification for Showerheads Version 1.1, July 26, 2018~~

Committee Reason: For the modification: Referencing the Water Sense standard would be a mistake as that non-consensus standard is likely to ratchet down to lower flow rates. It is better to refer to the requirements for high-efficiency showerheads that are already addressed in the current (consensus) ASME product standard. (8-6)
For the proposal As Modified: The Committee agreed with the published reason statement. (8-7)

P87-21 Part I

Individual Consideration Agenda

Public Comment 1:

Proponents: Matt Sigler, Plumbing Manufacturers International, representing Plumbing Manufacturers International; James Kendzel, representing American Supply Association (jkendzel@asa.net); Dan Buuck, representing National Association of Home Builders (dbuuck@nahb.org) requests Disapprove

Commenter's Reason:

- Definitive studies should be conducted first to better understand the impacts on public health and plumbing system performance before the maximum flow rates for plumbing fixtures and fixture fittings are lowered in the IPC.
- Showerheads with a maximum flow rate of 2.0 gpm are already required in ICC's Green Construction Code (IGCC). Lowering the maximum flow rate of showerheads in the IPC will require the maximum flow rate for showerheads to be lowered in the IGCC without any definitive study being conducted.
- The plumbing fixture and fitting water consumption requirements in the plumbing portion of the IPC are based on federal requirements (Energy Policy Act of 1992), and therefore should remain unchanged until federal requirements are changed.
- There is nothing in Federal Law that prevents a state or local jurisdiction from adopting a 2.0 gpm maximum showerhead requirement. In fact, since the Department of Energy waived in 2010 the Federal preemption, which permits states and local jurisdictions to go lower than federal requirements, several states including California, Colorado, Hawaii, Massachusetts, Nevada, New York, Oregon, Vermont and Washington, and local jurisdictions including Chicago, New York City and Washington D.C., have all chosen to lower the flow rate of showerheads sold and/or installed to 2.0 gpm or less.
- Many regions of the country have water pressure that is much lower than 80 psi, in some areas less than half that pressure. Therefore, consumers in such regions where the incoming water pressure is around 40 psi will be required to use showerheads that produce a maximum flow rate closer to 1.5 gpm than 2.0 gpm. Placing this requirement in the model code does not take those regional differences into consideration and can lead to consumer distrust of water conservation efforts.
- People have strong opinions when it comes to showerhead performance. That, and the fact that they are relatively easy to replace, makes the impact of this change in terms of water savings, fairly minimal. The public will not put up with showerhead performance that does not meet their personal preference, and this will cause headaches for both code enforcement and contractors.

Cost Impact: The net effect of the public comment and code change proposal will not increase or decrease the cost of construction
No change to code.

Public Comment# 2389

P87-21 Part II

Proposed Change as Submitted

Proponents: Edward R. Osann, Natural Resources Defense Council, representing Natural Resources Defense Council (eosann@nrdc.org); Anthony Floyd, City of Scottsdale, representing City of Scottsdale (afloyd@scottsdaleaz.gov); sharon bonesteel, salt river project, representing salt river project (sharon.bonesteel@srpnet.com); David Collins, representing The Preview Group, Inc. (dcollins@preview-group.com)

2021 International Residential Code

Revise as follows:

TABLE P2903.2 MAXIMUM FLOW RATES AND CONSUMPTION FOR PLUMBING FIXTURES AND FIXTURE FITTINGS[b]

PLUMBING FIXTURE OR FIXTURE FITTING	MAXIMUM FLOW RATE OR QUANTITY
Lavatory faucet	2.2 gpm at 60 psi
Shower head[a,c]	2.0 ~~2.5~~ gpm at 80 psi
Sink faucet	2.2 gpm at 60 psi
Water closet	1.6 gallons per flushing cycle

For SI: 1 gallon per minute = 3.785 L/m, 1 pound per square inch = 6.895 kPa.

a. A hand-held shower spray shall be considered to be a shower head.

b. Consumption tolerances shall be determined from referenced standards.

c. Shower heads shall comply with USEPA WaterSense Specificaiton for Showerheads.

Add new text as follows:

USEPA

United States Environmental Protection Agency
Ariel Rios Building
1200 Pennsylvania Avenue, NW
Washington, DC 20460

Add new standard(s) as follows:

USEPA United States Environmental Protection Agency.
WaterSense Specification for Showerheads Version 1.1, July 26, 2018

Reason: Showerheads operating at 2.0 gpm at 80 psi are commonly available and perform well. The U.S. EPA's WaterSense specification of 2.0 gpm was first adopted in 2010, along with criteria that ensure adequate spray pattern, spray force, and minimum flow at pressures less than 80 psi. Based on the most recent reports of participating manufacturers, more than 10,000 models from over 200 brands currently meet all WaterSense specifications, demonstrating the widespread availability and commercial viability of efficient showerheads. One factor in customer acceptance is the growing use of built-in pressure compensation, by which a showerhead will perform at its rated flow, even in buildings or portions of buildings with low water pressure.
For designers of plumbing systems, it is important to match the building's water distribution system with the anticipated performance of fixture fittings such as showerheads. Plumbing systems designed to meet the 2024 IRC should accommodate the nation's ongoing transition to high-efficiency showerheads. Water, energy, and materials will be saved if plumbing distribution systems are right-sized at the time of construction.

The WaterSense label is easily recognizable, and will allow building officials to easily verify compliance with this provision.

There are significant water, energy, and greenhouse gas savings that would accrue nationwide if all newly installed showerheads met the WaterSense specification beginning in 2025, the earliest practical application of the IRC as modified by this proposal. Even accounting for several states that have already require efficient showerheads, the potential for further savings are substantial. These savings, drawn from the supporting analysis of a November 2020 report by the Appliance Standards Awareness Project, would reach the following:

Estimated Savings from Efficient (2.0 gpm) Showerheads Effective 2025

Annual Savings in 2035

- Electricity (TWh) 4.1
- Nat gas & oil (TBtu) 25.8
- Water (billion gallons) 79.5
- Utility bills (billion 2019 $) 1.9
- CO2 reductions (MMT)
- --- Low-carbon grid scenario 1.9
- --- AEO reference case 2.7

Annual Savings in 2050

- Electricity (TWh) 4.1
- Nat gas & oil (TBtu) 25.8
- Water (billion gallons) 79.5
- Utility bills (billion 2019 $) 2.1

- CO2 reductions (MMT)
- --- Low-carbon grid scenario 1.7
- --- AEO reference case 2.5

Cumulative Savings through 2050

- Energy (Quads) 1.3
- Water (billion gallons) 1,669
- Utility bills (billion 2019 $) 41.4
- CO2 reductions (MMT)
- --- Low-carbon grid scenario 38.4
- --- AEO reference case 54.8

Cost-effectively reducing unnecessary water use and energy consumption is entirely consistent with the purposes of the International Residential Code. As noted in Chapter 1 of the 2021 Edition, section R101.3 states that the purpose of this code is to establish minimum requirements to advance safety, health, and general welfare through affordability and energy conservation, among other objectives. Nothing is more fundamental to health, safety, and general welfare than the maintenance of adequate water supplies and the reduction of GHG emissions. Energy- and water-saving technologies, such as showerheads meeting EPA WaterSense criteria, help building occupants save water, energy, and utility bills, while helping to ensure that drinking water supplies are maintained at safe and reliable levels, protecting human health and firefighting capability, as well as environmental resources.

Bibliography: U.S. Environmental Protection Agency, *WaterSense Specification for Showerheads, version 1.1*, July 26, 2018, available at <https://www.epa.gov/watersense/showerheads#Showerhead%20Specification>.
Mauer, J. and deLaski, A., *A Powerful Priority: How Appliance Standards Can Help Meet U.S. Climate Goals and Save Consumers Money,* Appliance Standards Awareness Project and American Council for an Energy-Efficient Economy, November 2020, available at <https://appliance-standards.org/document/report-overview-powerful-priority-how-appliance-standards-can-help-meet-us-climate-goals>.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
Showerheads that meet WaterSense criteria are widely available and competitively priced.

Staff Analysis: A review of the standard(s) proposed for inclusion in the code, USEPA WaterSense Specification for Showerheads Version 1.1, July 26, 2018 with regard to the ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before March 20, 2021.

P87-21 Part II

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: Saving water is a regional issue. Any potential water savings is likely offset by the user taking a longer shower. The IRC is not a water savings code. The green code is the appropriate place for this. The plumbing community continues to be concerned about lowering the flow of water in both distribution systems and drainage systems without some definitive studies being completed to understand the health impacts and drainage system issues. (11-0)

P87-21 Part II

Individual Consideration Agenda

Public Comment 1:

IRC: TABLE P2903.2, ASME (New),

Proponents: Ed Osann, representing Natural Resources Defense Council (eosann@nrdc.org); Sharon Bonesteel, representing salt river project (sharon.bonesteel@srpnet.com); David Collins, representing The American Institute of Architects (dcollins@preview-group.com) requests As Modified by Public Comment

Modify as follows:

2021 International Residential Code

TABLE P2903.2 MAXIMUM FLOW RATES AND CONSUMPTION FOR PLUMBING FIXTURES AND FIXTURE FITTINGS[b]

PLUMBING FIXTURE OR FIXTURE FITTING	MAXIMUM FLOW RATE OR QUANTITY
Lavatory faucet	2.2 gpm at 60 psi
Shower head[a,c]	2.0 gpm at 80 psi
Sink faucet	2.2 gpm at 60 psi
Water closet	1.6 gallons per flushing cycle

For SI: 1 gallon per minute = 3.785 L/m, 1 pound per square inch = 6.895 kPa.

a. A hand-held shower spray shall be considered to be a shower head.

b. Consumption tolerances shall be determined from referenced standards.

c. Shower heads shall comply with all requirements for high-efficiency showerheads in ASME A112.18.1-2020/CSA B125.1-2020 ~~USEPA WaterSense Specificaiton for Showerheads Showerheads.~~ .

ASME ~~USEPA~~

American Society of Mechanical Engineers ~~United States Environmental Protection Agency~~
~~Ariel Rios Building~~
Two Park Avenue ~~1200 Pennsylvania Avenue, NW~~
New York ~~Washington~~ , NY ~~DC~~ 10016-5990 ~~20460~~

~~USEPA~~ ASME ~~USEPA WaterSense Specification for Showerheads Version 1.1, July 26, 2018~~ United States Environmental Protection Agency . Plumbing Supply Fittings, ASME A112.18.1-2020/CSA B125.1-2020 ~~USEPA WaterSense Specification for Showerheads Version 1.1, July 26, 2018~~

Commenter's Reason: The purpose of this proposal as modified by this comment remains the same as that of the original proposal -- to save a significant amount of energy, as well as water, over the life of new or remodeled residential buildings subject to this code. This modification maintains the proposed maximum flow rate of 2.0 gallons per minute as included in the original proposal.
The revision offered in this public comment changes a footnote to specify that showerhead performance requirements must comply with requirements laid out in the current ASME standard, rather than referencing requirements in the US EPA WaterSense specification for showerheads. The substantive requirements remain the same, since the performance requirements for high-efficiency shower heads in the ASME standard are based upon the WaterSense specification. However, in deference to the preference of the ICC to only refer to consensus-based standards in the code, and because the WaterSense specification is not a consensus-based standard, this change is being made.

It should be noted that these changes are the exact same changes contained in a floor modification of Part I of this proposal approved by the IPC Technical Committee in April. So if this public comment is approved, showerhead proposals pending for both the IPC and the IRC (P87-21 Parts I and II, respectively) will be harmonized.

In rejecting the original proposal, the IRC-P Committee took no notice of the widespread availability of high-efficiency showerheads in the market and their likely future use in new homes being built today. While showerheads are easily swapped out, supply piping and mixing valves are seldom replaced. To better ensure the safe and economical use of a high-efficiency showerhead in the future, it is important to specify high-efficiency at the time of original construction, to allow the plumbing designer to right-size the plumbing supply piping and match the rated flow of the mixing valve with the maximum flow of an efficient showerhead.

Some committee members spoke of "taking away choices" and predicted that showers would take longer. Neither of these opinions are an accurate depiction of the range and performance of high-efficiency showerheads on the market today. As for choice, there are over 11,000 models of showerheads that meet the requirements referenced in this proposal. And while specifying a maximum flow rate of 2.0 gallons per minute, the ASME requirements for high-efficiency showerheads include requirements for spray force, spray pattern, and minimum flow rate, all intended to assure good rinsing performance and a satisfying shower experience for users. Additionally, many showerheads today are available with built-in pressure compensation, to ensure that strong and satisfying flows are available to bathers in dwellings with low water pressure.

This proposal, as modified by public comment, will save energy, water, and money for building owners and occupants for years to come. The only "choice" being "taken away" is the choice of a builder to install an energy-wasting showerhead in a new home -- a showerhead that will receive daily use for a decade or more while the nation undertakes many strenuous measures to slow the pace of climate change and avoid catastrophic global warming. This is one clear step to take to avoid the waste of energy and water and protect the supplies of both for future generations.

Cost Impact: The net effect of the public comment and code change proposal will not increase or decrease the cost of construction
This public comment does not change the substance of the original proposal, only referenced standard. All substantive requirements remain the same. There is no impact on the cost of construction. High-efficiency showerheads are available in over 11,000 models and are competitively priced.

Public Comment 2:

Proponents: Dan Buuck, representing National Association of Home Builders (dbuuck@nahb.org); Matt Sigler, representing Plumbing Manufacturers International; James Kendzel, representing American Supply Association (jkendzel@asa.net) requests Disapprove

Commenter's Reason:

- Many regions of the country have water pressure that is much lower than 80 psi, in some areas less than half that pressure. Therefore, consumers in such regions where the incoming water pressure is around 40 psi will be required to use showerheads that produce a maximum flow rate closer to 1.5 gpm than 2.0 gpm. Placing this requirement in the model code does not take those regional differences into consideration and can lead to consumer distrust of water conservation efforts.
- Definitive studies should be conducted first to better understand the impacts on public health and plumbing system performance before the maximum flow rates for plumbing fixtures and fixture fittings are lowered in the IPC.
- Showerheads with a maximum flow rate of 2.0 gpm are already required in ICC's Green Construction Code (IGCC). Lowering the maximum flow rate of showerheads in the IPC will require the maximum flow rate for showerheads to be lowered in the IGCC without any definitive study being conducted.
- The plumbing fixture and fitting water consumption requirements in the plumbing portion of the IPC are based on federal requirements (Energy Policy Act of 1992), and therefore should remain unchanged until federal requirements are changed.
- There is nothing in Federal Law that prevents a state or local jurisdiction from adopting a 2.0 gpm maximum showerhead requirement. In fact, since the Department of Energy waived in 2010 the Federal preemption, which permits states and local jurisdictions to go lower than federal requirements, several states including California, Colorado, Hawaii, Massachusetts, Nevada, New York, Oregon, Vermont and Washington, and local jurisdictions including Chicago, New York City and Washington D.C., have all chosen to lower the flow rate of showerheads sold and/or installed to 2.0 gpm or less.
- People have strong opinions when it comes to showerhead performance. That, and the fact that they are relatively easy to replace, minimizes the impact of this change in terms of water savings. The public will not put up with showerhead performance that does not meet their personal preference, and this will cause headaches for both code enforcement and contractors.

Cost Impact: The net effect of the public comment and code change proposal will not increase or decrease the cost of construction
No change to code.

Public Comment# 2633

P88-21

Proposed Change as Submitted

Proponents: Erin Coffman, representing Water Systems Council

2021 International Plumbing Code

Add new text as follows:

606.5.11 Pressurized potable water storage tanks.
Pressurized potable water tanks shall comply with WSC PST.

Add new standard(s) as follows:

WSC

Water Systems Council
1101 30th St. NW - Suite 500
Washington, D.C. 20007
USA

WSC Water Systems Council.
PST 2000/2016 Standard Pressurized Water Storage Tank

Reason: The current code language does not provide requirements for pressurized potable water storage tanks. These pressurized tanks are critical to water well supply systems. Requirements are necessary for safety aspects and dependable performance standards.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The equipment that is currently being installed on projects already complies with the standard. Therefore, requiring compliance to the standard doesn't affect the cost of construction.

P88-21

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The proposed text is placed under the incorrect section (606.5 water pressure booster systems) and should be located at 608.12.1. The standard only addresses tanks up to a certain size therefore, the proposed text should reflect that limitation. (14-0)

P88-21

Individual Consideration Agenda

Public Comment 1:

IPC: 606.5.11

Proponents: Terry Burger, representing ASSE International; Erin Coffman, representing Water Systems Council (ecoffman@watersystemscouncil.org) requests As Modified by Public Comment

Modify as follows:

2021 International Plumbing Code

~~606.5.11~~ 608.12.1 **Pressurized potable water storage tanks .** Pressurized potable water tanks shall comply with WSC PST.

Commenter's Reason: The committee voted to disapprove because they stated that the proposal made reference to IBC for which the reference was invalid. And that the definitions had requirement within them. The committee also recommended that this proposal was better placed in Section 608.12. The committee’s comments and reasons have been taken into consideration to this proposal.
The current code language does not provide requirements for pressurized potable water storage tanks. These pressurized tanks are critical to

water well supply systems. Requirements are necessary for safety aspects and dependable performance standards.

Bibliography: None

Cost Impact: The net effect of the public comment and code change proposal will not increase or decrease the cost of construction
This comment simply locates the proposed text to a different location in the code and therefore, does not change the original proposal's cost impact statement justification of no cost impact.

Public Comment# 2419

P102-21

Proposed Change as Submitted

Proponents: John Williams, Chair, representing Healthcare Committee (ahc@iccsafe.org)

2021 International Plumbing Code

Delete and substitute as follows:

~~**609.3 Hot water.** *Hot water* shall be provided to supply all of the hospital fixture, kitchen and laundry requirements. Special fixtures and equipment shall have hot water supplied at a temperature specified by the manufacturer. The hot water system shall be installed in accordance with Section 607.~~

609.3 Water. Water shall be provided in health care facilities in accordance with Section 609.3.1 and 609.3.2.

Add new text as follows:

609.3.1 Hand-washing water.
Hand-washing water shall be provided to all dedicated handwashing stations. Dedicated hand-washing stations shall be permitted to be colder than tempered water.

609.3.2 Hot water.
Hot water shall be provided in accordance with Section 607.

Reason: A major source of infection in the healthcare setting is the presence of waterborn contaminants, including Legionella, C-Difficile, and others that thrive in a certain water temperature. In particular, Leginella thrives in higher temperature water. Recently, outbreaks in New York City and other municipalities have highlighted the need to manage water to prevent contamination. For this reason, ASHRAE 188-2015 was implemented for water management plans in the healthcare setting.
Hand washing sinks in ares such as emergency departments and intensive care units are common, and have been required in the FGI Guidelines for many versions. This proposal seeks to make the allowance for cold hand washing in higher acuity areas at handwashing sinks.

The ASHRAE guideline 12 states “Conditions that are favorable for the amplification of legionellae growth include the presence of other bacteria, amoebae and other protozoan hosts, water temperatures of 25-42°C (77-108°F), stagnation, scale, sediment and biofilms.” Tempered water falls within this breeding area that is dangerous for the sensitive populations in health care facilities. Research has shown that “warm or hot” water have not significant impact on levels of bacterial reduction[1].

Common pathogens such as Escherichia coli, Salmonella typhimurium and Klebsiella pneumonia stay alive at temperatures up to 55°C (131°F) for over ten minutes and Staphylococcus aureus would require at least 50 minutes of exposure at a temperature of 60°C (140°F) to be reduced to an immeasurable level. By comparison, just 30 seconds of skin exposure to water heated to 55°C would cause deep second-degree burns, and water heated to 60°C could be tolerated for less than six seconds before causing serious harm.

Bibliography: 1. Carrico AR, Spoden M, Wallston KA, Vandenbergh MP. The Environmental Cost of Misinformation: Why the Recommendation to Use Elevated Temperatures for Handwashing is Problematic. Int J Consum Stud. 2013;37(4):433-441. doi:10.1111/ijcs.12012

Cost Impact: The code change proposal will decrease the cost of construction
Allowing for cold water decrease the cost for piping for to supply hot water and increase operational safety.

P102-21

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: Water colder than tempered water is as cold as the incoming water supply temperature. The Committee cannot see how such a requirement could apply in every region where the code is used. In some areas, winter time incoming cold water is much too cold to hold one's hands under for needed 20 seconds for proper handwashing. The CDC recommends range of 68-75 degrees F if cold water only is to be used for handwashing. Although the intent of reducing Legionella is understood, where is the actual data to show that there are a significant number of cases coming from handwashing stations? (14-0)

Individual Consideration Agenda

Public Comment 1:

Proponents: John Williams, representing Healthcare Committee (ahc@iccsafe.org) requests As Submitted

Commenter's Reason: The purpose of this change is to allow for maximum amount of handwashing options in a hospital setting, while considering optimal operating performance of systems. In addition to the proven effectiveness of handwashing against COVID-19, other pathogens such as Legionella are a primary concern for healthcare facilities. Water systems are constantly being optimized to In addition, use of higher water temperature increases energy consumption, and therefore having alternate options for handwashing would be beneficial from an environmental standpoint. Even if ABHR is used, it is not recommended for use when hands are heavily soiled or greasy, also per the CDC (Show Me the Science – When & How to Use Hand Sanitizer in Community Settings | Handwashing | CDC). From that article, the “CDC recommends washing hands with soap and water whenever possible because handwashing reduces the amounts of all types of germs and chemicals on hands.”
Hospital water systems do not directly reflect outside weather conditions in terms of temperature. Systems generally receive water from municipal mains at about 45 degrees minimum. To combat pathogens such as Legionella, CDC recommendations are to maintain cold water temperature at approximately 68 degrees, based on standard ASHRAE 12-2020. This is achieved by simple circulation of the water through the interior system of the hospital, where indoor air temperatures are maintained. Systems heat water, and also chilled water, to operational temperatures, but water from the cold water tap is not extreme in temperature. This dispels the notion of the “Minnesota Effect,” which was a concern in the debate and discussion during the Committee Action Hearings on this code change.

Also, during proper handwashing, use of soap accounts for most of the 20 seconds recommended for hand scrubbing. Hands are only under the water briefly at the beginning, to rinse hands, and then at the end to rinse off the soap. Based on CDC observations, found at Frequent Questions About Hand Hygiene | Handwashing | CDC the effectiveness of the soap is not related to water temperature. Per the CDC, on the topic of use of warm water or cold water for handwashing, “[u]se your preferred water temperature – cold or warm – to wash your hands. Warm and cold water remove the same number of germs from your hands. The water helps create soap lather that removes germs from your skin when you wash your hands. Water itself does not usually kill germs; to kill germs, water would need to be hot enough to scald your hands.” Other studies suggest that cold water handwashing is actually more effective than warm water handwashing, including elimination of a number of pathogens as noted in *Quantifying the Effects of Water Temperature, Soap Volume, Lather Time, and Antimicrobial Soap as Variables in the Removal of Escherichia coli ATCC 11229 from Hands* (https://meridian.allenpress.com/jfp/article/80/6/1022/200017/Quantifying-the-Effects-of-Water-Temperature-Soap). In brief, “the results of this study indicate that water temperature is not a critical factor for the removal of transient microorganisms from hands.”

Regarding data surrounding Legionella testing, ASHRAE 188-2017 requires a testing program to determine growth of Legionella at cooling towers and domestic water systems. The purpose for testing is to treat the water before the pathogen grows to lethal levels. In 2017, as noted in Legionellosis Report 2017 (pa.gov), the top jurisdictions had a total of 7,458 cases of Legionella. The monumental Legionnaires Disease outbreak of 1976 at the Bellevue Stratford Hotel in Philadelphia had 182 reported cases with 29 deaths, for a 15.9% death rate. There have been more recent outbreaks in 2017 at Lenox Hill Hospital in New York, and in relation to the Flint, MI water crisis in 2019. Water testing programs are instituted throughout the united states to avoid such a catastrophic result, so systems can be properly cleaned before they reach an outbreak level.

The complexities of encouraging handwashing, while mitigating pathogens such as Legionella and COVID-19, are a balance that hospitals face regularly. This change to allow cold handwashing affords another tool to successfully create the safest environment possible.

Cost Impact: The net effect of the public comment and code change proposal will decrease the cost of construction
Allowing for cold water decrease the cost for piping for to supply hot water and increase operational safety.

Public Comment# 2572

P103-21

Proposed Change as Submitted

Proponents: Jason Shank, ASSE International, representing ASSE International

2021 International Plumbing Code

Revise as follows:

611.1 Design. Point-of-use reverse osmosis drinking water treatment units shall comply with CSA B483.1 or NSF 58. Drinking water treatment units shall meet the requirements of CSA B483.1, NSF 42, NSF 44, NSF 53 or NSF 62.Commercial and food service water treatment equipment shall comply with ASSE 1087.

Add new standard(s) as follows:

ASSE

ASSE International
18927 Hickory Creek Drive, Suite 220
Mokena, IL 60448

1087-18 Commercial and Food Service Water Treatment Equipment Utilizing Drinking Water

Reason: Commercial water treatment equipment is used in point-of-entry (POE) and point-of-use (POU) applications connected to building plumbing to improve the water quality characteristics of potable water. This standard includes testing requirements for components and complete systems. Electrical compliance is not covered by the standard.
Plumbed water treatment units include any device or component, point-of-entry and point-of-use, that is used in a building to improve the quality of the water. This standard covers all water treatment products that are connected to the building's potable water plumbing system. This standard is not intended to cover water treatment products used for process water or wastewater applications. Examples of water treatment equipment include deionizers, filters, softeners, reverse osmosis assemblies, ultraviolet systems, ozone systems, and distillers.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal is adding another standard to chose from for the application.

Staff Analysis: A review of the standard(s) proposed for inclusion in the code, ASSE 1087-18 with regard to the ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before March 20, 2021.

P103-21

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: This additional requirement would only duplicate what is already required by this code section. This isn't any definition for the term "commercial." (14-0)

P103-21

Individual Consideration Agenda

Public Comment 1:

Proponents: Jason Shank, representing ASSE International (jshank@plumbers55.com) requests As Submitted

Commenter's Reason: P103-21 should be approved as submitted.
The committee voted to disapprove because they stated it will duplicate what is already required by this code section. We would like to bring the following information to the committee's attention.

The scope of NSF 44 covers residential water softeners. This standard cannot be used for commercial water treatment equipment. NSF International has sent letters to AHJs informing them that NSF 44 cannot be used on commercial water softeners greater than 1.25" NPS. The NSF

330 standard defines residential water softener as a system with an 1.25” NPS plumbing connection. All water softeners with plumbing connections greater than 1.25 NPS” are outside the scope of NSF 44. Attached is a letter from Jeremy Brown from NSF International explaining that NSF 44 cannot be used for commercial applications on water softeners with a valve greater than 1.25” NPS. Only referencing NSF 44 in the code creates a conflict because companies cannot be tested or certified to NSF 44 even though the code requires it. The reason ASSE 1087 was developed was to capture commercial water treatment equipment that fell outside the scope of the existing NSF drinking water treatment standards. Without the addition of ASSE 1087 water softeners with plumbing connections greater than 1.25 NPS are not covered by a health and safety standard in the IPC.

The scope of NSF 58 specifically covers point of use reverse osmosis system. Point of entry and commercial reverse osmosis system are not covered in the scope of NSF 58. The reason ASSE 1087 was developed was to capture commercial water treatment equipment that fell outside the scope of the existing NSF drinking water treatment standards. Only referencing NSF 58 in the code creates a conflict because companies cannot test point of entry RO systems to NSF 58 even though the code requires it. Without the addition of ASSE 1087 point of entry RO systems are not covered by a health and safety standard in the IPC.

The scope of NSF 42 and NSF 53 covers residential and commercial modular water filtration systems. NSF defines commercial modular as a system consisting of multiple components attached to a manifold, produced specifically for food service applications, installed by an authorized plumber or authorized agent of the manufacturer, and not intended for use in residential applications. The NSF 42 and 53 standard do not cover commercial water filtration equipment outside commercial modular systems. The reason ASSE 1087 was developed was to capture commercial water treatment equipment that fell outside the scope of the existing NSF drinking water treatment standards. Only referencing NSF 42 and 53 for water filtration equipment creates a conflict because commercial water treatment equipment, other than commercial modular systems, cannot be tested to NSF 42 or 53 even though the code requires it. Without the addition of ASSE 1087 commercial water filters are not covered by a health and safety standard in the IPC.

Based on this information we request the committee to reconsider their action. The additional of the ASSE 1087 standard does not duplicate the existing NSF drinking water treatment standards and provides health and safety testing from water treatment equipment being used in commercial buildings, schools, churches, day cares, etc. Without the ASSE 1087 standard commercial water treatment products may be the only plumbing component that contacts potable water not covered by a health and safety standard.

NSF 44 - 2018

1.2 Scope

The manual, auto-initiated, and demand-initiated regeneration (DIR) residential cation exchange water softeners addressed by this standard are designed for the reduction of specific substances that may be present in drinking water (public or private) considered to be microbiologically safe and of known quality. Systems covered under this standard are intended to reduce hardness affecting the aesthetic quality of water. The established health hazards, barium and radium, are optional performance claims addressed by this Standard. Sytems with manufacturer claims that include components or functions covered uner other NSF or NSF/ANSI Standards or Criteria, shall conform to the applicable requirements therein. Systems covered by this Standard are not intended to be sued with drinking water that is microbiologically unsafe or of unknown quality without adequate disinfection before or after the system.

NSF 330 - 2020

3.186.14 residential water softener: (As used in NSF/ANSI 44) A cation exchange water softener that is connected to the water system with conventional plumbing fittings not exceeding 1.25 in NPS (nominal pipe size), that is designed for residential use, and that is regenerated in place. All operations of the regeneration process, which may include maintenance of the water supply to the residence, backwashing brining, rinsing, and returning the system to service, are performed by the manual or automatic controls of the system. Salt brine is used for regeneration.
NSF 58 Scope

1.2 Scope

The point-of-use RO drinking water treatment systems addressed by the Standard are designed to be used for the reduction of specific substances that may be present in drinking water (pubic or private) considered to be microbiologically safe and of known quality. Systems covered by the Standard are intended for reduction of total dissolved solids (TDS) and other contaminants specified herein. They may be chemical or particulate (including filterable cysts) in nature. It is recognized that a system may be effective in controlling one or more of these contaminants, but systems are not required to control all, however, TDS testing is required. Systems with manufacturer claims that include components or functions covered under other NSF or NSF/ANSI Standards or Criteria shall conform to the applicable requirements therein. Systems covered by the Standard are not intended to be used with drinking water that is microbiologically

NSF 42 Scope

1.2 Scope

The point-of-use (POU) and point-of-entry (POE) systems addressed by this Standard are designed to be used for the reduction of specific substances that may be present in drinking water (public or private) considered to be microbiologically safe and of known quality. Systems covered under this Standard are intended to address one or more of the following: reduce substances affecting the aesthetic quality of the water, add chemicals for scale control, or limit microbial growth in the system (basteriostatic). Substances may be soluble or particulate in nature. It is recognized that a system may be effective in controlling one or more of these substances but is not required to control all. Systems with manufacturer claims that include components or functions covered under other NSF or NSF/ANSI standards or Criteria shall conform to the applicable requirements therein. Filter systems covered by the Standard are not intended to be used with drinking water that is microbiologically unsafe or of unknown quality without adequate disinfection before or after the system.

NSF 53 Scope

1.2 Scope

The point-of-use and point-of-entry systems addressed by this Standard are designed to be used for the reduction of specific substances that may be present in drinking water (pubic or private) considered to be microbiologically safe and of known quality. Systems covered under this Standard are intended to reduce substances that are considered established or potential health hazards. They may be chemical or particulate (including filterable cysts) in nature. It is recognized that a system may be effective in controlling one or more of these contaminants, but systems are not required to control all. Systems with manufacturer claims that include components or functions covered under other NSF or NSF/ANSI Standards or Criteria shall conform to the applicable requirements therein. Systems covered by the Standard are not intended to be used with drinking water that is microbiologically unsafe or of unknown quality without adequate disinfection before or after the system.

NSF 330 – Commercial modular system definition

3.35 commercial modular system: A system consisting of multiple components attached to a manifold, produced specifically for food service applications, installed by an authorized plumber or authorized agent of the manufacturer, and not intended for use in residential applications.

Cost Impact: The net effect of the public comment and code change proposal will not increase or decrease the cost of construction
The code change proposal will not increase or decrease the cost of construction This proposal is adding another standard to choose from for the application.

Public Comment# 2597

P111-21

Proposed Change as Submitted

Proponents: Brian Helms, Charlotte Pipe and Foundry, representing Charlotte Pipe and Foundry (brian.helms@charlottepipe.com)

2021 International Plumbing Code

Revise as follows:

702.6
Chemical waste drainage system
. A chemical wastedrainage system , including its vent system, shall be completely ~~separated~~ independent from the sanitary drainage system. Separate drainage systems for chemical waste and vent pipes shall conform to one of the standards indicated in Table 702.6. The chemical waste shall be treated in accordance with Section 803.2 before discharging to the sanitary drainage system. ~~Separate drainage systems for chemical wastes and vent pipes shall be of an *approved* material that is~~ Chemical waste drainage system pipe and fitting materials shall be resistant to temperature, corrosion and degradation for the concentrations of chemicals involved per manufacturer recommendations.

901.3
Chemical waste drainage vent systems
. The vent system for a chemical waste drainage system shall be independent of ~~the sanitary vent system and shall terminate separately~~ any sanitary drainage vent system. The termination of a chemical waste drainage vent system shall be through the roof to the outdoors or to an air admittance valve that complies with ASSE 1049. Air admittance valves for chemical waste drainage systems shall be constructed of one of the materials ~~*approved* in accordance with Section~~ listed in table 702.6 and shall be tested for chemical resistance in accordance with ASTM F1412.

Add new text as follows:

TABLE 702.6 CHEMICAL WASTE DRAINAGE SYSTEM PIPE AND FITTINGS

MATERIAL	STANDARD
Chlorinated polyvinyl chloride (CPVC)	ASTM F2618
Borosilicate glass	ASTM C1053
High silicon iron	ASTM A518/A518M
Polypropylene (PP)	ASTM F1412
Polyvinylidene flouride (PVDF)	ASTM F1673

902.1.1 Chemical waste drainage system vents.
The pipe and fitting materials for a chemical waste drainage vent system shall be in accordance with Section 702.6. The methods utilized for construction and installation of such venting system shall be in accordance with the pipe and fitting manufacturers' instructions.

Add new standard(s) as follows:

ASTM

ASTM International
100 Barr Harbor Drive, P.O. Box C700
West Conshohocken, PA 19428-2959

F2618-19	Standard Specification for Chlorinated Poly (Vinyl Chloride) (CPVC) Pipe and Fittings for Chemical Waste Drainage Systems
A518/A518M-99(2018)	Standard Specification for Corrosion-Resistant High-Silicon Iron Castings

Reason: Chemical waste drainage applications are very different from sanitary drainage applications regulated in Chapter 7. Chemical waste drainage applications can vary in complexity and may be included projects ranging from K-12 chemistry labs to biomedical facilities. Many chemical waste drainage applications require pipe and fitting systems that have both higher temperature capability and resistance to a variety of chemicals and substances that typical DWV are not suitable for. Pipe and fitting materials that are manufactured to standards for chemical waste drainage applications are specifically designed to convey waste that may be detrimental to DWV and other non-pressure systems and that may be harmful to the health and safety of the public.
The code currently provides very specific direction on allowable materials for sanitary drainage systems but is not as specific for chemical waste in 702.6. Currently, the code states that these systems have to be separated from the sanitary system in section 702.6 and even gives direction on system design in section 803.2, but is very vague on what materials are acceptable for chemical waste applications.

Section 702.6 currently requires an "approved" material for chemical waste systems. By definition in Chapter 2, "approved" means that the material should be "acceptable to the code official." This proposal removes this statement as well as the responsibility of the official to determine whether the materials used are suitable for both temperature and chemical resistance requirements that can be unique to each project. Instead this proposal replaces this language with the addition of a table that includes ALL piping systems manufactured to standards specifically for chemical waste drainage and that are also third party listed for these applications for easy enforcement of the code.

Since no single piping system is chemically resistant to every chemical and substance that man has made, manufacturers recommendations regarding chemical resistance, temperature capability and installation should be referenced by the installer or designer when choosing a material for chemical waste drainage. References to manufacturers recommendations have been included in this proposal.

This proposal also adds new text for chemical waste drainage system vents as well. Materials used for venting chemical waste drainage systems are exposed to the same chemicals and substances (in gas form) that the drainage system is and should be held to the same requirements.

The current requirements for chemical waste drainage systems are too vague and unenforceable. This code change proposal clarifies the code requirements by revising section 702.6 and adding a table for allowable materials for chemical waste drainage applications. In addition, it revises section 901.3 and adds new text for chemical waste vent materials.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This code change proposal will not increase or decrease the cost of construction because it is intended to clarify allowable, third party certified products appropriate for chemical waste drainage applications.

Staff Analysis: A review of the standard(s) proposed for inclusion in the code, ASTM A518/A518M-99(2018) and ASTM F2618-19 with regard to the ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before March 20, 2021.

P111-21

Public Hearing Results

Committee Action: **As Modified**

Committee Modification:

TABLE 702.6 CHEMICAL WASTE DRAINAGE SYSTEM PIPE AND FITTINGS

MATERIAL	STANDARD
Chlorinated polyvinyl chloride (CPVC)	ASTM F2618
Borosilicate glass	ASTM C1053
High silicon iron	ASTM A518/A518M
~~Polypropylene (PP)~~ Polyolefin	ASTM F1412, CSA B181.3
Polyvinylidene fluoride (PVDF)	ASTM F1673, CSA B181.3

Committee Reason: For the modification: The CSA standard (already in the reference standards chapter) is also applicable to these products. Polyolefin is a broader term for these products.
For the proposal as modified: The Committee agreed that this a needed addition to the code to help the the code official approve piping waste piping. However, the Committee requests that the proponent bring this back back in public comment to change the phrase "resistant to temperature" to "suitable for the temperature of the waste." (14-0)

P111-21

Individual Consideration Agenda

Public Comment 1:

IPC: 702.6, 901.3, TABLE 702.6, 902.1.1

Proponents: Brian Helms, representing Charlotte Pipe and Foundry (brian.helms@charlottepipe.com) requests As Modified by Public Comment

Modify as follows:

2021 International Plumbing Code

702.6 Chemical waste drainage system . A chemical waste drainage system, including its vent system, shall be completely independent from the sanitary drainage system. Separate drainage systems for chemical waste and vent pipes shall conform to one of the standards indicated in Table 702.6. The chemical waste shall be treated in accordance with Section 803.2 before discharging to the sanitary drainage system. Chemical waste drainage system pipe and fitting materials shall be resistant to ~~temperature,~~ corrosion and degradation for the concentrations of chemicals involved per manufacturer recommendations.

901.3 Chemical waste ~~drainage vent~~ drainage vent systems . The vent system for a chemical waste drainage system shall be independent of any sanitary drainage vent system. The termination of a chemical waste drainage vent system shall be through the roof to the outdoors or to an air admittance valve that complies with ASSE 1049. Air admittance valves for chemical waste drainage systems shall be constructed of one of the materials listed in table 702.6 and shall be tested for chemical resistance in accordance with ASTM F1412.

TABLE 702.6 CHEMICAL WASTE DRAINAGE SYSTEM PIPE AND FITTINGS

MATERIAL	STANDARD
Chlorinated polyvinyl chloride (CPVC)	ASTM F2618
Borosilicate glass	ASTM C1053
High silicon iron	ASTM A518/A518M
Polyolefin	ASTM F1412, CSA B181.3
Polyvinylidene flouride (PVDF)	ASTM F1673, CSA B181.3

902.1.1 Chemical waste drainage system vents . The pipe and fitting materials for a chemical waste drainage vent system shall be in accordance with Section 702.6. The methods utilized for construction and installation of such venting system shall be in accordance with the pipe and fitting manufacturers' instructions.

Commenter's Reason: During the Committee Action Hearings, Vice Chair Gregg Gress expressed concern regarding the use of the phrase, "resistant to temperature". This phrase has been removed per his recommendation. A material's temperature capability is included in the manufacturers recommendations, which is already included in the proposal.

Cost Impact: The net effect of the public comment and code change proposal will not increase or decrease the cost of construction
The public comment as well the original proposal and modification will not increase or decrease the cost of construction.

Public Comment# 2461

P129-21 Part I

Proposed Change as Submitted

Proponents: Joanne Carroll, Subtegic Group Inc., representing HammerHead Trenchless (jcarroll@subtegic.com)

THIS IS A 2 PART CODE CHANGE. PART I WILL BE HEARD BY THE IPC COMMITTEE. PART II WILL BE HEARD BY THE IRC-P&M COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THESE COMMITTEES.

2021 International Plumbing Code

Add new definition as follows:

CURED-IN-PLACE PIPE. A plastic piping system of a particular design with a wall structure which is uniquely defined for each diameter and wall thickness combination, produced from a specific textile tube saturated with a specific thermosetting resin and installed by a specific process used to rehabilitate damaged or deteriorated pipe in-place by insertion of the cured-in-place pipe material within the existing pipe.

Revise as follows:

718.1 General ~~Cure-in-place.~~ This section shall govern the rehabilitation of building sewers and buried building drains using cured-in-place pipe. ~~Sectional cure-in-place rehabilitation of *building sewer* piping and sewer service lateral piping shall be in accordance with ASTM F2599. Main and lateral cure-in-place rehabilitation of *building sewer* and sewer service lateral pipe and their connections to the main sewer pipe shall be in accordance with ASTM F2561. Hydrophilic rings or gaskets in cure-in-place rehabilitation of *building sewer* piping and sewer service laterals shall be in accordance with ASTM F3240 to ensure water tightness and elimination of ground water penetration.~~

Add new text as follows:

718.2 Applicability.
The rehabilitation of existing building sewers and buried building drains shall be limited to gravity piping 3 inches (76 mm) in diameter and larger. The rehabilitated pipe shall meet the drainage load requirements of the existing piping.

718.3 Pre-installation requirements.
Prior to commencement of the rehabilitation, the existing piping sections to be rehabilitated shall be cleaned to remove solid debris and deposits that will interfere with the installation and finished quality of the cured-in-place pipe. After the cleaning process has occurred and water has been flushed through the system, the piping shall be inspected internally by a recorded video camera survey.

718.3.1 Pre-installation inspection.
The existing piping shall be inspected internally by a recorded video camera survey. The survey shall include notations of the cleanouts and fitting locations, the length and the approximate depth of the existing piping.

718.4 Permitting.
Prior to permit issuance, the code official shall review and evaluate the pre-installation recorded video camera survey to determine if the existing piping is able to be rehabilitated with cured-in-place pipe in accordance with the proposed cured-in-place pipe system's third-party certification showing conformance to NSF 14, applicable installation requirements of referenced standards and this code.

718.5 Prohibited applications.
Where review of the pre-installation recorded video camera survey reveals that the existing piping is not installed correctly or defects exist that prevent the insertion and expansion of the cured-in-place pipe material, rehabilitation with cured-in-place pipe shall not be permitted until the defective portions of piping have been repaired with pipe and fittings in accordance with this code. Defects include, but are not limited to, back grade or insufficient slope.

718.6 Rehabilitation materials.
The cured-in-place pipe materials shall be manufactured in compliance with applicable standards and certified as required in Section 303. Cured-in-place pipe specimens for testing shall consist of a specific textile tube and specific resin system manufactured at a specific thickness. The cured-in-place pipe materials shall be third-party listed and labeled.

718.7 Installation.
The installation of cured-in-place pipe materials shall be performed in accordance with the current listing as required in 718.6, manufacturer's installation instructions, this code and applicable referenced standards including ASTM F1216, ASTM F1743, ASTM F2599, or ASTM F2561. Hydrophilic o-rings or gaskets used in cured-in-place pipe shall be in accordance with ASTM F3240.

718.7.1 Material data report.
The installer shall record the data as required by the cured-in-place pipe manufacturer and applicable standards. The recorded data shall include but is not limited to the location of the project, cured-in-place pipe tube and resin type with batch and lot numbers, amount of product installed and conditions of the installation. A copy of the data report shall be provided to the code official prior to final approval.

718.8 Post-installation recorded video camera survey.

The completed, rehabilitated piping system shall be inspected internally by a recorded video camera survey. The video survey shall be submitted to the code official prior to finalization of the permit. The video survey shall be reviewed and evaluated to provide verification that terminations of the cured-in-place pipe are smooth so as not to interfere with flow or collect debris, and that the cured-in-place pipe has been installed forming a tight interference fit to the existing pipe, and that no infiltration of groundwater, obstruction of flow or other defects exist which adversely affect the piping system in compliance with all laws and other provisions of this code. Any defects identified shall be repaired or replaced as approved by the authority having jurisdiction in accordance with applicable standards and this code.

718.9 Certification.
A certification shall be provided in writing to the code official, from the permit holder, that the cured-in-place pipe has been installed in accordance with the current listing required in Section 718.6, manufacturer's installation instructions, the applicable standards and this code.

718.10 Approval.
Upon verification of compliance with the requirements of Sections 718.1 through 718.9, the code official shall approve the installation.

Add new standard(s) as follows:

ASTM

ASTM International
100 Barr Harbor Drive, P.O. Box C700
West Conshohocken, PA 19428-2959

F1216 - 16	Standard Practice for Rehabilitation of Existing Pipelines and Conduits by the Inversion and Curing of a Resin-Impregnated Tube
F1743 - 17	Standard Practice for Rehabilitation of Existing Pipelines and Conduits by Pulled-in-Place Installation of Cured-in-Place Thermosetting Resin Pipe (CIPP)

Reason:
Proposal IPC

The proposal adds requirements for cured-in-place pipe materials and detailed installation and quality management practices for the specialized rehabilitation of existing piping that will provide not only clarity but improve efficiencies for code officials and those providing administration and enforcement of the code. Acceptance of this proposal will also remove confusion in the industry surrounding the use of cured-in-place pipe for the rehabilitation of building sewers and buried building drains. Adding specific requirements consistent with format of prior sections for specialized construction (Sections 716 and Section 717) this revision makes the section user friendly while providing clear requirements for the enforcement and use of cured-in-place pipe.

Proposal IRC

There are instances where under slab and buried piping requires replacement or repair and excavation is difficult or even impossible. The proposal adds a new section to the IRC consistent with a proposal to revise the existing Section 718 in the IPC. The section provides instruction on the rehabilitation of existing buried sewer piping by the cured-in-place pipe trenchless method. This trenchless method provides for the rehabilitation or renewal of existing deteriorated pipe with minimal or no excavation. The proposal includes requirements for cured-in-place pipe materials and detailed installation and quality management practices for the specialized rehabilitation of existing piping that will provide clear and efficient enforcement for those providing administration and enforcement of the code. Consistent with format of prior sections for specialized construction in the IPC (Sections 716 and Section 717) this revision makes the section user friendly while providing clear requirements for the enforcement and use of cured-in-place pipe.

Cost Impact: The code change proposal will decrease the cost of construction
The code change proposal will decrease the cost of construction by allowing more materials that are compliant with the code to be considered while improving quality of the work through the requirements for materials and verification of performance by certification through an approved agency. The requirement for certification of materials will increase choices and may offer cost savings.

Staff Analysis: A review of the standards proposed for inclusion in the code, ASTM F1216 –16 and ASTM F1743 - 17 with regard to the ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before March 20, 2021.

P129-21 Part I

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The proposed new standard contains a significant amount of permissive language. The new definition is confusing. (14-0)

Individual Consideration Agenda

Public Comment 1:

IPC: 202 (New), 718.1 (New) , 718.2 (New), 718.3 (New), 718.4 (New), 718.5 (New), 718.6 (New), 718.6.1 (New), 718.7 (New), 718.8 (New)

Proponents: Joanne Carroll, representing HammerHead Trenchless (jcarroll@subtegic.com) requests As Modified by Public Comment

Replace as follows:

2021 International Plumbing Code

CURED-IN-PLACE PIPE . A plastic piping system used to rehabilitate damaged or deteriorated pipe in-place by insertion of the cured-in-place pipe material within the existing pipe.

718.1 General ~~Cure in place~~. This section shall govern the rehabilitation of building sewers and buried building drains using cured-in-place pipe.~~Sectional cure-in-place rehabilitation of *building sewer* piping and sewer service lateral piping shall be in accordance with ASTM F2599. Main and lateral cure-in-place rehabilitation of *building sewer* and sewer service lateral pipe and their connections to the main sewer pipe shall be in accordance with ASTM F2561. Hydrophilic rings or gaskets in cure-in-place rehabilitation of *building sewer* piping and sewer service laterals shall be in accordance with ASTM F3240 to ensure water tightness and elimination of ground water penetration.~~

718.2 Applicability . The rehabilitation of existing building sewers and buried building drains shall be limited to gravity piping 3 inches (76 mm) in diameter and larger. The rehabilitated pipe shall meet the drainage load requirements of the existing piping.

718.3 Pre-installation requirements . Prior to commencement of the rehabilitation, the existing piping sections to be rehabilitated shall be cleaned to remove solid debris and deposits that will interfere with the installation and finished quality of the cured-in-place. A recorded video camera survey made by the installer shall document pre-installation pipe condition and include notations of the cleanouts and fitting locations, the length, and the approximate depth of the existing piping.

718.4 Prohibited applications . Cured-in-place pipe shall not be permitted until defects that prevent the insertion and expansion of the cured-in-place pipe material have been repaired with pipe and fittings in accordance with this code. Defects include, but are not limited to, back grade or insufficient slope.

718.5 Rehabilitation materials. . The cured-in-place pipe materials shall be manufactured in compliance with applicable standards and certified as required in Section 303. The cured-in-place pipe materials shall be third-party listed and labeled.

718.6 Installation. . The installation of cured-in-place pipe materials shall be performed in accordance with the current listing as required in Section 718.5, manufacturer's installation instructions, this code and applicable referenced standardsincluding ASTM F2599and ASTM F2561. Hydrophilic o-rings or gaskets used in cured-in-place pipe shall be in accordance with ASTM F3240.

718.6.1 Material data report. . The installer shall record the data as required by the cured-in-place pipe manufacturer and applicable standards. A copy of the data report shall be provided as required by the code official

718.7 Post-installation requirements. . Terminations of the cured-in-place pipe shall be smooth so as not to interfere with flow or collect debris and the cured-in-place pipe shall have formed a tight interference fit to the existing pipe. Infiltration of groundwater, obstruction of flow or other defects which adversely affect the piping system shall not be permitted. Defects shall be repaired or replaced as approved by the code official in accordance with applicable standards and this code. A recorded video camera survey shall be made by the installer of the completed cured-in-place pipe installation as required by the code official.

718.8 Certification. . As required by the code official, a certification shall be provided bythe permit holder to the code official that the cured-in-place pipe has been installed in accordance with the current listing required in Section 718.5, manufacturer's installation instructions, the applicable standards and this code.

Commenter's Reason: The public comment is made in consideration of the committee's comments by providing a simplified definition, removal of proposed ASTM standards until such time as the permissive language is removed through the ongoing ASTM process, and edits intended to provide clarity within the code making visible the key components of construction when installing cured-in-place pipe.

Cost Impact: The net effect of the public comment and code change proposal will decrease the cost of construction
The net effect of the public comment and code change proposal will decrease the cost of construction by allowing more materials that are code compliant and offering competitive alternatives.

Public Comment# 2838

Public Comment 2:

IPC: SECTION 202, 718.1, 718.2, 718.3, 718.3.1, 718.4, 718.5, 718.6, 718.7, 718.7.1, 718.8, 718.9, 718.10,

Proponents: Sidney Cavanaugh, representing IPS Corp. (sidneycavanaugh@yahoo.com) requests As Modified by Public Comment

Modify as follows:

2021 International Plumbing Code

CURED-IN-PLACE PIPE . ~~A plastic piping system of a particular design with a wall structure which is uniquely defined for each diameter and wall thickness combination, produced from a specific textile tube saturated with a specific thermosetting resin and installed by a specific process used to rehabilitate damaged or deteriorated pipe in-place by insertion of the cured-in-place pipe material within the existing.~~ A thermoset resin saturated into an absorbent textile tube pressed against an inner pipe wall and cured to form a new pipe within a pipe.

718.1 General . This section shall govern the rehabilitation of building sewers, sewer service lateral piping and their connection to the main sewer.~~and buried building drain+s using cured-in-place pipe.~~ Sectional cured-in-place rehabilitation of building sewer piping and sewer service lateral piping shall be in accordance with ASTM F2599. Main and lateral cure-in-place rehabilitation of building sewer and sewer service lateral pipe and their connection to the main sewer pipe shall be in accordance with ASTM F2561. Hydrophilic rings or gaskets shall be used in cure-in-place rehabilitation of building sewer piping and sewer service laterals and they shall be in accordance with ASTM F3240 to ensure water tightness and elimination of ground water penetration.

718.2 ~~Applicability~~ Pre-installation requirements and inspection. . ~~The rehabilitation of existing building sewers and buried building drains shall be limited to gravity piping 3 inches (76 mm) in diameter and larger. The rehabilitated pipe shall meet the drainage load requirements of the existing piping.~~ Prior to commencement of the rehabilitation, the existing piping sections to be rehabilitated shall be cleaned to remove solid debris and deposits that will interfere with the installation and finished quality of the cured-in-place pipe. After the cleaning process has occurred and water has been flushed through the system the piping shall be inspected internally by a recorded video camara survey. The survey shall include notations of the cleanouts and fitting locations, the length and approximate depth of the existing piping.

~~718.3 Pre-installation requirements~~.
~~Prior to commencement of the rehabilitation, the existing piping sections to be rehabilitated shall be cleaned to remove solid debris and deposits that will interfere with the installation and finished quality of the cured-in-place pipe. After the cleaning process has occurred and water has been flushed through the system, the piping shall be inspected internally by a recorded video camera survey.~~

~~718.3.1 Pre-installation inspection~~.
~~The existing piping shall be inspected internally by a recorded video camera survey. The survey shall include notations of the cleanouts and fitting locations, the length and the approximate depth of the existing piping.~~

~~718.4~~ 718.2.1 Permitting . ~~Prior to permit issuance, the~~ The code official shall review and evaluate the pre-installation recorded video camera survey to determine if the existing piping is able to be rehabilitated with cured-in-place pipe~~ in accordance with the proposed cured-in-place pipe~~ system's third-party certification showing conformance to~~ NSF 14,~~ applicable installation requirements of referenced standards~~ and this code~~ in Section 718.1.

~~718.5~~ 718.2.2 Prohibited applications . Where review of the pre-installation recorded video camera survey reveals that the existing piping is not installed correctly or defects exist that prevent the insertion and expansion of the cured-in-place pipe material, rehabilitation with cured-in-place pipe shall not be permitted until the defective portions of piping have been repaired with pipe and fittings in accordance with this code. Defects include, but are not limited to, back grade or insufficient slope.

~~718.6~~ 718.3 Rehabilitation materials . The cured-in-place pipe materials shall be manufactured in compliance with applicable standards and certified as required in Section 303. ~~Cured-in-place pipe specimens for testing shall consist of a specific textile tube and specific resin system manufactured at a specific thickness.~~ The cured-in-place pipe materials shall be third-party listed and labeled.

~~718.7 Installation~~.
~~The installation of cured-in-place pipe materials shall be performed in accordance with the current listing as required in 718.6, manufacturer's installation instructions, this code and applicable referenced standards including ASTM F1216, ASTM F1743, ASTM F2599, or ASTM F2561. Hydrophilic o-rings or gaskets used in cured-in-place pipe shall be in accordance with ASTM F3240.~~

~~718.7.1~~ 718.4 Material data report . The installer shall record the data as required by the cured-in-place pipe manufacturer and applicable standards. The recorded data shall include but is not limited to the location of the project, cured-in-place pipe tube and resin type with batch and lot numbers, amount of product installed and conditions of the installation. A copy of the data report shall be provided to the code official prior to final approval.

~~718.8 Post-installation recorded video camera survey~~.
~~The completed, rehabilitated piping system shall be inspected internally by a recorded video camera survey. The video survey shall be submitted to the code official prior to finalization of the permit. The video survey shall be reviewed and evaluated to provide verification that terminations of the cured-in-place pipe are smooth so as not to interfere with flow or collect debris, and that the cured-in-place pipe has been installed forming a tight~~

~~interference fit to the existing pipe, and that no infiltration of groundwater, obstruction of flow or other defects exist which adversely affect the piping system in compliance with all laws and other provisions of this code. Any defects identified shall be repaired or replaced as approved by the authority having jurisdiction in accordance with applicable standards and this code.~~

~~718.9 Certification~~.
~~A certification shall be provided in writing to the code official, from the permit holder, that the cured-in-place pipe has been installed in accordance with the current listing required in Section 718.6, manufacturer's installation instructions, the applicable standards and this code.~~

~~718.10 Approval~~ . ~~Upon verification of compliance with the requirements of Sections 718.1 through 718.9, the code official shall approve the installation.~~

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~~F1216 - 16~~	~~Standard Practice for Rehabilitation of Existing Pipelines and Conduits by the Inversion and Curing of a Resin-Impregnated Tube~~

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~~F1743 - 17~~	~~Standard Practice for Rehabilitation of Existing Pipelines and Conduits by Pulled-in-Place Installation of Cured-in-Place Thermosetting Resin Pipe (CIPP)~~

Commenter's Reason: It is very important to have a correct definition in the code which is already included in appropriate standards for Cured-In-Place pipe. The one suggested comes directly from ASTM F3240. It is also important to retain the current wording used in the 2021 edition of the IPC Section 718.1 with only minimal change which clarifies the content of the Section and underlines the importance of hydrophilic rings and gaskets used in cure-in-place pipe rehabilitation. Finally, the modification offered tries to organize and save the important items/parts of the original proposal which include critical pre inspection and post inspection components as well as material certification/confirmation requirements.

Cost Impact: The net effect of the public comment and code change proposal will not increase or decrease the cost of construction
This public comment clarifies the intent of the original proposal and does not require additional labor or materials that would impact the proposal's original claim of decreasing cost of construction.

Public Comment# 2538

P129-21 Part II

Proposed Change as Submitted

Proponents: Joanne Carroll, Subtegic Group Inc., representing HammerHead Trenchless (jcarroll@subtegic.com)

2021 International Residential Code

Add new definition as follows:

CURED-IN-PLACE PIPE. A plastic piping system of a particular design with a wall structure which is uniquely defined for each diameter and wall thickness combination, produced from a specific textile tube saturated with a specific thermosetting resin and installed by a specific process used to rehabilitate damaged or deteriorated pipe in-place by insertion of the cured-in-place pipe material within the existing pipe.

Add new text as follows:

P3012
Rehabilitation of Underground Building Sewers and Building Drains by the Cured-In-Place Pipe Method

P3012.1 General.
This section shall govern the rehabilitation of building sewers and buried building drains using cured-in-place pipe.

P3012.2 Applicability.
The rehabilitation of existing building sewers and buried building drains shall be limited to gravity piping 3 inches (76 mm) in diameter and larger. The rehabilitated pipe shall meet the drainage load requirements of the existing piping.

P3012.3 Pre-installation requirements.
Prior to commencement of the rehabilitation, the existing piping sections to be rehabilitated shall be cleaned to remove solid debris and deposits that will interfere with the installation and finished quality of the cured-in-place pipe. After the cleaning process has occurred and water has been flushed through the system, the piping shall be inspected internally by a recorded video camera survey.

P3012.3.1 Pre-installation inspection.
The existing piping shall be inspected internally by a recorded video camera survey. The survey shall include notations of the clean outs and fitting locations, the length and the approximate depth of the existing piping.

P3012.4 Permitting.
Prior to permit issuance, the code official shall review and evaluate the pre-installation recorded video camera survey to determine if the existing piping is able to be rehabilitated with cured-in-place pipe in accordance with the proposed cured-in-place pipe system's third-party certification showing conformance to NSF 14, applicable installation requirements of referenced standards and this code.

P3012.5 Prohibited applications.
Where review of the pre-installation recorded video camera survey reveals that the existing piping is not installed correctly or defects exist that prevent the insertion and expansion of the cured-in-place pipe material, rehabilitation with cured-in-place pipe shall not be permitted until the defective portions of piping have been repaired with pipe and fittings in accordance with this code. Defects include, but are not limited to, back grade or insufficient slope.

P3012.6 Rehabilitation materials.
The cured-in-place pipe materials shall be manufactured in compliance with applicable standards and certified as required in Section 303. Cured-in-place pipe specimens for testing shall consist of a specific textile tube and specific resin system manufactured at a specific thickness. The cured-in-place pipe materials shall be third-party listed and labeled.

P3012.7 Installation.
The installation of cured-in-place pipe materials shall be performed in accordance with the current listing as required in P3012.6, manufacturer's installation instructions, this code and applicable referenced standards including ASTM F1216, ASTM F1743, ASTM F2599, or ASTM F2561. Hydrophilic o-rings or gaskets used in cured-in-place pipe shall be in accordance with ASTM F3240.

P3012.7.1 Material data report.
The installer shall record the data as required by the cured-in-place pipe manufacturer and applicable standards. The recorded data shall include but is not limited to the location of the project, cured-in-place pipe tube and resin type with batch and lot numbers, amount of product installed and conditions of the installation. A copy of the data report shall be provided to the code official prior to final approval.

P3012.10 Approval.
Upon verification of compliance with the requirements of Sections P3012.1 through P3012.9, the code official shall approve the installation.

P3012.8 Post-installation recorded video camera survey.
The completed, rehabilitated piping system shall be inspected internally by a recorded video camera survey. The video survey shall be submitted to the code official prior to finalization of the permit. The video survey shall be reviewed and evaluated to provide verification that terminations of the cured-in-place pipe are smooth so as not to interfere with flow or collect debris, and that the cured-in-place pipe has been installed forming a tight interference fit to the existing pipe, and that no infiltration of groundwater, obstruction of flow or other defects exist which adversely affect the piping system in compliance with all laws and other provisions of this code. Any defects identified shall be repaired or replaced as approved by the authority having jurisdiction in accordance with applicable standards and this code.

P3012.9 Certification.
A certification shall be provided in writing to the code official, from the permit holder, that the cured-in-place pipe has been installed in accordance with the current listing required in Section P3012.6, manufacturer's installation instructions, the applicable standards and this code.

Add new standard(s) as follows:

ASTM

ASTM International
100 Barr Harbor Drive, P.O. Box C700
West Conshohocken, PA 19428

F1216-16	Standard Practice for Rehabilitation of Existing Pipelines and Conduits by the Inversion and Curing of a Resin-Impregnated Tube
F1743 - 17	Standard Practice for Rehabilitation of Existing Pipelines and Conduits by Pulled-in-Place Installation of Cured-in-Place Thermosetting Resin Pipe (CIPP)
F2599-20	Standard Practice for Sectional Repair of Damaged Pipe By Means of an Inverted Cured-In-Place Liner
F2561-20	Standard Practice for Rehabilitation of a Sewer Service Lateral and Its Connection to the Main Using a One Piece Main and Lateral Cured-in-Place Liner
F3240-19e1	Standard Practice for Installation of Seamless Molded Hydrophilic Gaskets (SMHG) for Long-Term Watertightness of Cured-in-Place Rehabilitation of Main and Lateral Pipelines

Reason: There are instances where under slab and buried piping requires replacement or repair and excavation is difficult or even impossible. The proposal adds a new section to the IRC consistent with a proposal to revise the existing Section 718 in the IPC. The section provides instruction on the rehabilitation of existing buried sewer piping by the cured-in-place pipe trenchless method. This trenchless method provides for the rehabilitation or renewal of existing deteriorated pipe with minimal or no excavation. The proposal includes requirements for cured-in-place pipe materials and detailed installation and quality management practices for the specialized rehabilitation of existing piping that will provide clear and efficient enforcement for those providing administration and enforcement of the code. Consistent with format of prior sections for specialized construction in the IPC (Sections 716 and Section 717) this revision makes the section user friendly while providing clear requirements for the enforcement and use of cured-in-place pipe.

Cost Impact: The code change proposal will decrease the cost of construction
The code change proposal will decrease the cost of construction by allowing more materials that are compliant with the code to be considered while improving quality of the work through the requirements for materials and verification of performance by certification through an approved agency. The requirement for certification of materials will increase choices and may offer cost savings.

Staff Analysis: A review of the standards proposed for inclusion in the code, ASTM F1216 –16, ASTM F1743-17. ASTM F2599-20, ASTM F2561-20 and F3240-19e1 with regard to the ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before March 20, 2021.

P129-21 Part II

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The ASTM F1216 standard has permissive language. The requirements leave the decision as to whether the application is a good candidate for the method, to the code official but offers no criteria to make that determination. Although this is a great solution that is needed, there doesn't seem to be much actual support to local code officials from manufacturers of the products. There is an incorrect code section reference: Section P2609.3 should be P2609.4. (11-0)

P129-21 Part II

Individual Consideration Agenda

Public Comment 1:

IRC: (New), P3012, P3012.1, P3012.2, P3102.3 (New), P3012.4 (New), P3012.5 (New), P3012.6 (New), P3012.6.1 (New), P3012.7 (New), P3012.8 (New),

Proponents: Joanne Carroll, representing HammerHead Trenchless (jcarroll@subtegic.com) requests As Modified by Public Comment

Replace as follows:

2021 International Residential Code

CURED-IN-PLACE PIPE . A plastic piping system used to rehabilitate damaged or deteriorated pipe in-place by insertion of the cured-in-place pipe material within the existing pipe.

P3012
Rehabilitation of Underground Building Sewers and Building Drains by the Cured-In-Place Pipe Method

P3012.1 General . This section shall govern the rehabilitation of building sewers and buried building drains using cured-in-place pipe.

P3012.2 Applicability . The rehabilitation of existing building sewers and buried building drains shall be limited to gravity piping 3 inches (76 mm) in diameter and larger. The rehabilitated pipe shall meet the drainage load requirements of the existing piping.

P3102.3 Pre-installation requirements. . Prior to commencement of the rehabilitation, the existing piping sections to be rehabilitated shall be cleaned to remove solid debris and deposits that will interfere with the installation and finished quality of the cured-in-place. A recorded video camera survey made by the installer shall document pre-installation pipe condition and include notations of the cleanouts and fitting locations, the length, and the approximate depth of the existing piping.

P3012.4
Prohibited applications
. Cured-in-place pipe shall not be permitted until defects that prevent the insertion and expansion of the cured-in-place pipe material have been repaired with pipe and fittings in accordance with this code. Defects include, but are not limited to, back grade or insufficient slope.

P3012.5 Rehabilitation materials . The cured-in-place pipe materials shall be manufactured in compliance with applicable standards and certified as required in Section 303. The cured-in-place pipe materials shall be third-party listed and labeled.

P3012.6 Installation. . The installation of cured-in-place pipe materials shall be performed in accordance with the current listing as required in Section P3012.5, manufacturer's installation instructions, this code and applicable referenced standards including ASTM F2599 and ASTM F2561. Hydrophilic o-rings or gaskets used in cured-in-place pipe shall be in accordance with ASTM F3240.

P3012.6.1 Material data report. . The installer shall record the data as required by the cured-in-place pipe manufacturer and applicable standards. A copy of the data report shall be provided as required by the building official.

P3012.7 Post-installation requirements . Terminations of the cured-in-place pipe shall be smooth so as not to interfere with flow or collect debris and the cured-in-place pipe shall have formed a tight interference fit to the existing pipe. Infiltration of groundwater, obstruction of flow or other defects which adversely affect the piping system shall not be permitted. Defects shall be repaired or replaced as approved by the building official in accordance with applicable standards and this code. A recorded video camera survey shall be made by the installer of the completed cured-in-place pipe installation as required by the building official.

P3012.8 Certification . As required by the building official, a certification shall be provided by the permit holder to the building official that the cured-in-place pipe has been installed in accordance with the current listing required in Section P3012.5, manufacturer's installation instructions, the applicable standards and this code.

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F2599-20	Standard Practice for Sectional Repair of Damaged Pipe By Means of an Inverted Cured-In-Place Liner

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F2561-20	Standard Practice for Rehabilitation of a Sewer Service Lateral and Its Connection to the Main Using a One Piece Main and Lateral Cured-in-Place Liner

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F3240-19e1	Standard Practice for Installation of Seamless Molded Hydrophilic Gaskets (SMHG) for Long-Term Watertightness of Cured-in-Place Rehabilitation of Main and Lateral Pipelines

Commenter's Reason: The public comment is made in consideration of the committee's comments by providing a simplified definition, removal of proposed ASTM standards containing permissive language until such time as the permissive language is removed through the ongoing ASTM process, and edits intended to provide clarity within the code making visible the key components of construction when installing cured-in-place pipe.

Cost Impact: The net effect of the public comment and code change proposal will decrease the cost of construction
The net effect of the public comment and code change will decrease the cost of construction by allowing more materials that are code compliant and offering competitive alternatives.

Public Comment# 2853

Public Comment 2:

IRC: SECTION 202, P3012, P3012.1, P3012.2, P3012.3, P3012.3.1, P3012.4, P3012.5, P3012.6, P3012.7, P3012.7.1, P3012.10, P3012.8, P3012.9,

Proponents: Sidney Cavanaugh, representing IPS Corp. (sidneycavanaugh@yahoo.com) requests As Modified by Public Comment

Modify as follows:

2021 International Residential Code

CURED-IN-PLACE PIPE . ~~A plastic piping system of a particular design with a wall structure which is uniquely defined for each diameter and wall thickness combination, produced from a specific textile tube saturated with a specific thermosetting resin and installed by a specific process used to rehabilitate damaged or deteriorated pipe in-place by insertion of the cured-in-place pipe material within the existing.~~ A thermoset resin saturated into an absorbent textile tube pressed against an inner pipe wall and cured to form a new pipe within a pipe.

P3012
Rehabilitation of Underground Building Sewers, ~~and Building Drains Drains by the~~ Sewer Service Lateral Piping and Their Connection to the Main Sewer by the Cured-In-Place Pipe Method

P3012.1 General . ~~This section shall govern the rehabilitation of building sewers and buried building drains using cured-in-place pipe.~~ This section shall govern the rehabilitation of building sewers, sewer service lateral piping, and their connection to the main sewer. Sectional cured-in-place rehabilitation of building sewer piping and sewer service lateral piping shall be in accordance with ASTM F2599. Main and lateral cure-in-place rehabilitation of building sewer and sewer service lateral pipe and their connection to the main sewer pipe shall be in accordance with ASTM F2561. Hydrophilic rings or gaskets shall be used in cure-in-place rehabilitation of building sewer piping and sewer service laterals and they shall be in accordance with ASTM F3240 to ensure water tightness and elimination of ground water penetration.

P3012.2 ~~Applicability~~ Pre-installation requirements and inspection. . ~~The rehabilitation of existing building sewers and buried building drains shall be limited to gravity piping 3 inches (76 mm) in diameter and larger. The rehabilitated pipe shall meet the drainage load requirements of the existing piping.~~ Prior to commencement of the rehabilitation, the existing piping sections to be rehabilitated shall be cleaned to remove solid debris and deposits that will interfere with the installation and finished quality of the cured-in-place pipe. After the cleaning process has occurred and water has been flushed through the system the piping shall be inspected internally by a recorded video camara survey. The survey shall include notations of the cleanouts and fitting locations, the length and approximate depth of the existing piping.

~~**P3012.3 Pre-installation requirements.**~~
~~Prior to commencement of the rehabilitation, the existing piping sections to be rehabilitated shall be cleaned to remove solid debris and deposits that will interfere with the installation and finished quality of the cured-in-place pipe. After the cleaning process has occurred and water has been flushed through the system, the piping shall be inspected internally by a recorded video camera survey.~~

~~**P3012.3.1 Pre-installation inspection.**~~
~~The existing piping shall be inspected internally by a recorded video camera survey. The survey shall include notations of the clean outs and fitting locations, the length and the approximate depth of the existing piping.~~

~~P3012.4~~ P3012.2.1 Permitting . ~~Prior to permit issuance,~~ the code official shall review and evaluate the pre-installation recorded video camera survey to determine if the existing piping is able to be rehabilitated with cured-in-place pipe ~~in accordance with the proposed cured-in-place pipe~~ system's third-party certification showing conformance to ~~NSF 14~~, applicable installation requirements of referenced standards ~~and this code~~ in Section P3012.1.

~~P3012.5~~ P3012.2.2 Prohibited applications . Where review of the pre-installation recorded video camera survey reveals that the existing piping is not installed correctly or defects exist that prevent the insertion and expansion of the cured-in-place pipe material, rehabilitation with cured-in-place pipe shall not be permitted until the defective portions of piping have been repaired with pipe and fittings in accordance with this code. Defects include, but are not limited to, back grade or insufficient slope.

~~P3012.6~~ P3012.3 Rehabilitation materials . The cured-in-place pipe materials shall be manufactured in compliance with applicable standards and certified as required in Section 303. ~~Cured-in-place pipe specimens for specimens for testing shall consist of a specific textile tube and specific resin system manufactured at a specific thickness.~~ The cured-in-place pipe materials shall be third-party listed and labeled.

~~P3012.7 Installation~~.

~~The installation of cured-in-place pipe materials shall be performed in accordance with the current listing as required in P3012.6, manufacturer's installation instructions, this code and applicable referenced standards including ASTM F1216, ASTM F1743, ASTM F2599, or ASTM F2561. Hydrophilic o-rings or gaskets used in cured-in-place pipe shall be in accordance with ASTM F3240.~~

~~P3012.7.1~~ P3012.4 Material data report . The installer shall record the data as required by the cured-in-place pipe manufacturer and applicable standards. The recorded data shall include but is not limited to the location of the project, cured-in-place pipe tube and resin type with batch and lot numbers, amount of product installed and conditions of the installation. A copy of the data report shall be provided to the code official prior to final approval.

~~P3012.10 Approval~~.

~~Upon verification of compliance with the requirements of Sections P3012.1 through P3012.9, the code official shall approve the installation.~~

~~P3012.8 Post-installation recorded video camera survey~~.

~~The completed, rehabilitated piping system shall be inspected internally by a recorded video camera survey. The video survey shall be submitted to the code official prior to finalization of the permit. The video survey shall be reviewed and evaluated to provide verification that terminations of the cured-in-place pipe are smooth so as not to interfere with flow or collect debris, and that the cured-in-place pipe has been installed forming a tight interference fit to the existing pipe, and that no infiltration of groundwater, obstruction of flow or other defects exist which adversely affect the piping system in compliance with all laws and other provisions of this code. Any defects identified shall be repaired or replaced as approved by the authority having jurisdiction in accordance with applicable standards and this code.~~

~~P3012.9 Certification~~.

~~A certification shall be provided in writing to the code official, from the permit holder, that the cured-in-place pipe has been installed in accordance with the current listing required in Section P3012.6, manufacturer's installation instructions, the applicable standards and this code.~~

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~~F1216-16~~	~~Standard Practice for Rehabilitation of Existing Pipelines and Conduits by the Inversion and Curing of a Resin-Impregnated Tube~~

,

~~F1743 - 17~~	~~Standard Practice for Rehabilitation of Existing Pipelines and Conduits by Pulled-in-Place Installation of Cured-in-Place Thermosetting Resin Pipe (CIPP)~~

Commenter's Reason: This modification attempts to save the important parts of the original proposal and to be consistent with existing wording in the IPC. Unfortunately at this time both ASTM F1216 and ASTM F1743 contain non mandatory wording not in compliance with ICC policy.

Cost Impact: The net effect of the public comment and code change proposal will not increase or decrease the cost of construction
This public comment clarifies the intent of the original proposal and does not require additional labor or materials that would impact the proposal's original claim of decreasing cost of construction.

Public Comment# 2786

P133-21 Part I

Proposed Change as Submitted

Proponents: Gary Duren, representing self (codecompliance1@aol.com)

THIS IS A 2 PART PROPOSAL. PART I WILL BE HEARD BY THE IPC COMMITTEE. PART II WILL BE HEARD BY THE IRC-P&M COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THESE COMMITTEES.

2021 International Plumbing Code

Add new definition as follows:

SANITARY WASTE VALVE. A device conforming to ASME A112.18.8 used as an alternate to a water-filled tubular waste trap that provides protections of the property from foul air in the sewer.

Add new text as follows:

1003.1 General.
Sanitary waste valve shall be permitted to be installed as an alternate to the liquid seal tubular traps required in Section 1002. Sanitary waste valves shall conform to ASME A112.18.8,

1003.2 Installation.
Sanitary waste valves shall be installed in accordance with the requirements of this section and the manufacturer's instructions.

1003.3 Where permitted.
Sanitary waste valves shall be permitted to be installed as an alternate to 1 1/4 inch (32 mm) and 1 1/2 inch (38mm) tubular traps. Where a sanitary waste valve is installed on the outlet of a food waste grinder, the device shall be installed in the vertical orientation.

1003.4 Location.
Sanitary waste valves shall be permitted to be installed as an alternate where tubular traps are required for sinks, lavatories, laundry trays, tubs, showers or similar fixtures. Sanitary waste valves shall not be used on urinals. Sanitary waste valves shall be provided with access.

Add new standard(s) as follows:

ASME

American Society of Mechanical Engineers
Two Park Avenue
New York, NY 10016-5990

ANSI/ASME A112.18.8-2020 Sanitary Waste Valves for Plumbing Drainage Systems

Reason: PURPOSE
This group of code changes is being introduced to improve the efficacy of the drain waste and vent system by providing a more sanitary option to the ancient practice of requiring water reservoir p-traps as the exclusive method of preventing sewer gas from entering occupied spaces. Public health and safety is thereby improved by allowing an alternate solution which reduces the risk of foul odor and disease spreading via the DWV system. The cost of construction is not negatively impacted.

BACKGROUND

Foul air routinely enters the occupied building space when p-traps lose their water seal. Such losses are a serious area of public health concern since in recent years important research has been published that directly links the spread of harmful pathogens via the DWV piping system. The research demonstrates that there are essentially two primary means by which harmful pathogens are spread in occupied building spaces via the *conventional* water-reservoir-trap-based DWV system:

1. Evaporation, lack of use or over/under-pressure conditions caused by the routine discharge of a water closet depletes the water level within the trap to a point where waste water is aerosolized and released into the air currents present in buildings.[*Gormley et al*]

2. Water reservoirs within traps have been shown to spread pathogens via "biological slime" creeping up the drainage pipes into the adjacent sinks.[*Mathers, et al*]

The age old mantra of the Plumbing Industry is: "Plumbers Protect the Health of the Nation". If this is true, now it is time to introduce an alternative to the ancient water reservoir traps into the code. ANSI/ASME A112.18.8 -2020 compliant Sanitary Waste Valves (SWV) provide an effective alternate to 1-1/4" and 1-1/2" tubular water reservoir p-traps.

Since SWV's *do not* retain water or other waste they are inherently more sanitary than water filled p-traps. The ASME A112.18.8-2020 Standard has been strengthened following comments at previous code cycles and now provides a 100% higher level of protection against sewer gas intrusion than is provided by water filled tubular traps currently required.

Complete copies of the latest research referenced abpve and additional educational materials are available at *PlumbingResearchGroup.org*

Proponent respectfully requests that the Committee improve the efficacy of the UPC by permitting the use of ANSI/ASME A112.18.8-20 compliant sanitary waste valves as an alternate to accessible tubular traps and improve the plumbing code. In support of this request, please consider the following statements:

SUPPORTING STATEMENT

Sanitary Waste Valves Intended for Use as an Alternate to 1-1/4 and 1-1/2 Tubular P-traps.

It is clearly the intent of the plumbing code that there is a water seal at every plumbing fixture outlet. The exclusive water reservoir sealing that the code currently requires has inherent physical limitations against pressure fluctuations within the DWV system. The most significant pressure fluctuations occur within the waste system upon the discharge of one or more water closets. It is well known and documented that water traps are subject to failure (full or partial loss of the two inch water seal) due to excessive positive or negative pressure excursions and also loss of the water seal can and routinely does occur due to evaporation especially in conditions of low use or high ambient temperature.

When considering acceptance of an alternate a code official must determine that the alternate meets the intent of the current code, by demonstrating equivalency in terms of strength, effectiveness, safety, and performance: Sanitary Waste Valves comply with the code in the following ways

1. A Sanitary Waste Valve conforming to ANSI/ASME A112.18.8 is equal in strength to conventional tubular water traps since the material requirements of ASTM F409 are part of the standard.

The strength of a trap is determined by the materials used in construction and by its resistance to pressure fluctuations in the sanitary drainage system produced by flowing water.

2. A Sanitary Waste Valve conforming to ANSI/ASME A112.18.8 is more effective than a conventional tubular trap in terms of sanitation and over/under-pressure resistance.

Water traps not only retain water, they retain waste solids and other potentially dangerous bacteriological, fungal and viral pathogens. They are in effect miniature septic systems. Depending on the frequency of use and the location of the trap these solids may decay or harmful pathogens can breed, multiply and spread to surrounding areas. In food prep sinks this may cause food contamination and/or food-borne illness to occur.

A Sanitary Waste Valve is not a trap since by definition it does not significantly retain liquid (water) or foreign particles so there is not the same scope to provide a breeding ground for potentially dangerous bacteriological and harmful viral pathogens. Since a Sanitary Waste Valve has a greater resistance against pressures excursions the effectiveness of its sealing ability is greater and thereby safer over a conventional water reservoir trap, even in the fixture it serves is infrequently or never used.

3. A Sanitary Waste Valve conforming to ANSI/ASME A112.18.8 is actually safer than a conventional tubular trap in that conventional traps are subject to loss of water seal by evaporation or siphonage and the SWV is not.

Studies by Professor JA Swaffield *et al* of Heriot-Watt University, Edinburgh, Scotland have shown how the SARS virus was spread in 2003 throughout Amoy Gardens, a high-rise residential structure located in Hong Kong. Part of the causal effect was the failure of water traps due to evaporation, and/or losses from pressure excursions. A Sanitary Waste Valve is not subject to evaporation. A Sanitary Waste Valve is much more effective than a water trap in resisting positive and negative pressure fluctuations.

4. A Sanitary Waste Valve that conforms to ANSI/ASME A112.18.8 performance is at a minimum equal to a tubular trap in regard to reliability, connectivity, material durability and flow capacity.

The referenced Standard contains prescriptive requirements to insure that a compliant/listed Sanitary Waste Valve meets the flow capacity and material requirements of conventional code-required 1-1/4 and 1-1/2 tubular traps. Specifically the Standard requires that the Sanitary Waste Valve must reliably and repeatedly withstand a 4" water gage back-pressure test, which is significantly beyond the capability of a fully replenished p-trap

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This is only a option that is not mandated by the code and as such, there is impact to construction cost.

Staff Analysis: A review of the standard(s) proposed for inclusion in the code, ASME A112.18.8-2020 with regard to the ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before March 20, 2021.

P133-21 Part I

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The Committee is not necessarily against this technology used in certain applications. The proposed definition doesn't describe what the device is. Use of the term "foul air" doesn't seem to be necessary or understandable by everyone. The text is proposed to be located in an inappropriate section of the code. (14-0)

P133-21 Part I

Individual Consideration Agenda

Public Comment 1:

IPC: SECTION 202, 1003.1, 1003.2, 1003.3, 1003.4

Proponents: Gary Duren, representing self (codecompliance1@aol.com) requests As Modified by Public Comment

Modify as follows:

2021 International Plumbing Code

SANITARY WASTE VALVE . A device <u>incorporating a bladder or checking member that provides sealing function and protection against sewer gas intrusion used as an alternate to a water filled plastic tubular p-trap.</u> ~~conforming to ASME A112.18.8 used as an alternate to a water-filled tubular waste trap that provides protections of the property from foul air in the sewer.~~

1003.1 General . Sanitary waste valve shall be permitted to be installed as an alternate to the liquid seal <u>plastic</u> tubular traps required in Section 1002. Sanitary waste valves shall ~~conform to~~ <u>comply with</u> ASME A112.18.8,

1003.2 Installation . Sanitary waste valves shall be installed in accordance with the requirements of this section and the manufacturer's instructions.

1003.3 Where permitted . Sanitary waste valves shall be permitted to be installed as an alternate to 1 1/4 inch (32 mm) and 1 1/2 inch (38mm) <u>plastic</u> tubular traps. Where a sanitary waste valve is installed on the outlet of a food waste grinder, the device shall be installed in the vertical orientation.

1003.4 Location . Sanitary waste valves shall be permitted to be installed as an alternate where tubular traps are required for sinks, lavatories, laundry trays, tubs~~,~~ or showers ~~or similar fixtures. Sanitary waste valves shall not be used on urinals. urinals.~~ Access to Sanitary waste valves shall be provided ~~with access.~~

Commenter's Reason: The IPC Code Change Committee encouraged the proponent to come back with modifications to correct flaws in the original proposal. The proposed mod addresses the Committee concerns and as such is in a position to be approved as modified by this public comment. Specifically the proposed definition has been updated. and the proposal is more technically correct. It is now clear that it is not the intent of this proposal to permit a SWV as an alternated where metallic p-traps are currently required.
The technical research papers show that there are 2 modes of disease transmission that may occur via the sanitary system and water filled p-traps. Sanitary Wastes Valves clearly provide a safer alternative to a water filled trap. Nothing in this proposal mandates anything. The proposal does provide a good alternate that meets a tough performance standard where water filled p-traps have no such standard.

Bibliography: Please see Mather's et al and Gormely et al

Cost Impact: The net effect of the public comment and code change proposal will not increase or decrease the cost of construction
There is no change in the cost impact as this alternative method is not mandatory.

Public Comment# 2748

P133-21 Part II

Proposed Change as Submitted

Proponents: Gary Duren, representing self (codecompliance1@aol.com)

2021 International Residential Code

Add new definition as follows:

SANITARY WASTE VALVE. A device conforming to ASME A112.18.8 used as an alternative to a water-filled tubular waste trap that provides protections of the property from foul air in the sewer.

Add new text as follows:

P3202
SANITARY WASTE VALVES

P3202.1 General.
Sanitary waste valve shall be permitted to be installed as an alternate to the liquid seal tubular traps required in Section P3201. Sanitary waste valves shall conform to ASME A112.18.8.

P3202.2 Installation.
Sanitary waste valves shall be installed in accordance with the requirements of this section and the manufacturer's instructions.

P3202.3 Where permitted.
Sanitary waste valves shall be permitted to be installed as an alternate to 1 1/4 inch (32 mm) and 1 1/2 inch (38 mm) tubular traps. Where a sanitary waste valve is installed on the outlet of a food waste grinder, the device shall be installed in the vertical orientation.

P3202.4 Location.
Sanitary waste valves shall be permitted to be installed as an alternate where tubular traps are required for sinks, lavatories, laundry trays, tubs showers or similar fixtures. Sanitary waste valves shall not be used on urinals. Sanitary waste valves shall be accessible.

Add new standard(s) as follows:

ASME

American Society of Mechanical Engineers
Two Park Avenue
New York, NY 10016-5990

ANSI/ASME A112.18.8 - 2020 Sanitary Waste Valves for Plumbing Drainage Systems

Reason: 2021 PROPOSED CHANGES TO IRC PLUMBING CODE
This group of code changes is being introduced to improve the efficacy of the drain waste and vent system by providing a more sanitary option to the ancient practice of requiring water reservoir p-traps as the exclusive method of preventing sewer gas from entering occupied spaces. Public health and safety is thereby improved by allowing an alternate solution which reduces the risk of foul odor and disease spreading via the DWV system. The cost of construction is not negatively impacted.

BACKGROUND

Foul air routinely enters the occupied building space when p-traps lose their water seal. Such losses are a serious area of public health concern since in recent years important research has been published that directly links the spread of harmful pathogens via the DWV piping system. The research demonstrates that there are essentially two primary means by which harmful pathogens are spread in occupied building spaces via the *conventional* water-reservoir-trap-based DWV system:

1. Evaporation, lack of use or over/under-pressure conditions caused by the routine discharge of a water closet depletes the water level within the trap to a point where waste water is aerosolized and released into the air currents present in buildings.[*Gormley et al]*

2. Water reservoirs within traps have been shown to spread pathogens via "biological slime" creeping up the drainage pipes into the adjacent sinks.[*Mathers, et al*]

The age old mantra of the Plumbing Industry is: "Plumbers Protect the Health of the Nation". If this is true, now it is time to introduce an alternative to the ancient water reservoir traps into the code. ANSI/ASME A112.18.8 -2020 compliant Sanitary Waste Valves (SWV) provide an effective alternate to 1-1/4" and 1-1/2" tubular water reservoir p-traps.

Since SWV's *do not* retain water or other waste they are inherently more sanitary than water filled p-traps. The ASME A112.18.8-2020 Standard has been strengthened following comments at previous code cycles and now provides a 100% higher level of protection against sewer gas intrusion than is provided by water filled tubular traps currently required.

Complete copies of the latest research referenced abpve and additional educational materials are available at *PlumbingResearchGroup.org*

Proponent respectfully requests that the Committee improve the efficacy of the UPC by permitting the use of ANSI/ASME A112.18.8-20 compliant sanitary waste valves as an alternate to accessible tubular traps and improve the plumbing code. In support of this request, please consider the following statements:

SUPPORTING STATEMENT

Sanitary Waste Valves Intended for Use as an Alternate to 1-1/4 and 1-1/2 Tubular P-traps.

It is clearly the intent of the plumbing code that there is a water seal at every plumbing fixture outlet. The exclusive water reservoir sealing that the code currently requires has inherent physical limitations against pressure fluctuations within the DWV system. The most significant pressure fluctuations occur within the waste system upon the discharge of one or more water closets. It is well known and documented that water traps are subject to failure (full or partial loss of the two inch water seal) due to excessive positive or negative pressure excursions and also loss of the water seal can and routinely does occur due to evaporation especially in conditions of low use or high ambient temperature.

When considering acceptance of an alternate a code official must determine that the alternate meets the intent of the current code, by demonstrating equivalency in terms of strength, effectiveness, safety, and performance: Sanitary Waste Valves comply with the code in the following ways:

1. A Sanitary Waste Valve conforming to ANSI/ASME A112.18.8 is equal in strength to conventional tubular water traps since the material requirements of ASTM F409 are part of the standard. - The strength of a trap is determined by the materials used in construction and by its resistance to pressure fluctuations in the sanitary drainage system produced by flowing water.

2. A Sanitary Waste Valve conforming to ANSI/ASME A112.18.8 is more effective than a conventional tubular trap in terms of sanitation and over/under-pressure resistance. - Water traps not only retain water, they retain waste solids and other potentially dangerous bacteriological, fungal and viral pathogens. They are in effect miniature septic systems. Depending on the frequency of use and the location of the trap these solids may decay or harmful pathogens can breed, multiply and spread to surrounding areas. In food prep sinks this may cause food contamination and/or food-borne illness to occur. - A Sanitary Waste Valve is not a trap since by definition it does not significantly retain liquid (water) or foreign particles so there is not the same scope to provide a breeding ground for potentially dangerous bacteriological and harmful viral pathogens. Since a Sanitary Waste Valve has a greater resistance against pressures excursions the effectiveness of its sealing ability is greater and thereby safer over a conventional water reservoir trap, even in the fixture it serves is infrequently or never used.

3. A Sanitary Waste Valve conforming to ANSI/ASME A112.18.8 is actually safer than a conventional tubular trap in that conventional traps are subject to loss of water seal by evaporation or siphonage and the SWV is not. - Studies by Professor JA Swaffield *et al* of Heriot-Watt University, Edinburgh, Scotland have shown how the SARS virus was spread in 2003 throughout Amoy Gardens, a high-rise residential structure located in Hong Kong. Part of the causal effect was the failure of water traps due to evaporation, and/or losses from pressure excursions. A Sanitary Waste Valve is not subject to evaporation. A Sanitary Waste Valve is much more effective than a water trap in resisting positive and negative pressure fluctuations.

4. A Sanitary Waste Valve that conforms to ANSI/ASME A112.18.8 performance is at a minimum equal to a tubular trap in regard to reliability, connectivity, material durability and flow capacity. - The referenced Standard contains prescriptive requirements to insure that a compliant/listed Sanitary Waste Valve meets the flow capacity and material requirements of conventional code-required 1-1/4 and 1-1/2 tubular traps. Specifically the Standard requires that the Sanitary Waste Valve must reliably and repeatedly withstand a 4" water gage back-pressure test, which is significantly beyond the capability of a fully replenished p-trap

Cost Impact: The code change proposal will not increase or decrease the cost of construction
There is no negative cost impact associated with this proposal

P133-21 Part II

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: There are some parts of the proposal that are not written in code language format. This seems to violate sections that require venting and liquid-filled traps. The Committee believes this could be a device to install in addition to a liquid-filled trap. Testimony was given indicating that most failures of these devices are caused by installation issues. (11-0)

P133-21 Part II

Individual Consideration Agenda

Public Comment 1:

IRC: SECTION 202, P3202.1, P3202.3, P3202.4

Proponents: Gary Duren, representing self (codecompliance1@aol.com) requests As Modified by Public Comment

Modify as follows:

2021 International Residential Code

SANITARY WASTE VALVE . A device incorporating a bladder or checking member that provides sealing function and protection for the property against sewer gas intrusion used as an alternate to a water filled plastic tubular p-trap. ~~conforming to ASME A112.18.8 used as an alternative to a water-filled tubular waste trap that provides protections of the property from foul air in the sewer.~~

P3202.1 General . ~~Sanitary waste valve shall be permitted to be installed as an alternate to the liquid seal tubular traps required in Section P3201.~~ Sanitary waste valves shall comply with ~~conform to~~ ASME A112.18.8.

P3202.3 Where permitted . Sanitary waste valves shall be permitted to be installed as an alternate to 1 1/4 inch (32 mm) and 1 1/2 inch (38 mm) plastic tubular traps. Where a sanitary waste valve is installed on the outlet of a food waste grinder, the device shall be installed in the vertical orientation.

P3202.4 Location . Sanitary waste valves shall be permitted to be installed as an alternate where tubular traps are required for sinks, lavatories, laundry trays, tubs or showers . ~~or similar fixtures. Sanitary~~ Access to sanitary waste valves shall ~~not~~ be provided accessible ~~used on urinals~~.

Commenter's Reason: The IRC Plumbing/Mechanical Committee failed to exercise it's due diligence by failing to read and be familiar with the supporting technical research documentation referenced in the reason statement. The technical research papers demonstrate how disease may be spread by the sanitary drainage system vis water filled p-traps. The committee also cited perceived conflicts with the mandatory venting requirements of the code notwithstanding the fact that the proposal DOES NOT include any exception or exemption statements related to venting. The proposed definition has been modified in accordance with the Committee reason statement and the additional mods correct technical flaws in the original proposal. This proposal does not mandate anything but does provide a more healthy and sanitary alternative for users and designers and should be approved as modified.

Bibliography: Mathers et al and Gormely et al

Cost Impact: The net effect of the public comment and code change proposal will not increase or decrease the cost of construction
There is no change in the cost impact as this alternative method is not mandatory.

Public Comment# 2755

P147-21 Part I

Proposed Change as Submitted

Proponents: Edward R. Osann, Natural Resources Defense Council, representing Natural Resources Defense Council (eosann@nrdc.org); CJ Lagan, representing LIXIL (cj.lagan@lixil.com); albert rubin, representing self (rubin@ncsu.edu); Sharon Bonesteel, representing salt river project (sharon.bonesteel@srpnet.com)

THIS IS A 2 PART CODE CHANGE. PART I WILL BE HEARD BY THE PLUMBING CODE COMMITTEE. PART II WILL BE HEARD BY THE RESIDENTIAL PLUMBING CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THESE COMMITTEES.

2021 International Plumbing Code

Add new text as follows:

APPENDIX G
NON-SEWERED SANITATION SYSTEMS

SECTION G101
GENERAL

G101.1 Applicability.
The provisions of this chapter shall apply to the installation of non-sewered sanitation systems.

G101.2 System requirements.
Non-sewered sanitation systems shall comply with ANSI/CAN/IAPMO/ISO 30500.

SECTION G102
DEFINITIONS

G102.1 General.
For purposes of this Appendix, the following definitions shall apply:

CONDITIONED SPACE. An area, room, or space normally occupied by humans that is heated or cooled by equipment.

NON-SEWERED SANITATION SYSTEM. A prefabricated integrated sewage treatment unit that is not connected to a public sewer or private sewage disposal system.

SECTION G103
INSTALLATION

G103.1 General.
The installation of non-sewered sanitation systems shall be in accordance with the manufacturer's installation instructions and with Section G103.2 through Section G103.7.

G103.2 Operating conditions.
A non-sewered sanitation system in either a conditioned or unconditioned space shall be installed where the ambient temperature, ambient humidity, and atmospheric pressure are within the ranges indicated in the manufacturer's installation instructions or product *listing* .

G103.3 Clearances for servicing and maintenance.
A non-sewered sanitation system shall be located to allow access and clearance for service and maintenance. Unless otherwise specified by the manufacturer's installation instructions, not less than 30 inches in depth, width, and height of working space shall be provided at any access panel.

G103.4 Backflow prevention.
A potable water supply connected to a non-sewered sanitation system shall be protected from backflow in accordance with Section 608 of this code.

G103.5 Effluent storage.
Any container or vessel for the storage of effluent discharged from a non-sewered sanitation system and not integral to such system shall be installed in accordance with Section 1301.9 of this code.

G103.6 Systems utilizing a combustion process.
A non-sewered sanitation system utllizing a combustion process shall comply with the *International Mechanical Code* or *International Fuel Gas Code.*

Exception: A non-sewered sanitation system *listed* for unvented use.

G103.7 Connection to plumbing drainage system.
Unless the code official determines otherwise, a non-sewered sanitation system shall not be required to be connected to the sanitary drainage system of the building or premises.

SECTION G104
OPERATION AND MAINTENANCE MANUALS

G104.1 Operation and maintenance manual.
Non-sewered sanitation systems shall be provided with a manufactuer's operation and maintenance manual.

SECTION G105
USE OF EFFLUENT AND SOLID WASTE

G105.1 System output.
The use or disposal of all substances exiting a non-sewered sanitation system shall be in accordance with the authority having jurisdiction.

G106.1
REFERENCE STANDARDS

G106.1 General.
See Table G106.1 for standards that are referenced in various sections of this appendix. Standards are listed by the standard identification with the effective date, the standard title, and the section or sections of this appendix that reference the standard.

TABLE G106.1 REFERENCE STANDARDS.

STANDARD ACRONYM	STANDARD NAME	SECTIONS HEREIN REFERENCED
ANSI/CAN/IAPMO/ISO 30500-2019	Non-sewered sanitation systems - Prefabricated integrated treatment units - General Safety and performance requirements for design and testing	AG101.2

Reason: This proposal covers the essential considerations that a building official must assess when a non-sewered sanitation system (NSSS) as defined herein is installed in a building. Designed for operation without a sewer connection and, in many cases, without a dedicated water supply, NSSSs are anticipated to meet critical public health needs in areas with limited water and wastewater infrastructure, water supply constraints, and/or unfavorable soils for traditional on-site disposal methods. In the U.S., over 20% of the population relies on an on-site wastewater system. And even today, a portion of our population does not have access to fully functioning sanitation, largely due to lack of affordable infrastructure or to challenging site conditions.
In 2011, the Bill & Melinda Gates Foundation launched the "Reinvent the Toilet Challenge" to bring new technology to bear to achieve sustainable sanitation solutions. The target is a factory-built device that provides complete and effective treatment of human sanitary waste, unconnected to any sewer or drainage network and with minimal inputs of energy and water. Eight teams received Foundation support to develop prototypes for lab testing, field trials, and commercialization. Among these initial devices, three broad pathways for treatment technology have emerged -- electro-chemical, biological, and combustion -- and in some cases, combinations of these in the same device. Manufacturers have been involved in these efforts, and LIXIL (owner of the American Standard brand) and other companies are working to develop compliant systems for both domestic and international installations. It is the general preference of manufacturers to design and market systems that are compliant with published codes and standards, rather than one-off compliance reviews by individual jurisdictions.

To facilitate commercialization of hi-tech toilets and their acceptance by state and national regulatory bodies, an ISO standard was adopted in 2018 to establish the key performance attributes of NSSSs. Standard 30500, *Non-sewered sanitation systems - Prefabricated integrated treatment units - General safety and performance requirements for design and testing*, sets performance requirements for solid and liquid outputs, odor, noise, air emissions, materials, safety, marking, and ergonomics, together with relevant test procedures for measuring the attainment of these requirements. This ISO standard was adopted in identical form as a U.S. and Canadian national standard in 2019, designated as ANSI/CAN/IAPMO/ISO 30500:2019.

This proposal addresses the considerations that must be taken into account by building officials regarding the placement and installation of NSSSs in buildings. The proposal would permit (but not require) the installation of a NSSS listed to the ISO standard, and provide an exception to the general requirement in the IPC that sanitation devices be connected to the building drainage system, unless a connection is required by the AHJ. Certain key protections, such as backflow prevention, proper ventilation of combustion-based units, and proper siting of storage tanks (if any) external to the unit are each specified in the proposal. Considerations of the use and disposal of outputs of the system are specifically referred to an AHJ, which most likely will be a health department.

Criteria for the functioning of the unit for its intended purpose are established by the ISO standard and do not need to be repeated in plumbing code language. It should be noted that the ISO standard was developed by an international group of scientists, engineers, and regulators to assure the highest levels of treatment would apply to all outputs (air, water, and solids) from the device. The performance-based standards allow a variety of technologies to be applied, so long as key metrics are achieved. The microbiological reduction requirements for solid and liquid waste are based on the quantitative microbial risk assessment (QMRA) method recognized by the World Health Organization for this purpose. The requirements of the standard mimic the highest quality standards imposed by regulatory agencies on waste-derived materials destined for reuse. The standard's test procedures are rigorous (both lab and field tests are required), and the proposal allows only NSSSs listed to the standard to be approved for installation under this appendix.

With "Reinvented Toilets" meeting the 30500 standard now on the cusp of commercialization, the arrival of such toilets at job sites across the country can reasonably be expected by the time this code update is published and adopted by states and localities, e.g., 2025. Clear code language will accelerate the availability of safe sanitation for people who lack it today. While much is still unknown about the cost, maintenance, and reliability of NSSSs, or even the business model for their installation and servicing, forward-looking communities and jurisdictions with acute sanitation needs will want to be prepared for the safe installation and use of this promising new technology as it enters the market. This proposal lays out the necessary groundwork for code officials to inspect and approve their installation, set out in an appendix available for voluntary adoption by state and local code bodies.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The proposal creates an appendix for voluntary adoption, and thus poses no additional costs on construction built to the base code. In jurisdictions where it is adopted, the proposal authorizes, but does not require, installation of a non-sewered sanitation device, as defined. Builders remain free to install less expensive sanitary ware if they so choose. First costs of an NSSD are expected to be higher than a conventional flush toilet, but may reduce sewer connection charges. NSSDs may also allow construction on sites that might otherwise be unbuildable due to lack of sewer infrastructure or site conditions unsuitable for conventional on-site systems.

Staff Analysis: A review of the standard(s) proposed for inclusion in the code, ANSI/CAN/IAPMO/ISO 30500-2019 with regard to the ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before March 20, 2021.

P147-21 Part I

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: In Section G103.6, the exception appears to allow combustion appliances that are nonvented to not comply with the other I-Codes that cover combustion appliances. That doesn't make sense and is not safe. The language in Section G103.7 makes no logical sense. (8-6)

P147-21 Part I

Individual Consideration Agenda

Public Comment 1:

IPC: G103.6, G103.7

Proponents: Ed Osann, representing Natural Resources Defense Council (eosann@nrdc.org); Sun Kim, representing Sun kim (sun.kim@gatesfoundation.org); CJ Lagan, representing LIXIL (cj.lagan@lixil.com) requests As Modified by Public Comment

Modify as follows:

2021 International Plumbing Code

G103.6 Systems utilizing a combustion process . A non-sewered sanitation system utllizing a combustion process shall comply with the *International Mechanical Code* or *International Fuel Gas Code.*

~~**Exception:** A non-sewered sanitation system *listed* for unvented use.~~

G103.7 Connection to plumbing drainage system . ~~Unless the code official determines otherwise, a~~ A non-sewered sanitation system shall not be required to be connected to the sanitary drainage system of the building or premises.

Commenter's Reason: The amendments in this public comment are responding to the two areas of concern raised by the IPC Technical Committee. The Committee invited the proponents to come back with a public comment with two fixes:
* remove the exemption for certain combustion-based products from the requrirements of the Mechanical Code; and

* remove the reference to an official's discretion regarding the connection of an RT to a building drainage system.

The proponents of the original proposal agree with these recommendations. The changes proposed in this public comment do exactly that -- they cure the two objections raised by the IPC committee. In fact, a companion proposal (P147-21 Part II) to establish the same appendix in the International Residential Code was revised during the Technical Committee Hearing through a floor modification containing these two specific changes and was approved by the IRC Plumbing/Mechanical Committee.

Since this public comment simply provides the requested clarifications, all of the substantive points of need and justification in the original reason statement remain fully applicable here.

Cost Impact: The net effect of the public comment and code change proposal will not increase or decrease the cost of construction
Since this public comment simply provides two narrow clarifications requested by the IPC Technical Committee, the cost impact statement in the original proposal remains fully applicable here. It will neither increase nor decrease the cost of construction.

Public Comment# 2561

NOTE: P147-21 PART II DID NOT RECEIVE A PUBLIC COMMENT AND IS REPRODUCED FOR INFORMATIONAL PURPOSES ONLY

P147-21 Part II

Proposed Change as Submitted

Proponents: Edward R. Osann, Natural Resources Defense Council, representing Natural Resources Defense Council (eosann@nrdc.org); CJ Lagan, representing LIXIL (cj.lagan@lixil.com); albert rubin, North Carolina State University, representing self (rubin@ncsu.edu)

2021 International Residential Code

Add new text as follows:

APPENDIX AX
NON-SEWERED SANITATION SYSTEMS

SECTION AX101
GENERAL

AX101.1 Applicability.
The provisions of this chapter shall apply to the installation of non-sewered sanitation systems.

AX101.2 System requirements.
Non-sewered sanitation systems shall comply with ANSI/CAN/IAPMO/ISO 30500.

SECTION AX102
DEFINITIONS

AX102.1 General.
For purposes of this chapter, the following definitions shall apply.

Conditioned Space. An area, room, or space normally occupied and being heated or cooled for human habitation by any equipment.

Non-Sewered Sanitation System. A prefabricated integrated sewage treatment unit that is not connected to a public sewer or private sewage disposal system.

SECTION AX103
INSTALLATION

AX103.1 General.
The installation of non-sewered sanitation systems shall be in accordance with the manufacturer's installation instructions and with Section AX103.2 through AX103.7.

AX103.2 Operating conditions.
A non-sewered sanitation system in either a conditioned or unconditioned space shall be installed where the ambient temperature, ambient humidity, and altitude (atmospheric pressure) are in accordance with the manufacturer's installation instructions or product listing.

AX103.3 Clearances for servicing and maintenance.
A non-sewered sanitation system shall be located to permit access and sufficient clearance for service and maintenance. Unless otherwise specified by the manufacturer's installation instructions, not less than 30 inches in depth, width, and height of working space shall be provided at any access panel.

AX103.4 Backflow prevention.
A domestic water supply connection to a non-sewered sanitation system shall be protected in accordance with Section P2902 of this code.

AX103.5 Effluent storage.
Any container or vessel for the storage of effluent discharged from a non-sewered sanitation system and not integral to such system shall be installed in accordance with Section P2910.9 of this code.

AX103.6 Systems employing combustion.
A non-sewered sanitation system employing combustion shall comply with the mechanical code.

Exception: A non-sewered sanitation system listed for unvented use.

AX103.7 Connection to plumbing system not required.
Unless the Authority Having Jurisdiction determines otherwise, a non-sewered sanitation system is not required to be connected to the sanitary drainage system of the building or premises.

SECTION AX104
MANUAL REQUIRED

AX104.1 Operation and maintenance manual.
Non-sewered sanitation systems shall have an operation and maintenance manual provided by the manufacturer.

AX105 System output.
The use or disposal of all substances exiting the non-sewered sanitation system shall be determined by the Authority Having Jurisdiction.

AX106.1 General.
See Table AX106.1 for standards that are referenced in various sections of this appendix. Standards are listed by the standard identification with the effective date, the standard title, and the section or sections of this appendix that reference the standard.

TABLE AX106.1 REFERENCE STANDARDS

STANDARD ACRONYM	STANDARD NAME	SECTIONS HEREIN REFERENCED
ANSI/CAN/IAPMO/ISO 30500-2019	Non-sewered sanitation systems - Prefabricated integrated treatment units - General Safety and performance requirements for design and testing	AX101.2

Reason: This proposal covers the essential considerations that a building official must assess when a non-sewered sanitation system (NSSS) as defined herein is installed in a building. Designed for operation without a sewer connection and, in many cases, without a dedicated water supply, NSSSs are anticipated to meet critical public health needs in areas with limited water and wastewater infrastructure, water supply constraints, and/or unfavorable soils for traditional on-site disposal methods. In the U.S., over 20% of the population relies on an on-site wastewater system. And even today, a portion of our population does not have access to fully functioning sanitation, largely due to lack of affordable infrastructure or to challenging site conditions.
In 2011, the Bill & Melinda Gates Foundation launched the "Reinvent the Toilet Challenge" to bring new technology to bear to achieve sustainable sanitation solutions. The target is a factory-built device that provides complete and effective treatment of human sanitary waste, unconnected to any sewer or drainage network and with minimal inputs of energy and water. Eight teams received Foundation support to develop prototypes for lab testing, field trials, and commercialization. Among these initial devices, three broad pathways for treatment technology have emerged -- electro-chemical, biological, and combustion -- and in some cases, combinations of these in the same device. Manufacturers have been involved in these efforts, and LIXIL (owner of the American Standard brand) and other companies are working to develop compliant systems for both domestic and international installations. It is the general preference of manufacturers to design and market systems that are compliant with published codes and standards, rather than one-off compliance reviews by individual jurisdictions.

To facilitate commercialization of hi-tech toilets and their acceptance by state and national regulatory bodies, an ISO standard was adopted in 2018 to establish the key performance attributes of NSSSs. Standard 30500, *Non-sewered sanitation systems - Prefabricated integrated treatment units - General safety and performance requirements for design and testing*, sets performance requirements for solid and liquid outputs, odor, noise, air emissions, materials, safety, marking, and ergonomics, together with relevant test procedures for measuring the attainment of these requirements. This ISO standard was adopted in identical form as a U.S. and Canadian national standard in 2019, designated as ANSI/CAN/IAPMO/ISO 30500:2019.

This proposal addresses the considerations that must be taken into account by building officials regarding the placement and installation of NSSSs in buildings. The proposal would permit (but not require) the installation of a NSSS listed to the ISO standard, and provide an exception to the general requirement in the code that sanitation devices be connected to the building drainage system, unless a connection is required by the AHJ. Certain key protections, such as backflow prevention, proper ventilation of combustion-based units, and proper siting of storage tanks (if any) external to the unit are each specified in the proposal. Considerations of the use and disposal of outputs of the system are specifically referred to an AHJ, which most likely will be a health department.

Criteria for the functioning of the unit for its intended purpose are established by the ISO standard and do not need to be repeated in plumbing code language. It should be noted that the ISO standard was developed by an international group of scientists, engineers, and regulators to assure the highest levels of treatment would apply to all outputs (air, water, and solids) from the device. The performance-based standards allow a variety of technologies to be applied, so long as key metrics are achieved. The microbiological reduction requirements for solid and liquid waste are based on the quantitative microbial risk assessment (QMRA) method recognized by the World Health Organization for this purpose. The requirements of the standard mimic the highest quality standards imposed by regulatory agencies on waste-derived materials destined for reuse. The standard's test procedures are rigorous (both lab and field tests are required), and the proposal allows only NSSSs listed to the standard to be approved for installation under this appendix.

With "Reinvented Toilets" meeting the 30500 standard now on the cusp of commercialization, the arrival of such toilets at job sites across the country can reasonably be expected by the time this code update is published and adopted by states and localities, e.g., 2025. Clear code language will accelerate the availability of safe sanitation for people who lack it today. While much is still unknown about the cost, maintenance, and reliability of NSSSs, or even the business model for their installation and servicing, forward-looking communities and jurisdictions with acute sanitation needs will want to be prepared for the safe installation and use of this promising new technology as it enters the market. This proposal lays out the necessary groundwork for code officials to inspect and approve their installation, set out in an appendix available for voluntary adoption by state and local code bodies.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The proposal creates an appendix for voluntary adoption, and thus poses no additional costs on construction built to the base code. In jurisdictions where it is adopted, the proposal authorizes, but does not require, installation of a non-sewered sanitation device, as defined. Builders remain free to install less expensive sanitary ware if they so choose. First costs of an NSSD are expected to be higher than a conventional flush toilet, but may reduce sewer connection charges. NSSDs may also allow construction on sites that might otherwise be unbuildable due to lack of sewer infrastructure or site conditions unsuitable for conventional on-site systems.

Staff Analysis: A review of the standard(s) proposed for inclusion in the code, ANSI/CAN/IAPMO/ISO 30500-2019 with regard to the ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before March 20, 2021.

P147-21 Part II

Public Hearing Results

Committee Action: **As Modified**

Committee Modification:

AX103.6 Systems employing combustion.
A non-sewered sanitation system employing combustion shall comply with the mechanical code.

~~**Exception:** A non-sewered sanitation system listed for unvented use.~~

AX103.7 Connection to plumbing system not required. ~~Unless the Authority Having Jurisdiction determines otherwise, a~~ A non-sewered sanitation system is not required to be connected to the sanitary drainage system of the building or premises.

Committee Reason: For the modification: Some extraneous language needed removed and the exception was found to be in conflict with the mechanical and fuel gas sections of the code.
For the proposal as modified: This is a good addition to the appendix of the code as there are some remote areas where septic systems are not possible. The language provides guidance to the code official to be able to work with the local health authority for using this method. (11-0)

P147-21 Part II

RP10-21

Proposed Change as Submitted

Proponents: Edward R. Osann, Natural Resources Defense Council, representing Natural Resources Defense Council (eosann@nrdc.org); sharon bonesteel, salt river project, representing salt river project (sharon.bonesteel@srpnet.com); Anthony Floyd, City of Scottsdale, representing City of Scottsdale (afloyd@scottsdaleaz.gov); David Collins, representing The Preview Group, Inc. (dcollins@preview-group.com)

2021 International Residential Code

Revise as follows:

P2905.3 Hot water supply to fixtures. The*developed length* of hot water piping, from the source of the hot water to the fixtures that require hot water, shall not exceed 75 ~~100~~ feet (22 860 ~~30 480~~ mm). Water heaters and recirculating system piping shall be considered to be sources of hot water.

Reason: This proposal reduces the current limit on domestic hot water supply line length by 25%, from 100 feet to 75 feet.
Lengthy hot water piping wastes water and energy while occupants wait for hot water to arrive at outlets for bathing, washing, and culinary purposes. Hot water in supply pipes cools down between draws, and the longer the pipe length, the more cooled-down hot water will need to be purged by the next user. The water sitting in the pipe will be purged, and a nearly equal volume of water will lose heat to the pipe wall on its way to the outlet, and be purged as well. Pipe insulation will partially reduce the volumes to be purged, but note that current I-Codes do not require insulation of piping less than 3/4", and 1/2" piping is widely used to supply sinks and showers. Reducing the maximum length from 100 feet to 75 feet will reduce the volume of water in DHW supply lines and the consequent volume of purged water. 75 feet will provide ample flexibility for designers to locate DHW outlets in sufficient proximity to the hot water heater to meet this requirement, more flexibility than the 50-foot limit on DHW pipe length currently in the IPC. Note also that reduced pipe length will reduce the waiting time for building occupants.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The code change proposal can be met through design changes without adding to construction costs. Reduced pipe length may result in cost savings for labor and materials.

RP10-21

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The 100 feet was just put in the code in the last cycle. Builders are having a difficult time making distances of less than 85 feet. Cost will no doubt be increased if the number is lowered to 75 feet. In a moderately-sized ranch home, a 100 foot limit is difficult to attain. (11-0)

RP10-21

Individual Consideration Agenda

Public Comment 1:

IRC: P2905.3

Proponents: Ed Osann, representing Natural Resources Defense Council (eosann@nrdc.org) requests As Modified by Public Comment

Modify as follows:

2021 International Residential Code

P2905.3 Hot water supply to fixtures . The*developed length* of hot water piping, from the source of the hot water to the fixtures that require hot water, shall not exceed 85 feet (25 908 mm) ~~75 feet (22 860 mm) mm).~~ . Water heaters and recirculating system piping shall be considered to be sources of hot water.

Commenter's Reason: As with the original proposal, this modification via public comment is intended to save energy as well as water compared with the current code, with its maximum hot water pipe length of 100 feet. The committee reason statement suggests, in part, that some builders may be offering new home designs with a maximum hot water pipe length of 85 feet without great difficulty. This comment would codify an 85-foot maximum length, which is far more accommodating than the 50-foot length limit currently in the International Plumbing Code. While the proposal as submitted (75-feet max) would be preferable, an 85-foot maximum offers a 15% improvement in the amount of hot water that must be purged to the drain before hot water arrives at a sink or shower.

In rejecting the proposal as submitted, the IRC-P Committee lost sight of the moment we're in -- we need to take every reasonable step to reduce fossil fuel emissions (which are embedded in most domestic hot water) as soon as possible. Avoiding plumbing system designs that perpetuate the waste of hot water for the life of the building is certainly a step we should take today.

Cost Impact: The net effect of the public comment and code change proposal will not increase or decrease the cost of construction
The code change proposal as modified by this public comment can be met through design changes without adding to construction costs. Reduced pipe length may result in cost savings for labor and materials.

Public Comment# 2973

Public Comment 2:

Proponents: Anthony Floyd, representing City of Scottsdale (afloyd@scottsdaleaz.gov); David Collins, representing The American Institute of Architects (dcollins@preview-group.com) requests As Submitted

Commenter's Reason: The current code language permits up to 100 feet of total developed length from the hot water source to the furthest hot water fixture. The volume of water wasted in a typical 3/4 inch nominal pipe size with a length of 100 feet is 300 ounces or 2.3 gallons. Without a central hot water supply core, manifold distribution or demand-initiated recirculation system, this volume of hot water is typically wasted every time an occupant turns on a faucet or showerhead, while waiting for the delivery of hot water. This inefficient delivery of hot water is a useless waste of water and energy. The associated water wasted in a 75 or greater length hot water pipe should not substitute for less wasteful hot water delivery. The IPC limits the total developed length of hot water piping to 50 feet for non-residential projects. The 75 feet maximum length of this proposed code change is intended to provide some flexibility for plumbing layout in residential projects governed under the IRC.

Cost Impact: The net effect of the public comment and code change proposal will not increase or decrease the cost of construction
Whether this code change will increase or not increase the cost of construction depends on the plumbing layout and hot water distribution system.

Public Comment# 2881

RM1-21

Proposed Change as Submitted

Proponents: David C Bixby, ACCA, representing ACCA (bixster1953@yahoo.com)

2021 International Residential Code

Add new text as follows:

M1305.1.2.2 Permanent service access.
Where equipment or appliances requiring routine service (including, but not limited to, the changeout of filters) are located in an Attic, a permanent means of access shall be provided. Attic access shall be provided by pulldown stairs or other permanent steps to allow for removal of the largest appliance. Such service access shall not require the use of portable ladders.

Exception: Attics that already have existing appliances installed and maintained.

Reason: Section M1305.1.2 provides specifications for the size of the minimum clear and unobstructed opening and passageway to allow removal of the largest appliance. However, the need for a safe and secure energy efficient access is not specified, and should be added for the safety of personnel and consumers. For consumers, replacement of filters is recommended maintenance and access to the attic should be as safe as possible. Attic stairs often include proven energy savings through verifiable factory energy performance ratings. The proposal also reflects the intent of Section M1202.3, Maintenance, which requires mechanical systems, both existing and new, to be maintained in proper operating condition and in a safe condition. The proposal is also consistent with Section 306.5 in the International Mechanical Code which requires providing safe and reasonable access for servicing appliances. It should be noted that the proposal is similar to an amendment to the Georgia building code that became effective January 1, 2020.

Cost Impact: The code change proposal will increase the cost of construction
This proposal will increase the cost of construction. ACCA estimates the cost will be about $700 for new construction. Although the proposal exempts attics that already have existing appliances installed and maintained, ACCA estimates the cost to move appliances into an existing home's attic (appliances not previously there) could be about $1,900.

RM1-21

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: Increasing cost is not justified. Would require stair access even when another access point is available at the same level of the equipment. Limits access to raise a piece of equipment into an attic or to remove a piece of equipment. The attic will be used for storage when it isn't designed as such. (11-0)

RM1-21

Individual Consideration Agenda

Public Comment 1:

IRC: M1305.1.2.2

Proponents: David Bixby, representing ACCA (bixster1953@yahoo.com) requests As Modified by Public Comment

Modify as follows:

2021 International Residential Code

M1305.1.2.2 Permanent service access . ~~Where equipment or appliances requiring routine service (including, but not limited to, the changeout of filters) are located in an Attic, a permanent means of access shall be provided. Attic access shall be provided by pulldown stairs or other permanent steps to allow for removal of the largest appliance. Such service access shall not require the use of portable ladders.~~ For new construction, a permanent means of access without the use of a portable ladder shall be provided in order to comply with M1305.1. Such means shall include the use of either pulldown stairs or other permanent steps acceptable to the authority having jurisdiction.

Exception: ~~Attics that already have existing appliances installed and maintained.~~ Existing construction.

Commenter's Reason: The proposed code change has been modified to clarify that it applies ONLY to the new construction market, in order to comply with M1305.1 which is shown below*. Again, the need is for NEW homes to be constructed to take care of future service, repair, replacement and overall general safety for all including the homeowner, contractors, insurance representatives, regular structural pest control inspections, especially first responders and anyone else who may need to access to this part of the home in the future. Existing homes should not be asked to make changes they cannot afford or do not want unless it falls within some other type of health, safety, fire code issues. We are not suggesting that existing homes anywhere in the country change their existing access to a stair/ladder access when they change their heating and cooling equipment or any other items in their attics.
Although the committee cited cost as one reason for rejection, a more realistic estimate is that attic stairs/ladders may add $250-$350 to a new home cost, but the savings in safety over time is significantly overcome and justified. Permanent attic access is needed as part of a complete system for ongoing sustainable property maintenance and occupant safety.

Another committee reason for rejection was that the stairs would limit access to raise a piece of equipment into an attic or to remove a piece of equipment. The bigger issue with mechanical equipment hoist/lifting equipment to and from attics is the fact that many openings in existing homes most likely will have to be dismantled and reinstalled due to equipment being larger than the existing openings. Hence one of the reasons new homes should have an opening as large as any appliance in the attic and the stairs or ladder access is for safety of anyone going to service the equipment in the attic.

The committee was also concerned that if stairs were available to the owner, the attic would be used for storage when it isn't designed as such, and adversely affect the existing insulation. No equipment, appliance, or home appendage should be installed in any attic area without adequate walk board/platforms to allow for safe access to the items for service, repair or replacement. If that is the case then the insulation will be properly protected, and home owners will always use their attic for storage regardless. This is already happening whether there are permanent stairs or not.

Another committee reason for rejection was that the original wording might require stair access even when another access point is available at the same level of the equipment for servicing such as filter changes. It should be noted that only 1-inch filters can be put in return air grills and a significant amount of homes are changing to the larger more efficient air filtration systems which do not allow for wall or ceiling mount filter changes.

***M1305.1 Appliance access for inspection service, repair and replacement.** *Appliances* shall be located to allow for access for inspection, service, repair and replacement without removing permanent construction, other *appliances*, or any other piping or ducts not connected to the *appliance* being inspected, serviced, repaired or replaced. A level working space not less than 30 inches deep and 30 inches wide (762 mm by 762 mm) shall be provided in front of the control side to service an *appliance.*

Cost Impact: The net effect of the public comment and code change proposal will increase the cost of construction
The modified proposal will result in an increase in the cost of construction. It is estimated that the cost of installing pull-down stairs will add about $250 to $350 to the cost of building a new home.

Public Comment# 2818

RM3-21

Proposed Change as Submitted

Proponents: Emily Toto, ASHRAE, representing ASHRAE (etoto@ashrae.org)

2021 International Residential Code

Revise as follows:

M1401.1 Installation. Heating and cooling *equipment* and *appliances* shall be installed in accordance with the manufacturer's instructions , ~~and~~ the requirements of this code, and ASHRAE 15.2.

Add new standard(s) as follows:

ASHRAE

ASHRAE
1791 Tullie Circle NE
Atlanta, GA 30329

15.2—2020	Safety Standard for Refrigeration Systems in Residential Applications

Reason: ASHRAE is developing a new standard, ASHRAE 15.2, which will cover the application requirements for residential air conditioning and heat pump systems. This standard has completed a second Publication Public Review (PPR2) and expected to be completed in first quarter of 2021. This proposal adds a reference to the anticipated newly published standard into the IRC.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal provides new safety requirements for use of new systems with flammable refrigerants but does not introduce additional requirements that would impact cost to existing air conditioners or heat pumps.

Staff Analysis: A review of the standards proposed for inclusion in the code, ASHRAE 15.2—2020: Safety Standard for Refrigeration Systems in Residential Applications, with regard to the ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before March 20, 2021.

RM3-21

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The standard isn't completed. Manufacturers will provide installation information. The added language is cumbersome and overcomplicates. (11-0)

RM3-21

Individual Consideration Agenda

Public Comment 1:

Proponents: Emily Toto, representing ASHRAE (etoto@ashrae.org) requests As Submitted

Commenter's Reason: ASHRAE 15.2 is a new standard under development that will establish application guidelines for residential air conditioning systems serving individual dwelling units. Requirements for these systems currently reside in both the ASHRAE 15 and UL 60335-2-40 standards. However, ASHRAE recognized the need for a simplified set of application requirements, that focus on only residential installations, and can be readily found in one location. Once ASHRAE 15.2 publishes, equipment manufacturers will require compliance with this standard in their installation instructions.

Bibliography: ASHRAE 15.2—2020 : Safety Standard for Refrigeration Systems in Residential Applications

Cost Impact: The net effect of the public comment and code change proposal will not increase or decrease the cost of construction

This code change proposal in of itself will not increase or decrease the cost of construction. However, the cost of residential air conditioning systems will likely increase over the next several years as a result of increasing energy efficiency requirements and the transition to lower global warming potential refrigerants.

Staff Analysis: In accordance with Section 3.6.3.1 of ICC Council Policy 28, the new referenced standard ASHRAE 15.2—2020: Safety Standard for Refrigeration Systems in Residential Applications, must be completed and readily available prior to the Public Comment Hearing in order for this public comment to be considered.

Public Comment# 2438

RM8-21

Proposed Change as Submitted

Proponents: Guy McMann, representing Colorado Association of Plumbing and Mechanical Officials (CAPMO) (gmcmann@jeffco.us)

2021 International Residential Code

Add new text as follows:

1502.6 Makeup air.
Installations exhausting more than 200 cfm (0.09 3/s) shall be provided with make up air. Where a closet is designated for the installation of a clothes dryer, an opening having a area of not less than 100 sq. inches (0.o645 m2) for make up air shall be provided in the closet enclosure, or make up air shall be provided by other approved means.

Reason: This language does not appear in Section M1502 for dryer exhaust and is a logical location for the makeup air requirements for residential clothes dryers. This is the same language found in the IMC.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
IRC-1502.6……..This IMC extraction should not increase the cost of construction as no new materials are required to provide and opening in a wall. A louvered door is over and above what the code calls for but would be an option and not a requirement possibly increasing cost.

RM8-21

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The language is inconsistent and confusing with the use of the term "makeup air", which is undefined in the IRC. It is not clear what is needed, make-up air or transfer air, for the appliance. The term "designated" should be changed to "intended" when referring to the closet's intended use for a dryer. (11-0)

RM8-21

Individual Consideration Agenda

Public Comment 1:

IRC: (New), M1502.6 (New), M1502.6.1 (New), M1503.6, M1503.6.1

Proponents: Mike Moore, representing Broan-NuTone (mmoore@statorllc.com) requests As Modified by Public Comment

Replace as follows:

2021 International Residential Code

AIR, MAKEUP . Any combination of outdoor and transfer air intended to replace exhaust air and exfiltration.

AIR, OUTDOOR . Ambient air that enters a building through a ventilation system, through intentional openings for natural ventilation, or by infiltration.

AIR, TRANSFER . Air moved from one indoor space to another.

M1502.6 Makeup air . Installations exhausting more than 200 cfm (0.09 m^3/s) shall be provided with makeup air.

M1502.6.1 Closet Installation . Where a closet is designed for the installation of a clothes dryer, makeup air shall be provided in accordance with the dryer manufacturer's installation instructions. If the manufacturer installation instructions do not include specifications for provision of makeup air, one or more permanent openings having a total area of not less than 100 square inches (645 mm^2) shall be provided in the closet enclosure, or makeup air shall be provided by other approved means.

M1503.6 Makeup air required . Where one or more gas, liquid or solid fuel-burning *appliance* that is neither direct-vent nor uses a mechanical draft venting system is located within a dwelling unit's air barrier, each exhaust system capable of exhausting in excess of 400 cubic feet per minute (0.19 m^3/s) shall be mechanically or passively provided with makeup air at a rate approximately equal to the exhaust air rate. Such makeup air systems shall be equipped with not fewer than one outdoor air duct and damper complying with Section M1503.6.2.

Exception: Makeup air is not required for exhaust systems installed for the exclusive purpose of space cooling and intended to be operated only when windows or other air inlets are open.

M1503.6.1 Location . Kitchen exhaust makeup air that is ducted from the outdoors shall be discharged into the same room in which the exhaust system is located or into rooms or *duct systems* that communicate through one or more permanent openings with the room in which such exhaust system is located. Such permanent openings shall have a net cross-sectional area not less than the required area of the makeup air supply openings.

Commenter's Reason: This PC represents a consensus position between proponents and opponents of RM8 that addresses the committee's concerns while establishing minimum and reasonable requirements for clothes dryer makeup air. It was also reviewed and approved by the PMGCAC. The PC borrows from the makeup air requirements of Section 504.7 of the IMC and Section G2439.5 of the IRC Fuel Gas chapter, recognizes the primacy of manufacturer installation instructions (similar to how clothes dryer exhaust duct equivalent length is addressed in Section M1502.4.6.2), and introduces definitions of makeup air, transfer air, and outdoor air that are also copied from the IMC. In the case that manufacturer instructions do not provide specifications for the provision of makeup air, the text and accompanying definitions clarify that transfer air can be used to meet makeup air requirements for clothes dryers in closets or that makeup air could be directly ducted from the outdoors to the clothes dryer closet, at the builder's discretion.

To ensure that the cross-walked definitions are compatible with other makeup air requirements in the IRC, slight modifications have been made to the kitchen range hood makeup air section. These modifications clarify that, where required by M1503.6, a kitchen range hood makeup air system shall have at least one outdoor air duct to provide makeup air. This modification is made to preserve the intent of Section M1503.6 when introducing the definition of makeup air to the IRC.

Cost Impact: The net effect of the public comment and code change proposal will not increase or decrease the cost of construction
In most cases, this language should not increase the cost of construction as it permits transfer air to serve as makeup air for clothes dryers and recognizes manufacturer instructions as the primary path for determining makeup air requirements for clothes dryers.

Public Comment# 2328

RM9-21

Proposed Change as Submitted

Proponents: Mike Moore, Stator LLC, representing Broan-NuTone (mmoore@statorllc.com)

2021 International Residential Code

Revise as follows:

M1503.3 Exhaust discharge. Domestic cooking exhaust equipment shall discharge to the outdoors through a duct. The duct shall have a smooth interior surface, shall be airtight, shall be equipped with a backdraft damper and shall be independent of all other exhaust systems. Ducts serving domestic cooking exhaust equipment shall not terminate in an attic or *crawl space* or areas inside the building.

> **Exception:** ~~Where installed in accordance with the manufacturer's instructions, and where mechanical or natural *ventilation* is otherwise provided, l~~ *Listed* and *labeled* ductless range hoods shall not be required to discharge to the outdoors~~.~~ ,provided that the installation complies with all of the following:
>
> 1. The equipment is installed in accordance with the manufacturer's instructions.
> 2. Mechanical or natural ventilation is otherwise provided in the cooking area.
> 3. The equipment is installed in an existing kitchen not having an existing range hood exhaust duct to the outdoors.

Reason: Cooking is typically the largest source of indoor air pollution in homes, with concentrations of key pollutants frequently exceeding U.S. National Ambient Air Quality Standards. Over time, exposure to these pollutants has been shown to reduce duration and quality of life. Research has demonstrated that provision of kitchen ventilation is needed to comply with the Section 101.3 purpose of the IRC to "establish minimum requirements to safeguard the public safety, health and general welfare through ...ventilation." Unless captured at the source and exhausted to the exterior, cooking pollutants spread rapidly through a home and deposit on surfaces, only to be released again into the breathing zone when disturbed at a later time. This proposal adds one more condition to the two conditions within this section that are required to approve ductless range hoods: the installation of the ductless range hood must be in an existing kitchen that does not have an existing range hood exhaust duct to the outdoors. This will ensure that where installed within new construction, range hoods will be exhausted to the exterior. The exception permitting ductless range hoods for existing construction is provided in recognition of the high costs that could otherwise be associated with retrofitting a duct to the exterior. Within new construction, requiring a range hood to be ducted can be a very low-cost item with high returns in terms of occupant health. Please see the cost statement for more information.

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Cost Impact: The code change proposal will increase the cost of construction
There is no increase in construction costs for existing homes.

Where homes of new construction are already provided with range hoods ducts, there will not be any increase in construction cost.

Where new construction homes are not currently provided with ducts for their range hoods, this proposal would increase the cost of construction. Installed duct costs can be estimated at ~ $7.10 per linear foot for 6" diameter galvanized steel duct (Mechanical Costs with RS Means Data. 2020. Section 23 31 13.16.5420), and a damper would cost about $25 retail.

RM9-21

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The range hood is not required. Removes the option for a recirculation hood. Would be problematic for townhomes where the range hood is not typically on an exterior wall. (11-0)

RM9-21

Individual Consideration Agenda

Public Comment 1:

IRC: M1503.3

Proponents: Mike Moore, representing Broan-NuTone (mmoore@statorllc.com) requests As Modified by Public Comment

Modify as follows:

2021 International Residential Code

M1503.3 Exhaust discharge . Domestic cooking exhaust equipment shall discharge to the outdoors through a duct. The duct shall have a smooth interior surface, shall be airtight, shall be equipped with a backdraft damper and shall be independent of all other exhaust systems. Ducts serving domestic cooking exhaust equipment shall not terminate in an attic or *crawl space* or areas inside the building.

Exception: *Listed* and *labeled* ductless range hoods shall not be required to discharge to the outdoors, provided that the installation complies with all of the following:

1. The equipment is installed in accordance with the manufacturer's instructions.
2. ~~Mechanical or natural ventilation~~ Local exhaust is otherwise provided in the ~~cooking area.~~ kitchen in accordance with Section M1505, or the equipment is installed in an *existing building's* kitchen where mechanical or natural ventilation is otherwise provided.
3. ~~The equipment is installed in an existing kitchen not having an existing range hood exhaust duct to the outdoors.~~

Commenter's Reason: As cited in the reason statement for the original proposal, the negative health effects associated with pollutant concentrations that occur when cooking pollutants are not exhausted has been well documented (see original bibliography). However, there continues to be market resistance to proposals that require range hoods to exhaust to the exterior. In response to this opposition, this PC provides more flexibility than the original proposal. For existing buildings, the PC makes no effective change to the current IRC language (recirculating range hoods are permitted where natural or mechanical ventilation is otherwise provided). For all other buildings, the PC only permits recirculating range hoods where local exhaust is otherwise provided (note that local exhaust is now required by Section R303.4 for all buildings and dwelling units complying with Section N1102.4.1, so no new construction complying with Chapter 11 and Section R303.4 of the IRC will be affected by this PC). The PC gives existing buildings a "pass" on mechanically exhausting a kitchen because retrofitting an exhaust duct can be prohibitively expensive. In new construction, however, costs to install ducting are much lower (see cost impact statement). Relying on natural ventilation alone is an insufficient means to provide required ventilation because it requires pressure differentials that may or may not exist, and when they exist, the pressure differential could be just as likely to spread the pollutant throughout the dwelling unit and neighboring units (in the case of attached dwelling units) as it would be to exhaust the pollutant directly to the outdoors. Further, studies have shown that occupants often do not operate windows for ventilation, even in temperate climates.[1,2,3] Concerns with window operation include security and discomfort (including severe draft in winter). For these reasons, the proposal requires that when recirculating hoods are provided in other than existing construction, some other form of local exhaust must also be provided.

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Cost Impact: The net effect of the public comment and code change proposal will increase the cost of construction
There is no increase in construction costs for existing buildings. There is also no increase in construction costs for new construction that meets the requirements of Section R303.4 and Chapter 11 of the IRC.

New construction that does not comply with these sections of the IRC and that does not already provide a local mechanical exhaust system in the kitchen would experience an increase in the cost of construction if they elect to install a recirculating hood. In such cases, this proposal would increase the cost of construction. Installed duct costs can be estimated at ~ $7.10 per linear foot for 6" diameter galvanized steel duct (Mechanical Costs with RS Means Data. 2020. Section 23 31 13.16.5420), and a termination would cost about $35 retail.

Public Comment# 2702

RM12-21

Proposed Change as Submitted

Proponents: Joseph Summers, representing Chair of PMGCAC (PMGCAC@iccsafe.org)

2021 International Residential Code

Revise as follows:

M1504.3 Exhaust openings. Air exhaust openings shall terminate as follows:

1. Not less than 3 feet (914 mm) from property lines.
2. Not less than 3 feet (914 mm) from gravity air intake openings, operable windows and doors.
3. Not less than 10 feet (3048 mm) from mechanical air intake openings except where the either of the following apply:
   - 3.1. The exhaust opening is located not less than 3 feet (914 mm) above the air intake opening.
   - 3.2 The exhaust opening is part of an approved factory-built intake/exhaust combination termination fitting installed in accordance with the manufacturer's instructions, and the exhaust air is drawn from a living space.
4. Openings shall comply with Sections R303.5.2 and R303.6.

Reason: Intake/exhaust combination terminations are regularly installed with heating and energy recovery ventilators (H/ERVs) used for dwelling units. Their use reduces building penetrations, labor, and associated system costs. By reducing the number of penetrations, air leakage can also be reduced, resulting in space conditioning energy savings. Further, the durability of the structure can be improved through reducing entry pathways for bulk water. Manufacturer tests conducted by Natural Resources Canada (NRC) have demonstrated that use of intake/exhaust combination terminations results in minimum cross-contamination of airflows(i.e., not exceeding 4%; see NRC report A1- 007793). These results are aligned with ASHRAE 62.2 approval of such devices, which limits cross-contamination to 10%, as verified by the manufacturer. If approved, this proposed modification to the IRC would limit application of intake/exhaust combination terminations to “approved”, “factory-built” units. Approval of this proposed modification is expected to result in more affordable and architecturally flexible terminations. Note: The IRC defines living space as, “space within a dwelling unit utilized for living, sleeping, eating, cooking, bathing, washing and sanitation purposes”.
This proposal is submitted by the ICC Plumbing/Mechanical/Gas Code Action Committee (PMG CAC). The PMG CAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2020, the PMG CAC has held several virtual meetings open to any interested party. Numerous interested parties attended the committee meetings and offered their input. Related documentation and reports are posted on the PMG CAC website at: https://www.iccsafe.org/products-and-services/i-codes/code-development-process/pmg-code-action-committee-pmgcac/ Reference PMGCAC Working Document Item 7.

Bibliography: Ouazia, B. 2016. Evaluation of a dual hood performance in term of contaminant re-entrainment from exhaust to supply. A1-007793. National Research Council Canada. For a copy of the report, please contact the proponent at the email address provided. Additional reports are available from the proponent upon request.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal will not increase the cost of construction because no additional labor, materials, equipment, appliances or devices are mandated beyond what is currently required by the code.

RM12-21

Public Hearing Results

Committee Action: **As Submitted**

Committee Reason: The Committee agreed with the published reason statement. (11-0)

RM12-21

Individual Consideration Agenda

Public Comment 1:

IRC: M1504.3

Proponents: Joseph J. Summers, representing Chair of PMGCAC (pmgcac@iccsafe.org) requests As Modified by Public Comment

Modify as follows:

2021 International Residential Code

M1504.3 Exhaust openings . Air exhaust openings shall terminate as follows:

1. Not less than 3 feet (914 mm) from property lines.
2. Not less than 3 feet (914 mm) from gravity air intake openings, operable windows and doors.
3. Not less than 10 feet (3048 mm) from mechanical air intake openings except where the either of the following apply:

   3.1. The exhaust opening is located not less than 3 feet (914 mm) above the air intake opening.

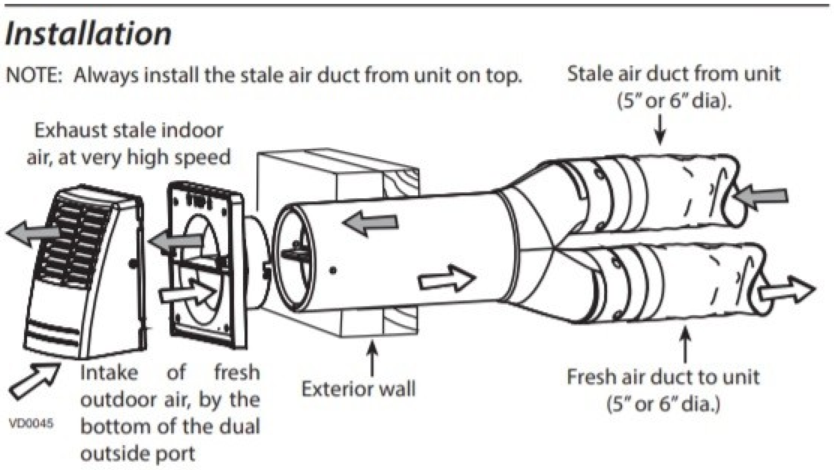
   3.2 The exhaust opening is part of ~~an approved~~ a factory-built intake/exhaust combination termination fitting installed in accordance with the fan manufacturer's instructions, and the exhaust air is drawn from a living space.
4. Openings shall comply with Sections R303.5.2 and R303.6.

Commenter's Reason: This comment modifies language approved by the IRC Mechanical committee to align with the IMC Committee's action on M16.
Factory-built intake/exhaust combination termination fittings are regularly provided by fan manufacturers and installed by builders to separate mechanical air intakes from mechanical exhaust serving dwelling unit or sleeping unit mechanical ventilation systems. The included image from a fan manufacturer's installation instructions provides an example of a typical fitting serving this purpose.

The IRC Mechanical committee's approval of RM12 as submitted aligned with the 2018 IMC's Sections 401.4 and 501.3.1 approval of the use of "*approved* factory-built intake/exhaust combination termination fittings" to separate the air streams associated with mechanical intake air openings and living space exhaust air, when the fitting is provided in accordance with the fan manufacturer's instructions. Similarly, Section G2407.1 of the Fuel Gas Code (see below for reference) approves the use of concentric vent termination fittings to separate combustion air from flue gases provided that such fittings are installed "in accordance with the appliance manufacturer's instructions"; the primary difference between the 2018 IMC and the Fuel Gas Code in this respect is that the Fuel Gas Code does not require special approval for concentric vent termination fittings.

By approving M16 as submitted, the IMC Committee removed the requirement for factory-built intake/exhaust combination termination fittings to be "approved" when such terminations are installed in accordance with the "appliance" manufacturer's instructions (based on feedback received since the hearings, a PC will be submitted to M16 to change the word "appliance" to "fan" to better clarify that such terminations must be recognized by the fan manufacturer to be provided without special approval). This action aligned the 2024 IMC requirements for factory-built intake/exhaust combination termination fittings with the Fuel Gas Code's treatment of concentric vent termination fittings (i.e., no special approval is required when installed in accordance with the appliance/fan manufacturer's instructions). Approval of this public comment to RM12 and approval of M16 as modified with the PMGCAC's public comment will align the 2024 IRC, 2024 IMC, and 2024 FGC in this regard.

Fuel Gas Code reference: "G2407.1 (304.1) General. ...Direct-vent appliances, gas appliances of other than natural draft design, vented gas appliances not designated as Category I and appliances equipped with power burners, shall be provided with combustion, ventilation and dilution air in accordance with the appliance manufacturer's instructions."



Cost Impact: The net effect of the public comment and code change proposal will decrease the cost of construction
Removing requirements for special approval of factory-built intake/exhaust combination termination fittings can be expected to reduce labor costs for builders, contractors, and code officials.

Public Comment# 2253

RM15-21

Proposed Change as Submitted

Proponents: Mike Moore, Stator LLC, representing Broan-NuTone (mmoore@statorllc.com)

2021 International Residential Code

Revise as follows:

M1505.4.3 Mechanical ventilation rate. The whole-house mechanical ventilation system shall provide outdoor air at a continuous rate not less than that determined in accordance with Table M1505.4.3(1) or not less than that determined by Equation 15-1.

Ventilation rate in cubic feet per minute = {air leakage factor x [(0.01 × total square foot area of house) + [7.5 × (number of bedrooms + 1)]]} **(Equation 15-1)**

where the air leakage factor is determined in accordance with Table M1505.4.3(3)

Exceptions:

1. Ventilation rate credit. The minimum mechanical ventilation rate determined in accordance with Table M1505.4.3(1) or Equation 15-1 shall be reduced by 30 percent, provided that both of the following conditions apply:

   1.1. A ducted system supplies ventilation air directly to each bedroom and to one or more of the following rooms:

      1.1.1. Living room.

      1.1.2. Dining room.

      1.1.3. Kitchen.

   1.2. The whole-house ventilation system is a balanced ventilation system.

2. Programmed intermittent operation. The whole-house mechanical ventilation system is permitted to operate intermittently where the system has controls that enable operation for not less than 25 percent of each 4-hour segment and the ventilation rate prescribed in Table M1505.4.3(1), by Equation 15-1 or by Exception 1 is multiplied by the factor determined in accordance with Table M1505.4.3(2).

TABLE M1505.4.3(1) CONTINUOUS WHOLE-HOUSE MECHANICAL VENTILATION SYSTEM AIRFLOW RATE REQUIREMENTS

DWELLING UNIT FLOOR AREA (square feet)	NUMBER OF BEDROOMS				
	0–1	2–3	4–5	6–7	> 7
	Airflow in CFM				
	Dwelling Unit Design Air Leakage Rate (ACH50)[a]				
~~< 1,500~~	~~30~~	~~45~~	~~60~~	~~75~~	~~90~~
~~1,501–3,000~~	~~45~~	~~60~~	~~75~~	~~90~~	~~105~~
~~3,001–4,500~~	~~60~~	~~75~~	~~90~~	~~105~~	~~120~~
~~4,501–6,000~~	~~75~~	~~90~~	~~105~~	~~120~~	~~135~~
~~6,001–7,500~~	~~90~~	~~105~~	~~120~~	~~135~~	~~150~~
~~> 7,500~~	~~105~~	~~120~~	~~135~~	~~150~~	~~165~~
5 ACH50					
< 1500	35	50	70	85	105
1,501-2,500	40	55	75	90	110
2,501-3,500	45	60	85	105	120
3,501-4,500	50	70	90	115	135
4,501-5,500	60	75	100	120	140
5,501-6,500	65	85	110	130	150
6,501-7,500	75	90	115	140	160
> 7,500	80	100	120	145	170
4 ACH50					
< 1500	45	55	75	90	110
1,501-2,500	50	65	85	100	120
2,501-3,500	65	80	100	120	135
3,501-4,500	80	95	115	135	155
4,501-5,500	95	115	135	150	170
5,501-6,500	110	130	150	170	185
6,501-7,500	130	145	165	185	205
> 7,500	145	160	180	200	220
3 ACH50					
< 1500	50	65	80	95	110
1,501-2,500	60	75	90	110	125
2,501-3,500	85	95	115	130	145
3,501-4,500	105	120	135	155	170
4,501-5,500	125	140	160	175	195
5,501-6,500	150	160	180	200	215
6,501-7,500	170	185	200	220	235
> 7,500	190	205	225	240	260
2 ACH50					
< 1500	55	70	85	100	115
1,501-2,500	70	80	95	110	130
2,501-3,500	95	110	125	140	155
3,501-4,500	120	135	150	165	180
4,501-5,500	150	160	175	195	210
5,501-6,500	175	185	205	220	235
6,501-7,500	200	215	230	245	260

> 7,500	225	240	255	270	290

DWELLING UNIT FLOOR AREA (square feet)	NUMBER OF BEDROOMS				
1 ACH50	0–1	2–3	4–5	6–7	> 7
	Airflow in CFM				
< 1500	60	70	85	100	115
1,501-2,500	75	85	100	115	130
2,501-3,500	105	115	130	145	160
3,501-4,500	130	145	160	175	190
4,501-5,500	160	170	190	205	220
5,501-6,500	190	200	215	230	245
6,501-7,500	220	230	245	260	275
> 7,500	250	260	275	290	305

a. ACH50 = dwelling unit design air leakage rate at 50 Pascals of pressure, found as the lesser of the value specified by the builder or design professional, where applicable, and the maximum air leakage permitted by Section N1102.4.1.2.

For SI: 1 square foot = 0.0929 m^2, 1 cubic foot per minute = 0.0004719 m^3/s.

Add new text as follows:

TABLE M1505.4.3(3) WHOLE-HOUSE MECHANICAL VENTILATION SYSTEM AIR LEAKAGE FACTOR

ACH50[a]	5	4	3	2	1
Air Leakage Factor	1	1.3	1.7	1.7	1.8

a. ACH50 = dwelling unit design air leakage rate at 50 Pascals of pressure, found as the lesser of the value specified by the builder or design professional, where applicable, and the maximum air leakage permitted by Section N1102.4.1.2.

Reason: Requirements for whole-house mechanical ventilation are developed with the objective of achieving an annual average number of air changes per hour, where fresh, outdoor air replaces indoor air. In practice, ventilation is achieved by a combination of natural (via leakage through the building envelope) and mechanical means. The leakier a home is, the more natural ventilation is available. The tighter a home is, the more mechanical ventilation is needed to achieve the same number of air changes. To support access to acceptable indoor air quality in any home, regardless of how tightly it is constructed, the IRC's whole-house mechanical ventilation rates should be determined as a function of the air leakage rate of the home -- with tighter homes requiring more mechanical ventilation than leaky homes. Currently, the IRC requires the same whole-house mechanical ventilation rate for a home, regardless of whether its leakage rate is 5 ACH50 or 1 ACH50; this is not reasonable and results in far fewer air changes (and likely poorer IAQ) for the tight, energy-efficient home with a 1 ACH50 leakage rate.
ASHRAE Standard 62.2 provides a method for determining a home's mechanical ventilation rate as a function of its natural ventilation rate. Within 62.2, the natural ventilation rate is determined as a function of the measured leakage rate of a home (i.e., air changes per hour at 50 Pascals, aka "ACH50"), the weather shielding factor (varies by the severity of the local climate with respect to wind and annual ambient temperature), the height of the home, and the percent of the building envelope surface area that is not attached to garages or other dwelling units. The 62.2 method can be fairly complicated for builders; so this proposal offers a simplified and more prescriptive method for achieving reasonably comparable results by using a simple table or equation. The net effect of this proposal is to provide the same annual average fresh air changes for a home - regardless of whether its air leakage rate of is 1 ACH50 or 5 ACH50. For reasons of practicality, the mechanical ventilation rate is proposed to be determined based on the design air leakage rate and not the tested air leakage rate. Where there is no design air leakage rate, the leakage rate is assumed to be equal to the leakage limit permitted by IRC Section N1102.4.1.2.

Method and assumptions used in deriving the table and equation:

The contribution of natural ventilation to the total annual average ventilation rate was calculated using ASHRAE 62.2-2019 Equation 4-3. The average weather and shielding factor selected was 0.56, which is the average across all weather stations listed in ASHRAE 62.2-2019. Home height is a function of number of stories, with each story contributing 9 feet to the height above grade and the number of stories determined by 10-year average U.S. Census data weightings (i.e., 44% for one-story, 51% for two-story, and 5% for three-story). One hundred percent of the building envelope area is assumed to be adjacent to the exterior (maximizing the natural ventilation credit). The mechanical ventilation rate provided in Table M1505.4.3(1) is calculated using the average floor area and average number of bedrooms of the corresponding range (for example, for a home with a floor area of 2500-3500 sqft and 4-5 bedrooms, the ventilation rate was calculated assuming a floor area of 3000 sqft and 4.5 bedrooms). The "air leakage factor" was determined empirically by recording, for each building envelope air leakage rate, the multiple of the existing Equation 15-1 that was associated with the most typical combinations of rooms and floor area.

Cost Impact: The code change proposal will increase the cost of construction
For dwelling units that have a design leakage rate of 5 ACH50 or higher, there may be no increase in construction costs, as the mechanical ventilation rates proposed are very close to those that are currently required by this section for many cases. For other dwelling units, this proposal may increase the cost of construction, but this is not always the case. For example, builders specifying an exhaust or supply fan for the outdoor air ventilation system could use a multi- or variable speed fan that will accommodate multiple flow rate settings (e.g., 50/80/110 cfm are typical for exhaust fans; supply fans typically have even higher flow rate settings), with no additional construction costs for selecting a higher speed and airflow rate.

For the typical case of a 3 ACH50, 2500 ft2 home with 4-5 bedrooms, the ventilation rate required by this proposal's modification to Table M1505.4.3(1) would be 90 cfm, which is 15 cfm higher than the 75 cfm currently required by the IRC for this same home. If the builder is already using a nominal, single-speed 110 cfm exhaust fan or multi-speed exhaust fan to provide WHMV, there is no additional cost. If the builder previously used a single-speed 80 cfm exhaust fan and transitioned to a single-speed 110 cfm exhaust fan, the additional cost would be about $10-$20 retail.

RM15-21

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The increased ventilation rates will result in excessive indoor humidity resulting in a need for dehumidification. The method uses a blower door test to establish the ventilation rate.

RM15-21

Individual Consideration Agenda

Public Comment 1:

IRC: TABLE M1505.4.3(3)

Proponents: Mike Moore, representing Broan-NuTone (mmoore@statorllc.com) requests As Modified by Public Comment

Modify as follows:

2021 International Residential Code

TABLE M1505.4.3(3) WHOLE-HOUSE MECHANICAL VENTILATION SYSTEM AIR LEAKAGE FACTOR

ACH50[a]	5	4	3	2	1
Air Leakage Factor	~~1~~ 1.2	~~1.3~~ 1.4	1.7	~~1.7~~ 1.8	~~1.8~~ 1.9

a. ACH50 = dwelling unit design air leakage rate at 50 Pascals of pressure, found as the lesser of the value specified by the builder or design professional, where applicable, and the maximum air leakage permitted by Section N1102.4.1.2.

Commenter's Reason: The committee's statement that this proposal requires a blower door test is incorrect. The method is based on a *design* air leakage rate that does not require a blower door test. If no design air leakage rate is provided by the builder or design professional, the design air leakage rate defaults to what is specified in Chapter 11 (see footnote a to the proposed Table M1505.4.3(1) for more information. Tightening a home's envelope without simultaneously increasing ventilation will inevitably increase the concentration of pollutants generated indoors. To maintain acceptable indoor air quality (IAQ), the minimum ventilation rate should therefore increase as a home's leakage rate decreases. As pointed out during the committee action hearings, it is unfortunate that maintaining acceptable IAQ generally requires energy use for conditioning and sometimes for dehumidification. However, the code's purpose is to "establish minimum requirements to provide a reasonable level of safety, health and general welfare", even when such measures require energy.

The committee requested more information be provided regarding the affect of airflow rates on health and welfare. Studies that have shown better health outcomes for building occupants as a function of higher ventilation rates include:

1. Sundell[1]: Sick building syndrome declines as ventilation rate increases.

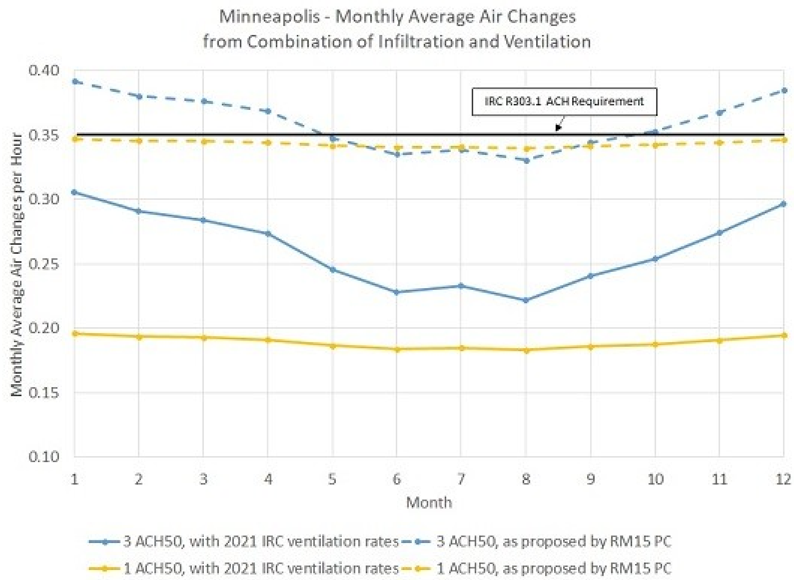
2. Milton[2]: Sick leave decreases as ventilation rate increases.

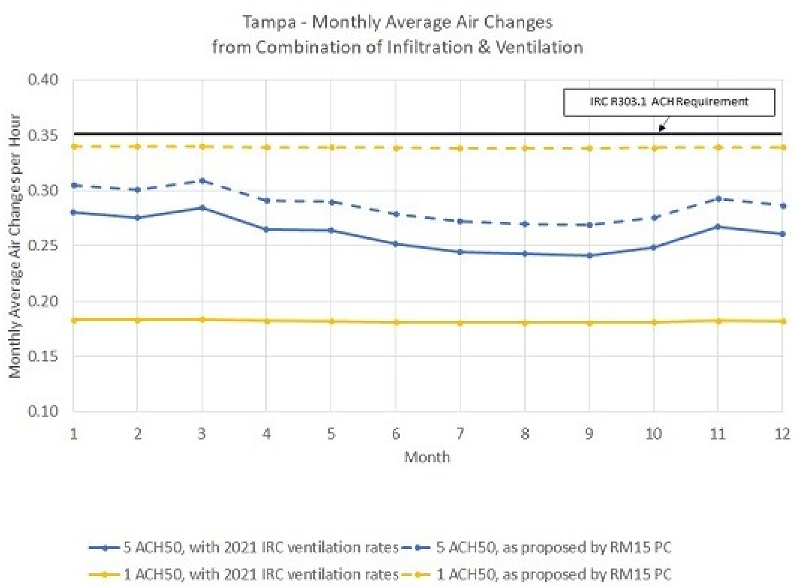
3. Bornehag[3]: Risk of asthma for children increases with decreasing ventilation rate in homes.

4. Seppänen[4]: Productivity decreases with decreasing ventilation rate.

While most of these studies were conducted in commercial buildings, LBNL's[5] analysis of residential studies concluded that, "Just over half of (residential) studies report one or more statistically significant health benefits of increased ventilation rates." LBNL noted that, "The findings of research on how ventilation rates in homes affect health are mixed," but that "overall… the number of reported statistically significant improvements in health with increased ventilation rates far exceeded the anticipated chance improvements in health."

In addition to noting the research that has associated higher ventilation rates with improved performance, reduced sick leave, and various improved health outcomes, it is informative to compare the IRC's ventilation rates with international ventilation rates. As a point of reference, the IRC M1505.4.3 mechanical ventilation rate for a 2,000 ft^2, 3-bedroom home with 8-foot ceilings is 0.19 air changes per hour (found by applying the Equation 15-1 rate of 50 cfm to volume of 16,000 ft^3). This rate is 60% lower than the average of the European rates reported Brelih and Seppänen[6]. The IRC M1505.4.3 rate is also 46% lower than the IRC ventilation rate required in Section R303.1.1 for habitable rooms without glazing. If we know the building leakage rate (ACH50) and the mechanical ventilation airflow rate, we can use ASHRAE's Handbook of Fundamentals[6] to determine the total air changes as a function of outdoor weather conditions. Following are graphs that show the average monthly combined infiltration and ventilation air change rates that can be expected for a typical home in Minneapolis and in Tampa as a function of building envelope leakage -- when following the current M1505.4.3 ventilation requirements (solid lines) and when following the modified rates proposed by this PC to RM15 (dashed lines). Note that the ventilation factors were corrected based on an error that was identified during the PC review process. The spreadsheet used to calculate these values is available upon request.





To keep concentrations of indoor air pollutants in check, ventilation rates should increase as homes get tighter. Studies have shown improvements in health outcomes with increasing ventilation rates. The ventilation rate required by the IRC M1505.4.3 is far lower than European rates, ASHRAE 62.2 rates, and even the rate required by IRC Section 301.1.1. Approval of RM15 as modified by this public comment will provide a rational and scalable air change rate for tightly constructed homes.

Bibliography: 1. Sundell et al. 1994. Sick Building Syndrome (SBS) in Office Workers and Facial Skin Symptoms among VDT-Workers in Relation to Building and Room Characteristics: Two Case-Referent Studies. Indoor Air, 4: 83-94.
2. Milton et al. 2000. Risk of Sick Leave Associated with Outdoor Air Supply Rate, Humidification, and Occupant Complaints. Indoor Air, 10:212-221.
3. Bornehag, C & Sundell, Jan & Hägerhed, Linda. (2003). Asthma and allergy among children and the association to ventilation rate at home, a case control study. Epidemiology. 14. 10.1097/00001648-200309001-00224.
4. Seppänen, O. A., and W. Fisk. 2006. Some quantitative relations between indoor environmental quality and work performance or health. HVAC&R Research 12 (4):957–73. doi:10.1080/10789669.2006.10391446.
5. Lawrence Berkeley National Laboratory. Indoor Air Quality Scientific Findings Resource Bank. Building Ventilation. Accessed May 6, 2021. https://iaqscience.lbl.gov/vent-summary#:~:text=Just%20over%20half%20of%20studies,improve%20with%20increased%20ventilation%20rates.
6. ASHRAE. 2017. Handbook of Fundamentals. 16.24, Enhanced Model with associated assumptions.

Cost Impact: The net effect of the public comment and code change proposal will increase the cost of construction
Please refer to the original cost impact statement.

Public Comment# 2895

Public Comment 2:

Proponents: Dan Buuck, representing National Association of Home Builders (dbuuck@nahb.org) requests Disapprove

Commenter's Reason: The proposal does not provide evidence of issues in homes built to meet the current ventilation rates and building tightness criteria. However, the added ventilation would increase energy use and lead to issues with indoor relative humidity. An analysis of increased ventilation rates showed that the added humid air would require supplemental dehumidification in homes located as far north as Virginia, D.C., and Maryland. Supplemental dehumidification is expensive and onerous to install and to maintain. In cold climates, the added ventilation will lead to low indoor relative humidity during the heating season and will trigger the need for supplemental humidification, which can be similarly expensive and onerous to install and to maintain. If not monitored optimally, the supplemental humidification can lead to moisture issues due to increased vapor drive through the exterior envelope. The increased energy use is the result of the additional demand for sensible heat (cooling/heating), latent heat (relative humidity control), and fan energy.

Cost Impact: The net effect of the public comment and code change proposal will not increase or decrease the cost of construction
No change to code.

Public Comment# 2613

Public Comment 3:

Proponents: Craig Conner, representing self (craig.conner@mac.com); Joseph Lstiburek, representing Myself (joe@buildingscience.com) requests Disapprove

Commenter's Reason: The premise that as the houses get tighter they need more code ventilation is incorrect. The current ventilation rate specified in the IRC and IMC assumes no infiltration. That is why there is no code difference between 5 ach@50 and 3 ach@50, etc. The reason is that infiltration is unpredictable and cannot be relied upon. That is why no major code anywhere (ie. Canada and Europe) provides a credit for infiltration.

A blower door test and the ASHRAE ventilation model is extremely unreliable - it has been shown to be widely inaccurate - it over estimates the contribution by infiltration by 30 to 100 percent in the tracer gas testing in the published literature. The reason is that the blower door test does not tell you the distribution of holes and the actual pressures acting on them. The pressures are dominated by indoor/outdoor temperature differences and wind…. which vary seasonally and by climate zone. Hence the necessity to ignore infiltration and give it no credit and have a uniform rate in all climate zones.

Varying ventilation rate by tightness sends exactly the wrong message…that tight construction results in IAQ issues…and that message will discourage better construction.

Increasing the ventilation rate by up to 80 percent in code houses will lead to excessive humidity issues in hot humid and mixed humid climates. We already see this with the ASHRAE 62.2 rate which is 50 percent higher than the code rate. The higher rates require dehumidifiers and high end a/c systems to address the “part-load” humidity issue.

In cold climates it leads to excessive dryness and a need for “energy recovery ventilators” (ERV’s) to preserve indoor humidity and avoid humidifiers.

The changes will lead to significantly increased operating costs (energy) and significantly increased construction costs (dehumidifiers, higher moisture removal a/c, and energy recovery ventilators (ERV’s).

If the issue of concern is IAQ and a lack of ventilation then the correct approach is to increase the ventilation rate requirement for all houses in all climates the same amount. That of course would have to be justified by real indoor contaminant data and real health studies. The proponent should come back with a proposal that does that.

Cost Impact: The net effect of the public comment and code change proposal will not increase or decrease the cost of construction
No change to code.

Public Comment# 2712

RM16-21

Proposed Change as Submitted

Proponents: Mike Moore, Stator LLC, representing Broan-NuTone (mmoore@statorllc.com)

2021 International Residential Code

Delete without substitution:

~~**[MP] BALANCED VENTILATION.** Any combination of concurrently operating mechanical exhaust and mechanical supply whereby the total mechanical exhaust airflow rate is within 10 percent of the total mechanical supply airflow rate.~~

Revise as follows:

[MP] BALANCED VENTILATION SYSTEM. A ventilation system where the total <u>mechanical</u> supply airflow and total <u>mechanical</u> exhaust airflow are simultaneously within 10 percent of their average~~s~~. The balanced ventilation system airflow is the average of the <u>mechanical</u> supply and <u>mechanical</u> exhaust airflows.

M1505.4.3 Mechanical ventilation rate. The whole-house mechanical ventilation system shall provide outdoor air at a continuous rate not less than that determined in accordance with Table M1505.4.3(1) or not less than that determined by Equation 15-1.

Ventilation rate in cubic feet per minute = (0.01 × total square foot area of house) + [7.5 × (number of bedrooms + 1)] **(Equation 15-1)**

Exceptions:

1. Ventilation rate credit. The minimum mechanical ventilation rate determined in accordance with Table M1505.4.3(1) or Equation 15-1 shall be reduced by 30 percent, provided that both of the following conditions apply:

   1.1. A ducted system supplies ventilation air directly to each bedroom and to one or more of the following rooms:

      1.1.1. Living room.

      1.1.2. Dining room.

      1.1.3. Kitchen.

   1.2. The whole-house ventilation system is a *balanced ventilation system*.

2. Programmed intermittent operation. The whole-house mechanical ventilation system is permitted to operate intermittently where the system has controls that enable operation for not less than 25 percent of each 4-hour segment and the ventilation rate prescribed in Table M1505.4.3(1), by Equation 15-1 or by Exception 1 is multiplied by the factor determined in accordance with Table M1505.4.3(2).

Reason: The 2021 versions of the IMC and IRC introduced a 30% ventilation rate credit for dwelling units with systems providing balanced ventilation. Because these changes were based on the approval of multiple proposals, their approval resulted in different definitions for *balanced ventilation* and *balanced ventilation system* across the IRC and IMC. This proposal and its companion proposal to the IMC are correlation proposals that will align the terminology, definitions, and their application across both codes. This proposal deletes the term "*balanced ventilation*", which is not used within the IRC, and modifies the term "*balanced ventilation system*" to incorporate the relevant components of "*balanced ventilation*". The proposed definition for "balanced ventilation system" is also proposed within the companion proposal to the IMC. The change that is proposed in Section M1505.4.3 exception 1.2 is italicizing the phrase "*balanced ventilation system*" so that the user is directed to the corresponding definition.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This change is editorial and therefore will not increase or decrease the cost of construction.

RM16-21

Public Hearing Results

Committee Action: **As Submitted**

Committee Reason: The committee agreed with the published reason statement. (11-0)

Individual Consideration Agenda

Public Comment 1:

IRC: SECTION 202

Proponents: Joseph J. Summers, representing Chair of PMGCAC (pmgcac@iccsafe.org) requests As Modified by Public Comment

Modify as follows:

2021 International Residential Code

[MP] BALANCED VENTILATION SYSTEM . ~~A ventilation system where the total mechanical supply airflow and total mechanical exhaust airflow are simultaneously within 10 percent of their average. The balanced ventilation system airflow is the average of the mechanical supply and mechanical exhaust airflows.~~
A ventilation system that simultaneously supplies outdoor air to and exhausts air from a space, where the mechanical supply airflow rate and the mechanical exhaust airflow rate are each within 10% of the average of the two airflow rates.

Commenter's Reason: The PMGCAC worked with the proponent to revise the language in response to the IMC Committee's comments on M23, which is the coordinating proposal to align definitions across the IMC and IRC. All parties agree that this definition better clarifies the meaning of the current term. The PMGCAC and the proponent are submitting a coordinating public comment to revise the IMC definition under M23.

Cost Impact: The net effect of the public comment and code change proposal will not increase or decrease the cost of construction
This change is a non-substantive clarification of an existing definition.

Public Comment# 2453

RM17-21

Proposed Change as Submitted

Proponents: Glenn Mathewson, BuildingCodeCollege.com, representing Self (glenn@glennmathewson.com)

2021 International Residential Code

Add new text as follows:

M1506
LOCAL EXHAUST RATES

Revise as follows:

~~M1505.4.4~~ M1506.1 ~~Local exhaust rates~~ General. *Local exhaust* systems shall be designed to have the capacity to exhaust the minimum airflow rate determined in accordance with Table ~~M1505.4.4.~~ M1506.1

TABLE ~~M1505.4.4~~ M1506.1 MINIMUM REQUIRED LOCAL EXHAUST RATES ~~FOR ONE- AND TWO-FAMILY DWELLINGS~~

AREA TO BE EXHAUSTED	EXHAUST RATES[a]
Kitchens	100 cfm intermittent or 25 cfm continuous
Bathrooms-Toilet Rooms	Mechanical exhaust capacity of 50 cfm intermittent or 20 cfm continuous

For SI: 1 cubic foot per minute = 0.0004719 m^3/s, 1 inch water column = 0.2488 kPa.

a. The listed exhaust rate for bathrooms-toilet rooms shall equal or exceed the exhaust rate at a minimum static pressure of 0.25 inch water column in accordance with Section M1505.3.

M1503.5 Kitchen exhaust rates. Where domestic kitchen cooking *appliances* are equipped with ducted range hoods or down-draft exhaust systems, ~~the fans shall be sized in accordance with Section M1505.4.4.~~ the minimum exhaust rate shall be in accordance with Section M1506.1

Reason: 1) Local exhaust rates for kitchens and bathrooms should not be a subsection of whole house mechanical ventilation. This proposal creates a new subsection 305.5 "Local Exhaust Rates"

2) There is no reason to state "one and two-family dwellings" unless this is meant to not apply to dwelling units in a townhouse. Technically (by definition), a townhouse contains "dwelling units" and is not a "dwelling". There is no reason this would not also apply to dwelling units in townhouses.
3) The reference to the minimum kitchen exhaust rate should be about exhaust rates, not "sizing of fans".

Cost Impact: The code change proposal will not increase or decrease the cost of construction
1) Striking out the term "for one- and two-family dwellings" will not change the cost of construction, because the provisions in the table are already applied to "dwelling units" in "townhouses" in industry standard practice. The IRC scope is only for one- and two-family dwellings and townhouses, and since the provisions in this table apply to all of those, there is no necessity to describe the building types in the table heading.

2) Moving Table M1506.1 into its own section does not change the application of the table and thus does not affect the cost of construction. It is simply a reorganization, as local exhaust rates are not directly associated with whole-house ventilation systems.

3) Changing the phrase "the fans" to "exhaust rate" used in Section M1503.5 to reference Table M1504.4 so that the object of the reference matches the title and purpose of the table (exhaust rate) will have no cost impact on construction.

RM17-21

Public Hearing Results

Committee Action: **As Modified**

Committee Modification:

~~M1506.1~~ M1505.5 ~~General~~ Local exhaust rates. *Local exhaust* systems shall be designed to have the capacity to exhaust the minimum airflow rate determined in accordance with Table ~~M1506.1~~ M1505.5

TABLE ~~M1506.1~~ M1505.5 MINIMUM REQUIRED LOCAL EXHAUST RATES

AREA TO BE EXHAUSTED	EXHAUST RATES[a]
Kitchens	100 cfm intermittent or 25 cfm continuous
Bathrooms-Toilet Rooms	Mechanical exhaust capacity of 50 cfm intermittent or 20 cfm continuous

For SI: 1 cubic foot per minute = 0.0004719 m^3/s, 1 inch water column = 0.2488 kPa.

a. The listed exhaust rate for bathrooms-toilet rooms shall equal or exceed the exhaust rate at a minimum static pressure of 0.25 inch water column in accordance with Section M1505.3.

M1503.5 Kitchen exhaust rates. Where domestic kitchen cooking *appliances* are equipped with ducted range hoods or down-draft exhaust systems, the exhaust rate shall equal or exceed the airflow required in Table M1505.5 at one or more speed settings. ~~the minimum exhaust rate shall be in accordance with Section M1506.1~~

Committee Reason: For the modification: It clears up the language of the original proposal by applying the highest setting to the minimum requirement, which was the intent of the original proposal.
For the proposal as modified: It provides clarity for the minimum requirements. (7-4)

RM17-21

Individual Consideration Agenda

Public Comment 1:

IRC: M1506, TABLE M1505.5, M1503.5, M1505.5

Proponents: Mike Moore, representing Broan-NuTone (mmoore@statorllc.com); Glenn Mathewson, representing Self (glenn@glennmathewson.com) requests As Modified by Public Comment

Further modify as follows:

2021 International Residential Code

~~M1506~~
~~LOCAL EXHAUST RATES~~

TABLE M1505.5 MINIMUM REQUIRED LOCAL EXHAUST RATES

AREA TO BE EXHAUSTED	EXHAUST RATES[a]
Kitchens	100 cfm intermittent or 25 cfm continuous
Bathrooms-Toilet Rooms	~~Mechanical exhaust capacity of~~ 50 cfm intermittent or 20 cfm continuous

For SI: 1 cubic foot per minute = 0.0004719 m^3/s, 1 inch water column = 0.2488 kPa.

a. The listed exhaust rate for bathrooms-toilet rooms shall equal or exceed the exhaust rate at a minimum static pressure of 0.25 inch water column in accordance with Section M1505.3.

M1503.5 Kitchen exhaust rates . Where domestic kitchen cooking *appliances* are equipped with ducted range hoods or down-draft exhaust systems, the exhaust rate shall equal or exceed the airflow required in Table M1505.5 at one or more speed settings.

M1505.5 Local exhaust rates . *Local exhaust* systems shall be designed to have the capacity to exhaust the minimum airflow rate determined in accordance with Table ~~M1505.5.~~ M1505.5 at one or more speed settings.

Commenter's Reason: Section 1506 has no text in it and should be stricken.
The text "mechanical exhaust capacity of" in Table M1505.5 is unnecessary because this table is located within the "Mechanical Ventilation" section, and it is understood that the local exhaust rates in Table M1505.5 are mechanical exhaust airflow rates. The text, "at one or more speed settings" should be included in M1505.5 to align with action that the committee took on M1503.5 and the intention that the minimum airflow rate required by Table M1505.5 be provided by at least one speed setting of the exhaust equipment. This text clarifies that single speed units can comply when the single speed provides an airflow rate no less than the relevant table value and that variable and multiple speed units can comply when at least one speed setting provides an airflow rate no less than the relevant table value.

This clarification is needed to ensure that popular bathroom exhaust fans with multiple speed settings (e.g., 30, 50, and 80 cfm) can be approved, and permits builders to order one SKU across multiple projects that can be customized as necessary to satisfy the targeted ventilation rate (e.g., Table M1505.5's 50 cfm intermittent or 20 cfm continuous). This modification also permits smart range hoods to comply with this section; smart range hoods can detect and respond to pollutant concentrations during cooking events by increasing airflows to 300-400 cfm on high speed as needed but can also throttle back to intermittent airflows of less than 100 cfm following a cooking event when lower airflows and quieter operation are desired to exhaust residual pollutant concentrations in the kitchen.

Cost Impact: The net effect of the public comment and code change proposal will not increase or decrease the cost of construction
This proposal and public comment clarify the current requirements of the code.

Public Comment# 2199

RM19-21

Proposed Change as Submitted

Proponents: Craig Conner, representing self (craig.conner@mac.com); Joseph Lstiburek, Building Science Corporation, representing Myself (joe@buildingscience.com)

2021 International Residential Code

Revise as follows:

M1602.2 Return air openings. Return air openings for heating, *ventilation* and air-conditioning systems shall comply with all of the following:

1. Openings shall not be located less than 10 feet (3048 mm) measured in any direction from an open combustion chamber or draft hood of another *appliance* located in the same room or space.
2. The amount of return air taken from any room or space shall be not greater than the flow rate of supply air delivered to such room or space.
3. Return and transfer openings shall be sized in accordance with the *appliance* or *equipment* manufacturer's installation instructions, Manual D or the design of the *registered design professional*.
4. <u>Where return air is taken from a closet smaller than 30 ft2 (2.8 m2) the return air shall be no more than 30 cfm (15 l/s), shall serve only the closet, and shall not require a dedicated supply duct.</u>
5. <u>Where return air is taken from a closet smaller than 30 ft2 (2.8 m2) the closet door shall be undercut a minimum of 1.5 inches (38 mm) or the closet shall include a louvered door or transfer grille with a minimum net free area of 30 inch2 (194 cm2).</u>

4 6. Return air shall not be taken from a ~~closet,~~ bathroom, toilet room, kitchen, garage, mechanical room, boiler room, furnace room or unconditioned attic.

Exceptions:

1. Taking return air from a kitchen is not prohibited where such return air openings serve the kitchen only, and are located not less than 10 feet (3048 mm) from the cooking *appliances*.
2. Dedicated forced-air systems serving only the garage shall not be prohibited from obtaining return air from the garage.
3. <u>Return air taken from closets shall serve only the closet and may shall be permitted to be taken from closets that have no dedicated supply duct.</u>

5 7. For other than dedicated HVAC systems, return air shall not be taken from indoor swimming pool enclosures and associated deck areas except where the air in such spaces is dehumidified,

6 8. Taking return air from an unconditioned *crawl space* shall not be accomplished through a direct connection to the return side of a forced-air furnace. Transfer openings in the *crawl space* enclosure shall not be prohibited.

7 9. Return air from one *dwelling unit* shall not be discharged into another *dwelling unit*.

Reason: Mold growth is now common in closets due to higher interior moisture loads and less heat gain in closets. Allowing a limited amount of return air provides a means of controlling closet moisture levels. Providing supply air to a closet exacerbates the problem by making closet surfaces colder.
This is one of six separate proposed changes related to controlling mold in closets, bathrooms and mechanical room. The six changes fix problems caused by an increase in code thermal resistance over the past several code cycles.

For a more detailed explanation see:

https://www.buildingscience.com/documents/building-science-insights/bsi-109-how-changing-filters-led-condensation-and-mold-problem

Cost Impact: The code change proposal will increase the cost of construction
The code change proposal increases the cost of construction. The cost is the cost of adding the return duct. However, this code change is not a requirement. It gives builders an option to solve and avoid problems.

Staff Analysis: Multiple proposals RM18-21, RM19-21 and RM20-21 propose changes to M1602.2. Proposals RM18-21, RM19-21 and RM20-21 comply with CP2 #28 3.3.3 because they address different subject matter within Section M1602.2. RM18-21 addresses bathrooms. RM19-21 addresses closets. RM20-21 addresses boiler rooms and mechanical closets.

RM19-21

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The supporting document indicated that ASHRAE needs to continue looking at the issue. The proposed language is confusing. (7-4)

RM19-21

Individual Consideration Agenda

Public Comment 1:

IRC: M1602.2

Proponents: Craig Conner, representing self (craig.conner@mac.com); Joseph Lstiburek, representing Myself (joe@buildingscience.com) requests As Modified by Public Comment

Modify as follows:

2021 International Residential Code

M1602.2 Return air openings . Return air openings for heating, *ventilation* and air-conditioning systems shall comply with all of the following:

1. Openings shall not be located less than 10 feet (3048 mm) measured in any direction from an open combustion chamber or draft hood of another *appliance* located in the same room or space.
2. The amount of return air taken from any room or space shall be not greater than the flow rate of supply air delivered to such room or space.
3. Return and transfer openings shall be sized in accordance with the *appliance* or *equipment* manufacturer's installation instructions, Manual D or the design of the *registered design professional*.

~~4.~~ ~~Where return air is taken from a closet smaller than 30 ft2 (2.8 m2) the return air shall be no more than 30 cfm (15 l/s), shall serve only the closet, and shall not require a dedicated supply duct.~~

~~5.~~ ~~Where return air is taken from a closet smaller than 30 ft2 (2.8 m2) the closet door shall be undercut a minimum of 1.5 inches (38 mm) or the closet shall include a louvered door or transfer grille with a minimum net free area of 30 inch2 (194 cm2).~~

4. Where return air is taken from a closet the return air shall be no more than 30 cfm (15 l/s), shall serve only the closet, shall not require a dedicated supply duct and the closet door shall be undercut a minimum of 1.5 inches (38 mm) or the closet shall include a louvered door or transfer grille with a minimum net free area of 30 inch2 (194 cm2).

5. ~~6.~~ Return air shall not be taken from a bathroom, toilet room, kitchen, garage, mechanical room, boiler room, furnace room or unconditioned attic.

Exceptions:

1. Taking return air from a kitchen is not prohibited where such return air openings serve the kitchen only, and are located not less than 10 feet (3048 mm) from the cooking *appliances*.
2. Dedicated forced-air systems serving only the garage shall not be prohibited from obtaining return air from the garage.
3. Return air taken from closets shall serve only the closet ~~and may shall~~ and ~~may~~ shall be permitted to be taken from closets that have no dedicated supply duct.

6. ~~7.~~ For other than dedicated HVAC systems, return air shall not be taken from indoor swimming pool enclosures and associated deck areas except where the air in such spaces is dehumidified,

7. ~~8.~~ Taking return air from an unconditioned *crawl space* shall not be accomplished through a direct connection to the return side of a forced-

air furnace. Transfer openings in the *crawl space* enclosure shall not be prohibited.

8. ~~9.~~ Return air from one *dwelling unit* shall not be discharged into another *dwelling unit*.

Commenter's Reason: Modify the text to be less confusing and remove an unneeded restriction on the closet size. The return openings are sized so as to not produce negative pressure in the closet.

Cost Impact: The net effect of the public comment and code change proposal will increase the cost of construction
The code change proposal increases the cost of construction. The cost is the cost of adding the return duct. However, this code change is not a requirement. It gives builders an option to solve and avoid problems.

Public Comment# 2714

RM20-21

Proposed Change as Submitted

Proponents: Craig Conner, representing self (craig.conner@mac.com); Joseph Lstiburek, representing Myself (joe@buildingscience.com)

2021 International Residential Code

Revise as follows:

M1602.2 Return air openings. Return air openings for heating, *ventilation* and air-conditioning systems shall comply with all of the following:

1. Openings shall not be located less than 10 feet (3048 mm) measured in any direction from an open combustion chamber or draft hood of another *appliance* located in the same room or space.
2. The amount of return air taken from any room or space shall be not greater than the flow rate of supply air delivered to such room or space. <u>Return air taken from mechanical rooms shall serve only the mechanical room and shall be permitted to be taken from mechanical rooms that have no dedicated supply duct.</u>
3. Return and transfer openings shall be sized in accordance with the *appliance* or *equipment* manufacturer's installation instructions, Manual D or the design of the *registered design professional*.

<u>4.</u> <u>Where return air is taken from a mechanical room with combustion appliances only sealed combustion appliances shall be permitted within the mechanical room.</u>

<u>5.</u> <u>Where return air is taken from a mechanical room the pressure differential across the mechanical room door shall be limited to 0.01 inch WC (2.5 pascals) or less by undercutting the door, or installing a louvered door or transfer grille, or by some other means.</u>

~~4~~ <u>6.</u> Return air shall not be taken from a closet, bathroom, toilet room, kitchen, garage, ~~mechanical room, boiler room, furnace room~~ or unconditioned attic.

Exceptions:

1. Taking return air from a kitchen is not prohibited where such return air openings serve the kitchen only, and are located not less than 10 feet (3048 mm) from the cooking *appliances*.
2. Dedicated forced-air systems serving only the garage shall not be prohibited from obtaining return air from the garage.

~~5~~ <u>7.</u> For other than dedicated HVAC systems, return air shall not be taken from indoor swimming pool enclosures and associated deck areas except where the air in such spaces is dehumidified,

~~6~~ <u>8.</u> Taking return air from an unconditioned *crawl space* shall not be accomplished through a direct connection to the return side of a forced-air furnace. Transfer openings in the *crawl space* enclosure shall not be prohibited.

~~7~~ <u>9.</u> Return air from one *dwelling unit* shall not be discharged into another *dwelling unit*.

Reason: Mold growth is now common in boiler rooms, furnace rooms or mechanical rooms due to higher interior moisture loads and less heat gain in such rooms. Allowing a limited amount of return air provides a means of controlling room moisture levels. Providing supply air to such a space exacerbates the problem by making room surfaces colder.
This is one of six separate proposed changes related to controlling mold in closets, bathrooms and mechanical room. The six changes fix problems caused by an increase in code thermal resistance over the past several code cycles.

For a more detailed explanation see:

https://www.buildingscience.com/documents/building-science-insights/bsi-109-how-changing-filters-led-condensation-and-mold-problem

https://www.buildingscience.com/documents/building-science-insights-newsletters/bsi-006-no-good-deed-shall-go-unpunished

Cost Impact: The code change proposal will increase the cost of construction
The code change proposal increases the cost of construction. The cost is the cost of adding the return duct. However, this *code change is not a requirement. It gives builders an option to solve and avoid problems.*

Staff Analysis: Multiple proposals RM18-21, RM19-21 and RM20-21 propose changes to M1602.2. Proposals RM18-21, RM19-21 and RM20-21 comply with CP2 #28 3.3.3 because they address different subject matter within Section M1602.2. RM18-21 addresses bathrooms. RM19-21 addresses closets. RM20-21 addresses boiler rooms and mechanical closets.

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The proposed language is confusing. For example, the statement about return air taken from the mechanical room shall serve only the mechanical room. There is a contradiction in Item 5. The Committee agreed with the intent of the proposal but the language needs more work. The Committee would like to see this brought back in public comment. (8-3)

RM20-21

Individual Consideration Agenda

Public Comment 1:

IRC: M1602.2

Proponents: Craig Conner, representing self (craig.conner@mac.com); Joseph Lstiburek, representing Myself (joe@buildingscience.com) requests As Modified by Public Comment

Modify as follows:

2021 International Residential Code

M1602.2 Return air openings . Return air openings for heating, *ventilation* and air-conditioning systems shall comply with all of the following:

1. Openings shall not be located less than 10 feet (3048 mm) measured in any direction from an open combustion chamber or draft hood of another *appliance* located in the same room or space.
2. The amount of return air taken from any room or ~~space~~ space except mechanical rooms, boiler rooms or furnace rooms shall be not greater than the flow rate of supply air delivered to such room or space. Return air taken from mechanical rooms , boiler rooms or furnace rooms shall serve only the mechanical room and shall be permitted to be taken from mechanical rooms that have no dedicated supply duct.
3. Return and transfer openings shall be sized in accordance with the *appliance* or *equipment* manufacturer's installation instructions, Manual D or the design of the *registered design professional*.
4. Where return air is taken from a mechanical room, boiler room or furnace room with combustion appliances only sealed combustion appliances shall be permitted within the mechanical room.
5. Where return air is taken from a mechanical room, boiler room or furnace room the pressure differential across the mechanical ~~room door~~ room ~~door~~ , boiler room or furnace room door shall be limited to 0.01 inch WC (2.5 pascals) or less by undercutting the door, or installing a louvered door or transfer grille, or by some other means.
6. Return air shall not be taken from a closet, bathroom, toilet room, kitchen, garage, or unconditioned attic.

   Exceptions:

   1. Taking return air from a kitchen is not prohibited where such return air openings serve the kitchen only, and are located not less than 10 feet (3048 mm) from the cooking *appliances*.
   2. Dedicated forced-air systems serving only the garage shall not be prohibited from obtaining return air from the garage.

7. For other than dedicated HVAC systems, return air shall not be taken from indoor swimming pool enclosures and associated deck areas except where the air in such spaces is dehumidified,
8. Taking return air from an unconditioned *crawl space* shall not be accomplished through a direct connection to the return side of a forced-air furnace. Transfer openings in the *crawl space* enclosure shall not be prohibited.
9. Return air from one *dwelling unit* shall not be discharged into another *dwelling unit*.

Commenter's Reason: Mold growth is now common in boiler rooms, furnace rooms or mechanical rooms due to higher interior moisture loads and less heat gain in such rooms. Allowing a limited amount of return air provides a means of controlling room moisture levels. Providing supply air to such a space exacerbates the problem by making room surfaces colder.

https://www.buildingscience.com/documents/building-science-insights/bsi-109-how-changing-filters-led-condensation-and-mold-problem

https://www.buildingscience.com/documents/building-science-insights-newsletters/bsi-006-no-good-deed-shall-go-unpunished

Cost Impact: The net effect of the public comment and code change proposal will increase the cost of construction
The code change proposal increases the cost of construction. The cost is the cost of adding the return duct. However, this code change is not a requirement. It gives builders an option to solve and avoid problems.

Public Comment# 2719

RM26-21

Proposed Change as Submitted

Proponents: Mike Moore, Stator LLC, representing Broan-NuTone (mmoore@statorllc.com)

2021 International Residential Code

Revise as follows:

M1505.4.4 Local exhaust rates. *Local exhaust* systems shall be designed to have the capacity to exhaust the minimum airflow rate determined in accordance with Table M1505.4.4. The listed exhaust airflow rate for bathrooms-toilet rooms shall equal or exceed the exhaust airflow rate in Table M1505.4.4 at a minimum static pressure of 0.25 inch wc in accordance with Section M1505.3.

TABLE M1505.4.4 MINIMUM REQUIRED LOCAL EXHAUST RATES FOR ONE- AND TWO-FAMILY DWELLINGS

AREA TO BE EXHAUSTED	EXHAUST RATES[a]
Kitchens	100 cfm intermittent or 25 cfm continuous
Bathrooms-Toilet Rooms	Mechanical exhaust capacity of 50 cfm intermittent or 20 cfm continuous

For SI: 1 cubic foot per minute = 0.0004719 m^3/s, 1 inch water column = 0.2488 kPa.

~~a. The listed exhaust rate for bathrooms-toilet rooms shall equal or exceed the exhaust rate at a minimum static pressure of 0.25 inch water column in accordance with Section M1505.3.~~

Reason: Traditionally, airflow rates for bathroom-toilet room fans have been listed and reported at 0.1 inch wc; this is still common practice. However, engineering calculations, field measurements, and research have shown that higher static pressures are generally needed to achieve an airflow of 50 cfm through typical exhaust duct configurations. For this reason, Footnote A to Table M1505.4.4 of the IRC has established 0.25 inch wc as the minimum static pressure at which a bathroom-toilet room exhaust fan must achieve a minimum airflow of 50 cfm. An exhaust fan that is listed to provide 50 cfm at 0.1 inch wc may only exhaust 10-30 cfm when installed with a typical exhaust duct configuration. To ensure that builders are selecting fans that can be expected to achieve the required 50 cfm in the field, Footnote A should be moved to the main section.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal is editorial only and does not increase or decrease the cost of construction.

RM26-21

Public Hearing Results

Committee Action: **As Submitted**

Committee Reason: The committee agreed that moving the requirement from the table footnote to the section text was a better location this information. (9-2)

RM26-21

Individual Consideration Agenda

Public Comment 1:

IRC: M1505.4.4

Proponents: Mike Moore, representing Broan-NuTone (mmoore@statorllc.com) requests As Modified by Public Comment

Modify as follows:

2021 International Residential Code

M1505.4.4 Local exhaust rates . *Local exhaust* systems shall be designed to have the capacity to exhaust the minimum airflow rate determined in accordance with Table ~~M1505.4.4. The~~ M1505.4.4 at one or more speed settings . The listed exhaust airflow rate for ~~bathrooms-toilet rooms shall~~ a bathroom or toilet room exhaust fan shall equal or exceed the exhaust airflow rate in Table M1505.4.4 at a minimum static pressure of 0.25 inch wc at one or more speed settings in accordance with Section M1505.3.

Commenter's Reason: Adding the phrase "at one or more speed settings" is needed to align RM26 with the committee's action on RM17 as modified by Mathewson 2. This phrase clarifies that variable speed and multiple speed fans may be used, provided that such fans have at least one speed setting that has "the capacity to exhaust the minimum airflow rate." This clarification is needed to ensure that popular bathroom exhaust fans with multiple speed settings (e.g., 30, 50, and 80 cfm) can be approved, and permits builders to order one SKU across multiple projects that can be customized as necessary to satisfy the targeted ventilation rate (e.g., Table M1505.4.4's 50 cfm intermittent or 20 cfm continuous).
The text is also modified to clarify that the listed airflow rate is a listing associated with the exhaust fan and not with a bathroom or toilet room.

Cost Impact: The net effect of the public comment and code change proposal will not increase or decrease the cost of construction
This proposal clarifies a current requirement and will therefore neither decrease nor increase the cost of construction.

M3-21

Proposed Change as Submitted

Proponents: Tim Earl, representing The Gypsum Association (tearl@gbhinternational.com)

2021 International Mechanical Code

Add new definition as follows:

GYPSUM BOARD. A type of gypsum panel product consisting of a noncombustible core primarily of gypsum with paper surfacing.

GYPSUM WALLBOARD. A gypsum board used primarily as an interior surfacing for building structures.

Reason: This defines terms already used in the code, using definitions already in the IBC and proposed for several other I-Codes this cycle that are also harmonized to ASTM and the industry.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This is a simple terminology update with no impact on cost.

M3-21

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The committee felt that terms currently defined in other I-codes should be revised in the code of origin before being duplicated in this code. The change should come back after that is accomplished. (Vote: 8-3)

M3-21

Individual Consideration Agenda

Public Comment 1:

Proponents: Tim Earl, representing The Gypsum Association (tearl@gbhint.com) requests As Submitted

Commenter's Reason: These terms are used in the IMC and should be defined there. Some committee members questioned the harmonization of the terms across the I-codes. However, as one committee member pointed out, some of those terms are in sections to be addressed in Group B. In order to achieve complete harmonization across the codes, this change must be approved first, to match already drafted changes for Group B codes.

Cost Impact: The net effect of the public comment and code change proposal will not increase or decrease the cost of construction
This is a terminology update with no impact on cost.

Public Comment# 2322

NOTE: M4-21 PART I DID NOT RECEIVE A PUBLIC COMMENT AND IS REPRODUCED FOR INFORMATIONAL PURPOSES ONLY

M4-21 Part I

Proposed Change as Submitted

Proponents: Joseph J. Summers, Chair of the PMGCAC, representing Plumbing, Mechanical and Fuel Gas Code Action Committee (pmgcac@iccsafe.org)

THIS IS A TWO PART CODE CHANGE. PART I WILL BE HEARD BY THE MECHANICAL CODE COMMITTEE. PART II WILL BE HEARD BY THE INTERNATIONAL RESIDENTIAL MECHANICAL/PLUMBING CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THESE COMMITTEES

2021 International Mechanical Code

Delete and substitute as follows:

~~**HEAT PUMP.** A refrigeration system that extracts heat from one substance and transfers it to another portion of the same substance or to a second substance at a higher temperature for a beneficial purpose.~~

HEAT PUMP. A refrigeration system or factory-made appliance that utilizes refrigerant to transfer heat into a space or substance.

Reason: There are two different definitions in the I-codes for "heat pump". The IRC definition identifies heat pumps as an appliance, and the IMC identifies heat pumps as are refrigeration system. This definition is clarifying that a heat pump could be either an appliance or a refrigeration system. This definition is also simplified that a heat pump is transferring heat into a space or substance. The reference to "beneficial purpose" in the IMC is commentary. The proposed new common definition is closely aligned with the term used in the two refrigeration standards referenced in the I-codes, ASHRAE 15 and UL 60335-2-40.
For information purposes, the following are the other definitions:

From the IRC: [MP] HEAT PUMP. An appliance having heating or heating and cooling capability and that uses refrigerants to extract heat from air, liquid or other sources.

From the IMC: HEAT PUMP. A refrigeration system that extracts heat from one substance and transfers it to another portion of the same substance or to a second substance at a higher temperature for a beneficial purpose.

From ASHRAE 15: HEAT PUMP a refrigerating system used to transfer heat into a space or substance.
From UL 60335-2-40: HEAT PUMP appliance which takes up heat at a certain temperature and releases heat at a higher temperature

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This code change proposal will not increase or decrease the cost of construction. This proposal provides clarity and consistency for the use of this term throughout the I-codes.

M4-21 Part I

Public Hearing Results

Committee Action: **As Submitted**

Committee Reason: The committee agrees this is editorial. Based on the reason statement, the definition is clarifying and is closely aligned with the term used in the two refrigeration standards referenced in the I-codes (ASHRAE 15 and UL 60335-2-40). (Vote: 6-5)

M4-21 Part I

M4-21 Part II

Proposed Change as Submitted

Proponents: Joseph J. Summers, representing Plumbing, Mechanical and Fuel Gas Code Action Committee (pmgcac@iccsafe.org)

THIS IS A TWO PART CODE CHANGE. PART 1 WILL BE HEARD BY THE MECHANICAL CODE COMMITTEE. PART 2 WILL BE HEARD BY THE INTERNATIONAL RESIDENTIAL MECHANICAL/PLUMBING CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THESE COMMITTEES

2021 International Residential Code

Delete and substitute as follows:

~~**[MP] HEAT PUMP.** An *appliance* having heating or heating and cooling capability and that uses refrigerants to extract heat from air, liquid or other sources.~~

<u>[MP]</u> <u>HEAT PUMP</u>.
<u>A refrigeration system or factory-made appliance that utilizes refrigerant to transfer heat into a space or substance.</u>

Reason: There are two different definitions in the I-codes for “heat pump”. The IRC definition identifies heat pumps as an appliance, and the IMC identifies heat pumps as are refrigeration system. This definition is clarifying that a heat pump could be either an appliance or a refrigeration system. This definition is also simplified that a heat pump is transferring heat into a space or substance. The reference to “beneficial purpose” in the IMC is commentary. The proposed new common definition is closely aligned with the term used in the two refrigeration standards referenced in the I-codes, ASHRAE 15 and UL 60335-2-40.
For information purposes, the following are the other definitions:

From the IRC: [MP] HEAT PUMP. An appliance having heating or heating and cooling capability and that uses refrigerants to extract heat from air, liquid or other sources.

From the IMC: HEAT PUMP. A refrigeration system that extracts heat from one substance and transfers it to another portion of the same substance or to a second substance at a higher temperature for a beneficial purpose.

From ASHRAE 15: HEAT PUMP a refrigerating system used to transfer heat into a space or substance.
From UL 60335-2-40: HEAT PUMP appliance which takes up heat at a certain temperature and releases heat at a higher temperature

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This code change proposal will not increase or decrease the cost of construction. This proposal provides clarity and consistency for the use of this term throughout the I-codes.

M4-21 Part II

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The definition is not consistent for the consumer trying to do construction, which may be the homeowner. (6-5)

M4-21 Part II

Individual Consideration Agenda

Public Comment 1:

Proponents: Joseph J. Summers, representing Chair of PMGCAC (pmgcac@iccsafe.org) requests As Submitted

PART 2 WILL BE HEARD BY THE INTERNATIONAL RESIDENTIAL MECHANICAL COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THIS COMMITTEE.

PART 2 WILL BE HEARD BY THE INTERNATIONAL RESIDENTIAL MECHANICAL COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THIS COMMITTEE.

Commenter's Reason: M4-21 Part I was approved as submitted. For consistency between the IRC mechanical and the IMC. A term that is used throughout the I-codes should have the same definition. This proposal needs to be approved for consistency. There was no opposing testimony on this proposal.
The PMGCAC is puzzled by the Committee's published reason statement for disapproval. We do not understand why "consumers" or "homeowners" would be confused by the revised definition in a *code*. Code definitions are only for support of the code text where that defined term is used.

One committee member mentioned that the revised definition does not meet the "Websters" definition... Here is Webster's definition (note the underline):

": an apparatus for heating or cooling (such as a building) by transferring heat by mechanical means from or to an external reservoir (such as the ground, water, or outside air)"

From the Energy.gov webpage on Heat Pumps:

"For climates with moderate heating and cooling needs, heat pumps offer an energy-efficient alternative to furnaces and air conditioners. Like your refrigerator, <u>heat pumps use electricity to move heat </u>from a cool space to a warm space, making the cool space cooler and the warm space warmer. During the heating season, <u>heat pumps move heat </u>from the cool outdoors into your warm house and during the cooling season, heat pumps move heat from your cool house into the warm outdoors. <u>Because they move heat rather than generate heat</u>, heat pumps can provide equivalent space conditioning at as little as one quarter of the cost of operating conventional heating or cooling appliances."

We urge the voters to approve this proposal to make terminology consistent across the codes and in agreement with other standards.

Cost Impact: The net effect of the public comment and code change proposal will not increase or decrease the cost of construction
This proposal is only a clarification of a definition.

Public Comment# 2443

M16-21

Proposed Change as Submitted

Proponents: Mike Moore, Stator LLC, representing Broan-NuTone (mmoore@statorllc.com)

2021 International Mechanical Code

Revise as follows:

401.4 Intake opening location. Air intake openings shall comply with all of the following:

1. Intake openings shall be located not less than 10 feet (3048 mm) from lot lines or buildings on the same lot.
2. Mechanical and gravity outdoor air intake openings shall be located not less than 10 feet (3048 mm) horizontally from any hazardous or noxious contaminant source, such as vents, streets, alleys, parking lots and loading docks, except as specified in Item 3 or Section 501.3.1. Outdoor air intake openings shall be permitted to be located less than 10 feet (3048 mm) horizontally from streets, alleys, parking lots and loading docks provided that the openings are located not less than 25 feet (7620 mm) vertically above such locations. Where openings front on a street or public way, the distance shall be measured from the closest edge of the street or public way.
3. Intake openings shall be located not less than 3 feet (914 mm) below contaminant sources where such sources are located within 10 feet (3048 mm) of the opening. Separation is not required between intake air openings and living space *exhaust air* openings of an individual *dwelling unit* or *sleeping unit* where a~~n approved~~ factory-built intake/exhaust combination termination fitting is used to separate the air streams in accordance with the *appliance* manufacturer's instructions.
4. Intake openings on structures in flood hazard areas shall be at or above the elevation required by Section 1612 of the *International Building Code* for utilities and attendant *equipment*.

501.3.1 Location of exhaust outlets. The termination point of exhaust outlets and ducts discharging to the outdoors shall be located with the following minimum distances:

1. For ducts conveying explosive or flammable vapors, fumes or dusts: 30 feet (9144 mm) from property lines; 10 feet (3048 mm) from operable openings into buildings; 6 feet (1829 mm) from exterior walls and roofs; 30 feet (9144 mm) from combustible walls and operable openings into buildings that are in the direction of the exhaust discharge; 10 feet (3048 mm) above adjoining grade.
2. For other product-conveying outlets: 10 feet (3048 mm) from the property lines; 3 feet (914 mm) from exterior walls and roofs; 10 feet (3048 mm) from operable openings into buildings; 10 feet (3048 mm) above adjoining grade.
3. For all *environmental air* exhaust: 3 feet (914 mm) from property lines; 3 feet (914 mm) from operable openings into buildings for all *occupancies* other than Group U; and 10 feet (3048 mm) from mechanical air intakes. Such exhaust shall not be considered hazardous or noxious. Separation is not required between intake air openings and living space *exhaust air* openings of an individual *dwelling unit* or *sleeping unit* where a~~n approved~~ factory-built intake/exhaust combination termination fitting is used to separate the air streams in accordance with the *appliance* manufacturer's instructions.
4. Exhaust outlets serving structures in flood hazard areas shall be installed at or above the elevation required by Section 1612 of the International Building Code for utilities and attendant *equipment*.
5. For specific systems, see the following sections:

   5.1. Clothes dryer exhaust, Section 504.4.

   5.2. Kitchen hoods and other kitchen exhaust *equipment*, Sections 506.3.13, 506.4 and 506.5.

   5.3. Dust, stock and refuse conveying systems, Section 511.2.

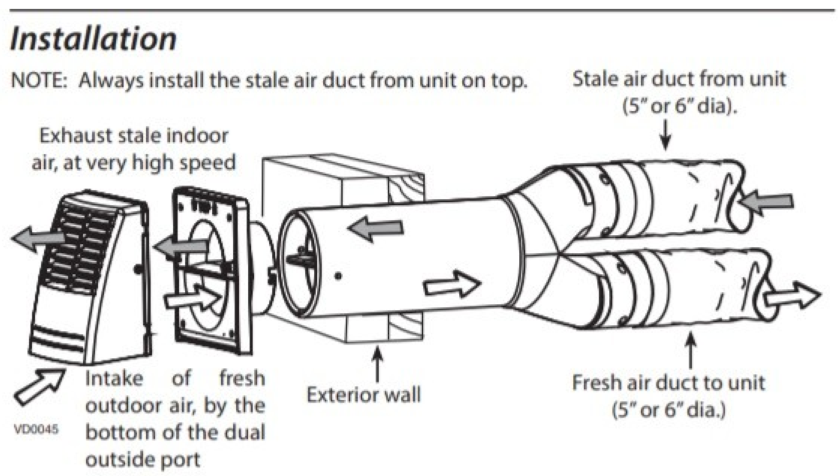
   5.4. Subslab soil exhaust systems, Section 512.4.

   5.5. Smoke control systems, Section 513.10.3.

   5.6. Refrigerant discharge, Section 1105.7.

   5.7. *Machinery room* discharge, Section 1105.6.1.

Reason: Factory-built intake/exhaust combination termination fittings are regularly provided by manufacturers and installed by builders to separate mechanical air intakes from mechanical exhaust serving dwelling unit or sleeping unit mechanical ventilation systems. The included image from a ventilation system manufacturer's installation instructions provides an example of a typical fitting serving this purpose.



IMC Sections 401.4 and 501.3.1 approve the use of "approved factory-built intake/exhaust combination termination fittings" to separate the air streams associated with mechanical intake air openings and living space exhaust air, when the fitting is provided in accordance with manufacturer's instructions. Similarly, Section G2407.1 of the Fuel Gas Code (see below for reference) approves the use of concentric vent termination fittings to separate combustion air from flue gases provided that such fittings are installed "in accordance with the appliance manufacturer's instructions". Like the Fuel Gas Code's treatment of concentric vent termination fittings, no special approval should be required for factory-built intake/exhaust combination termination fittings when installed in accordance with appliance manufacturer's instructions.

Fuel Gas Code reference: "G2407.1 (304.1) General. ...Direct-vent appliances, gas appliances of other than natural draft design, vented gas appliances not designated as Category I and appliances equipped with power burners, shall be provided with combustion, ventilation and dilution air in accordance with the appliance manufacturer's instructions."

Cost Impact: The code change proposal will decrease the cost of construction
Removing requirements for special approval of factory-built intake/exhaust combination termination fittings can be expected to reduce labor costs for builders, contractors, and code officials.

M16-21

Public Hearing Results

Committee Action: **As Submitted**

Committee Reason: This proposal was approved as submitted based on the proponent reason statement. Factory-built intake/exhaust combination termination fittings are regularly provided by manufacturers and installed by builders to separate mechanical air intakes from mechanical exhaust serving dwelling unit or sleeping unit mechanical ventilation systems. Special approval should not be required for these types of fittings when installed in accordance with the manufacturer installation instructions. (Vote: 6-5)

M16-21

Individual Consideration Agenda

Public Comment 1:

IMC: 401.4, 501.3.1

Proponents: Joseph J. Summers, representing Chair of PMGCAC (pmgcac@iccsafe.org) requests As Modified by Public Comment

Modify as follows:

2021 International Mechanical Code

401.4 Intake opening location . Air intake openings shall comply with all of the following:

1. Intake openings shall be located not less than 10 feet (3048 mm) from lot lines or buildings on the same lot.
2. Mechanical and gravity outdoor air intake openings shall be located not less than 10 feet (3048 mm) horizontally from any hazardous or noxious contaminant source, such as vents, streets, alleys, parking lots and loading docks, except as specified in Item 3 or Section 501.3.1. Outdoor air intake openings shall be permitted to be located less than 10 feet (3048 mm) horizontally from streets, alleys, parking lots and loading docks provided that the openings are located not less than 25 feet (7620 mm) vertically above such locations. Where openings front on a street or public way, the distance shall be measured from the closest edge of the street or public way.
3. Intake openings shall be located not less than 3 feet (914 mm) below contaminant sources where such sources are located within 10 feet (3048 mm) of the opening. Separation is not required between intake air openings and living space *exhaust air* openings of an individual *dwelling unit* or *sleeping unit* where a factory-built intake/exhaust combination termination fitting is used to separate the air streams in accordance with the ~~*appliance*~~ fan manufacturer's instructions.
4. Intake openings on structures in flood hazard areas shall be at or above the elevation required by Section 1612 of the *International Building Code* for utilities and attendant *equipment*.

501.3.1 Location of exhaust outlets . The termination point of exhaust outlets and ducts discharging to the outdoors shall be located with the following minimum distances:

1. For ducts conveying explosive or flammable vapors, fumes or dusts: 30 feet (9144 mm) from property lines; 10 feet (3048 mm) from operable openings into buildings; 6 feet (1829 mm) from exterior walls and roofs; 30 feet (9144 mm) from combustible walls and operable openings into buildings that are in the direction of the exhaust discharge; 10 feet (3048 mm) above adjoining grade.
2. For other product-conveying outlets: 10 feet (3048 mm) from the property lines; 3 feet (914 mm) from exterior walls and roofs; 10 feet (3048 mm) from operable openings into buildings; 10 feet (3048 mm) above adjoining grade.
3. For all *environmental air* exhaust: 3 feet (914 mm) from property lines; 3 feet (914 mm) from operable openings into buildings for all *occupancies* other than Group U; and 10 feet (3048 mm) from mechanical air intakes. Such exhaust shall not be considered hazardous or noxious. Separation is not required between intake air openings and living space *exhaust air* openings of an individual *dwelling unit* or *sleeping unit* where a factory-built intake/exhaust combination termination fitting is used to separate the air streams in accordance with the ~~*appliance*~~ fan manufacturer's instructions.
4. Exhaust outlets serving structures in flood hazard areas shall be installed at or above the elevation required by Section 1612 of the International Building Code for utilities and attendant *equipment*.
5. For specific systems, see the following sections:

    5.1. Clothes dryer exhaust, Section 504.4.

    5.2. Kitchen hoods and other kitchen exhaust *equipment*, Sections 506.3.13, 506.4 and 506.5.

    5.3. Dust, stock and refuse conveying systems, Section 511.2.

    5.4. Subslab soil exhaust systems, Section 512.4.

    5.5. Smoke control systems, Section 513.10.3.

    5.6. Refrigerant discharge, Section 1105.7.

    5.7. *Machinery room* discharge, Section 1105.6.1.

Commenter's Reason: The PMGCAC believes that use of the word "fan" instead of "appliance" will better clarify the intent of this proposal that factory-built intake/exhaust combination terminations are approved when recognized for use by the manufacturer of the connected ventilation fan. In the case that a voter is not familiar with these terminations, which were first approved in the 2021 IMC, intake/exhaust combination terminations are regularly installed with heating and energy recovery ventilators (H/ERVs) used for dwelling units. Their use reduces building penetrations, labor, and associated system costs. By reducing the number of penetrations, air leakage can also be reduced, resulting in space conditioning energy savings. Further, the durability of the structure can be improved through reducing entry pathways for bulk water. Manufacturer tests conducted by Natural Resources Canada (NRC) have demonstrated that use of intake/exhaust combination terminations results in minimum cross-contamination of airflows (i.e., not exceeding 4%; see NRC report A1- 007793). These results are aligned with ASHRAE 62.2 approval of such devices, which limits cross-contamination to 10%, as verified by the manufacturer. Approval of this proposed modification is expected to result in an easier path to approval for these more affordable and architecturally flexible terminations.

Bibliography: Ouazia, B. 2016. Evaluation of a dual hood performance in term of contaminant re-entrainment from exhaust to supply. A1-007793. National Research Council Canada. For a copy of the report, please contact the proponent at the email address provided.

Cost Impact: The net effect of the public comment and code change proposal will decrease the cost of construction
This PC is aligned with the intent of the original proposal that was approved by the committee and can decrease the cost of construction for the same reasons provided in the original proposal.

Public Comment# 2321

M18-21

Proposed Change as Submitted

Proponents: Joseph J. Summers, Chair of the PMGCAC, representing Plumbing, Mechanical and Fuel Gas Code Action Committee (PMGCAC@iccsafe.org)

2021 International Mechanical Code

Revise as follows:

SUPPLY AIR SYSTEM. An assembly of connected ducts,*plenums*, fittings, registers and grilles through which air, ~~heated or cooled~~ conditioned or unconditioned is conducted from the supply unit to the space or spaces to be ~~heated or cooled~~ conditioned or unconditioned (see also Return air system).

403.1 Ventilation system. Mechanical ventilation shall be provided by a method of supply air and return or *exhaust air* ~~except that mechanical ventilation air requirements for Group R-2, R-3 and R-4 *occupancies* shall be provided by an exhaust system, supply system or combination thereof~~. The amount of supply air shall be approximately equal to the amount of return and *exhaust air*. The system shall not be prohibited from producing negative or positive pressure. The system to convey *ventilation air* shall be designed and installed in accordance with Chapter 6.

Exception: Systems that are in accordance with Section 403.3.2.1.

403.3.2.1 Outdoor air for dwelling units. An outdoor air ventilation system consisting of a mechanical exhaust system, supply system or combination thereof shall be installed for each *dwelling unit*. Local exhaust or supply systems, including outdoor air ducts connected to the return side of an air handler, are permitted to serve as such a system. The outdoor air ventilation system shall be designed to provide the required rate of outdoor air continuously during the period that the building is occupied. The minimum continuous outdoor airflow rate shall be determined in accordance with Equation 4-9.

$$Q_{OA} = 0.01 A_{floor} + 7.5(N_{br} + 1)$$ **(Equation 4-9)**

where:

Q_{OA} = outdoor airflow rate, cfm

A_{floor} = floor area, ft^2

N_{br} = number of bedrooms; not to be less than one

Exceptions:

1. The outdoor air ventilation system is not required to operate continuously where the system has controls that enable operation for not less than 1 hour of each 4-hour period. The average outdoor airflow rate over the 4-hour period shall be not less than that prescribed by Equation 4-9.
2. The minimum mechanical ventilation rate determined in accordance with Equation 4-9 shall be reduced by 30 percent provided that both of the following conditions apply:

   2.1. A ducted system supplies ventilation air directly to each bedroom and to one or more of the following rooms:

      2.1.1. Living room.

      2.1.2. Dining room.

      2.1.3. Kitchen.

   2.2. The whole-house ventilation system is a *balanced ventilation* system.

Reason: Section 1020.5 of the IBC prohibits corridors from serving as “ventilation air ducts”. However, changes to the 2012 IMC introduced approval of mechanical ventilation systems that do not comply with this requirement. Specifically, when an exhaust-only ventilation system is specified to provide outdoor air for a dwelling unit whose entrance door is not located on an exterior wall (i.e., a dwelling unit opening onto a corridor that is not open to the atmosphere, referred to as a “corridor” within this rationale), we can expect much of the ventilation air to be conveyed through the corridor. This claim is supported by a study showing that for recently constructed dwelling units, approximately 40% of dwelling unit leakage area is to the corridor.* Operating an exhaust-only outdoor air ventilation system in a dwelling unit with an entrance door located on a corridor can be expected to establish a pressure differential with respect to the corridor, forcing a large percentage of the dwelling unit ventilation air to be conveyed by the corridor, in violation of IBC Section 1020.5. To coordinate IBC Section 1020.5 with IMC Sections 403.3.2.1 and 403.1, this proposal reestablishes the pre-2012 requirement for mechanical ventilation systems to supply outdoor ventilation air to the dwelling units without using the

corridor to convey the outdoor ventilation air.
This proposal also modifies the IMC definition of “supply air system” to ensure that it can apply to ventilation systems as well as heating and cooling systems. The term “supply air system” is used only once within the body of the 2021 IMC, and its use is not italicized; so the definition of “supply air system” does not currently apply anywhere within the IMC and its modification would not affect any other section (see the Preface section of the IMC for more information on use of italicized terms).

This proposal coordinates the IBC Section 1020.5 requirements with the IMC while maintaining the ability to use exhaust-only ventilation systems for provision of outdoor air for a dwelling unit whose entrance door is located on an exterior wall. The IBC defines an Exterior Wall as follows: “EXTERIOR WALL. A wall, bearing or nonbearing, that is used as an enclosing wall for a building, other than a fire wall, and that has a slope of 60 degrees (1.05 rad) or greater with the horizontal plane.”

This proposal is submitted by the ICC Plumbing/Mechanical/Gas Code Action Committee (PMG CAC). The PMG CAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2020, the PMG CAC has held several virtual meetings open to any interested party. Numerous interested parties attended the committee meetings and offered their input. Related documentation and reports are posted on the PMG CAC website at: https://www.iccsafe.org/products-and-services/i-codes/code-development-process/pmg-code-action-committee-pmgcac/ Reference PMGCAC Working Document Item 34.

Bibliography: Bohac D., and Sweeney L. 2020. Energy Code Field Studies: Low-Rise Multifamily Air Leakage Testing. Prepared by the Center for Energy and Environment, Ecotope, and The Energy Conservatory. Prepared for the U.S. Department of Energy Office of Energy Efficiency & Renewable Energy. https://www.energycodes.gov/sites/default/files/documents/LRMF_AirLeakageTesting_FinalReport_2020-07-06.pdf. [See Table 45, which shows average leakage to “common” area of 42%. The report also notes, “for buildings in this study, “common areas” are made up almost completely of corridors and a few small rooms such as mechanical closets and elevator rooms.]

Cost Impact: The code change proposal will not increase or decrease the cost of construction
IBC Section 1020.5 prohibits corridors from serving as “ventilation air ducts”. So presumably, the more restrictive provision of this section of the IBC would prevail over the permissive language in IMC 403.3.2.1 that permits the use of an exhaust system for provision of outdoor air for any Group R-2, R-3, or R-4 dwelling unit. Because this change only coordinates IMC requirements with what the (more restrictive) IBC already requires, no additional material or labor costs are associated with this proposal.

M18-21

Public Hearing Results

Committee Action: **Disapproved**

Committee Modification:

Committee Reason: The committee finds the proposal is confusing as written with respect to the definition of supply air systems and its relationship to the definition of return air systems. (Vote: 10-1)

M18-21

Individual Consideration Agenda

Public Comment 1:

IMC: 403.1, 403.3.2.1

Proponents: Joseph J. Summers, representing Chair of PMGCAC (pmgcac@iccsafe.org) requests As Modified by Public Comment

Replace as follows:

2021 International Mechanical Code

403.1 Ventilation system . Mechanical ventilation shall be provided by a method of supply air and return or *exhaust air* ~~except that mechanical ventilation air requirements for Group R-2, R-3 and R-4~~ ~~*occupancies*~~ ~~shall be provided by an exhaust system, supply system or combination thereof~~. The amount of supply air shall be approximately equal to the amount of return and *exhaust air*. The system shall not be prohibited from producing negative or positive pressure. The system to convey *ventilation air* shall be designed and installed in accordance with Chapter 6.

Exception: Systems that are in accordance with Section 403.3.2.1 and Chapter 6.

403.3.2.1 Outdoor air for dwelling units . For each dwelling unit where all entrance doors are located on an exterior wall, ~~A~~ an outdoor air ventilation system consisting of a mechanical exhaust system, supply system, or ~~combination thereof~~ balanced ventilation system shall be installed ~~for each *dwelling unit*~~. For other dwelling units, an outdoor air ventilation system consisting of a mechanical supply system or balanced ventilation system shall be installed to supply outdoor air directly to the dwelling unit in accordance with Section 601.2. Local exhaust or supply systems, including outdoor air ducts connected to the return side of an air handler, are permitted to serve as such a system. The outdoor air ventilation system shall be designed to provide the required rate of outdoor air continuously during the period that the building is occupied. The minimum continuous outdoor airflow rate shall be determined in accordance with Equation 4-9.

$$Q_{OA} = 0.01 A_{floor} + 7.5(N_{br} + 1)$$ **(Equation 4-9)**

where:

Q_{OA} = outdoor airflow rate, cfm

A_{floor} = floor area, ft^2

N_{br} = number of bedrooms; not to be less than one

Exceptions:

1. The outdoor air ventilation system is not required to operate continuously where the system has controls that enable operation for not less than 1 hour of each 4-hour period. The average outdoor airflow rate over the 4-hour period shall be not less than that prescribed by Equation 4-9.
2. The minimum mechanical ventilation rate determined in accordance with Equation 4-9 shall be reduced by 30 percent provided that both of the following conditions apply:

   2.1. A ducted system supplies ventilation air directly to each bedroom and to one or more of the following rooms:

      2.1.1. Living room.

      2.1.2. Dining room.

      2.1.3. Kitchen.

   2.2. The whole-house ventilation system is a *balanced ventilation* system.

Commenter's Reason: This PC replaces the original proposal, so the modifications that are shown are modifications to the 2021 IMC. Operating an exhaust-only outdoor air ventilation system in a dwelling unit with an entrance door located on a corridor can be expected to establish a pressure differential with respect to the corridor, drawing a large percentage of the dwelling unit ventilation air from the corridor (see the bibliography for more information), in violation of IBC Section 1020.5 and IMC 601.2. To coordinate IBC Section 1020.5 and IMC 601.2 with IMC Sections 403.3.2.1 and 403.1, this proposal reestablishes the pre-2012 IMC requirement for mechanical ventilation systems to supply outdoor air to dwelling units without using the corridor. The IMC committee rejected the original proposal because it did not agree with the modifications to the definition of supply air system. To resolve the committee's concerns, these modifications have been removed from this public comment.

Bibliography: Bohac D., and Sweeney L. 2020. Energy Code Field Studies: Low-Rise Multifamily Air Leakage Testing. Prepared by the Center for Energy and Environment, Ecotope, and The Energy Conservatory. Prepared for the U.S. Department of Energy Office of Energy Efficiency & Renewable Energy. https://www.energycodes.gov/sites/default/files/documents/LRMF_AirLeakageTesting_FinalReport_2020-07-06.pdf. [See Table 45, which shows average leakage to “common” area of 42% for 211 tightly-constructed dwelling units in 20 buildings of new construction located in 6 states. The report also notes, “for buildings in this study, “common areas” are made up almost completely of corridors and a few small rooms such as mechanical closets and elevator rooms. The 42% leakage did not include leakage around the door separating a dwelling unit from the corridor, which would have further increased this value.]

Cost Impact: The net effect of the public comment and code change proposal will not increase or decrease the cost of construction
IBC Section 1020.5 and IMC Section 601.2 prohibit corridors from serving as “ventilation air ducts”. So presumably, the more restrictive provision of these sections of the IBC and IMC would prevail over the language in IMC 403.3.2.1 that permits the use of an exhaust system for provision of outdoor air for any Group R-2, R-3, or R-4 dwelling unit. Because this change only coordinates IMC 403.3.2.1 requirements with what the (more restrictive) IBC and IMC sections already require, no additional material or labor costs are associated with this proposal.

Public Comment# 2256

M19-21

Proposed Change as Submitted

Proponents: Joseph Summers, representing Chair of PMGCAC (PMGCAC@iccsafe.org)

2021 International Mechanical Code

Revise as follows:

403.3.1 Other buildings intended to be occupied. The design of local exhaust systems and ventilation systems for outdoor air for *occupancies* other than Group R-2, R-3 and R-4 ~~three stories and less above grade plane~~ shall comply with Sections 403.3.1.1 through 403.3.1.4.

403.3.2 Group R-2, R-3 and R-4 occupancies~~, three stories and less~~. The design of local exhaust systems and ventilation systems for outdoor air in Group R-2, R-3 and R-4 *occupancies* ~~three stories and less in height above grade plane~~ shall comply with Sections 403.3.2.1 through 403.3.2.5.

403.3.2.1 Outdoor air for dwelling units. An outdoor air ventilation system consisting of a mechanical exhaust system, supply system or combination thereof shall be installed for each*dwelling unit*. Local exhaust or supply systems, including outdoor air ducts connected to the return side of an air handler, are permitted to serve as such a system. The outdoor air ventilation system shall be designed to provide the required rate of outdoor air continuously during the period that the building is occupied. The minimum continuous outdoor airflow rate shall be determined in accordance with Equation 4-9.

$$Q_{OA} = 0.01 A_{floor} + 7.5(N_{br} + 1)$$ **(Equation 4-9)**

where:

Q_{OA} = outdoor airflow rate, cfm

A_{floor} = conditioned floor area, ft^2

N_{br} = number of bedrooms; not to be less than one

Exceptions:

1. The outdoor air ventilation system is not required to operate continuously where the system has controls that enable operation for not less than 1 hour of each 4-hour period. The average outdoor airflow rate over the 4-hour period shall be not less than that prescribed by Equation 4-9.
2. The minimum mechanical ventilation rate determined in accordance with Equation 4-9 shall be reduced by 30 percent provided that both of the following conditions apply:

   2.1. A ducted system supplies ventilation air directly to each bedroom and to one or more of the following rooms:

      2.1.1. Living room.

      2.1.2. Dining room.

      2.1.3. Kitchen.

   2.2. The whole-house ventilation system is a *balanced ventilation* system.

Reason: Prior to 2015, the IMC used the same mechanical ventilation outdoor airflow rate calculation procedure for all R-2, R-3, and R-4 dwelling units. Beginning in 2015, a new calculation procedure was introduced in the IMC for low-rise R-2, R-3, and R-4 dwelling units. This 2015 calculation procedure was based on the airflow equation used in ASHRAE 62.2-2010, which was developed for leaky, detached, single-family homes (bad assumption!). Applying this ventilation equation and associated assumptions to tight, attached, low-rise R-2, R-3, and R-4 dwelling units results in extremely low flow rates that are a fraction of what was previously required by the IMC (1/3 less), what is currently required by ASHRAE 62.2 (1/3 less), and what is currently required by ASHRAE 62.1 (1/2 less).
Since 2015, ASHRAE 62.2 has revised its airflow rate calculation procedure for attached dwelling units, based on infiltration assumptions that are relevant to attached dwelling units, and the result is much closer to that required by required by the 2012 IMC for all private dwelling units and by the 2021 IMC for all private dwelling units that are not in low-rise R-2, R-3, and R-4 buildings. The rate required for IMC low-rise R-2, R-3, and R-4 dwelling units should also be revised to avoid under-ventilation that can lead to poor IAQ and negative health outcomes. Avoiding under-ventilating is especially important for IAQ in high-density multifamily dwelling units.

Following are calculations showing the outdoor airflow rate (QOA) required by various methods and demonstrating the deficiency of the ventilation rates for IMC low-rise R-2, R-3, and R-4 dwelling units. The rate calculated is for a 2-bedroom, 800 ft2 apartment with 8 ft ceilings (volume = 6400 ft3)

Method A: 2015-2021 IMC, dwelling units in low-rise R-2, R-3, and R-4 buildings (same equation used in ASHRAE 62.2-2010):

QOA = 0.01 cfm/ft2*ConditionedFloorArea + 7.5*(NumberBedrooms + 1)

= 0.01*800 + 7.5*(2+1)

= 8 + 22.5

= 30.5 cfm [This rate is 1/3 less than the 2012 IMC, 1/3 less than ASHRAE 62.2-2019, and ½ less than ASHRAE 62.1-2019]

Method B: 2012 IMC, all private dwelling units (same equation used in 2021 IMC for all private dwelling units that are not in low-rise R-2, R-3, and R-4 buildings):

QOA = Max [0.35 ACH, (15 cfm/person)*(2 persons for first bedroom and 1 person for second bedroom)]

= Max [0.35ACH*(6400 ft3)*(1-hr/60-min), 45]

= Max [37, 45]

= 45 cfm

Method C: ASHRAE 62.2-2019, all non-transient vertically attached dwelling units

QOA = 0.03 cfm/ft2*ConditionedFloorArea + 7.5*(NumberBedrooms + 1)

= 0.03*800 + 7.5*(2+1)

= 24 + 22.5

= 46.5 cfm [This method is proposed within this proposal. Note that this method produces values that are very close to those in Method B (i.e., the 2012 IMC for all private dwelling units and the 2021 IMC for all private dwelling units that are not in low-rise R-2, R-3, and R-4 buildings]

Method D: ASHRAE 62.1-2019, all transient dwelling units:

QOA = 0.06 cfm/ft2*ConditionedFloorArea + (5 cfm/person)*(2 persons for first bedroom and 1 person for second bedroom)

= 0.06*800 + 5*3

= 0.06*800 + 5*3

= 48 + 15

= 63 cfm

This proposal is submitted by the ICC Plumbing/Mechanical/Gas Code Action Committee (PMG CAC). The PMG CAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2020, the PMG CAC has held several virtual meetings open to any interested party. Numerous interested parties attended the committee meetings and offered their input. Related documentation and reports are posted on the PMG CAC website at: https://www.iccsafe.org/products-and-services/i-codes/code-development-process/pmg-code-action-committee-pmgcac/ Reference PMGCAC Working Document Item 38.

Cost Impact: The code change proposal will increase the cost of construction

An increase in required ventilation rate could, in some situations, require a “step up” to the next size of ventilation equipment or a “step up” to the next duct size in some parts of systems. Generally, next size “step-ups” will have some increased material costs but this would not always be the case for every project.

M19-21

Public Hearing Results

Committee Action: **As Modified**

Committee Modification:

403.3.2.1Outdoor air for dwelling units.
An outdoor air ventilation system consisting of a mechanical exhaust system, supply system or combination thereof shall be installed for each *dwelling unit*. Local exhaust or supply systems, including outdoor air ducts connected to the return side of an air handler, are permitted to serve as such a system. The outdoor air ventilation system shall be designed to provide the required rate of outdoor air continuously during the period that the building is occupied. The minimum continuous outdoor airflow rate shall be determined in accordance with Equation 4-9.

$Q_{OA}= \cancel{0.01}\ \underline{0.03}\ A_{floor} +7.5(N_{br}+1)$ **(Equation 4-9)**
where:

Q_{OA} = outdoor airflow rate, cfm

A_{floor} = conditioned floor area, ft^2

N_{br} = number of bedrooms; not to be less than one

Exceptions:

1. The outdoor air ventilation system is not required to operate continuously where the system has controls that enable operation for not less than 1 hour of each 4-hour period. The average outdoor airflow rate over the 4-hour period shall be not less than that prescribed by Equation 4-9.
2. The minimum mechanical ventilation rate determined in accordance with Equation 4-9 shall be reduced by 30 percent provided that both of the following conditions apply:

   2.1. A ducted system supplies ventilation air directly to each bedroom and to one or more of the following rooms:

      2.1.1. Living room.

      2.1.2. Dining room.

      2.1.3. Kitchen.

   2.2. The whole-house ventilation system is a *balanced ventilation* system.

Committee Reason: The proposal has passed as modified as the language is trying to align with ASHRAE 62.2 to avoid underventilation of spaces. (Vote: 7-4)

M19-21

Individual Consideration Agenda

Public Comment 1:

Proponents: Dan Buuck, representing National Association of Home Builders (dbuuck@nahb.org) requests Disapprove

Commenter's Reason: The proposal does not provide evidence of issues in homes built to meet the current ventilation rates and building tightness criteria. However, the added ventilation would increase energy use and lead to issues with indoor relative humidity. An analysis of increased ventilation rates showed that the added humid air would require supplemental dehumidification in homes located as far north as Virginia, D.C., and Maryland. Supplemental dehumidification is expensive and onerous to install and to maintain. In cold climates, the added ventilation will lead to low indoor relative humidity during the heating season and will trigger the need for supplemental humidification, which can be similarly expensive and onerous to install and to maintain. If not monitored optimally, the supplemental humidification can lead to moisture issues due to increased vapor drive through the exterior envelope. The increased energy use is the result of the additional demand for sensible heat (cooling/heating), latent heat (relative humidity control), and fan energy.

Cost Impact: The net effect of the public comment and code change proposal will not increase or decrease the cost of construction
No change to code.

Public Comment# 2615

Public Comment 2:

Proponents: Craig Conner, representing self (craig.conner@mac.com); Joseph Lstiburek, representing Myself (joe@buildingscience.com) requests Disapprove

Commenter's Reason: Current dwelling units are not under ventilated. There are no indoor contaminant data studies that baseline existing conditions in Code compliant buildings. Nor are there health studies linking residential occupancy health to ventilation rates. Changing Equation 4-9 results in a huge increase in ventilation of 60 percent of greater. Increasing the ventilation rate by 60 percent or greater will lead to excessive humidity issues in hot humid and mixed humid climates. We already see this with the ASHRAE 62.2 rate in single family detached dwellings which is 50 percent higher than the code rate. The higher rates require dehumidifiers and high end a/c systems to address the “part-load” humidity issue. In cold climates it leads to excessive dryness and a need for “energy recovery ventilators” (ERV’s) to preserve indoor humidity and avoid humidifiers. The changes will lead to significantly increased operating costs (energy) and significantly increased construction costs (dehumidifiers, higher moisture removal a/c, and energy recovery ventilators (ERV’s).

If the issue of concern is IAQ and a lack of ventilation then the correct approach to increase the ventilation rate requirement would have to be justified by real indoor contaminant data and real health studies.

Cost Impact: The net effect of the public comment and code change proposal will not increase or decrease the cost of construction
No change to cost.

Public Comment# 2723

M23-21

Proposed Change as Submitted

Proponents: Mike Moore, Stator LLC, representing Broan-NuTone (mmoore@statorllc.com)

2021 International Mechanical Code

Revise as follows:

BALANCED VENTILATION SYSTEM. ~~Any combination of concurrently operating mechanical exhaust and mechanical supply whereby the total mechanical exhaust airflow rate is within 10 percent of the total mechanical supply airflow rate.~~ <u>A ventilation system where the total mechanical supply airflow and total mechanical exhaust airflow are simultaneously within 10 percent of their average. The balanced ventilation system airflow is the average of the mechanical supply and mechanical exhaust airflows.</u>

403.3.2.1 Outdoor air for dwelling units. An outdoor air ventilation system consisting of a mechanical exhaust system, supply system or combination thereof shall be installed for each *dwelling unit*. Local exhaust or supply systems, including outdoor air ducts connected to the return side of an air handler, are permitted to serve as such a system. The outdoor air ventilation system shall be designed to provide the required rate of outdoor air continuously during the period that the building is occupied. The minimum continuous outdoor airflow rate shall be determined in accordance with Equation 4-9.

$$Q_{OA} = 0.01A_{floor} + 7.5(N_{br} + 1)$$ **(Equation 4-9)**

where:

Q_{OA} = outdoor airflow rate, cfm

A_{floor} = floor area, ft^2

N_{br} = number of bedrooms; not to be less than one

Exceptions:

1. The outdoor air ventilation system is not required to operate continuously where the system has controls that enable operation for not less than 1 hour of each 4-hour period. The average outdoor airflow rate over the 4-hour period shall be not less than that prescribed by Equation 4-9.
2. The minimum mechanical ventilation rate determined in accordance with Equation 4-9 shall be reduced by 30 percent provided that both of the following conditions apply:

   2.1. A ducted system supplies ventilation air directly to each bedroom and to one or more of the following rooms:

   2.1.1. Living room.

   2.1.2. Dining room.

   2.1.3. Kitchen.

   2.2. The whole-house ventilation system is a *balanced ventilation* ~~system~~ *system*.

Reason: The 2021 versions of the IMC and IRC introduced a 30% ventilation rate credit for dwelling units with systems providing balanced ventilation. Because these changes were based on the approval of multiple proposals, their approval resulted in different definitions for *balanced ventilation* and *balanced ventilation system* across the IRC and IMC. This proposal and its companion proposal to the IRC are correlation proposals that will align the terminology, definitions, and their application across both codes. The change that is proposed in Section 403.3.2.1 is italicizing the word "system" within the phrase "*balanced ventilation system*" so that the user is directed to the corresponding definition.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This change is editorial and therefore will not increase or decrease the cost of construction.

M23-21

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The proposal is poorly worded using words such as "average". It is not clearly defined text and is confusing, implying that air force rate should be within 10% of their average. (Vote: 11-0)

M23-21

Individual Consideration Agenda

Public Comment 1:

IMC: SECTION 202

Proponents: Joseph J. Summers, representing Chair of PMGCAC (pmgcac@iccsafe.org) requests As Modified by Public Comment

Modify as follows:

2021 International Mechanical Code

BALANCED VENTILATION SYSTEM. ~~A ventilation system where the total mechanical supply airflow and total mechanical exhaust airflow are simultaneously within 10 percent of their average. The balanced ventilation system airflow is the average of the mechanical supply and mechanical exhaust airflows.~~ A ventilation system that simultaneously supplies outdoor air to and exhausts air from a space, where the mechanical supply airflow rate and the mechanical exhaust airflow rate are each within 10% of the average of the two airflow rates.

Commenter's Reason: The PMGCAC worked with the proponent to revise the language in response to the IMC Committee's comments. All parties agree that this definition better clarifies the meaning of the current term. The PMGCAC and the proponent are submitting a coordinating public comment to revise the IRC definition under RM16.

Cost Impact: The net effect of the public comment and code change proposal will not increase or decrease the cost of construction
This change is a non-substantive clarification of an existing definition.

Public Comment# 2452

M25-21

Proposed Change as Submitted

Proponents: Mark Lessans, Johnson Controls, representing Johnson Controls (mark.lessans@jci.com)

2021 International Mechanical Code

SECTION 403
MECHANICAL VENTILATION

Add new text as follows:

403.4 Clean Air Delivery Capability.
Each mechanical system shall meet the requirements in 403.4.1. Each occupiable space shall meet the requirements in 403.4.2.

Exception: Occupiable spaces where 100% of the supply air meets High-efficiency Particulate Air filtration.

403.4.1 Airflow for Increased Filtration.
Mechanical systems shall be sized to accommodate a design airflow at a total static pressure drop which assumes the utilization of a supply air filter with a Minimum Efficiency Reporting Value of no less than 13.

403.4.2 Zonal Filtration or Disinfection Capability.
Each occupiable space shall have 120-volt receptacles which provide at least 0.2 watts per square foot of occupiable space above the requirements of the National Electrical Code to support supplemental air cleaning devices.

Exception: Rooms with less than 500 square feet of occupiable space.

Reason: This proposal seeks to “ready” buildings for retrofits and other changes if indoor clean air delivery needs to be increased – such as in response to mitigating an airborne contaminant – per ASHRAE and CDC guidance on reopening buildings during the COVID-19 pandemic. If the mechanical system is not designed with a MERV 13 filter, it would at least be sized to accommodate the use of one later on without having to redesign or replace the system. This is important, as MERV 13 filters are often at the balance point between filtration effectiveness and energy efficiency. However, these filters are thicker and have a larger airflow resistance when compared to conventional filters, and often existing systems cannot accommodate them. This proposal also requires that occupiable spaces be equipped with the electrical infrastructure needed to increase clean air delivery at the zonal level, such as using a HEPA room air cleaning machine.

Cost Impact: The code change proposal will increase the cost of construction
These additional requirements will result in a modest increase in construction costs, but this cost pales in comparison to the burden of adding them post-construction.

M25-21

Public Hearing Results

Committee Action: **As Modified**

Committee Modification:

APPENDIX D Clean Air Delivery

~~403.4~~ D101 Clean Air Delivery Capability.
Each mechanical system shall meet the requirements in ~~403.4.1~~ Section D101.1. Each occupiable space shall meet the requirements in ~~403.4.2~~ Section D101.2.
Exceptions:
1. Group R occupancies.
2. Occupiable spaces where 100% of the supply air meets High-efficiency Particulate Air filtration.
3. Rooms with less than 500 square feet of occupiable space.

~~403.4101.1~~ D101.1 Airflow for Increased Filtration.
Mechanical systems shall be sized to accommodate a design airflow at a total static pressure drop which assumes the utilization of a supply air filter with a Minimum Efficiency Reporting Value of no less than 13.

~~403.4.2~~ D101.2 Zonal Filtration or Disinfection Capability.
Each occupiable space greater than 500 square feet shall have at least one 125-volt, single-phase, 15- or 20-ampere receptacle outlet installed in an accessible location for the cord-and-plug connection of a supplemental air cleaning appliance. One additional receptacle outlet shall be installed for each additional 1000 square feet of occupiable space. The installation shall comply with NFPA 70. ~~shall have 120-volt receptacles which provide at least 0.2 watts per square foot of occupiable space above the requirements of the National Electrical Code to support supplemental air cleaning devices.~~ which provide at least 0.2 watts per square foot of occupiable space above the requirements of the National Electrical Code to support supplemental air cleaning devices.

Committee Reason: The committee has appropriately agreed that current code language must be clarified between residential and commercial in the appendix, Exempt Group 8 and electrical equipment. This proposal also requires that occupiable spaces be equipped with the electrical infrastructure needed to increase clean air delivery at the zonal level. The modifications further clarify acceptable industry practices and gives opportunities for jurisdictions. (Vote: 6-5)

Individual Consideration Agenda

Public Comment 1:

IMC: D101, D101.2

Proponents: John Catlett, representing BOMA International (catlettcodeconsulting@gmail.com) requests As Modified by Public Comment

Further modify as follows:

2021 International Mechanical Code

D101 Clean Air Delivery Capability . Each mechanical system shall meet the requirements in D101.1. ~~Each occupiable space shall meet the requirements in D101.2.~~

Exceptions:

1. Group R occupancies.
2. Occupiable spaces where 100% of the supply air meets High-efficiency Particulate Air filtration.

~~**D101.2 Zonal Filtration or Disinfection Capability**~~ **.** ~~Each occupiable space greater than 500 square feet shall have at least one 125-volt, single-phase, 15- or 20-ampere receptacle outlet installed in an accessible location for the cord-and-plug connection of a supplemental air cleaning appliance. One additional receptacle outlet shall be installed for each additional 1000 square feet of occupiable space. The installation shall comply with NFPA 70.~~

Commenter's Reason: BOMA supported the proposal as originally written as long as it was an appendix item. It provides good guidance to building owners who may choose to prepare for future pandemic needs or could be adopted locally by choice.
BOMA is deeply involved with the ICC Pandemic Task Force. It has been made clear that not all diseases that could potentially rise to pandemic status can be treated the same. So the proposal provides an option to consider for new or altered buildings.

However, a floor modification was added at the last minute that added the proposed deleted language.

The additional electrical outlet is not needed. Period. If it were, it should be added to the NEC, not the mechanical code.

The consumption associated with individual room air filtration systems is no more than normal cord and plug connected appliances that are already covered under the general load calculation found in the NEC. No evidence was provided to support the need. Portable heaters, small desk refrigerators, fans and similar devices do not require additional load calculation as they are assumed in the general calculation. The only benefit of the proposal is to the electrical manufacturing, suppliers, and installers.

The cost/benefit is just not there. We ask that the proposal be modified to remove the electrical outlets and additional calculation.

Cost Impact: The net effect of the public comment and code change proposal will decrease the cost of construction
This public comment will decrease the cost of compliance. The additional electrical outlet will serve no purpose other than a cost increase. Should there be a consideration of the actual need for the dedicated outlets, this should be considered by the appropriate NFPA 70 committee and not the ICC Mechanical Code Committee.

Public Comment 2:

IMC: D101

Proponents: Jeffrey Shapiro, representing IIAR (jeff.shapiro@intlcodeconsultants.com) requests As Modified by Public Comment

Further modify as follows:

2021 International Mechanical Code

D101 Clean Air Delivery Capability. ~~Each~~ In Groups A, B, E and I occupancies, each mechanical system shall meet the requirements in D101.1. Each occupiable space in such occupancies shall meet the requirements in D101.2.

~~Exceptions~~ Exception:

~~1. Group R occupancies.~~

~~2.~~ Occupiable spaces where 100% of the supply air meets High-efficiency Particulate Air filtration.

Commenter's Reason: The proposed requirements are an over-reach for factory, storage, high-hazard, industrial, mercantile, and utility occupancies and should not apply in any case, even though they are already relegated to an optional appendix. Residential occupancies were already exempted, so this public comment just retained that exemption.

Cost Impact: The net effect of the public comment and code change proposal will decrease the cost of construction
Reducing the scope of application for this appendix will result in cost savings for occupancies that are not included.

Public Comment# 2983

Public Comment 3.:

Proponents: Mary Koban, representing AHRI (mkoban@ahrinet.org) requests As Submitted

Commenter's Reason: AHRI supports the committee recommendation for the approval of M25 as modified.
AHRI supports the submitter in the floor modification to remove residential occupancies.

Based on the floor modification to exempt residential occupancies from this proposal, the technical committee agree that the code language was appropriate.

Cost Impact: The net effect of the public comment and code change proposal will decrease the cost of construction
This change is expected to have a cost impact. Our comment was to support the technical committee's modification of M25 which removed residential occupancies. If anything our comment would reduce the cost of construction.

Public Comment# 2567

M26-21

Proposed Change as Submitted

Proponents: Mark Lessans, Johnson Controls, representing Johnson Controls (mark.lessans@jci.com)

International Mechanical Code

2021 International Mechanical Code

Add new text as follows:

405.2 Demand Control Ventilation.
Each occupiable space shall be equipped with a carbon dioxide sensor which meets the requirements in 405.2.1 and 405.2.3. Mechanical equipment serving each zone(s) shall be equipped with controls which meet the requirements in 405.2.2.

405.2.1 Carbon Dioxide Sensor Performance Specifications.
Each carbon dioxide sensor installed in accordance with Section 405.2 shall meet the following carbon dioxide measurement specifications as certified by the equipment manufacturer:

1 Range lower bound less than or equal to 400 parts per million
2. Range upper bound greater than or equal to 2,000 parts per million
3. Accuracy within ±75 parts per million at a reading of 1,000 parts per million
4. Output resolution less than or equal to 5 parts per million

405.2.2 Mechanical System Controls.
Controls installed in accordance with Section 405.2 shall:

1. Receive data from the carbon dioxide sensor in the occupiable zone(s) at least once per 5 minutes
2. Be calibrated to provide pre-established outdoor airflow rates, or be equipped with the necessary instrumentation to measure outdoor airflow
3. Be capable of adjusting the outdoor airflow in response to an adjustable outdoor airflow setpoint
4. Increase the amount of outdoor air provided to each occupiable zone until the carbon dioxide level in each occupiable zone falls below a maximum threshold as defined by the user

405.2.3 Ventilation Rate Alarming.
When carbon dioxide levels are above a maximum level as defined by the user, sensors installed in accordance with Section 405.2 shall alert the occupants with a visual and audible indication in the zone or through a building monitoring system.

405.2.3.1 Default Carbon Dioxide Threshold Level.
The threshold level for carbon dioxide measurement above which triggers an alert in accordance with Section 405.2.3 shall be set to 1,100 parts per million by default.

Reason: Several recently published studies[1,2] have demonstrated that a large portion of indoor occupied spaces to not meet minimum requirements for ventilation as set in ASHRAE Standard 62.1, and have documented the impacts on occupant health, comfort, and productivity. Additionally, providing adequate ventilation is the most effective first step in mitigating the transmission of viruses carried by airborne particulates, an issue that has been highlighted during the COVID-19 pandemic.

This proposal seeks to ensure building occupants have access to adequate ventilation by bringing Demand Control Ventilation (DCV) to each occupiable zone and managing carbon dioxide levels – the best proxy we have for determining inadequate ventilation and/or above-normal occupancy. The proposal requires that every occupiable zone have a basic CO2 sensor, that the CO2 sensor communicate with the building mechanical system, and that the mechanical system be capable of adjusting airflow rates to keep CO2 levels (and therefore ventilation adequacy) within acceptable levels. It also requires that the CO2 sensor notify either the occupants, or the building manager, when ventilation is inadequate. This can be especially helpful first step in helping building occupants understand when indoor may be at unhealthy levels and take mitigating action.

If successfully deployed, this proposal would go a long way toward maintaining adequate ventilation, as well as assist in saving energy by preventing overventilation of spaces.

Bibliography: [1]University of California at Davis, Ventilation rates in California classrooms: Why many recent HVAC retrofits are not delivering sufficient ventilation, January 2020
[2]United States Government Accountability Office, School Districts Frequently Identified Multiple Building Systems Needing Updates or Replacement, June 2020

Cost Impact: The code change proposal will increase the cost of construction
This proposal will increase the cost of construction as additional sensors will be required.

M26-21

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The proponent references studies tied to school facilities only. Providing demand control ventilation to each occupiable space is too broad. (Vote: 11-0)

M26-21

Individual Consideration Agenda

Public Comment 1:

IMC: 405.2, 405.2.1, 405.2.2, 405.2.3, 405.2.3.1, Appendix D (New), (New), D101 (New), D101.1 (New), D101.2 (New), D101.3 (New), D101.4 (New)

Proponents: Mark Lessans, representing Johnson Controls (mark.lessans@jci.com) requests As Modified by Public Comment

Modify as follows:

2021 International Mechanical Code

~~**405.2 Demand Control Ventilation**~~**.**
~~Each occupiable space shall be equipped with a carbon dioxide sensor which meets the requirements in 405.2.1 and 405.2.3. Mechanical equipment serving each zone(s) shall be equipped with controls which meet the requirements in 405.2.2.~~

~~**405.2.1 Carbon Dioxide Sensor Performance Specifications**~~**.**
~~Each carbon dioxide sensor installed in accordance with Section 405.2 shall meet the following carbon dioxide measurement specifications as certified by the equipment manufacturer:~~

1. ~~Range lower bound less than or equal to 400 parts per million~~
2. ~~Range upper bound greater than or equal to 2,000 parts per million~~
3. ~~Accuracy within ±75 parts per million at a reading of 1,000 parts per million~~
4. ~~Output resolution less than or equal to 5 parts per million~~

~~**405.2.2 Mechanical System Controls**~~**.**
~~Controls installed in accordance with Section 405.2 shall:~~

1. ~~Receive data from the carbon dioxide sensor in the occupiable zone(s) at least once per 5 minutes~~
2. ~~Be calibrated to provide pre-established outdoor airflow rates, or be equipped with the necessary instrumentation to measure outdoor airflow~~
3. ~~Be capable of adjusting the outdoor airflow in response to an adjustable outdoor airflow setpoint~~
4. ~~Increase the amount of outdoor air provided to each occupiable zone until the carbon dioxide level in each occupiable zone falls below a maximum threshold as defined by the user~~

~~**405.2.3 Ventilation Rate Alarming**~~**.**
~~When carbon dioxide levels are above a maximum level as defined by the user, sensors installed in accordance with Section 405.2 shall alert the occupants with a visual and audible indication in the zone or through a building monitoring system.~~

~~**405.2.3.1 Default Carbon Dioxide Threshold Level**~~**.**
~~The threshold level for carbon dioxide measurement above which triggers an alert in accordance with Section 405.2.3 shall be set to 1,100 parts per million by default.~~

Appendix D
Clean Air Delivery

User Note .
The provisions contained in this appendix are not mandatory unless specifically referenced in the adopting ordinance.
About this appendix: *Appendix D provides criteria for an increased protection level for occupant health by delivering and monitoring clean air in occupied areas of the certain buildings.*

D101 Demand control ventilation .
Group A, B, E and I occupancies shall be equipped with a minimum of one carbon dioxide sensor for every 500 square feet of occupiable space. Carbon dioxide sensors installed in accordance with this section shall meet the requirements in Sections D101.1 and D101.3. Mechanical equipment serving each zone(s) shall be equipped with controls which meet the requirements in Section D101.2.

Exception: Occupiable zones less than 500 square feet.

D101.1 Carbon dioxide sensor performance specifications .
Each carbon dioxide sensor installed in accordance with Section D101 shall meet the following carbon dioxide measurement specifications as certified by the equipment manufacturer:

1. Range lower bound less than or equal to 400 parts per million
2. Range upper bound greater than or equal to 2,000 parts per million
3. Accuracy within ±75 parts per million at a reading of 1,000 parts per million
4. Output resolution less than or equal to 20 parts per million

D101.2 Mechanical system controls .
Controls for the mechanical equipment installed in accordance with Section D101 shall:

1. Receive data from the carbon dioxide sensor in the occupiable zone(s) at least once per 5 minutes
2. Be calibrated to provide pre-established outdoor airflow rates, or be equipped with the necessary instrumentation to measure the outdoor airflow rate
3. Be capable of adjusting the outdoor airflow rate in response to an adjustable outdoor airflow setpoint
4. Increase the amount of outdoor air provided to each occupiable zone until the carbon dioxide level in each occupiable zone falls below a maximum threshold as defined by the user

D101.3 Carbon dioxide detection threshold level .
The default detection threshold level for carbon dioxide measurement above which triggers an alert in accordance with Section D101.4 shall be set to 1,100 parts per million. The end user can modify the detection threshold level based on specific operations and needs.

D101.4 Carbon dioxide detection threshold level exceeded .
When carbon dioxide levels exceed the detection threshold level established in Section D101.3, the mechanical equipment shall modify the outdoor airflow rate as required in Section D101.2. When the carbon dioxide concentration remains above the detection threshold level for a period of 30 minutes or more, the occupants in the zone shall be alerted by approved audible and visual notification devices or through a building monitoring system.

Commenter's Reason: The code development committee disapproved this proposal because it was too broad in its application. This Public Comment contains revisions to address the committee’s concerns in addition to clarifications.
First, the committee agreed with moving this proposal to a new Appendix D. Appendix D is created along with renumbering of sections as appropriate. The standard appendix note is added indicating that as an appendix chapter, these provisions will only apply when specifically referenced in the adopted ordinance.

Second, this Public Comment limits application of these requirements. The requirements are only applicable to Groups A, B, E and I occupancies. These occupancies fall into similar characteristics for level of hazard and occupant density. Industrial type facilities such as Groups F, H and S are not included. Additionally, the exception eliminates the requirements for occupiable spaces where the air handling zone is less than 500 square feet.

Third, a revision is added to limit the number of carbon dioxide sensing devices to one per 500 square feet. This eliminates the need for a device in every room or space.

Fourth, clarification is added in Section D101.4 as far the actions required when excess levels of carbon dioxide are detected.

Cost Impact: The net effect of the public comment and code change proposal will not increase or decrease the cost of construction

This Public Comment moves the code change proposal into an Appendix, thus making the requirements not mandatory, and not increasing or decreasing the cost of construction.

Public Comment# 2213

M27-21

Proposed Change as Submitted

Proponents: Joseph Summers, Chair, representing Chair of PMGCAC (PMGCAC@iccsafe.org)

2021 International Mechanical Code

Add new text as follows:

SECTION 408
PROCESSING AND EXTRACTION FACILITIES

408.1 General.
Plant processing or extraction facilities shall comply with this section, the International Building Code and Chapter 39 of the International Fire Code. The extraction process includes the act of extraction of the oils and fats by use of a solvent, desolventizing of the raw material, production of the miscella, distillation of the solvent from the miscella and solvent recovery. Post-extraction processing includes winterization, solvent recovery, distillation, decarboxylation, isolation, chromatography and similar processes. The use, storage, transfilling and handling of hazardous materials in these facilities shall comply with this code, the International Building Code and the International Fire Code.

408.2 Existing buildings or facilities.
Existing buildings or facilities used for the processing of plants shall comply with this code, the International Building Code and the International Fire Code. Existing extraction processes where the medium of extraction or solvent is changed shall comply with this section.

408.3 Mechanical ventilation.
Natural ventilation shall not be permitted. Mechanical ventilation shall be designed and installed in accordance with Section 403 in this code and Chapter 39 of the International Fire Code. The exhaust airflow rate shall be provided in accordance with the requirements of 408.3.1 through 408.3.4.

408.3.1 Extraction processes using flammable gases or flammable liquids.
Continuous mechanical exhaust ventilation shall provide a minimum airflow rate of not less than 5 cfm/ft2 (0.0038 m3/(s*m2)) of floor area to prevent an accumulation of flammable vapors from exceeding 25 percent of the lower explosive limit (LEL). Recirculation of such air shall be prohibited.

> **Exception:** Where the registered design professional demonstrates that an engineered mechanical exhaust ventilation system design will prevent the maximum concentration of contaminants from exceeding 25% of the LEL, the minimum required rate of exhaust shall be reduced in accordance with such engineered system design.

408.3.2 Extraction processes using compressed asphyxiant or inert gases.
Continuous mechanical exhaust ventilation shall be provided in accordance with Chapter 39 of the International Fire Code. Recirculation of such air shall be prohibited.

408.3.3 Post-extraction processes using flammable or combustible liquids or gases.
Where flammable liquids, combustible liquids heated above their flashpoint, or flammable gases are used in post-extraction processing, the room or area shall be provided with continuous mechanical exhaust in accordance with Chapter 39 of the International Fire Code.

408.3.4 Interlocks.
Electrical equipment and appliances used in processes that generate flammable vapors or gases shall be interlocked with ventilation fans so that the equipment cannot be operated unless the exhaust ventilation fans are in operation.

408.4 Exhaust fan discharge.
Exhaust fans shall be positioned so that the discharge will not impinge on the roof, other equipment or appliances or parts of the structure. A vertical discharge fan shall be manufactured with an approved drain outlet at the lowest point of the housing to permit drainage of oils or byproducts to an approved location.

408.5 Exhaust fan mounting.
Upblast fans serving plant processing or extraction facilities and installed in a vertical or horizontal position shall be hinged, supplied with a flexible weatherproof electrical cable to permit inspection and cleaning and shall be equipped with a means of restraint to limit the swing of the fan on its hinge. The ductwork shall extend not less than 18 inches (457 mm) above the roof surface.

408.6 Clearances.
Exhaust equipment serving a plant processing or extraction facilities shall have a clearance to combustible construction of not less than 18 inches (457 mm).

> **Exception:** Factory-built exhaust equipment installed in accordance with Section 304.1 and listed for a lesser clearance.

408.7 Termination location.
The outlet of exhaust equipment serving plant processing or extraction facilities shall be in accordance with Section 501.3 of this code.

> **Exception:** The minimum horizontal distance between vertical discharge fans and parapet-type building structures shall be 2 feet (610 mm), provided that such structures are not higher than the top of the fan discharge opening.

408.8 Ducts.
Exhaust duct construction shall comply with Chapter 6.

408.9 Hazardous Exhaust Systems.
When the exhaust system is determined to be a hazardous exhaust system by this code, the International Building Code or the International Fire Code, that system shall be installed in accordance with Section 510 of this code.

502.21 Processing and Extraction Facilities.
Processing and extraction Facilities shall be provided with an exhaust system in accordance with of Section 408 of this code and Chapter 39 of the International Fire Code.

502.21.1 Operation.
The exhaust system for processing and extraction Facilities shall have controls that operate the system continuously when the space is occupied.

502.21.2 Post-processing.
Post-processing operations, including dispensing of flammable liquids between containers, shall be performed within a hazardous exhaust fume hood rated for exhausting flammable vapors and listed in accordance with UL 1805. Electrical equipment used within the hazardous exhaust fume hood shall be rated for use in flammable atmospheres.

> **Exception:** A hazardous exhaust fume hood shall not be required where an approved exhaust system is installed in accordance with NFPA 91.

Add new standard(s) as follows:

UL

UL LLC
333 Pfingsten Road
Northbrook, IL 60062-2096

1805-2002 Standard for Laboratory Hoods and Cabinets (Ed.1)

Reason: These facilities are becoming common in numerous states and these requirements are based of best practices and ensure basic fire and life safety measures. The requirements in this section provide requirements for hazardous and non-hazardous facilities. The development of these requirements was done in collaboration with the PMGCAC and FCAC. Most of these requirements are existing in current code we are only creating sections that provide an understandable path for compliance.

This proposal is submitted by the ICC Plumbing/Mechanical/Gas Code Action Committee (PMG CAC). The PMG CAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2020, the PMG CAC has held several virtual meetings open to any interested party. Numerous interested parties attended the committee meetings and offered their input. Related documentation and reports are posted on the PMG CAC website at: https://www.iccsafe.org/products-and-services/i-codes/code-development-process/pmg-code-action-committee-pmgcac/ Reference PMGCAC Working Document Item 10.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
These requirements already exist in the IBC and IFC. Adding these requirements to the IMC only provides guidance for the design and installation of systems that comply with existing code requirements. As such, this proposal does not require additional material or labor costs that would impact the cost of construction.

Staff Analysis: A review of the standards proposed for inclusion in the code, UL 1805-2002: Standard for Laboratory Hoods and Cabinets, with regard to some of the key ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before March 20, 2021.

M27-21

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The committee agrees that existing building provisions will cause correlation problems with IBC. (Vote: 11-0)

Individual Consideration Agenda

Public Comment 1:

IMC: 408.2

Proponents: Joseph J. Summers, representing Chair of PMGCAC (pmgcac@iccsafe.org) requests As Modified by Public Comment

Modify as follows:

2021 International Mechanical Code

~~**408.2 Existing buildings or facilities .** Existing buildings or facilities used for the processing of plants shall comply with this code, the International Building Code and the International Fire Code. Existing extraction processes where the medium of extraction or solvent is changed shall comply with this section.~~

Commenter's Reason: The Committee didn't like this section in the proposal so we removed it. We agree as the IEBC first needs to address when some (or all) of these provisions are applicable for the different alteration levels. Proposals to the IEBC can be accomplished in the next development cycle after this major section is in place for new construction. The main focus of the proposal was to establish provisions for new construction moving forward.

Cost Impact: The net effect of the public comment and code change proposal will increase the cost of construction
This public comment only removes existing buildings from the scope of the provisions. Overall, the original proposal's reason for increasing the cost of construction stands. Adding provisions where none existed previously will add more material and labor cost to facilities involving these processes.

Public Comment# 2576

M32-21

<u>Proposed Change as Submitted</u>

Proponents: John Williams, Chair, representing Healthcare Committee (ahc@iccsafe.org)

2021 International Mechanical Code

Revise as follows:

505.3 Exhaust ducts. Domestic cooking exhaust equipment shall discharge to the outdoors through sheet metal ducts constructed of galvanized steel, stainless steel, aluminum or copper. Such ducts shall have smooth inner walls, shall be airtight and shall be equipped with a backdraft damper. Installations in Group I-1 and I-2 *occupancies* shall be in accordance with ~~the *International Building Code* and Section 904.14 of the International Fire Code~~ <u>this section and Section 505.7 or 505.8</u>.

Exceptions:

1. ~~In other than Groups I-1 and I-2, where~~ <u>Where</u> installed in accordance with the manufacturer's instructions and where mechanical or natural ventilation is otherwise provided in accordance with Chapter 4, *listed* and *labeled* ductless range hoods shall not be required to discharge to the outdoors.
2. Ducts for domestic kitchen cooking *appliances* equipped with downdraft exhaust systems shall be permitted to be constructed of Schedule 40 PVC pipe and fittings provided that the installation complies with all of the following:
   - 2.1. The duct shall be installed under a concrete slab poured on grade.
   - 2.2. The underfloor trench in which the duct is installed shall be completely backfilled with sand or gravel.
   - 2.3. The PVC duct shall extend not more than 1 inch (25 mm) above the indoor concrete floor surface.
   - 2.4. The PVC duct shall extend not more than 1 inch (25 mm) above grade outside of the building.
   - 2.5. The PVC ducts shall be solvent cemented.

Add new text as follows:

<u>505.7 Group I-1 Occupancies</u>.
<u>In Group I-1 occupancies, hood installations over domestic cooking equipment shall be installed in accordance with one of the following:</u>

1. <u>Domestic hoods over cooktops and ranges installed in accordance with Section 420.9 of the International Building Code shall comply with the following:</u>
   - <u>1.1. Protection from fire shall be in accordance with Section 904.14 of the International Fire code.</u>
   - <u>1.2. Mechanical ventilation shall be provided to the rooms or spaces containing the cooking facility in accordance with Section 403.3.1.</u>
   - <u>1.3. Hood systems shall have a minimum air flow of 500 cfm (14,000 L/min).</u>
   - <u>1.4. Listed and labeled ductless range hoods shall have a charcoal filter to reduce smoke and odors.</u>
2. <u>Commercial kitchen hoods complying with Section 507 shall be provided over cooktops and ranges serving greater than 30 care recipients.</u>

<u>505.8 Group I-2 Occupancies</u>.
<u>In Group I-2 Occupancies, Hood installations over domestic cooking equipment shall be installed in accordance with one of the following:</u>

1. <u>Domestic hoods over cooktops and ranges installed in accordance with Section 407.2.7 of the International Building Code shall comply with the following:</u>
   - <u>1.1. Protection from fire shall be in accordance with Section 904.14 of the International Fire code.</u>
   - <u>1.2. Mechanical ventilation shall be provided to the rooms or spaces containing the cooking facility in accordance with Section 407.</u>
   - <u>1.3. Hood systems shall have a minimum air flow of 500 cfm (14,000 L/min).</u>
   - <u>1.4. Listed and labeled ductless range hoods shall have a charcoal filter to reduce smoke and odors.</u>
2. <u>Commercial kitchen hoods complying with Section 507 shall be provided over cooktops and ranges serving greater than 30 care recipients.</u>

Reason: In I-1 and I-2 Occupancies, Section 407.2.6 and 420.8 set up a number of safeguards that allow for meal preparation for up to 30 care recipients. These cooking operations are on a lower scale than commercial cooking facilities and do not generate the same level of smoke and

vapors. The aroma of food cooking is beneficial to the care recipients who live in I-1 and I-2 occupancies as it stimulates appetite and signals them that mealtime is near.
The hoods in question are not your standard domestic range hood. Hoods for I-1 and I-2 Occupancies must comply with Section 904.14 of the *International Fire Code*. This section requires hoods that are listed and labeled per UL 300A, have fire suppression built in, and have an interlock that cuts the fuel or power source upon activation of the extinguishing system. Stovetops must also have a timer that automatically turns off the cooking device after 120 minutes, preventing unattended cooking.

Federal Guidelines that govern I-2 Occupancies permit recirculating hoods with a charcoal filter and also require a higher airflow rate. This added language is being added to allow equivalent facilitation.

For commercial cooking facilities, compliance with NFPA 96 is required. However, NFPA 96 (Chapter 13) allows for the use of re-circulating hoods in commercial cooking operations, there is no justification to prohibit the use in these domestic uses.The issue at hand is that sometimes, especially in a renovation of a multi-story building, it can be impractical or impossible to run an exhaust duct to the outside. By requiring a vented hood, it would prevent many communities from being able to provide better food quality and a social experience that can be critical to quality of life.

The CHC was established by the ICC Board to evaluate and assess contemporary code issues relating to healthcare facilities. This is a joint effort between ICC and the American Society for Healthcare Engineering (ASHE), a subsidiary of the American Hospital Association, to eliminate duplication and conflicts in healthcare regulation. In 2020 the CHC held several virtual meeting, which included members of the committees as well as any interested parties, to discuss and debate the proposed changes. Information on the CHC, including: meeting agendas; minutes; reports; resource documents; presentations; and all other materials developed in conjunction with the CHC effort can be downloaded from the CHC website at CHC.

Cost Impact: The code change proposal will decrease the cost of construction
The cost of a domestic hood is less than a commercial hood and associate duct work.

M32-21

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The committee agrees that the the proposal language as written is problematic in this section and is missing the option of ducted installations for domestic hoods provided over cook tops. (Vote: 11-0)

M32-21

Individual Consideration Agenda

Public Comment 1:

IMC: 505.3, 505.7 (New), 505.8 (New)

Proponents: John Williams, representing Healthcare Committee (ahc@iccsafe.org) requests As Modified by Public Comment

Replace as follows:

2021 International Mechanical Code

505.3 Exhaust ducts . Domestic cooking exhaust equipment shall discharge to the outdoors through sheet metal ducts constructed of galvanized steel, stainless steel, aluminum or copper. Such ducts shall have smooth inner walls, shall be airtight and shall be equipped with a backdraft damper. Installations in Group I-1 and I-2 *occupancies* shall be in accordance with the *International Building Code* and Section 904.14 of the International Fire Code <u>and Section 505.7 or 505.8</u>.

Exceptions:

1. ~~In other than Groups I-1 and I-2, where~~ <u>Where</u> installed in accordance with the manufacturer's instructions and where mechanical or natural ventilation is otherwise provided in accordance with Chapter 4, *listed* and *labeled* ductless range hoods shall not be required to discharge to the outdoors.
2. Ducts for domestic kitchen cooking *appliances* equipped with downdraft exhaust systems shall be permitted to be constructed of

Schedule 40 PVC pipe and fittings provided that the installation complies with all of the following:

2.1. The duct shall be installed under a concrete slab poured on grade.

2.2. The underfloor trench in which the duct is installed shall be completely backfilled with sand or gravel.

2.3. The PVC duct shall extend not more than 1 inch (25 mm) above the indoor concrete floor surface.

2.4. The PVC duct shall extend not more than 1 inch (25 mm) above grade outside of the building.

2.5. The PVC ducts shall be solvent cemented.

505.7 Group I-1 Occupancies . In Group I-1 Occupancies, hood installations over domestic cooking equipment installed in accordance with Section 420.9 of the International Building Code shall comply with the following:

1. Range hoods shall have a minimum air flow rate of 500 cfm. (14,000 L/min).
2. Mechanical ventilation shall be provided to the rooms or spaces containing the domestic cooking equipment in accordance with Section 403.3.1.
3. Range hood exhaust shall discharge to the outdoors.

Exception : A listed and labeled ductless range hood shall be permitted where a charcoal filter is provided in the hood to reduce smoke and odors.

505.8 Group I-2 Occupancies . In Group I-2 Occupancies, hood installations over domestic cooking equipment installed in accordance with Section 407.2.7 of the International Building Code shall comply with the following:

1. Range hoods shall have a minimum air flow rate of 500 cfm. (14,000 L/min).
2. Mechanical ventilation shall be provided to the rooms or spaces containing the domestic cooking equipment in accordance with Section 403.3.1.
3. Range hood exhaust shall discharge to the outdoors.

Exception : A listed and labeled ductless range hood shall be permitted where a charcoal filter is provided in the hood to reduce smoke and odors.

Commenter's Reason: The intent of this code change is to allow listed and labeled ductless domestic range hoods, that meet specific criteria, over domestic cooking appliances in limited applications for I-1 and I-2 Occupancies. This Public Comment proposal addresses the comments the CHC heard from the committee and opponents:
First, we were told it was confusing to bring the language referencing commercial kitchen hoods into Section 505, which only addresses domestic cooking, so we have removed that language. This doesn't change any requirements when using commercial appliances, or prevent a designer from choosing to provide a type 1 hood over a domestic range.

Secondly, we heard that it was not clear in the initial proposal that it was a choice between ducting to the outdoors OR using a ductless (re-circulating) exhaust hood in these applications. For this reason, we have changed the ductless hood to be an exception to the requirement to vent to the outdoors. There are some conditions that arise, that make it difficult, or impossible, to vent a hood to the outdoors. We feel that this proposal is providing the adequate levels of safety for I-1 and I-2 care recipients, whether vented or ductless.

Please keep in mind that, by referencing Section 420.9 and Section 407.2.7 of the International Building Code, the range hoods in question are used only over domestic cooking appliances (cooktops and ranges) and are located either within individual dwelling units (I-1 only), in kitchens serving 30 or fewer care recipients, or in areas like a Physical Therapy or staff break room. The sections referenced also require additional safeguards like staff access to turn on the appliance and a timer that shuts off the appliance after 120 minutes, if not attended. These cooking provisions have been in the Codes since 2015, for nursing homes.

Further, the reference to the International Fire Code points to the requirement for fire suppression to be built into the hood, with manual activation and interconnection that turns off the cooking appliance. As I-1 and I-2 Occupancies are already required to be sprinkled, this brings another level of safety. NFPA data, NIST Special Report 1066 and further research by NIST (TN 1969), has shown that a single residential sprinkler head can extinguish a cooking oil fire in a skillet.

The addition of the charcoal filter in the ductless hood was meant to address the concerns from opponents on smoke, vapors and particulate matter being circulated through the space. This charcoal filtration matches the requirements in NFPA 96 for ductless (re-circulating) Commercial Kitchen hoods. NFPA 96 does allow for ductless hoods in commercial cooking applications. Keep in mind that the application this proposal addresses is only serving up to 30 residents total, which is at a much lower rate of meal service than a typical restaurant or other commercial application.

Setting the airflow requirement through the hood at 500 cfm, this matches the federal guidelines for this type of cooking operation and does a better job of capturing any fumes, grease laden vapors, etc from cooking operations. Standard domestic range hoods typically only provide 220 – 375 cfm so this is a significant increase. Several research studies have shown that higher air flow rates result in higher capture efficiencies and provide better indoor air quality.

Further, per Section 505.4, any exhaust hood over 400 cfm is required to be provided with equivalent make-up air systems. This ensures that sufficient fresh air is being brought into the space to offset impacts of cooking operations. The requirement in this text for mechanical ventilation, not natural ventilation, reinforces this requirement and ensures that adequate ventilation will be provided to mitigate air quality concerns.

This is the last part of a package of code changes around cooking that recognize what has been “done for years” in I-1 Assisted Living and I-2 Nursing Home occupancies but to get it in the codes as a consistent and safe application nationwide and so that AHJ’s have one set of rules that are easier to enforce. The Center for Medicare and Medicaid Services (CMS), who oversee Hospitals, Nursing Homes and Ambulatory Care Occupancies has allowed these cooking applications with re-circulating domestic range hoods since 2012. The CHC was established to work towards bringing the I-Codes in line with the Federal Guidelines and enable the I-codes to stand as an equivalent option. This code change is a needed piece to this equivalency status.

Example kitchen

Example kitchen

Range with timer control and grease collecting hood.

Bibliography: Singer, Brett C. 2011 Experimental Evaluation of Installed Cooking Exhaust Fan Performance, Lawrence Berkeley National Lab, LBNL-4183E
EPA website: https://www.epa.gov/indoor-air-quality-iaq/improving-indoor-air-quality

EPA Indoor Air Plus Program: https://www.epa.gov/sites/production/files/2018-03/documents/indoor_airplus_fillable_verification_checklist.pdf

Cost Impact: The net effect of the public comment and code change proposal will decrease the cost of construction
The cost of a domestic hood is less than a commercial hood and associate duct work.

Public Comment# 2621

M33-21

Proposed Change as Submitted

Proponents: Mike Moore, Stator LLC, representing Broan-NuTone (mmoore@statorllc.com)

2021 International Mechanical Code

Revise as follows:

505.3 Exhaust ducts. Domestic cooking exhaust equipment shall discharge to the outdoors through sheet metal ducts constructed of galvanized steel, stainless steel, aluminum or copper. Such ducts shall have smooth inner walls, shall be airtight and shall be equipped with a backdraft damper. Installations in Group I-1 and I-2 *occupancies* shall be in accordance with the *International Building Code* and Section 904.14 of the International Fire Code.

Exceptions:

1. In other than Groups I-1 and I-2~~, where installed in accordance with the manufacturer's instructions and where mechanical or natural ventilation is otherwise provided in accordance with Chapter 4,~~ *listed* and *labeled* ductless range hoods shall not be required to discharge to the outdoors~~.~~ , provided that the installation complies with all of the following:
   1.1. The equipment is installed in accordance with the manufacturer's instructions.
   1.2. Natural ventilation or a mechanical exhaust system is otherwise provided in the cooking area in accordance with Chapter 4.
   1.3. The installation is in an existing kitchen not having an existing range hood exhaust duct to the outdoors.
2. Ducts for domestic kitchen cooking *appliances* equipped with downdraft exhaust systems shall be permitted to be constructed of Schedule 40 PVC pipe and fittings provided that the installation complies with all of the following:
   2.1. The duct shall be installed under a concrete slab poured on grade.
   2.2. The underfloor trench in which the duct is installed shall be completely backfilled with sand or gravel.
   2.3. The PVC duct shall extend not more than 1 inch (25 mm) above the indoor concrete floor surface.
   2.4. The PVC duct shall extend not more than 1 inch (25 mm) above grade outside of the building.
   2.5. The PVC ducts shall be solvent cemented.

501.3 Exhaust discharge. The air removed by every mechanical exhaust system shall be discharged outdoors at a point where it will not cause a public nuisance and not less than the distances specified in Section 501.3.1. The air shall be discharged to a location from which it cannot again be readily drawn in by a ventilating system. Air shall not be exhausted into an attic or crawl space, or be directed onto walkways.

Exceptions:

1. Whole-house ventilation-type attic fans shall be permitted to discharge into the attic space of *dwelling units* having private attics.
2. Commercial cooking recirculating systems.
3. ~~Where installed in accordance with the manufacturer's instructions and where mechanical or *natural ventilation* is otherwise provided in accordance with Chapter 4, l~~ *Listed* and *labeled* domestic ductless range hoods shall not be required to discharge to the outdoors , when provided in accordance with Exception 1 to Section 505.3.

Reason: Cooking is typically the largest source of indoor air pollution in dwelling units, with concentrations of key pollutants frequently exceeding U.S. National Ambient Air Quality Standards. Over time, exposure to these pollutants has been shown to reduce duration and quality of life. Research has demonstrated that provision of kitchen ventilation in dwelling units is needed to comply with the Section 101.3 purpose of the IMC to "establish minimum requirements to provide a reasonable level of safety, health, property protection and general welfare." Unless captured at the source and exhausted to the exterior, cooking pollutants spread rapidly through a dwelling unit and deposit on surfaces, only to be released again into the breathing zone when disturbed at a later time. Like the current language in this section, this proposal does not permit ductless domestic range hoods to be installed in Group I-1 and I-2. In other occupancies, this proposal adds one more condition to the two conditions within this section that are required to approve ductless domestic range hoods: the installation of the ductless domestic range hood must be in an existing kitchen that does not have an existing range hood exhaust duct to the outdoors. This will ensure that where installed within new construction, domestic range hoods will be exhausted to the exterior. The exception permitting ductless range hoods for existing construction is provided in recognition of the high costs that could otherwise be associated with retrofitting a duct to the exterior. Within new construction, requiring a range hood to be ducted can be a very low-cost item with high returns in terms of occupant health. Please see the cost statement for more information.

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Cost Impact: The code change proposal will increase the cost of construction
There is no increase in construction costs for existing dwelling units.

Where new construction dwelling units are already provided with a range hood duct, there will not be any increase in construction cost.

Where new construction dwelling units are not currently provided with ducts for their range hoods, this proposal would increase the cost of construction. Installed duct costs can be estimated at ~ $7.10 per linear foot for 6" diameter galvanized steel duct (Mechanical Costs with RS Means Data. 2020. Section 23 31 13.16.5420), and a damper would cost about $25 retail.

M33-21

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The proposal requirements are overreaching and would inappropriately cause loss of use of ductless range hoods in commercial applications. (Vote: 11-0)

M33-21

Individual Consideration Agenda

Public Comment 1:

IMC: 505.3

Proponents: Mike Moore, representing Broan-NuTone (mmoore@statorllc.com) requests As Modified by Public Comment

Modify as follows:

2021 International Mechanical Code

505.3 Exhaust ducts . Domestic cooking exhaust equipment shall discharge to the outdoors through sheet metal ducts constructed of galvanized steel, stainless steel, aluminum or copper. Such ducts shall have smooth inner walls, shall be airtight and shall be equipped with a backdraft damper. Installations in Group I-1 and I-2 *occupancies* shall be in accordance with the *International Building Code* and Section 904.14 of the International Fire Code.

Exceptions:

1. In other than Groups I-1 and I-2 *listed* and *labeled* ductless range hoods shall not be required to discharge to the outdoors, provided that the installation complies with all of the following:

   1.1. The equipment is installed in accordance with the manufacturer's instructions.

   1.2. ~~Natural ventilation or a~~ A mechanical exhaust system is otherwise provided in the ~~cooking area~~ kitchen in accordance with Chapter 4 , or the equipment is installed in an existing building's kitchen where mechanical or *natural ventilation* is otherwise provided in accordance with Chapter 4.

   ~~1.3. The installation is in an existing kitchen not having an existing range hood exhaust duct to the outdoors.~~

2. Ducts for domestic kitchen cooking *appliances* equipped with downdraft exhaust systems shall be permitted to be constructed of Schedule 40 PVC pipe and fittings provided that the installation complies with all of the following:

   2.1. The duct shall be installed under a concrete slab poured on grade.

   2.2. The underfloor trench in which the duct is installed shall be completely backfilled with sand or gravel.

   2.3. The PVC duct shall extend not more than 1 inch (25 mm) above the indoor concrete floor surface.

   2.4. The PVC duct shall extend not more than 1 inch (25 mm) above grade outside of the building.

   2.5. The PVC ducts shall be solvent cemented.

Commenter's Reason: As cited in the reason statement for the original proposal, the negative health effects associated with pollutant concentrations that occur when cooking pollutants are not exhausted has been well documented (see original bibliography). However, there continues to be market resistance to proposals that require domestic range hoods to exhaust to the exterior. In response to this opposition, this PC provides more flexibility than the original proposal. For existing buildings, the PC makes no effective change to the current IMC language (recirculating range hoods are permitted where natural or mechanical ventilation is otherwise provided in accordance with Chapter 4). For all other buildings, the PC only permits recirculating range hoods where mechanical exhaust is otherwise provided (note that mechanical exhaust is now required by Section R401.2 for all dwelling units complying with the IECC or ASHRAE 90.1, so for these dwelling units, this PC also makes no effective change to the current IMC language).
The PC gives existing buildings a "pass" on mechanically exhausting a kitchen because retrofitting an exhaust duct can be prohibitively expensive. In new construction, however, costs to install ducting are much lower (see cost impact statement). Relying on natural ventilation alone is an insufficient means to provide required ventilation because it requires pressure differentials that may or may not exist, and when they exist, the pressure differential could be just as likely to spread the pollutant throughout the dwelling unit and neighboring units (in the case of attached dwelling units) as it would be to exhaust the pollutant directly to the outdoors. Further, studies have shown that occupants often do not operate windows for ventilation, even in temperate climates.[1,2,3] Concerns with window operation include security and discomfort (including severe draft in winter). For these reasons, the proposal requires that when recirculating hoods are provided in other than existing construction, some other form of mechanical exhaust must also be provided.

Cost Impact: The net effect of the public comment and code change proposal will increase the cost of construction
There is no increase in construction costs for existing buildings. There is also no increase in construction costs for dwelling units of new construction that meet the requirements of the IECC or ASHRAE 90.1. Other new construction using a recirculating domestic range hood that does not already provide a separate mechanical exhaust system would experience an increase in the cost of construction.

Where additional ducting would be required for new construction, this proposal would increase the cost of construction. Installed duct costs can be estimated at ~ $7.10 per linear foot for 6" diameter galvanized steel duct (Mechanical Costs with RS Means Data. 2020. Section 23 31 13.16.5420), and a termination would cost about $35 retail.

Public Comment# 2708

M38-21

Proposed Change as Submitted

Proponents: Joseph Summers, Chair, representing Chair of PMGCAC (PMGCAC@iccsafe.org)

2021 International Mechanical Code

Revise as follows:

506.3.2.5 Grease duct test. A field test shall be performed ~~Prior~~ prior to the use or concealment of any portion of a grease duct system~~, a leakage test shall be performed~~. Ducts shall be considered to be concealed where installed in shafts or covered by coatings or wraps that prevent the ductwork from being visually inspected on all sides. The permit holder shall be responsible to provide the necessary *equipment* and perform the grease duct leakage test. ~~A light test shall be performed to determine that all welded and brazed joints are liquid tight. A light test shall be performed by passing a lamp having a power rating of not less than 100 watts through the entire section of ductwork to be tested. The lamp shall be open so as to emit light equally in all directions perpendicular to the duct walls.~~ A test shall be performed for the entire duct system, including the hood-to-duct connection. The duct work shall be permitted to be tested in sections, provided that every joint is tested. For *listed* factory-built grease ducts, this test shall be limited to duct joints assembled in the field and shall exclude factory welds. The test shall be performed in accordance with either Section 506.3.2.5.1 or Section 506.3.2.5.2.

Add new text as follows:

506.3.2.5.3.1 Light test.
A duct test shall be performed by passing a lamp having not less than 1600 lumens, through the entire section of ductwork to be tested. The lamp shall be open so as to emit light equally in all directions perpendicular to the duct walls. A successful test shall be where the light from the lamp is not visible at any point on the exterior of the duct.

506.3.2.5.2 Water spray test.
A duct test shall be performed by simulating a cleaning operation, of the interior of the duct. A water pump, capable of a flowing outlet pressure of not less than 1200 psi (8,274 kPa) shall be used, along with any necessary hoses and spray nozzles, to apply high pressure water to the inside surfaces of the duct. A successful test shall be where there is no evidence of cleaning water at any point on the exterior of the duct.

Reason: There are several reasons for this proposal.
Some installers are using LED lamps for testing and such lamps are not rated, in terms of light output, in watts of power but instead in lumens of visible light. LED lamps are more rugged that incandescent lamps and are often preferred for field use.
The ASHRAE 154 (Ventilation for Commercial Cooking Standard) committee is moving away from light testing of grease ducts to simulated duct cleaning using water. Actual duct cleaning in the future should not result in water damage to the structure or to any materials that are used to wrap the duct. Furthermore, if a water leak is present, then almost certainly, grease will be present on the exterior of the duct. Grease on the exterior of a duct presents a fire hazard.

The installer has a choice as to which test to use.

This proposal is submitted by the ICC Plumbing/Mechanical/Gas Code Action Committee (PMG CAC). The PMG CAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2020, the PMG CAC has held several virtual meetings open to any interested party. Numerous interested parties attended the committee meetings and offered their input. Related documentation and reports are posted on the PMG CAC website at: https://www.iccsafe.org/products-and-services/i-codes/code-development-process/pmg-code-action-committee-pmgcac/ Reference PMGCAC Working Document Item 14.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The proposal adds an alternative for testing grease ducts. Although the alternative for water spray testing would cost more to perform than the light test, the alternative will not be mandated by the code and therefore, the proposal does not add any labor or material to impact the cost of construction.

M38-21

Public Hearing Results

Committee Action: **As Submitted**

Committee Reason: This proposal was approved as submitted because, as opposed to M37-21, it helps give better directive and tools to use with respect to testing of Grease Ducts. (Vote: 7-4)

M38-21

Individual Consideration Agenda

Public Comment 1:

Proponents: Nancy Swearengin, representing Self requests As Submitted

Commenter's Reason: 506.3.2.5.3.1 Light Test: Allowing the use of LED lights for grease duct testing would be a welcome addition in the field. Most mechanical contractors are only using LED lights on site, this addition to the code would allow inspections to be completed using equipment readily available. LED lights are brighter, more durable and operate at much cooler temperatures reducing the potential for harm to personnel performing the test. Vote to approve.
506.3.2.5.2 Water Spray Test: While the intent to provide more options for grease duct testing is admirable this method should not be allowed. Introducing water onto a job site presents many problems. Often times water is not available, testing is done in the winter with cold temperaturs (below freezing), power to the area is being supplied through temporary wiring and other personnel not involved in the testing are working in the same area. On all job sites any spills are supposed to be immediately cleaned up to prevent slips and falls, intentionally spraying water goes against all normal safety protocols. Testing of grease ducts is often done in sections, not after the entire system has been installed. In the real world of testing, during the rough phase of construction, it would almost impossible to truly simulate duct cleaning as described in this proposal. Vote to disapprove.

Cost Impact: The net effect of the public comment and code change proposal will increase the cost of construction
506.3.2.5.3.1 Light Test will not increase the cost of construction.

506.3.2.5.2 Water Spray Test will increase the cost of construction due to the equipment required, cost of water and the time spent for clean up.

Public Comment# 2823

Public Comment 2:

Proponents: Guy McMann, representing Colorado Association of Plumbing and Mechanical Officials (CAPMO) (gmcmann@jeffco.us) requests Disapprove

Commenter's Reason: Water testing grease ducts in new construction is a terrible idea weather its an option or not. Many systems are built in sections making water testing impractical. When water is present on the outside of the duct it will be impossible to distinguish where exactly it came from due to gravity and the inability to see in tight places. There is a time factor also in the time the leak occurred and the ability to see it. The proponent indicated there will be no additional cost but there certainly will be just in renting the machine alone, the water and the clean up. Water may be the answer to duct cleaning but has no place in duct testing in new construction. There may be no water available also depending on the location. Some jurisdictions will require water testing because they can and having this as an option will permit that unfortunate behavior. We urge the membership to disapprove this code change.

Cost Impact: The net effect of the public comment and code change proposal will increase the cost of construction
If this change is approved the cost will increase in renting the equipment and associated clean up. No change to code.

Public Comment# 2437

M50-21

Proposed Change as Submitted

Proponents: Jane Malone, American Association of Radon Scientists and Technologists, representing American Association of Radon Scientists and Technologists; Thomas Bowles, representing EPA (bowles.thomas@epa.gov); Ruth Mcburney, representing CRCPD (rmcburney@crcpd.org); Jonathan Wilson, National Center for Healthy Housing, representing National Center for Healthy Housing (jwilson@nchh.org); Kevin Stewart, American Lung Association, representing American Lung Association (Kevin.Stewart@Lung.org); Tobie Bernstein, representing Environmental Law Institute (bernstein@eli.org); David Kapturowski, representing Spruce Environmental Technologies, Inc. (dave@spruce.com)

2021 International Mechanical Code

Revise as follows:

512.1 General. Where a subslab soil exhaust system is provided, ~~the duct shall conform to the requirements of this section.~~ the system shall comply with ANSI/AARST CC1000.

Delete without substitution:

~~**512.2 Materials.** Subslab soil exhaust system duct material shall be air duct material *listed* and *labeled* to the requirements of UL 181 for Class 0 air ducts, or any of the following piping materials that comply with the *International Plumbing Code* as building sanitary drainage and vent pipe: cast iron; galvanized steel; copper or copper-alloy pipe and tube of a weight not less than type DWV; and plastic piping.~~

~~**512.3 Grade.**~~
~~Exhaust system ducts shall not be trapped and shall have a minimum slope of one-eighth unit vertical in 12 units horizontal (1-percent slope).~~

~~**512.4 Termination.**~~
~~Subslab soil exhaust system ducts shall extend through the roof and terminate not less than 6 inches (152 mm) above the roof and not less than 10 feet (3048 mm) from any operable openings or air intake.~~

~~**512.5 Identification.**~~
~~Subslab soil exhaust ducts shall be permanently identified within each floor level by means of a tag, stencil or other *approved* marking.~~

Add new standard(s) as follows:

AARST

The American Association of Radon Scientists and Technologists
527 N Justice Street
Hendersonville, NC 28739
USA

ANSI/AARST CC-1000-2018
Soil Gas Control Systems in New Construction of Buildings

Reason: The purpose of this proposed change is to update the legacy code language for soil exhaust systems in section 512 to the relevant consensus standard for soil gas exhaust systems, which includes additional specifications for materials, grade/slope, termination, and identification in the existing language as well as other essential components of soil gas control that are not now included in section 512.
The standard included in this proposal has been vetted and approved by EPA, multiple regulatory states, and HUD. It can be viewed for free at https://standards.aarst.org/CC-1000-2018/index.html In 2020, an addendum to ASHRAE 189.1 - 2017 was approved to incorporate a requirement for ANSI-AARST CC-1000 to replace the standard's existing soil gas requirement.

Cost Impact: The code change proposal will increase the cost of construction
This proposal does not add a requirement to install a radon control system. The proposal will add incremental cost to construction where radon control systems are installed if the builder is not already following the standard practice.
According to the Home Innovation Research Labs' Radon-Resistant Construction Practices in New U.S. Homes, the average reported per-unit installation cost of an active radon system in a multifamily dwelling in 2018 was $845, lower than $865 in 2017 but higher than $757 in 2016. The same paper indicates that in 2018 the average multifamily dwelling had an average selling price of $229,260. The cost of a system for a nonresidential commercial building will range from $2500 to higher depending on the footprint, volume and type of HVAC system.

Staff Analysis: A review of the standards proposed for inclusion in the code, AARST CC 1000-2018: Soil Gas Control Systems in New Construction of Buildings, with regard to some of the key ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before March 20, 2021.

M50-21

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The standard is more stringent but is questionable whether it's enforceable by removing the material requirements of Section 512.2 and the slope requirements of Section 512.3, which do not specifically appear in the reference standard. (Vote: 11-0)

M50-21

Individual Consideration Agenda

Public Comment 1:

IMC: SECTION 512, 512.1

Proponents: Jane Malone, representing American Assocation of Radon Scientists and Technologists; David Kapturowski, representing Spruce Environmental Technologies, Inc.; Jonathan Wilson, representing National Center for Healthy Housing (jwilson@nchh.org); Kevin Stewart, representing American Lung Association (kevin.stewart@lung.org); Thomas Bowles, representing Indoor Environments Division (bowles.thomas@epa.gov); Warren Friedman, representing Office of Lead Hazard Control and Healthy Homes (warren.friedman@hud.gov); Ruth McBurney, representing CRCPD (rmcburney@crcpd.org) requests As Modified by Public Comment

Replace as follows:

2021 International Mechanical Code

SECTION 512
SUBSLAB SOIL EXHAUST SYSTEMS

512.1 General . Where a subslab soil exhaust system is provided, the ~~duct shall conform to the requirements of this section~~ system shall be designed and constructed such that all occupiable spaces inside the structure contain radon levels below 4 picocuries per liter (pCi/L).

Commenter's Reason:
This comment is responsive to the Mechanical Committee's concern about the proposed removal of the material requirements of Section 512.2 and the slope requirements of Section 512.3. A performance based requirement is added.

Cost Impact: The net effect of the public comment and code change proposal will increase the cost of construction
This proposal does not add a requirement to install a radon control system. The proposal will add incremental cost to construction where radon control systems are installed if the builder is not already achieving radon levels below the EPA action level.

Public Comment# 2762

M52-21

Proposed Change as Submitted

Proponents: Craig Conner, representing self (craig.conner@mac.com); Joseph Lstiburek, representing Myself (joe@buildingscience.com)

2021 International Mechanical Code

Revise as follows:

601.5 Return air openings. Return air openings for heating, ventilation and air-conditioning systems shall comply with all of the following:

1. Openings shall not be located less than 10 feet (3048 mm) measured in any direction from an open combustion chamber or draft hood of another *appliance* located in the same room or space.
2. Return air shall not be taken from a hazardous or insanitary location or a refrigeration room as defined in this code.
3. The amount of return air taken from any room or space shall be not greater than the flow rate of supply air delivered to such room or space.
4. Return and transfer openings shall be sized in accordance with the *appliance* or *equipment* manufacturer's installation instructions, ACCA Manual D or the design of the registered design professional.
5. Return air taken from one *dwelling unit* shall not be discharged into another *dwelling unit*.
6. Taking return air from a crawl space shall not be accomplished through a direct connection to the return side of a forced air furnace. Transfer openings in the crawl space enclosure shall not be prohibited.
7. Return air shall not be taken from a closet, ~~bathroom,~~ toilet room, kitchen, garage, boiler room, furnace room or unconditioned attic.
8. Return air shall not be taken from indoor swimming pool enclosures and associated deck areas.

    Exceptions:

    1. Where the air from such spaces is dehumidified in accordance with Section 403.2.1, Item 2.
    2. Dedicated HVAC systems serving only such spaces.

Exceptions:

1. Taking return air from a kitchen is not prohibited where such return air openings serve the kitchen and are located not less than 10 feet (3048 mm) from the cooking *appliances*.
2. Taking return air from a kitchen is not prohibited in a *dwelling unit* where the kitchen and living spaces are in a single room and the cooking *appliance* is electric and located not less than 5 feet (1524 mm) in any direction from the return air intake opening.
3. Dedicated forced air systems serving only the garage shall not be prohibited from obtaining return air from the garage.

Reason: Return air from bathrooms is necessary to control bathroom moisture levels during cooling periods.
Increasing air change with the rest of the occupied space results in lower moisture levels in the bathroom and allows the air conditioning system to remove moisture. Relying on bathroom exhaust fans exhausting to the exterior to control bathroom moisture does not effectively reduce bathroom moisture levels. Exhaust ventilation in bathrooms should be used to control odors not moisture. Exhaust ventilation results in increasing air change in the entire occupied space and increasing moisture loads due to infiltration of exterior humid air throughout the occupied space. This higher air change rate (infiltration) supplies more moisture than the air conditioning system can remove. Odors are still controlled by bathroom exhaust fans exhausting air to the exterior. These bathroom exhaust fans do not have to operate continuously to control odors. Only providing supply air to bathrooms exacerbates the problem by making roof surfaces colder.

This is one of six separate proposed changes related to controlling mold in closets, bathrooms and mechanical room. The six changes fix problems caused by an increase in code thermal resistance over the past several code cycles.

For a more detailed explanation see:

https://www.buildingscience.com/documents/building-science-insights/bsi-109-how-changing-filters-led-condensation-and-mold-problem

https://www.buildingscience.com/documents/building-science-insights-newsletters/bsi-006-no-good-deed-shall-go-unpunished

Cost Impact: The code change proposal will increase the cost of construction
The code change proposal increases the cost of construction. The cost is the cost of adding the return duct.

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: This proposal is disapproved. The committee felt that this could allow 100% of the air from the bathroom to be recirculated and this would not be preferred. Furthermore, the committee felt the return air in the bathroom was necessary as passive return air occurs when the bathroom door is open. (Vote: 10-0)

Individual Consideration Agenda

Public Comment 1:

IMC: 601.5

Proponents: Craig Conner, representing self (craig.conner@mac.com); Joseph Lstiburek, representing Myself (joe@buildingscience.com) requests As Modified by Public Comment

Modify as follows:

2021 International Mechanical Code

601.5 Return air openings . Return air openings for heating, ventilation and air-conditioning systems shall comply with all of the following:

1. Openings shall not be located less than 10 feet (3048 mm) measured in any direction from an open combustion chamber or draft hood of another *appliance* located in the same room or space.
2. Return air shall not be taken from a hazardous or insanitary location or a refrigeration room as defined in this code.
3. The amount of return air taken from any room or space shall be not greater than the flow rate of supply air delivered to such room or space.
4. Return and transfer openings shall be sized in accordance with the *appliance* or *equipment* manufacturer's installation instructions, ACCA Manual D or the design of the registered design professional.
5. Return air taken from one *dwelling unit* shall not be discharged into another *dwelling unit*.
6. Taking return air from a crawl space shall not be accomplished through a direct connection to the return side of a forced air furnace. Transfer openings in the crawl space enclosure shall not be prohibited.
7. Return air shall not be taken from a closet, bathroom, toilet room, kitchen, garage, boiler room, furnace room or unconditioned attic.
8. Return air shall not be taken from indoor swimming pool enclosures and associated deck areas.

    Exceptions:

    1. Where the air from such spaces is dehumidified in accordance with Section 403.2.1, Item 2.
    2. Dedicated HVAC systems serving only such spaces.
    3. Return air can be taken from a bathroom that also contains a toilet room .

Exceptions:

1. Taking return air from a kitchen is not prohibited where such return air openings serve the kitchen and are located not less than 10 feet (3048 mm) from the cooking *appliances*.
2. Taking return air from a kitchen is not prohibited in a *dwelling unit* where the kitchen and living spaces are in a single room and the cooking *appliance* is electric and located not less than 5 feet (1524 mm) in any direction from the return air intake opening.
3. Dedicated forced air systems serving only the garage shall not be prohibited from obtaining return air from the garage.

4. Taking return air is not prohibited from a bathroom that also contains a toilet room.

Commenter's Reason: Modify the language to apply only to bathrooms also containing "Toilet Rooms".
Toilet rooms contain an exhaust fan that exhausts to the exterior to control odors in the toilet room. Toilet room exhaust is insufficient to address moisture problems in bathrooms containing bathtubs, showers, spas or similar bathing fixtures. Increasing ventilation rates in bathrooms to address moisture problems creates part load humidity (moisture) in the rest of the dwelling by increasing the infiltration of hot humid air throughout the dwelling. Allowing return air from the bathroom reduces the moisture load in the bathroom by diluting (lowering) the bathroom moisture by distributing the moisture to the rest of the dwelling allowing the existing a/c to remove this moisture without creating an additional moisture load.

Passive return air is insufficient to provide distribution and dilution of bathroom moisture as has been shown in current code constructed dwellings in hot humid and mixed humid climates.

It is significant to note that as dwellings become more and more efficient the part load moisture load will continue to migrate to cooler climate regions.

2021 IMC - Definitions
Toilet Room. A room containing a water closet and, frequently, a lavatory but not a bathtub, shower, spa or similar bathing fixture.

Cost Impact: The net effect of the public comment and code change proposal will increase the cost of construction
The code change proposal increases the cost of construction. The cost is the cost of adding the return duct.

Public Comment# 2724

M54-21

Proposed Change as Submitted

Proponents: Craig Conner, representing self (craig.conner@mac.com); Joseph Lstiburek, representing Myself (joe@buildingscience.com)

2021 International Mechanical Code

Revise as follows:

601.5 Return air openings. Return air openings for heating, ventilation and air-conditioning systems shall comply with all of the following:

1. Openings shall not be located less than 10 feet (3048 mm) measured in any direction from an open combustion chamber or draft hood of another *appliance* located in the same room or space.
2. Return air shall not be taken from a hazardous or insanitary location or a refrigeration room as defined in this code.
3. The amount of return air taken from any room or space shall be not greater than the flow rate of supply air delivered to such room or space.
4. Return and transfer openings shall be sized in accordance with the *appliance* or *equipment* manufacturer's installation instructions, ACCA Manual D or the design of the registered design professional.
5. Return air taken from one *dwelling unit* shall not be discharged into another *dwelling unit*.
6. Taking return air from a crawl space shall not be accomplished through a direct connection to the return side of a forced air furnace. Transfer openings in the crawl space enclosure shall not be prohibited.
7. Return air shall not be taken from a closet, bathroom, toilet room, kitchen, garage, boiler room, furnace room or unconditioned attic.

   <u>**Exception:** Taking return air from a boiler room, furnace room or mechanical room shall be permitted provided that the return air serves only those rooms, the combustion equipment is sealed combustion, and the pressure differential across the room is limited to 0.01 inch WC (2.5 pascals) or less by undercutting the door, installing a louvered door, a transfer grille, or by some other means. A dedicated supply duct shall not be required for those rooms.</u>

8. Return air shall not be taken from indoor swimming pool enclosures and associated deck areas.

   Exceptions:

   1. Where the air from such spaces is dehumidified in accordance with Section 403.2.1, Item 2.
   2. Dedicated HVAC systems serving only such spaces.

Exceptions:

1. Taking return air from a kitchen is not prohibited where such return air openings serve the kitchen and are located not less than 10 feet (3048 mm) from the cooking *appliances*.
2. Taking return air from a kitchen is not prohibited in a *dwelling unit* where the kitchen and living spaces are in a single room and the cooking *appliance* is electric and located not less than 5 feet (1524 mm) in any direction from the return air intake opening.
3. Dedicated forced air systems serving only the garage shall not be prohibited from obtaining return air from the garage.

Reason: Mold growth is now common in boiler rooms, furnace rooms or mechanical rooms due to higher interior moisture loads and less heat gain in such rooms. Allowing a limited amount of return air provides a means of controlling room moisture levels. Providing supply air to such a space exacerbates the problem by making room surfaces colder.
This is one of six separate proposed changes related to controlling mold in closets, bathrooms and mechanical room. The six changes fix problems caused by an increase in code thermal resistance over the past several code cycles.

For a more detailed explanation see:

https://www.buildingscience.com/documents/building-science-insights/bsi-109-how-changing-filters-led-condensation-and-mold-problem

https://www.buildingscience.com/documents/building-science-insights-newsletters/bsi-006-no-good-deed-shall-go-unpunished

Cost Impact: The code change proposal will increase the cost of construction
The code change proposal increases the cost of construction. The cost is the cost of adding the return duct. However, this code change is not a

requirement. It gives builders an option to solve and avoid problems.

M54-21

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: This proposal was disapproved based on the committee disbelief of the ability to transfer this application equally between residential and commercial spaces. (Vote: 8-3)

M54-21

Individual Consideration Agenda

Public Comment 1:

IRC: M1602.2

Proponents: Craig Conner, representing self (craig.conner@mac.com); Joseph Lstiburek, representing Myself (joe@buildingscience.com) requests As Submitted

Commenter's Reason: Mold growth is now common in boiler, furnace or mechanical rooms due to higher interior moisture loads and less heat gain in those rooms. Allowing a limited amount of return air provides a means of controlling room moisture levels.

Cost Impact: The net effect of the public comment and code change proposal will not increase or decrease the cost of construction
This provides an option, not a requirement. In some cases this option might lower costs.

Public Comment# 2727

M56-21

Proposed Change as Submitted

Proponents: Joseph Summers, representing Chair of PMGCAC (PMGCAC@iccsafe.org)

2021 International Mechanical Code

Revise as follows:

602.2 Construction of plenums. ~~*Plenum* enclosure construction materials that are exposed to the airflow shall comply with the requirements of Section 703.3 of the International Building Code or such materials shall have a flame spread index of not more than 25 and a smoke-developed index of not more than 50 when tested in accordance with ASTM E84 or UL 723.~~ Plenums shall be constructed in accordance with Section 602.2.1 and Section 602.2.2. The use of gypsum boards to form *plenums* shall be limited to systems where the air temperatures do not exceed 125ºF (52ºC) and the building and mechanical system design conditions are such that the gypsum board surface temperature will be maintained above the airstream dew-point temperature. Supply air *plenums* formed by gypsum boards shall not be incorporated in air-handling systems utilizing *direct evaporative cooling* systems.

Add new text as follows:

602.2.1 Plenum materials. .
Plenum enclosure construction materials that are exposed to the airflow shall comply with the requirements of Section 703.3 of the International Building Code or such materials shall have a flame spread index of not more than 25 and a smoke-developed index of not more than 50 when tested in accordance with ASTM E84 or UL 723.

Exception: Stud cavity and joist space plenums

Revise as follows:

~~**602.3**~~ **602.2.2 Stud cavity and joist space plenums.** Stud wall cavities and the spaces between solid floor joists to be utilized as air*plenums* shall comply with the following conditions:

1. Such cavities or spaces shall not be utilized as a *plenum* for supply air.
2. Such cavities or spaces shall not be part of a required fire-resistance-rated assembly.
3. Stud wall cavities shall not convey air from more than one floor level.
4. Stud wall cavities and joist space *plenums* shall comply with the floor penetration protection requirements of the *International Building Code*.
5. Stud wall cavities and joist space *plenums* shall be isolated from adjacent concealed spaces by *approved* fireblocking as required in the *International Building Code*.
6. Stud wall cavities in the outside walls of building envelope assemblies shall not be utilized as air *plenums*.

Reason: The intent of this code proposal is to provide clarity as to how plenums are permitted to be constructed under specific conditions. The current Sections 602.2 and 602.3 are requirements for the constructing the plenum, and thus the current Section 602.3 should be a subsection of Section 602.2. The text struck in 602.2 was moved in its entirety to the new 602.2.1. The language regarding the use of gypsum board in plenums was left in the charging paragraph, because it is a general requirement that applies to all plenums.
This proposal is submitted by the ICC Plumbing/Mechanical/Gas Code Action Committee (PMG CAC). The PMG CAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2020, the PMG CAC has held several virtual meetings open to any interested party. Numerous interested parties attended the committee meetings and offered their input. Related documentation and reports are posted on the PMG CAC website at: https://www.iccsafe.org/products-and-services/i-codes/code-development-process/pmg-code-action-committee-pmgcac/ Reference PMGCAC Working Document Item 32.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal is purely editorial for the purposes of clarifying existing requirements by better organizing the text. Material or labor to comply with the requirements are not different and as such, there is no impact on the cost of construction.

M56-21

Public Hearing Results

Committee Action: **Disapproved**

Committee Modification:

Committee Reason: This proposal was disapproved because there is clarification of text already regarding plenums in M55-21. (Vote: 11-0)

M56-21

Individual Consideration Agenda

Public Comment 1:

Proponents: Joseph J. Summers, representing Chair of PMGCAC (pmgcac@iccsafe.org) requests As Submitted

Commenter's Reason: Proposal M55-21 was a section reorganization ONLY, There was no intent to change or clarify the technical content of 602.2 or 602.3. A committee reason that "dismisses" M56-21 by stating that M55-21 already addresses this subject matter is not correct. Testimony reminded the Committee that Type I and Type II construction will *automatically* have noncombustible framing. For building types that *are* allowed to have wood framing (stud and joist) members, what is the increased *fire hazard* for the building if a stud or joist cavity is used as a plenum? All of the framing in the building can be of wood construction anyhow. We do not see evidence that supports the need for making sure that these plenums need the fire resistance. Decades of wood-framed buildings have had stud and joist cavity plenums and to our knowledge, there hasn't been a problem.

Opposing testimony indicated that if wood-framed cavities were to be used for plenums, then Fire Resistant Treated Wood needed to be used in these areas. Note that FRTW is required to be structurally de-rated (IBC 2303.2.5.) A derating may result in more framing needed. It is also implied that floor sheathing over the cavity would also need to the FRTW.

We believe that requiring stud and joist (plenum) cavity construction to comply with 25/50 is creating a need for solution for a problem that doesn't exist.

Cost Impact: The net effect of the public comment and code change proposal will not increase or decrease the cost of construction
This proposal is only a clarification.

Public Comment# 2447

M60-21

Proposed Change as Submitted

Proponents: Cory Wasniewski, Roberts Environmental Control Corp, representing Roberts Environmental Control Corp (CJW@RobertsHVAC.com)

2021 International Mechanical Code

Revise as follows:

604.3 Coverings and linings. Duct coverings ~~and linings~~, including adhesives where used, shall have a flame spread index not more than 25 and a smoke-developed index not more than ~~50~~ 450, when tested in accordance with ASTM E84 or UL 723, using the specimen preparation and mounting procedures of ASTM E2231. ~~Duct coverings and linings shall not flame, glow, smolder or smoke when tested in accordance with ASTM C411 at the temperature to which they are exposed in service. The test temperature shall not fall below 250°F (121°C).~~ Coverings shall be *listed* and *labeled*. Duct linings, including adhesives where used, shall have a flame spread index not more than 25 and a smoke-developed index not more than 50, when tested in accordance with ASTM E84 or UL 723, using the specimen preparation and mounting procedures of ASTM E2231. Duct coverings and linings shall not flame, glow, smolder or smoke when tested in accordance with ASTM C411 at the temperature to which they are exposed in service. The test temperature shall not fall below 250°F (121°C). Linings shall be *listed* and *labeled*.

~~Exception~~ Exceptions:

1. Polyurethane foam insulation that is spray applied to the exterior of ducts in attics and crawl spaces shall be subject to all of the following requirements:
   1. The foam plastic insulation shall have a flame spread index not greater than 25 and a smoke-developed index not greater than 450, when tested in accordance with ASTM E84 or UL 723, using the specimen preparation and mounting procedures of ASTM E2231.
   2. The foam plastic insulation shall not flame, glow, smolder or smoke when tested in accordance with ASTM C411 at the temperature to which they are exposed in service. The test temperature shall not fall below 250°F (121°C).
   3. The foam plastic insulation complies with the requirements of Section 2603 of the International Building Code.
   4. The foam plastic insulation is protected against ignition in accordance with the requirements of Section 2603.4.1.6 of the International Building Code.
2. Ductwork coverings and linings, including adhesives where used, located in a plenum rated cavity, shall have a flame spread index not more than 25 and a smoke-developed index not more than 50, when tested in accordance with ASTM E84 or UL 723, using the specimen preparation and mounting procedures of ASTM E2231. Duct coverings and linings shall not flame, glow, smolder or smoke when tested in accordance with ASTM C411 at the temperature to which they are exposed in service. The test temperature shall not fall below 250°F (121°C). Coverings and linings shall be *listed* and *labeled*.

Reason: ***Specific to ductwork insulation coverings not in Plenum-Rated Spaces.***

1. Ductwork coverings both indoors and outdoors, not located within a plenum rated space, are not in the air stream. They are in the same building space as all other construction materials.
2. Weatherproof and protective barriers that are atop of ductwork coverings (insulations) are required per section IMC 603.16, however, per IMC Sections 604.12 these barriers are not classified for a required flame and smoke index rating. This forces you to reference back to the IBC and NFPA 90A, allowing IBC Class A which defines a flame and smoke rating as ASTM E84 **25**/**450** equal to everything else in the building.
   1. *IBC allows all building insulation products, materials, and facings, again outside of a plenum-rated cavity, in its highest classification (Class A, I) to have an ASTM E84 rating of **25/450.** With the ONLY exception being materials within a plenum rated cavity.*
   2. *NFPA 90A Section 4.3.3.1.2 Specifically states the flame spread and smoke-developed index requirements of section 4.3.3.1.1 shall NOT apply to air duct weatherproof coverings where they are located entirely outside of a building, do not penetrate a wall or roof, and do not create an exposure hazard.*
3. There is a direct conflict of the NFPA 90A Section 4.3.3.1.2 allowing weather covering directly atop of the ductwork covering to meet ASTM E84 25/**450.** But then per IMC 604.3 not allowing the covering itself to meet the same specifications of ASTM E84 25/**450**. The covering and the weatherproof barrier would become the same assembly but then have conflicting requirements.
4. There is a conflict of the IBC allowing all interior and exterior to the building materials (with the only exception being materials within a plenum space) to meet the IBC Class A, I specification of ASTM E84 **25**/**450**. But the IMC section 604.3 ductwork coverings, that are in the same building space, do not follow the same NFPA and IBC specifications.

Bibliography:

- IBC
- IMC

- NFPA 90A

Cost Impact: The code change proposal will decrease the cost of construction

- Closed Cell (polyisocyanurates) foams that meet IBC Class A/I and NFPA specifications (ASTM E84 **25/450**) for use in ductwork coverings would reduce costs and improve energy efficiencies.
- Closed Cell (polyisocyanurates) foams have some of the highest R-values per inch and the lowest costs in the current markets when compared to other board insulations.
- Closed Cell (polyisocyanurates) foams are Green Building, GreenGuard, and LEED qualified building materials.
- Closed Cell (polyisocyanurates) foams when compared to equivalent R-Value Fiber Board insulations are not only more cost-effective, they have a 50% or more reduced weight load.
- Achieving a R-6.5 @ 1", R-9.8 @ 1.5", R-13.1 @ 2"
- Closed Cell (polyisocyanurates) foams weigh significantly less leading to installation cost savings.
- Closed Cell (polyisocyanurates) foams meet equivalent R-Values to FIber Board are 50% thickness. Saving space, time, and efficiency during construction.

M60-21

Public Hearing Results

Committee Action: As Modified

Committee Modification:

Revise as follows:

604.3Coverings and linings.

Duct coverings and linings, including adhesives where used, shall have a flame spread index not more than 25 and a smoke-developed index not more than ~~450~~ 50, when tested in accordance with ASTM E84 or UL 723, using the specimen preparation and mounting procedures of ASTM E2231. Duct coverings and linings shall not flame, glow, smolder or smoke when tested in accordance with ASTM C411 at the temperature to which they are exposed in service. The test temperature shall not fall below 250°F (121°C). Coverings and linings ~~Linings~~ shall be listed and labeled.

~~Duct linings, including adhesives where used, shall have a flame spread index not more than 25 and a smoke-developed index not more than 50, when tested in accordance with ASTM E84 or UL 723, using the specimen preparation and mounting procedures of ASTM E2231. Duct coverings and linings shall not flame, glow, smolder or smoke when tested in accordance with ASTM C411 at the temperature to which they are exposed in service. The test temperature shall not fall below 250°F (121°C). Linings shall be *listed* and *labeled*.~~

Exceptions:

1. Polyurethane foam insulation that is spray applied to the exterior of ducts in attics and crawl spaces shall be subject to all of the following requirements:
   1. The foam plastic insulation shall have a flame spread index not greater than 25 and a smoke-developed index not greater than 450, when tested in accordance with ASTM E84 or UL 723, using the specimen preparation and mounting procedures of ASTM E2231.
   2. The foam plastic insulation shall not flame, glow, smolder or smoke when tested in accordance with ASTM C411 at the temperature to which they are exposed in service. The test temperature shall not fall below 250°F (121°C).
   3. The foam plastic insulation complies with the requirements of Section 2603 of the International Building Code.
   4. The foam plastic insulation is protected against ignition in accordance with the requirements of Section 2603.4.1.6 of the International Building Code.
2. ~~Ductwork~~ Duct coverings added to the outside of ducts and not contained in plenums ~~and linings~~, including adhesives where used~~, located in a plenum rated cavity,~~ shall have a flame spread index not more than 25 and a smoke-developed index not more than 450 ~~50~~, when tested in accordance with ASTM E84 or UL 723, using the specimen preparation and mounting procedures of ASTM E2231. Duct coverings ~~and linings~~ shall not flame, glow, smolder or smoke when tested in accordance with ASTM C411 at the temperature to which they are exposed in service. The test temperature shall not fall below 250°F (121°C). Coverings ~~and linings~~ shall be *listed* and *labeled*.

Committee Reason: This is necessary for fire safety in duct coverings, linings and plenums. Coverings that are not plenums are treated like other building materials. The modification appropriately places the allowance for the higher smoke development (450) in the exception and the lower smoke development (50) in the base requirement. (Vote: 10-1)

Individual Consideration Agenda

Public Comment 1:

Proponents: Charles Haack, representing NAIMA requests Disapprove

Commenter's Reason: NAIMA opposes the adoption of the changes included in proposal M60-21 Mod-Hirshler-3.
First and foremost, NAIMA believes that this code revision places occupant safety below competing priorities including job site space restrictions and efficiency requirements (R-values). Current code-implemented life safety measures should not be relaxed or made less stringent without relevant written justification from the proponent.

Second, the language included in this code proposal is unclear on how insulation in double wall duct systems is handled and whether it is considered a duct lining or a duct covering for the purpose of meeting FSI/SDI requirements. To maintain occupant safety provisions contained in the current code, M60 Mod-Hirshler-3 needs to be clarified to ensure that double wall duct systems are not infiltrated with significant amounts of smoke from products exceeding an SDI of 50 during a fire event.

Cost Impact: The net effect of the public comment and code change proposal will not increase or decrease the cost of construction
No change to code.

Public Comment# 2861

NOTE: M66-21 PART I DID NOT RECEIVE A PUBLIC COMMENT AND IS REPRODUCED FOR INFORMATIONAL PURPOSES ONLY

M66-21 Part I

Proposed Change as Submitted

Proponents: Joseph Summers, representing Chair of PMGCAC (PMGCAC@iccsafe.org)

THIS IS A TWO PART CODE CHANGE. PART I WILL BE HEARD BY THE MECHANICAL CODE COMMITTEE. PART II WILL BE HEARD BY THE INTERNATIONAL RESIDENTIAL MECHANICAL/PLUMBING CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THESE COMMITTEES

2021 International Mechanical Code

Revise as follows:

1006.6 Safety and relief valve discharge. Safety and relief valve discharge pipes shall be of rigid pipe that is *approved* for the temperature of the system. High-pressure-steam safety valves shall be vented to the outside of the structure. The discharge piping serving pressure relief valves, temperature relief valves and combinations of such valves shall:

1. Not be directly connected to the drainage system.
2. Discharge through an air break located in the same room as the *appliance*.
3. Not be smaller than the diameter of the outlet of the valve served and shall discharge full size to the air break.
4. Serve a single relief device and shall not connect to piping serving any other relief device or *equipment*.
5. Discharge to the floor, to the pan serving the boiler or storage tank, to a waste receptor or to the outdoors.
6. Discharge in a manner that does not cause personal injury or structural damage.
7. Discharge to a termination point that is readily observable by the building occupants.
8. Not be trapped.
9. Be installed so as to flow by gravity.
10. ~~Not terminate~~ <u>Terminate not</u> more than 6 inches (152 mm) and <u>not less than two times the discharge pipe diameter</u> above the floor or <u>flood level rim of the</u> waste receptor.

11. Not have a threaded connection at the end of such piping.
12. Not have valves or tee fittings.
13. Be constructed of those materials listed in Section 605.4 of the *International Plumbing Code* or materials tested, rated and approved for such use in accordance with ASME A112.4.1.

Reason: Part I REASONING: The text for the requirements for a discharge pipe from any pressure (or temperature) relief valve should be identical between all the codes that have such requirements. It doesn't matter what the relief valve is protecting. Uniformity across the codes on these requirements will improve compliance.
PART II REASONING: Oddly, Section M2002.4 has minimal requirements for pressure relief valve discharge pipes. A boiler doesn't "know" what type of building it is located in. The requirements for a pressure relief valve discharge pipe should be identical to what is in the IMC for the same application. Uniformity across the codes on these requirements will improve compliance.

This proposal is submitted by the ICC Plumbing/Mechanical/Gas Code Action Committee (PMG CAC). The PMG CAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2020, the PMG CAC has held several virtual meetings open to any interested party. Numerous interested parties attended the committee meetings and offered their input. Related documentation and reports are posted on the PMG CAC website at: https://www.iccsafe.org/products-and-services/i-codes/code-development-process/pmg-code-action-committee-pmgcac/ Reference PMGCAC Working Document Item 31.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The relief valve piping already has to be installed and if relief valve manufacturers' instructions are being followed, many of these requirements are already being followed.

M66-21 Part I

Public Hearing Results

Committee Action: As Modified

Committee Modification:

1006.6Safety and relief valve discharge.
Safety and relief valve discharge pipes shall be of rigid pipe that is
approved for the temperature of the system. High-pressure-steam safety valves shall be vented to the outside of the structure. The discharge piping serving pressure relief valves, temperature relief valves and combinations of such valves shall:

1. Not be directly connected to the drainage system.
2. Discharge through an air break located in the same room as the *appliance*.
3. Not be smaller than the diameter of the outlet of the valve served and shall discharge full size to the air break.
4. Serve a single relief device and shall not connect to piping serving any other relief device or *equipment*.
5. Discharge to the floor, to the pan serving the boiler or storage tank, to a waste receptor or to the outdoors.
6. Discharge in a manner that does not cause personal injury or structural damage.
7. Discharge to a termination point that is readily observable by the building occupants.
8. Not be trapped.
9. Be installed so as to flow by gravity.
10. Terminate not more than 6 inches (152 mm) ~~and not less than two times the discharge pipe diameter~~ above the floor or flood level rim of the waste receptor.
11. Not have a threaded connection at the end of such piping.
12. Not have valves or tee fittings.

13. Be constructed of those materials listed in Section 605.4 of the *International Plumbing Code* or materials tested, rated and approved for such use in accordance with ASME A112.4.1.

Committee Reason: The committee agreed that the text for the requirements for a discharge pipe from any pressure (or temperature) relief valve should be identical between all the codes that have such requirements. It doesn't matter what the relief valve is protecting. Uniformity across the codes on these requirements will improve compliance. The modification further clarifies acceptable industry practices. (Vote: 11-0)

M66-21 Part I

M66-21 Part II

Proposed Change as Submitted

Proponents: Joseph J. Summers, representing Chair of PMGCAC (pmgcac@iccsafe.org)

THIS IS A TWO PART CODE CHANGE. PART 1 WILL BE HEARD BY THE MECHANICAL CODE COMMITTEE. PART 2 WILL BE HEARD BY THE INTERNATIONAL RESIDENTIAL MECHANICAL/PLUMBING CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THESE COMMITTEES.

2021 International Residential Code

Revise as follows:

M2002.4 Pressure relief valve. Boilers shall be equipped with pressure relief valves with minimum rated capacities for the equipment served. Pressure relief valves shall be set at the maximum rating of the boiler. ~~Discharge shall be piped to drains by gravity to within 18 inches (457 mm) of the floor or to an open receptor.~~

M2002.4.1 Requirements for discharge pipe. . The discharge piping serving a pressure relief valve, temperature relief valve or combination valve shall:

1. Not be directly connected to the drainage system.
2. Discharge through an air gap located in the same room as the boiler.
3. Not be smaller than the diameter of the outlet of the valve served and shall discharge full size to the air gap.
4. Serve a single relief device and shall not connect to piping serving any other relief device or equipment.
5. Discharge to the floor, to the pan serving the water heater or storage tank, to a waste receptor or to the outdoors.
6. Discharge in a manner that does not cause personal injury or structural damage.
7. Discharge to a termination point that is readily observable by the building occupants.
8. Not be trapped.
9. Be installed to flow by gravity.
10. Terminate not more than 6 inches (152 mm) and not less than two times the discharge pipe diameter above the floor or waste receptor flood level rim.
11. Not have a threaded connection at the end of the piping.
12. Not have valves or tee fittings.
13. Be constructed of those materials indicated in Section P2906.5 or materials tested, rated and approved for such use in accordance with ASME A112.4.1.
14. Be one nominal size larger than the size of the relief-valve outlet, where the relief-valve discharge piping is installed with insert fittings. The outlet end of such tubing shall be fastened in place.
15. The end of the discharge pipe shall be cut at a 45-degree angle.

Reason: Part I REASONING: The text for the requirements for a discharge pipe from any pressure (or temperature) relief valve should be identical between all the codes that have such requirements. It doesn't matter what the relief valve is protecting. Uniformity across the codes on these requirements will improve compliance.
PART II REASONING: Oddly, Section M2002.4 has minimal requirements for pressure relief valve discharge pipes. A boiler doesn't "know" what type of building it is located in. The requirements for a pressure relief valve discharge pipe should be identical to what is in the IMC for the same application. Uniformity across the codes on these requirements will improve compliance.

This proposal is submitted by the ICC Plumbing/Mechanical/Gas Code Action Committee (PMG CAC). The PMG CAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2020, the PMG CAC has held several virtual meetings open to any interested party. Numerous interested parties attended the committee meetings and offered their input. Related documentation and reports are posted on the PMG CAC website at: https://www.iccsafe.org/products-and-services/i-codes/code-development-process/pmg-code-action-committee-pmgcac/ Reference PMGCAC Working Document Item 31.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The relief valve piping already has to be installed and if relief valve manufacturers' instructions are being followed, many of these requirements are already being followed.

M66-21 Part II

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The air gap verses the air break is confusing. It doesn't make sense that the boiler relief valve discharges to a water heater pan. (10-1)

M66-21 Part II

Individual Consideration Agenda

Public Comment 1:

IRC: M2002.4.1

Proponents: Joseph J. Summers, representing Chair of PMGCAC (pmgcac@iccsafe.org) requests As Modified by Public Comment

Modify as follows:

2021 International Residential Code

M2002.4.1 Requirements for discharge pipe. . The discharge piping serving a pressure relief valve, temperature relief valve or combination valve shall:

1. Not be directly connected to the drainage system.
2. Discharge through an air ~~gap located gap~~ break located in the same room as the boiler.
3. Not be smaller than the diameter of the outlet of the valve served and shall discharge full size to the air ~~gap. gap~~ break .
4. Serve a single relief device and shall not connect to piping serving any other relief device or equipment.
5. Discharge to the floor, to the pan serving the ~~water heater~~ boileror storage tank, to a waste receptor or to the outdoors.
6. Discharge in a manner that does not cause personal injury or structural damage.
7. Discharge to a termination point that is readily observable by the building occupants.
8. Not be trapped.
9. Be installed to flow by gravity.
10. Terminate not more than 6 inches (152 mm) ~~and not less than two times the discharge pipe diameter~~ above the floor or waste receptor flood level rim.
11. Not have a threaded connection at the end of the piping.

12. Not have valves or tee fittings.
13. Be constructed of those materials indicated in Section P2906.5 or materials tested, rated and approved for such use in accordance with ASME A112.4.1.
14. ~~Be one nominal size larger than the size of the relief-valve outlet, where the relief-valve discharge piping is installed with insert fittings. The outlet end of such tubing shall be fastened in place.~~
15. ~~The end of the discharge pipe shall be cut at a 45-degree angle.~~

PART 2 WILL BE HEARD BY THE INTERNATIONAL RESIDENTIAL MECHANICAL COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THIS COMMITTEE.

Commenter's Reason: This public comment corrects Committee identified problems and also makes small changes to correlate the text with Part I of this proposal, As Modified.

Cost Impact: The net effect of the public comment and code change proposal will not increase or decrease the cost of construction
This public comment is only a clarification of the original proposal.

Public Comment# 2451

M73-21

Proposed Change as Submitted

Proponents: Emily Toto, ASHRAE, representing ASHRAE (etoto@ashrae.org)

2021 International Mechanical Code

Add new definition as follows:

Refrigerant Designation. The unique identifying alphanumeric value or refrigerant number assigned to an individual refrigerant and published in ASHRAE Standard 34.

Delete and substitute as follows:

~~**1101.7 Change in refrigerant type.** The type of refrigerant in refrigeration systems having a refrigerant circuit containing more than 220 pounds (99.8 kg) of Group A1 or 30 pounds (13.6 kg) of any other group refrigerant shall not be changed without prior notification to the code official and compliance with the applicable code provisions for the new refrigerant type.~~

1101.7 Changing Refrigerant. Changes of refrigerant in an existing system to a refrigerant with a different refrigerant designation shall only be allowed where in accordance with the following:

1. The change of refrigerant shall be approved by the owner.
2. The change in refrigerant shall be in accordance with one of the following.

    2.1 Written instructions of the original equipment manufacturer.

    2.2 An evaluation of the system by a registered design professional or by an approved agency that validates safety and suitability of the replacement refrigerant.

    2.3 Approved by the code official.

3. Where the replacement refrigerant is classified into the same safety group, requirements that were applicable to the existing system shall continue to apply.
4. Where the replacement refrigerant is classified into a different safety group, the system shall comply with the requirements of this standard for a new installation, and the change of refrigerant shall require code official approval.

~~**1102.2.1 Mixing.** Refrigerants, including refrigerant blends, with different designations in ASHRAE 34 shall not be mixed in a system.~~

~~**Exception:** Addition of a second refrigerant is allowed where permitted by the *equipment* or *appliance* manufacturer to improve oil return at low temperatures. The refrigerant and amount added shall be in accordance with the manufacturer's instructions.~~

1102.2.1 Mixing.
Refrigerants with different refrigerant designations shall only be mixed in a system in accordance with both of the following:

1. The addition of a second refrigerant is allowed by the equipment manufacturer and is in accordance with the manufacturer's written instructions.
2. The resulting mixture does not change the refrigerant safety group.

Reason: With the onset of flammable refrigerants, the need to address change of refrigerant from one safety class to another was identified. ASHRAE published addendum e to ASHRAE 15-2016 to address this concern (which is now part of the ASHRAE 15-2019 version, Section 5.3).

Bibliography: 1. ANSI/ASHRAE 15-2019, Safety Standard for Refrigeration Systems
2. ANSI/ASHRAE 34-2019, Designation and Safety Classification of Refrigerants

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal provides a clarification to address the use of new systems but does not introduce any additional requirements that would impact cost.

M73-21

Public Hearing Results

Committee Action: **As Submitted**

Committee Reason: This proposal was passed as submitted because it provides clear criteria of what will be required in changing of refrigerants in this code and ASHRAE15 to be used. (Vote: 10-1)

M73-21

Individual Consideration Agenda

Public Comment 1:

IMC: 1101.7

Proponents: Emily Toto, representing ASHRAE (etoto@ashrae.org) requests As Modified by Public Comment

Modify as follows:

2021 International Mechanical Code

1101.7 Changing Refrigerant . Changes of refrigerant in an existing system to a refrigerant with a different refrigerant designation shall only be allowed where in accordance with the following:

1. ~~The change of refrigerant shall be approved by the owner. owner.~~ The owner or the owner's authorized agent shall be notified prior to making a change of refrigerant, and the change of refrigerant shall not be made where the owner objects to the change.
2. The change in refrigerant shall be in accordance with one of the following.

   2.1 Written instructions of the original equipment manufacturer.

   2.2 An evaluation of the system by a registered design professional or by an approved agency that validates safety and suitability of the replacement refrigerant.

   2.3 Approved by the code official.
3. Where the replacement refrigerant is classified into the same safety group, requirements that were applicable to the existing system shall continue to apply.
4. Where the replacement refrigerant is classified into a different safety group, the system shall comply with the requirements of this standard for a new installation, and the change of refrigerant shall require code official approval.

Commenter's Reason: The intent of notifying the owner or owner's agent is to ensure the owner of the building is aware of the change and can address any consequences to the building or occupancy that might be tied to the change of refrigerant. The owner notification can be made by the designer, contractor, installer or any other party involved in the proposed refrigerant change. This modification to the originally submitted language is more appropriate than requiring owner "approval."

Bibliography: ANSI/ASHRAE 15-2019, Safety Standard for Refrigeration Systems

Cost Impact: The net effect of the public comment and code change proposal will not increase or decrease the cost of construction
This proposal provides a clarification to address the use of new systems but does not introduce any additional requirements that would impact cost.

Public Comment# 2436

Public Comment 2:

Proponents: Mary Koban, representing AHRI (mkoban@ahrinet.org) requests As Submitted

Commenter's Reason: AHRI support the committee recommendation for the approval of M73 as submitted
AHRI supports the committee recommendation to approve the code change proposal noted in M73 as the change aligns the mechanical code with ANSI/ASHRAE 15 and newer refrigerants now listed in ANSI/ASHRAE 34. The modifications provide a criteria of what is required to change refrigerants in the mechanical code.

·As systems can now include new safety classes, the need to address the change of refrigerant from one safety class to another was identified.

·Addendum e to ASHRAE 15-2016 was published to address this concern (which is now part of the ANSI/ASHRAE 15-2019 version, Section5.3).

Bibliography: ANSI/ASHRAE 15: 2019
ANSI/ASHRAE 34: 2019

Cost Impact: The net effect of the public comment and code change proposal will not increase or decrease the cost of construction
The code change will not change the cost of construction.

Public Comment# 2568

M80-21

Proposed Change as Submitted

Proponents: Brad Campbell, Titeflex Corp., representing Gastite (brad.campbell@gastite.com)

2021 International Mechanical Code

Revise as follows:

PIPING. Where used in this code, "piping" refers to either pipe or tubing, or both.
Pipe.

A rigid conduit of iron, steel, copper, copper-alloy, or plastic , or multilayer composite aluminum and plastic.

Tubing.

Semirigid conduit of copper, copper-alloy, aluminum, plastic, or steel , or multilayer composite aluminum and plastic.

TABLE 1107.4 REFRIGERANT PIPE

PIPING MATERIAL	STANDARD
Aluminum tube	ASTM B210/ASTM B210M, ASTM B491/B491M
Brass (copper alloy) pipe	ASTM B43
Copper linesets	ASTM B280, ASTM B1003
Copper pipe	ASTM B42, ASTM B302
Copper tube[a]	ASTM B68, ASTM B75, ASTM B88, ASTM B280, ASTM B819
Steel pipe[b]	ASTM A53, ASTM A106
Steel tube	ASTM A254, ASTM A334
Polyethylene of raised temperature / aluminum / polyethylene of raised temperature (PERT/AL/PERT) linesets	ASTM FXXXX

a. Soft annealed copper tubing larger than $1^3/_8$ inch (35 mm) O.D. shall not be used for field-assembled refrigerant piping unless it is protected from mechanical damage.

b. ASTM A53, Type F steel pipe shall not be used for refrigerant lines having an operating temperature less than -20°F (-29°C).

Add new text as follows:

1108.10 PERT/AL/PERT pipe.
Joints between PERT/AL/PERT pipe or fittings shall be mechanical or press-connect joints conforming to Section 1108.3.

Revise as follows:

1109.4.1 Piping material. Piping material for Group A2, A3, B2 or B3 refrigerant located inside the building, except for*machinery rooms*, shall be copper pipe, brass pipe or steel pipe. Multilayer composite PERT/AL/PERT pipe may be used for Group A2 refrigerant. Pipe joints located in areas other than the *machinery room* shall be welded. Self-contained *listed* and *labeled equipment* or *appliances* shall have piping material based on the listing requirements.

Exception: PERT/AL/PERT pipe joints located in areas other than the machinery room shall be mechanical or press-connect joints.

Add new text as follows:

ASTM

ASTM International
100 Barr Harbor Drive, P.O. Box C700
West Conshohocken, PA 19428

ASTM FXXXX — Polyethylene of Raised Temperature/Aluminum/Polyethylene of Raised Temperature (PERT/AL/PERT) Composite Pressure Pipe based on Inner Diameter (ID) for use in Air Conditioning and Refrigeration Line Set Systems

Reason: PERT/AL/PERT pipe material is not listed in the IMC 1107 Refrigeration Piping Materials section. This type of composite pipe has primarily been used for water conveyance applications but if the pipe is designed and tested to the new ASTM FXXXX Standard for "Polyethylene of Raised Temperature / Aluminum / Polyethylene of Raised Temperature (PERT/AL/PERT) Composite Pressure Pipe based on Inner Diameter (ID) for use in Air Conditioning and Refrigeration Line Set Systems" it will be a comparable Line Set option. This new ASTM FXXXX standard will be finalized and published in the next 30 days.

Bibliography: ASTM FXXX approved PERT/AL/PERT lineset pipes have been tested and proven to be an excellent refrigeration piping material option. This standard was designed with dimensional tables that are ID controlled to match that of ACR Copper lineset tube so that the flowrate and volume of the pipe remains the same. This specification also has high pressure performance tables so that the pipe satisfies the wide range of refrigerant pressures. The new ASTM standard covers the following test evaluations:

- Dimensional evaluation to allowed standard (ASTM D2122)
- Adhesion testing (visual and peel) to verify the bonding between the various layers
- Ring pull testing to ensure a strong and effective weld seam
- Elongation and tensile testing of the aluminum alloy used in the pipe construction to ensure that only top performing alloys are used for this application (ASTM E8/E8M)
- Burst pressure testing to verify the listed design pressure (ASTM D1599)
- Sustained pressure testing to ensure the pipe will handle continuous high pressure values at elevated temperatures (ASTM1598)
- Vibration testing after specified refrigerant exposure to pipe and fitting assembly (UL1963 Sec. 58.10)
- Pull testing after specified refrigerant exposure to pipe and fitting assembly (UL1963 Sec.58.11)
- Burst or Fatigue testing after specified refrigerant exposure to pipe and fitting assembly (Fatigue Method UL207 Sec. 14)

- Hydrostatic burst testing to evaluate the fitting connection to the pipe (ASTM 1599)
- Hydrostatic sustained pressure testing to evaluate the fitting connection to the pipe (ASTM1598)
- Thermocycling testing to evaluate the fitting connection to the pipe

This product has also been tested and evaluated for refrigerant and oil exposure to ASHRAE G38 "Guideline for Using Metal Pressure Vessels to Test Materials Used in Refrigeration Systems" where the physical properties of the inner PERT wall were evaluated both before and after exposure testing.

Cost Impact: The code change proposal will decrease the cost of construction
The use of an ASTM FXXXX approved PERT/AL/PERT lineset pipe will provide a decrease in the cost of construction due to cost effective raw materials that are used to make up the multilayer pipe. Most importantly the PERT, adhesive, and aluminum layer construction maintains better price stability than that of the commonly used refrigeration piping materials today which are very volatile and can not be held for any period of time. The product is light weight and can be sold in larger easily handled coils that can be straightened and formed for quicker installation in the field saving time and money. The overall structure of the pipe provides a lower risk of kinking than that of traditional lineset pipes which helps prevent unnecessary installation scrap and rework. Also this type of pipe is less likely to be stolen at job sights due to nature of the material.

Staff Analysis: A review of the standards proposed for inclusion in the code, ASTM FXXXX: Polyethylene of Raised Temperature/Aluminum/Polyethylene of Raised Temperature (PERT/AL/PERT) Composite Pressure Pipe based on Inner Diameter (ID) for use in Air Conditioning and Refrigeration Line Set Systems, with regard to some of the key ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before March 20, 2021.

M80-21

Public Hearing Results

Committee Action: **As Submitted**

Committee Reason: There was some concern about the use of the word "may" as it is permissive and subjective. However, the proposal has passed as submitted because composite aluminum piping is approved under ASTM standards and is an appropriate option for refrigerant piping. (Vote: 7-4)

M80-21

Individual Consideration Agenda

Public Comment 1:

Proponents: Julius Ballanco, representing Mueller Industries (jbengineer@aol.com) requests Disapprove

Commenter's Reason: This code change should not have been accepted since there is no ASTM standard listed. How can on even evaluate a change when the standard is listed as FXXXX? In addition to this failure to comply with the procedures, there are many other reasons that this change should not be accepted.
There is no indication that the draft ASTM standard evaluates the piping material to the pressure found in refrigeration systems. For example, R410A routinely operates a pressure above 400 psi. The pressure can reach over 600 psi in certain operating conditions. R32, one of the low GWP A2L refrigerants operates at even higher pressures.

There is no associated fitting standard proposed for this plastic pipe. Section 1108.10 requires the joints and fittings to be mechanical or press, yet there is no standard to evaluate these fittings. There is also no standard for the press joints. Refrigerant press connect fittings for copper tube are evaluated to UL 207 which is a robust standard. As written, any water press connect fittings could be used. This will result in failure of the joints and fittings.

Refrigerant piping installed in the field is typically located both indoors and outside. There is no indication in the proposal as to whether this new material would be resistant to the UV exposure over the life of the refrigeration system. Testing needs to verify that the plastic pipe will not fail when exposed to long periods of UV radiation.

ASHRAE has recently completed a rewrite of the entire refrigerant piping section in ASHRAE 15. PERT-AL-PERT is not listed as an acceptable material in ASHRAE 15. Before the Mechanical Code accepts a new unproven material, there should first be acceptance by ASHRAE. All of the current piping requirements for refrigeration system are based on ASHRAE 15.

Interestingly, the change proposed in Section 1109.4.1 would allow a plastic pipe for Group A2 refrigerants. Plus, the text uses permissive language with the word "may." The code does not currently allow copper tube and aluminum tube to be used in field piping for Group A2 refrigerants. In essence, the change is listing plastic refrigerant pipe as being better than copper tube or aluminum tube which has not been proven.

More importantly, this change would introduce a combustible piping material for the first time in refrigeration systems. Combustible pipe has traditionally not been permitted for indoor installations for refrigerant piping, fuel gas piping, and fuel oil piping. This would be the first attempt without providing any technical documentation or research on the impact of a fire. The reason combustible pipe has not been used in refrigerant piping, fuel gas piping, and fuel oil piping is because of the additional eminent hazard that results during a fire. Refrigerant can easily escape during a fire. In addition to the asphyxiation properties of refrigerant, burning refrigerant results in deadly gases. These gases can readily pass through a building and cause harm away from the fire location. As we transition to Group A2L refrigerants, there is a higher combustibility rate of the refrigerant compared to Group A1 refrigerants. Yet, no research has been done on the impact of using this material.

The refrigerant industry has spent millions of dollars investigating the fire impact of low GWP refrigerants. In all of the fire tests, noncombustible piping material was used on the refrigeration systems. A switch to plastic pipe would change the results perhaps significantly. However, without such research we will never know.

Before such a drastic change in piping materials is ever accepted, there needs to be extensive research and testing on the impact during all possible conditions including fire. New piping material should be evaluated to UL 207 and so listed. One cannot simply come by and say I have a new plastic pipe for refrigerant systems, why don't you approve it. This change must be disapproved.

Cost Impact: The net effect of the public comment and code change proposal will not increase or decrease the cost of construction
No change to code.

Staff Analysis: In accordance with Section 3.6.3.1 of ICC Council Policy 28, the new referenced standard ASTM FXXX Polyethylene of Raised Temperature/Aluminum/Polyethylene of Raised Temperature (PERT/AL/PERT) line sets, must be completed and readily available prior to the Public Comment Hearing in order for this public comment to be considered.

Public Comment# 2815

Public Comment 2:

Proponents: Gregg Gress, representing Retired (greggagress@gmail.com) requests Disapprove

Commenter's Reason: The new definitions state that plastic composite tube is both a tubing and a pipe. Materials are one or the other, not both. ASTM F3506 states that it does not address safety concerns with the material. The very common refrigerant 410A will have a high-side pressure of over 400 psig at a 90 F ambient temperature (120 F condensing temp). Is plastic/aluminum composite tube appropriate for such pressures? Refrigerant lines for cooling and heat pump applications are exposed to extreme temperatures. ASTM F3506 appears to test for temperature duty classes of 140 F or 180 F. Plastics can soften or become brittle at high and low temperatures. Does the PE-RT/AL/PE-RT tube depend on the inner and outer layers of plastic to hold the pressures? If not, and the aluminum alone will hold the pressures, then what is the purpose of the plastic layers? Why not just use plain aluminum tubing? Assuming that all component layers of the composite pipe are necessary to contain the pressures, what happens when the tubing is exposed to a fire condition? Traditional plastic/aluminum tube has employed the aluminum layer as a means of holding the tube in whatever shape it is bent. However, it seems that now the welded seam aluminum layer is depended upon as a pressure containing tube. The fittings for plastic composite tube rely on elastomeric O-rings. How will the O-ring fittings respond to fire exposure? Does ASTM F3506 test for fire exposure? Section 1108.3.3 of the IMC prohibits solder joints for all refrigerant classes except A1 and Section 1109 requires copper, brass or steel pipe with welded joints for classes A2, A3 B2 and B3. The proposed revision to this section would allow plastic/aluminum composite tubing for A2 flammable refrigerants. That is quite a leap! The proposed new text in Section 1109.4.1 is permissive (may) and is actually an exception that should be written as an exception. The codes have always specified metallic line sets because of the danger of releasing refrigerants into a fire. Such release endangers the occupants and firefighters. Copper line sets have an indefinite life span, but plastic composite pipe has a service life of 50 years. How does aging affect the properties of the tubing? Has ASHRAE 15 standard (safety standard for refrigeration systems) changed to permit plastic composite line sets? Section 1109.2 of the IMC limits where metallic refrigerant piping can be located in a building. Should these limitations be revisited if plastic composite tubing is allowed? Refrigerants have huge global warming potential as greenhouse gases and releases to atmosphere must be held to an absolute minimum. Plastic composite tubing with O-ring joints?? Call me old school, or just old, but I have many safety and environmental concerns over the use of plastic tubing of any type for refrigerants.

Cost Impact: The net effect of the public comment and code change proposal will not increase or decrease the cost of construction
No change to code.

Staff Analysis: In accordance with Section 3.6.3.1 of ICC Council Policy 28, the new referenced standard ASTM FXXX Polyethylene of Raised Temperature/Aluminum/Polyethylene of Raised Temperature (PERT/AL/PERT) line sets, must be completed and readily available prior to the Public Comment Hearing in order for this public comment to be considered.

Public Comment 3:

Proponents: Jonathan Roberts, representing UL LLC (jonathan.roberts@ul.com) requests Disapprove

Commenter's Reason: The proposed standard, ASTM F3506, does not address a number of significant factors that need to be considered for permanent piping or tubing that will contain flammable gas. Those factors include:

- Flammability
- Crush resistance
- UV resistance
- Puncture resistance
- Durability
- Aging

In addition, ASTM F3506 references UL 1963 for the vibration and pull tests, which is not applicable for permanently installed refrigeration piping and tubing. UL 1963 is the standard for refrigerant recovery and recycling equipment. It is only for temporary use, while attended by the service technician. The standard was not intended for permanent installations. The following are the definitions of recovery and recycling equipment, from UL 1963:

- 3.27 RECOVERY EQUIPMENT – An appliance that transfers refrigerant in any condition from a product to an external container without necessarily testing or processing the refrigerant.
- 3.28 RECYCLING EQUIPMENT – An appliance that extracts refrigerant from a product and cleans the refrigerant for reuse.

Cost Impact: The net effect of the public comment and code change proposal will not increase or decrease the cost of construction
No change to code.

Staff Analysis: In accordance with Section 3.6.3.1 of ICC Council Policy 28, the new referenced standard ASTM FXXX Polyethylene of Raised Temperature/Aluminum/Polyethylene of Raised Temperature (PERT/AL/PERT) line sets, must be completed and readily available prior to the Public Comment Hearing in order for this public comment to be considered.

Public Comment# 2693

Public Comment 4:

Proponents: CP28 Administration

Commenter's Reason: The administration of ICC Council Policy 28 (CP28) is not taking a position on this code change. This public comment is being submitted to bring a procedural requirement to the attention of the ICC voting membership. In accordance with Section 3.6.3.1.1 of ICC Council Policy 28 (partially reproduced below), the new referenced standard(s) ASTM FXXXX WK74677 must be completed and readily available prior to the Public Comment Hearing in order for this public comment to be considered.
(CP28) 3.6.3.1.1 Proposed New Standards. In order for a new standard to be considered for reference by the Code, such standard shall be submitted in at least a consensus draft form in accordance with Section 3.4. If the proposed new standard is not submitted in at least consensus draft form, the code change proposal shall be considered incomplete and shall not be processed. The code change proposal shall be considered at the Committee Action Hearing by the applicable code development committee responsible for the corresponding proposed changes to the code text. If the committee action at the Committee Action Hearing is either As Submitted or As Modified and the standard is not completed, the code change proposal shall automatically be placed on the Public Comment Agenda with the recommendation stating that in order for the public comment to be considered, the new standard shall be completed and readily available prior to the Public Comment Hearing.

Public Comment# 2991

WUIC1-21

Proposed Change as Submitted

Proponents: Tony Crimi, representing North American Insulation Manufacturers Association (NAIMA), representing representing North American Insulation Manufacturers Association (NAIMA)

2021 International Wildland-Urban Interface Code

Revise as follows:

IGNITION-RESISTANT BUILDING MATERIAL. A type of building material that resists ignition or sustained flaming combustion sufficiently so as to reduce losses from wildland-urban interface conflagrations under worst-case weather and fuel conditions with wildfire exposure ~~of burning embers and small flames,~~ as prescribed in Section 503.

Reason: The current definition is misleading and conflicting within itself. It talks about materials being ignition resistant under worst-case fuel conditions, but then limits that to exposure to burning embers and small flames. It further limits that to the conditions specified in Section 503. If not previously, recent experience has certainly shown that there are worst case wildland fire exposure conditions than exposure to burning embers and small flames. There is a large body of work being done in the US and Internationally to better define more appropriate fire exposure conditions than those previously considered necessary. As written, this definition is incorrect.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The proposal revises the defined term but does not add additional requirements.

WUIC1-21

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The committee stated that the reasons for disapproval were based on not wanting to add requirements into the definition and opposition to the removal of the language of burning embers and small flames. (Vote: 14-0)

WUIC1-21

Individual Consideration Agenda

Public Comment 1:

IWUIC: SECTION 202

Proponents: Tony Crimi, representing representing North American Insulation Manufacturers Association (NAIMA) (tcrimi@sympatico.ca) requests As Modified by Public Comment

Modify as follows:

2021 International Wildland-Urban Interface Code

IGNITION-RESISTANT BUILDING MATERIAL . A type of building material that resists ignition or sustained flaming combustion sufficiently so as to reduce losses from ~~wildland-urban interface conflagrations under worst-case weather and fuel conditions with~~ wildfire exposure of burning embers and small flames, as prescribed in Chapter 5 ~~Section 503~~.

Commenter's Reason: This proposal does not add requirements into the definition. It deletes some language. The current definition is misleading and conflicting within itself. It talks about materials being ignition resistant under worst-case fuel conditions, but then limits that to exposure to burning embers and small flames. There is a large body of work being done in the US and Internationally to better define more appropriate fire exposure conditions than those previously considered necessary. As written, this definition is incorrect in referring to "worst case".
During the CAH, several participants agreed there was a need for a change to the definition, but suggested that the statement about "burning embers and small flames" needed to be retained, and it was the portion about "wildland-urban interface conflagrations under worst-case weather

and fuel conditions" that should be removed.

Following the CAH, several commenters collaborated on the revised definition, which is submitted here.

Cost Impact: The net effect of the public comment and code change proposal will not increase or decrease the cost of construction
This is a change in the definition only.

Public Comment# 2369

Public Comment 2:

IWUIC: SECTION 202

Proponents: Jeffrey Greenwald, representing North American Modern Building Alliance (jgreenwald@operativegreenwald.com) requests As Modified by Public Comment

Modify as follows:

2021 International Wildland-Urban Interface Code

IGNITION-RESISTANT BUILDING MATERIAL . A type of building material that resists ignition or sustained flaming combustion sufficiently so as to reduce losses from ~~wildland-urban interface conflagrations under worst-case weather and fuel conditions with~~ wildfire exposure <u>of burning embers and small flames</u> ~~as prescribed in Section 503~~.

Commenter's Reason: The present definition is flawed for two reasons: (1) it contains prescriptive requirements by sending the user to section 503 and (2) it states that ignition resistant materials will resist “worst case” conditions, which is untrue. Moreover, it is clear that the concept that “ignition resistant building materials” as described in section 503 will not resist worst case conditions. Therefore the proposed public comment deletes language that causes the flaws and leaves a more logical definition.
The North American Modern Building Alliance (NAMBA) is focused on addressing fire safety through the development and enforcement of building codes. Members of NAMBA are: ACC Center for the Polyurethanes Industry, ACC North American Flame Retardant Alliance, Atlas Roofing Corp., BASF Corporation, Carlisle Construction Materials, Covestro, DuPont, EIFS Industry Members Association, EPS Industry Alliance, GAF, Huntsman, Kingspan Insulation LLC, Metal Construction Association, Owens Corning, Polyisocyanurate Insulation Manufacturers Association, and Rmax - A Business Unit of the Sika Corporation.

Cost Impact: The net effect of the public comment and code change proposal will not increase or decrease the cost of construction
The proposal revises the defined term but does not add additional requirements.

Public Comment# 2482

WUIC2-21

Proposed Change as Submitted

Proponents: Michael Cudahy, representing Self (mikec@cmservices.com)

2021 International Wildland-Urban Interface Code

Add new text as follows:

404.11 Water Supply Protection.
Service lines shall be protected from backsiphonage by a dual check valve installed in a valve box as close as practicable to the water main.

Reason: In large scale wildland-urban interface fires multiple buildings in one area are often destroyed, compromising the integrity of the water distribution systems. Large scale failure of plumbing systems causes systemic water pressure drops and hampers fire fighting efforts. The pressure drop also allows for back draft of toxic combustion gasses and runoff into the service and main lines, contaminating the water system, potentially for a significant period of recovery, even for buildings not directly impacted.
The installation of a simple check valve or other suitable back flow device on the service line would limit the systemic pressure drop and associated backsiphonage of combustion gasses and contaminated water into the potable water network, easing fire fighting efforts and recovery. There are inexpensive NSF-61 listed check valves which can be buried or otherwise protected that can serve this important function.

Cost Impact: The code change proposal will increase the cost of construction
The proposal would require the addition of a check valve or other device and a valve box on the building water service line, which would increase the cost of construction. NSF-61 listed check valves for example, would cost in the range of $30 to $200, depending on size and material, plus installation. An extra valve box would add between $20 and $200, plus installation.

WUIC2-21

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The committee stated that the reasons for disapproval were based on the requirements that are already in the IPC, the cost impact in colder climates, no provisions for maintenance, issues with constructability and potential conflicts with various water purveyors and public works agencies. (Vote: 14-0)

WUIC2-21

Individual Consideration Agenda

Public Comment 1:

IWUIC: 404.11

Proponents: Michael Cudahy, representing PPFA (mikec@cmservices.com) requests As Modified by Public Comment

Modify as follows:

2021 International Wildland-Urban Interface Code

404.11 Water Supply Protection . Service lines from utility water systems shall be protected from backsiphonage by ~~a dual check valve installed in a valve box as close as practicable to the water main.~~ an approved method.

Commenter's Reason: In large scale wildland-urban interface fires, multiple buildings in one area are often destroyed, compromising the integrity of the water distribution network. Large scale failure of plumbing systems causes systemic water pressure drops. The pressure drop allows for backdraft of toxic combustion gasses and runoff into the service and main lines, contaminating the water system, potentially for a significant period of recovery, even for buildings not directly impacted, which is a resiliency issue even for unaffected structures.

As noted during testimony, no single approach, location or device, is suitable for all climates, construction types and jurisdictions, so it seems proper to allow the AHJ make the determination what should be done in terms of water supply protection. If the utility protects the water supply, that would be the approved method. The requirement would not apply to well water, only utility provided.

Bibliography: none

Cost Impact: The net effect of the public comment and code change proposal will increase the cost of construction
The change will increase the cost of construction depending on the local jurisdictions approved method of back flow prevention. This could range from zero additional cost to a few thousand depending on what is required in the area, with the likely amount being a few hundred dollars, since the committee noted the issues were very climate related and jurisdictional.

Public Comment# 2813

WUIC3-21

Proposed Change as Submitted

Proponents: Marcelo Hirschler, GBH International, representing self (mmh@gbhint.com)

2021 International Wildland-Urban Interface Code

503.1 General. Buildings and structures hereafter constructed, modified or relocated into or within *wildland-urban interface areas* shall meet the construction requirements in accordance with Table 503.1. Class 1, Class 2 or Class 3, ignition-resistant construction shall be in accordance with Sections 504, 505 and 506, respectively. Materials required to be ignition-resistant materials shall comply with the requirements of Section 503.2.

Revise as follows:

TABLE 503.1 IGNITION-RESISTANT CONSTRUCTION[a]

DEFENSIBLE SPACE[c]	FIRE HAZARD SEVERITY					
	Moderate Hazard		High Hazard		Extreme Hazard	
	Water Supply[b]		Water Supply[b]		Water Supply[b]	
	Conforming[d]	Nonconforming[e]	Conforming[d]	Nonconforming[e]	Conforming[d]	Nonconforming[e]
Nonconforming	IR 2	IR 1	IR 1	IR 1 Rated ~~N.C.~~	IR 1 Rated ~~N.C.~~	Not Permitted
Conforming	IR 3	IR 2	IR 2	IR 1	IR 1	IR 1 N.C.
1.5 × Conforming	Not Required	IR 3	IR 3	IR 2	IR 2	IR 1

a. Access shall be in accordance with Section 403.

b. Subdivisions shall have a conforming water supply in accordance with Section 402.1.

IR 1 = Ignition-resistant construction in accordance with Section 504.

IR 2 = Ignition-resistant construction in accordance with Section 505.

IR 3 = Ignition-resistant construction in accordance with Section 506.

Rated When exterior walls have a fire-resistance rating of not less than 1 hour, the exterior surfaces of such walls shall be noncombustible.

N.C. = ~~Exterior walls shall have a fire-resistance rating of not less than 1 hour and the exterior surfaces of such walls shall be noncombustible. Usage of log wall construction is allowed.~~

c. Conformance based on Section 603.

d. Conformance based on Section 404.

e. A nonconforming water supply is any water system or source that does not comply with Section 404, including situations where there is no water supply for structure protection or fire suppression.

Reason: Table 503.1 has been in the IWUIC code since its first edition, in 2003, when no ignition resistant materials were allowed as alternatives to 1 hour fire resistance rated construction. In subsequent editions, including the 2021 edition, ignition resistant materials are allowed as alternates to a 1 hour fire resistant rated assembly. However, this table has not been updated and is no longer consistent. The table states that some IR1 areas must have fire resistant rated construction but section 503.2 describes all the types of ignition resistant materials that are allowed for IR1, IR2 and IR3 construction, and they include log wall construction (mentioned in the table for some instances) but also fire retardant-treated wood, and various other ignition resistant materials. Thus, assuming that all building elements (or even all walls) must comply with a fire resistance rating is incorrect and singling out "log wall" in the table is also incorrect.
Therefore, it is recommended that the note regarding "N.C." be revised to refer to "Rated" (or any other appropriate term) and to explain that, in some instances (the more severe environments), having a 1 hour fire resistance rated construction is not sufficient to prevent flame spread (upwards) along a wall, which is why having a covering that is noncombustible is important in WUI areas.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This clarifies an error in the code.

WUIC3-21

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The committee stated that the reasons for disapproval were based on the proposal not addressing the problem and creating more confusion, going beyond an editorial change and the importance in maintaining the current level of technical requirements in fire safety. (Vote: 10-3)

WUIC3-21

Individual Consideration Agenda

Public Comment 1:

IWUIC: 503.1, TABLE 503.1

Proponents: Marcelo Hirschler, representing self (mmh@gbhint.com) requests As Modified by Public Comment

Replace as follows:

2021 International Wildland-Urban Interface Code

503.1 General . Buildings and structures hereafter constructed, modified or relocated into or within *wildland-urban interface areas* shall meet the construction requirements in accordance with Table 503.1. Class 1, Class 2 or Class 3, ignition-resistant construction shall be in accordance with Sections 504, 505 and 506, respectively. Materials required to be ignition-resistant materials shall comply with the requirements of Section 503.2.

TABLE 503.1 IGNITION-RESISTANT CONSTRUCTION[a]

	FIRE HAZARD SEVERITY					
	Moderate Hazard		**High Hazard**		**Extreme Hazard**	
	Water Supply[b]		**Water Supply[b]**		**Water Supply[b]**	
DEFENSIBLE SPACE[c]	**Conforming[d]**	**Nonconforming[e]**	**Conforming[d]**	**Nonconforming[e]**	**Conforming[d]**	**Nonconforming[e]**
Nonconforming	IR 2	IR 1	IR 1	IR 1[f] ~~N.C.~~	IR 1 [f] ~~N.C.~~	Not Permitted
Conforming	IR 3	IR 2	IR 2	IR 1	IR 1	IR 1 [f] ~~N.C.~~
1.5 × Conforming	Not Required	IR 3	IR 3	IR 2	IR 2	IR 1

a. Access shall be in accordance with Section 403.

b. Subdivisions shall have a conforming water supply in accordance with Section 402.1.

IR 1 = Ignition-resistant construction in accordance with Section 504.

IR 2 = Ignition-resistant construction in accordance with Section 505.

IR 3 = Ignition-resistant construction in accordance with Section 506.

~~N.C. = Exterior walls shall have a fire-resistance rating of not less than 1 hour and the exterior surfaces of such walls shall be noncombustible. Usage of log wall construction is allowed.~~

c. Conformance based on Section 603.

d. Conformance based on Section 404.

e. A nonconforming water supply is any water system or source that does not comply with Section 404, including situations where there is no water supply for structure protection or fire suppression.

f Ignition-resistant construction shall comply with Section 504, except that the exterior walls shall have a fire-resistance rating of not less than 1 hour and the exterior surfaces of such walls shall comply with the requirements for ignition resistant materials in accordance with Section 503.2. Usage of log wall construction is allowed.

Commenter's Reason: The public comment corrects the errors in the original proposal and does so in a way that makes the most sense.
It was clear from the comments by both the committee and staff that there is no clarity as to whether the table intends to require wall materials to comply with **both IR1 and NC** (which basically simply means comply with NC, since none of the other options in IR1 will have a fire resistance rating of 1 hour) or with **either IR1 and NC** (which basically makes NC superfluous because 1 hour fire resistance rating is already one of the options in IR1). That needs to be corrected.

In Sections 504, 505 and 506 it is clear that exterior walls can be built with a fire resistance rating of at least 1 hour. In none of the sections is there a statement that the 1 hour fire resistance rating is the only permitted option (there are several others) and it does not state that the exterior surfaces must be noncombustible (which is really unnecessary since it is just one type of assembly that meets the requirements). Moreover, the use of residential construction that has an exterior noncombustible section is not likely to be realistic.

In view of the fact that the most logical interpretation probably is that both IR1 and NC are required and they are not consistent with each other, this public comment eliminates the inconsistency and just requires that the exterior walls must be constructed with 1 hour fire resistance rating but not necessarily with an exterior that is noncombustible (as that is not very likely to be used) but an exterior that is an ignition resistant material in accordance with Section 503.2. That way there continues to be a progression in fire safety in the table, from left to right, without including an unrealistic requirement.

This public comment also specifically still allows log wall construction, just as it is in the code now.

This public comment also adds, explicitly, that ignition-resistant construction consistent with the type of fire hazard (as represented by IR1), including roofing materials, still need to comply with all of section 504, to avoid losing the requirements for materials other than walls.

Cost Impact: The net effect of the public comment and code change proposal will not increase or decrease the cost of construction
The code contains an unclear requirement and the public comment clarifies it, and makes it consistent with other sections.

Public Comment# 2302

WUIC6-21

Proposed Change as Submitted

Proponents: Christopher Athari, Hoover Treated Wood Products, representing Hoover Treated Wood Products (cathari@frtw.com)

2021 International Wildland-Urban Interface Code

Revise as follows:

503.2 Ignition-resistant building material. Ignition-resistant building materials shall comply with any one of the following:

1. Material shall be tested on all sides with the extended ASTM E84 (UL 723) test or ASTM E2768, except panel products shall be permitted to test only the front and back faces. Panel products shall be tested with a ripped or cut longitudinal gap of $^1/_8$ inch (3.2 mm). Materials that, when tested in accordance with the test procedures set forth in ASTM E84 or UL 723 for a test period of 30 minutes, or with ASTM E2768, comply with the following:

   1.1. Flame spread. Material shall exhibit a *flame spread index* not exceeding 25 and shall not show evidence of progressive combustion following the extended 30-minute test.

   1.2. Flame front. Material shall exhibit a flame front that does not progress more than $10^1/_2$ feet (3200 mm) beyond the centerline of the burner at any time during the extended 30-minute test.

   1.3. Weathering. Ignition-resistant building materials shall maintain their performance in accordance with this section under conditions of use. Materials shall meet the performance requirements for weathering (including exposure to temperature, moisture and ultraviolet radiation) contained in the following standards, as applicable to the materials and the conditions of use:

      1.3.1. Method A " Test Method for Accelerated Weathering of Fire-Retardant-Treated Wood for Fire Testing" in ASTM D2898, for fire-retardant-treated wood, wood-plastic composite and plastic lumber materials.

      1.3.2. ASTM D7032 for wood-plastic composite materials.

      1.3.3. ASTM D6662 for plastic lumber materials.

   1.4. Identification. Materials shall bear identification showing the fire test results.

   <u>1.5. The use of paints, coating, stains, or other surface treatments is not an approved method of protection as required in this section.</u>

   Exception: Materials composed of a combustible core and a noncombustible exterior covering made from either aluminum at a minimum 0.019 inch (0.48 mm) thickness or corrosion-resistant steel at a minimum 0.0149 inch (0.38 mm) thickness shall not be required to be tested with a ripped or cut longitudinal gap.

2. Noncombustible material. Material that complies with the requirements for *noncombustible* materials in Section 202.
3. Fire-retardant-treated wood. Fire-retardant-treated wood identified for exterior use and meeting the requirements of Section 2303.2 of the International Building Code.
4. Fire-retardant-treated wood *roof coverings*. *Roof assemblies* containing fire-retardant-treated wood shingles and shakes that comply with the requirements of Section 1505.6 of the International Building Code and classified as Class A *roof assemblies* as required in Section 1505.2 of the International Building Code.

Reason: In response to the wildfire season of 2020, in wildfire-impacted communities, efforts are being made by manufacturers seeking approval for painted, coated, stains, or other surface-treated wood that require continuous maintenance in lieu of ignition-resistant building materials. This proposed addition will clarify that paints, coating, stains, and other types of products with vulnerable surface coatings are not approved for use as ignition-resistant building materials in the wildland-urban interface (WUI).
This language already exists in the International Building Code in Section 2303.2.2 for fire-retardant-treated wood (FRTW), which is one of the categories of ignition-resistant building materials in IWUIC (503.2#3). It is also in the 2021 IRC, Section R802.1.5.2. This language is also included in the Second Revision for the upcoming NFPA 1140 Standard for Wildland Fire Protection for FRTW. It is also in Chapters 7A and 23 of the California Building Code concerning FRTW.

Finally, note that the required testing referenced in 503.2#1 would require ignition-resistant building materials to undergo the same testing as FRTW.

Adding this proposed language to 503.2 adds clarity and conformity to codes affecting WUI communities and ensures that any ignition-resistant material will perform as well as FRTW.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This language has been in the IBC for two cycles and IRC for one, making it consistent throughout the codes.

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The committee stated that the reasons for disapproval were that the proposal would prohibit coatings altogether and it doesn't make a differentiation between factory coated versus coated in the field and if it was only intended to be a coating on wood then that should have been more clearly defined. (Vote: 13-0)

WUIC6-21

Individual Consideration Agenda

Public Comment 1:

Proponents: Mike Eckhoff, representing Hoover Treated Wood Products, Inc. (meckhoff@frtw.com); James Gogolski, representing Hoover Treated Wood Products, Inc. (jgogolski@frtw.com) requests As Submitted

Commenter's Reason: Clear limitations on the use of these materials are urgently needed as these surface coated materials require continuous maintenance to perform as ignition-resistant building materials. For this reason, they are inappropriate for use in the WUI as there is no guarantee of long term performance without periodic inspection and recoating as necessary. This constitutes an excessive burden on AHJ's.
Due in part to extensive wildfire losses, California Building Code's Chapter 7A in Section 703A.5.3 has adopted the same language and restrictions proposed in this PC.

The maintenance issue was noted in FCAC's reason statement for WUIC10-21:

- "No evidence exists that coatings are sufficiently durable to be permitted for outdoor use,"
- NIST investigated (see bibliography) coatings and found that they "on their own" would provide protection for not "more than a few weeks" to an estimated "few months" when combined with a top-coating, and
- "[a] durability of a few months is not sufficient to ensure adequate protection, since it is unlikely that homeowners will recoat outdoor products."

Bibliography: The study cited by FCAC: "Effect of Fire-Retardant Coatings and Weathering on the Flammability of Wood-Based Materials in WUI Communities," by Laura Dubrulle, Mauro Zammarano, Douglas Fox, Rick Davis, Kathryn Butler, Erik Johnsson and Alexander Maranghides. It was presented at the 2019 BCC Research Conference on May 19-22, 2019, in San Antonio, TX and later published as NIST TN 2094 in 2020 (https://doi.org/10.6028/NIST.TN.2094).

Cost Impact: The net effect of the public comment and code change proposal will not increase or decrease the cost of construction
This language has been in the IBC for two cycles and IRC for one, making it consistent throughout the codes.

Public Comment# 2893

WUIC9-21

Proposed Change as Submitted

Proponents: Marcelo Hirschler, GBH International, representing self (mmh@gbhint.com)

2021 International Wildland-Urban Interface Code

Revise as follows:

503.2 Ignition-resistant building material. Ignition-resistant building materials shall comply with any one of therequirements in Sections 503.2.1 through 503.2.4. ~~following:~~

1. ~~Material shall be tested on all sides with the extended ASTM E84 (UL 723) test or ASTM E2768, except panel products shall be permitted to test procedures set forth in ASTM E84 or UL 723 for a test period of 30 minutes, or with ASTM E2768, comply with the following:~~
    1.1. ~~Flame spread. Material shall exhibit a *flame spread index* not exceeding 25 and shall not show evidence of progressive combustion followir~~
    1.2. ~~Flame front. Material shall exhibit a flame front that does not progress more than $10\frac{1}{2}$ feet (3200 mm) beyond the centerline of the burner a~~
    1.3. ~~Weathering. Ignition-resistant building materials shall maintain their performance in accordance with this section under conditions of use. Ma applicable to the materials and the conditions of use:~~
        1.3.1. ~~Method A " Test Method for Accelerated Weathering of Fire-Retardant-Treated Wood for Fire Testing" in ASTM D2898, for fire-retar~~
        1.3.2. ~~ASTM D7032 for wood-plastic composite materials.~~
        1.3.3. ~~ASTM D6662 for plastic lumber materials.~~
    1.4 ~~Identification. Materials shall bear identification showing the fire test results.~~

    ~~**Exception:** Materials composed of a combustible core and a noncombustible exterior covering made from either aluminum at a minimum 0.0~~

2. ~~Noncombustible material. Material that complies with the requirements for *noncombustible* materials in Section 202.~~
3. ~~Fire-retardant-treated wood. Fire-retardant-treated wood identified for exterior use and meeting the requirements of Section 2303.2 of the Interna~~
4. ~~Fire-retardant-treated wood *roof coverings. Roof assemblies* containing fire-retardant-treated wood shingles and shakes that comply with the re~~

Add new text as follows:

503.2.1 Noncombustible material.
Material that comply with the requirements for noncombustible materials in Section 202.

503.2.2 Fire-retardant-treated wood.
Fire-retardant-treated wood identified for exterior useand meet the requirements of Section 2303.2 of the International Building Code shall be considered to comply with Section 503.2.

503.2.2.1 Weathering.
Fire retardant treated wood shall demonstrate compliance with the requirements of Section 503.2.2 after weathering in accordance with Method A "Test Method for Accelerated Weathering of Fire-Retardant Treated Wood for Fire Testing" in ASTM D2898.

503.2.3 Fire-retardant-treated wood roof coverings.
Roof assemblies containing fire-retardant-treated wood shingles and shakes that comply with the requirements of Section 1505.6 of the International Building Code and classified as Class A roof assemblies as required in Section 1505.2 of the *International Building Code*.

503.2.4 Alternate ignition resistant material.
Material shall exhibit a flame spread index of 25 or less when tested on the front and back faces in accordance with the ASTM E84 or UL 723 test. Additionally, the ASTM E84 or UL 723 test shall be continued for a 20-minute period and the flame front shall not progress more than 10 ½ feet (3200 mm) beyond the centerline of the burners at any time during the test on either the front or back faces. Panel products shall be tested with a ripped or cut longitudinal gap of 1/8 inch (3.2 mm).

Exceptions:

1. Materials composed of a combustible core and a noncombustible exterior covering made from either aluminum at a minimum 0.019 inch (0.48 mm) thickness or corrosion-resistant steel at a minimum 0.0149 inch (0.38 mm) thickness shall not be required to be tested with a ripped or cut longitudinal gap.
2. Materials complying with the requirements of ASTM E2768 on the front and back faces shall not be required to be tested in accordance

with ASTM E84 or UL 723, but shall be required to demonstrate its performance after weathering.

503.2.4.1 Performance requirements for weathering.
The material shall also maintain its performance under conditions of use by meeting performance requirements for weathering (including exposure to temperature, moisture and ultraviolet radiation) in accordance with Sections 503.2.4.2 through 503.2.4.4.

503.2.4.2 Alternate ignition resistant materials.
Alternate ignition resistant materials shall demonstrate compliance with the requirements of Section 503.2.4 after weathering in accordance with Method A "Test Method for Accelerated Weathering of Fire-Retardant Treated Wood for Fire Testing" in ASTM D2898.

503.2.4.3 Wood-plastic composite materials.
Wood-plastic composite materials shall demonstrate compliance with the requirements of Section 503.2.4 after weathering in accordance with ASTM D7032.

503.2.4.4 Plastic lumber materials.
Plastic lumber materials shall demonstrate compliance with the requirements of Section 503.2.4 after weathering in accordance with ASTM D6662.

Reason: This code change does 4 things, without changing any of the requirements:
1. It introduces into the IWUIC the same changes to eliminate the duplicate testing requirements for fire retardant treated wood (and, by extension, ignition resistant materials) already contained in the IBC and IRC.

2. This moves what used to be Items 2, 3, & 4 to be new sections 503.2.1, 503.2.2, and 503.2.3. These three provisions are easy to grasp but are somewhat obscured in the current text by the complexity of Item 1.

3. This adds to the item on fire retardant treated wood the same weathering requirements, under a new subsection, 503.2.4, that are presently hidden under item 1.

4. This reorganizes current Item 1 (proposed to be revised to a new section 503.2.4) to make the language (hopefully) clearer, without changing the requirements. The weathering requirements for the alternate ignition resistant materials are shown as new subsections.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This is just an editorial rewrite to improve clarity in a complex section.

WUIC9-21

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The committee stated that the reasons for disapproval were opposition to the alteration of the current requirements and the preference for the formatting to be a list instead of a paragraph. (Vote: 13-1)

WUIC9-21

Individual Consideration Agenda

Public Comment 1:

IWUIC: 503.2, 503.2.1, 503.2.2, 503.2.2.1, 503.2.3, 503.2.4, 503.2.4.1 (New), 503.2.4.2 (New), 503.2.4.2, 503.2.4.1, 503.2.4.3.1 (New), 503.2.4.3, 503.2.4.4

Proponents: Marcelo Hirschler, representing self (mmh@gbhint.com); Mike Eckhoff, representing Hoover Treated Wood Products, Inc. (meckhoff@frtw.com) requests As Modified by Public Comment

Modify as follows:

2021 International Wildland-Urban Interface Code

503.2 Ignition-resistant building material . Ignition-resistant building materials shall comply with any one of the requirements in Sections 503.2.1

through 503.2.4.

503.2.1 Noncombustible material . Material shall ~~that~~ comply with the requirements for noncombustible materials in Section 202.

503.2.2 Fire-retardant-treated wood . Fire-retardant-treated wood shall be identified for exterior use and shall meet the requirements of Section 2303.2 of the International Building Code . ~~shall be considered to comply with Section 503.2503.2.~~

~~503.2.2.1 Weathering~~.
~~Fire retardant treated wood shall demonstrate compliance with the requirements of Section 503.2.2 after weathering in accordance with Method A "Test Method for Accelerated Weathering of Fire-Retardant Treated Wood for Fire Testing" in ASTM D2898.~~

503.2.3 Fire-retardant-treated wood roof coverings . Roof assemblies containing fire-retardant-treated wood shingles and shakes shall ~~that~~ comply with the requirements of Section 1505.6 of the International Building Code and shall be classified as Class A roof assemblies as required in Section 1505.2 of the *International Building Code*.

503.2.4 ~~Alternate ignition resistant~~ Ignition resistant building material . Material shall ~~exhibit a flame spread index of 25 or less when~~ be tested on the front and back faces in accordance with the extended ASTM E84 or UL 723 test , for a total test period of 30 minutes, or with the ASTM E2768 test. The materials shall bear identification showing the fire test results. ~~Additionally, the ASTM E84 or UL 723 test shall be continued for a 20-minute period and the flame front shall not progress more than 10 ½ feet (3200 mm) beyond the centerline of the burners at any time during the test on either the front or back faces.~~ Panel products shall be tested with a ripped or cut longitudinal gap of 1/8 inch (3.2 mm).
The materials, when tested in accordance with the test procedures set forth in ASTM E84 or UL 723 for a test period of 30 minutes, or with ASTM E2768, shall comply with Sections 503.2.4.1 through 503.2.4.3.

~~Exceptions~~ Exception:

~~1.~~ Materials composed of a combustible core and a noncombustible exterior covering made from either aluminum at a minimum 0.019 inch (0.48 mm) thickness or corrosion-resistant steel at a minimum 0.0149 inch (0.38 mm) thickness shall not be required to be tested with a ripped or cut longitudinal gap.

~~2. Materials complying with the requirements of ASTM E2768 on the front and back faces shall not be required to be tested in accordance with ASTM E84 or UL 723, but shall be required to demonstrate its performance after weathering.~~

503.2.4.1 Flame spread .
The material shall exhibit a flame spread index not exceeding 25.

503.2.4.2 Flame front . The material shall exhibit a flame front that does not progress more than 10 ½ feet (3200 mm) beyond the centerline of the burner at any time during the test.

~~503.2.4.2 Alternate ignition resistant materials~~.
~~Alternate ignition resistant materials shall demonstrate compliance with the requirements of Section 503.2.4 after weathering in accordance with Method A "Test Method for Accelerated Weathering of Fire-Retardant Treated Wood for Fire Testing" in ASTM D2898.~~

~~503.2.4.1~~ 503.2.4.3 ~~Performance requirements for weathering.~~ Weathering . ~~The material shall also~~ Ignition resistant building materials shall maintain their ~~its~~ performance in accordance with this section under conditions of use . ~~by meeting~~ The materials shall meet the performance requirements for weathering (including exposure to temperature, moisture and ultraviolet radiation) contained in the following standards, as applicable to the materials and conditions of use. ~~in accordance with Sections 503.2.4.2 through 503.2.4.4.~~

503.2.4.3.1 Evaluation requirements for weathering .
Fire-retardant-treated wood, wood-plastic composite materials, and plastic lumber materials shall be evaluated after weathering in accordance with Method A "Test Method for Accelerated Weathering of Fire-Retardant-Treated Wood for Fire Testing" in ASTM D2898.

~~503.2.4.3~~ 503.2.4.3.2 Wood-plastic composite materials . Wood-plastic composite materials shall be evaluated ~~demonstrate compliance with the requirements of Section 503.2.4~~ after weathering in accordance with ASTM D7032.

~~503.2.4.4~~ 503.2.4.3.3 Plastic lumber materials . Plastic lumber materials shall be evaluated ~~demonstrate compliance with the requirements of Section 503.2.4~~ after weathering in accordance with ASTM D6662.

Commenter's Reason: This public comment does not change the requirements in any way but places the sections in a logical order and with a separate section for each type of ignition resistant material. Note that there are 4 types of ignition resistant materials: noncombustible materials, fire-retardant-treated wood, fire-retardant-treated roof coverings and other ignition resistant building materials (including those wood-plastic composite and plastic lumber materials that meet the appropriate requirements). This public comment places them in that order. It also includes the two requirements that have to be met with the fire test (in accordance with the extended ASTM E84 or with ASTM E2768), the requirement for the rip or gap with the structural panels, and the weathering requirements. This also includes the original requirement for labeling with the fire test results and the exception.
A mod had been proposed on the original but the changes were felt to be too substantial.

Cost Impact: The net effect of the public comment and code change proposal will not increase or decrease the cost of construction

This change is purely editorial and just reorganizes for clarity. No requirements are changed.

WUIC10-21

Proposed Change as Submitted

Proponents: Michael O'Brian, representing FCAC (fcac@iccsafe.org)

2021 International Wildland-Urban Interface Code

Add new text as follows:

503.3 Coated Wood Panels.
Coated wood panels used as ignition resistant materials shall be listed and labeled in accordance with the requirements of Section 503.2, where tested on the front and back faces.

Reason: No evidence exists that coatings are sufficiently durable to be permitted for outdoor use. At present the code is silent on whether fire-retardant coatings can, or not, be used outdoors, except for a prohibition to use them on decks (primarily because of the potential for erosion damage from frequent walking).
A relatively recent study by NIST investigated whether fire retardant coatings applied to wood products were able to continue being effective after being exposed to weather. The study was entitled “Effect of Fire-Retardant Coatings and Weathering on the Flammability of Wood-Based Materials in WUI Communities” and was authored by Laura Dubrulle, Mauro Zammarano, Douglas Fox, Rick Davis, Kathryn Butler, Erik Johnsson and Alexander Maranghides. It was presented at the 2019 BCC Research Conference on May 19-22, 2019, in San Antonio, TX and later published as NIST TN 2094 in 2020 (https://doi.org/10.6028/NIST.TN.2094). It studied 10 fire-retardant coatings (6 film-forming and 4 penetrating stains) and 5 top-coatings (although not necessarily those recommended by the coatings manufacturers specifically for use with their products). The fire properties were assessed by using the cone calorimeter (ASTM E1354, in the horizontal orientation and at 50 kW/m2 initial heat flux) and the wood used was red cedar (with the intent of simulating fences, for example). Weathering was done by exposure to “simulated rainwater” and by UV exposure. The conclusion was that none of the fire-retardant coatings investigated would provide adequate protection, on their own, for more than “a few weeks”. When used together with top-coatings, the protective effect was estimated to last “a few months”.

A durability of a few months is not sufficient to ensure adequate protection, since it is unlikely that homeowners will recoat outdoor products (including any wall materials, eaves, or soffits or even fences).The IBC recognizes fire-retardant treated wood in Chapter 23 and it has a clarifying statement in 2303.2.2 that states: “The use of paints, coating, stains or other surface treatments is not an approved method of protection as required in this section.” That clarification is fully appropriate since a coated wood product is not a product that complies with the requirements of a fire retardant treated wood product, which are clear in section 2303 and which require the product to be “impregnated” with chemical. Clearly, coatings do not impregnate the wood.This means that coated wood panels (i.e. panels with coatings that improve fire performance) are not recognized in the IBC code, other than in existing buildings. It is fully appropriate not to allow the application on site of a paint or coating intended to improved fire performance because such an application in a new building would not ensure a consistent application of a safe product.This proposal would incorporate into the IWUIC coated wood panels but only if they have been factory-produced and have been listed and labeled as having complied with the same fire safety requirements as fire retardant treated wood, including having been tested with the ripped or cut longitudinal gap. This proposal does not introduce any new standards not already in the IWUIC.

This proposal is submitted by the ICC Fire Code Action Committee (FCAC). The FCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance assigned International Codes with regard to fire and life safety in new and existing buildings and facilities as well as the protection of life and property in wildland urban interface areas. In 2020 and 2021 the Fire-CAC held multiple virtual meetings that were open to any interested party. In addition, there were numerous virtual specific working group meetings that were also open to any interested parties, to develop, discuss and debate the proposed changes. Related documentation and reports are posted on the FCAC website at: https://www.iccsafe.org/products-and-services/i-codes/code-development/cs/fire-code-action-committee-fcac/

Cost Impact: The code change proposal will increase the cost of construction
Factory produced wood panels will be more expensive than field applied coatings.

WUIC10-21

Public Hearing Results

Committee Action: **As Submitted**

Committee Reason: The committee stated that the reason for the approval was that it provides code approval for factory manufactured coded wood panels. (Vote: 8-7)

Individual Consideration Agenda

Public Comment 1:

Proponents: Mike Eckhoff, representing Hoover Treated Wood Products, Inc. (meckhoff@frtw.com); James Gogolski, representing Hoover Treated Wood Products, Inc. (jgogolski@frtw.com) requests Disapprove

Commenter's Reason: This proposal should be disapproved.
Coated wood panels are not defined anywhere in the code. The code official has absolutely no guidance on what method should or should not be permitted or what substrates might be inappropriate to coat.

Also, these proposed regulations do not apply to any products currently on the market.

Finally, the FCAC's own reason statement explains exactly why these materials should not be allowed to be used in the IWUIC:

- "No evidence exists that coatings are sufficiently durable to be permitted for outdoor use,"
- NIST investigated (see bibliography) coatings and found that they "on their own" would provide protection for not "more than a few weeks" to an estimated "few months" when combined with a top-coating, and
- "[a] durability of a few months is not sufficient to ensure adequate protection, since it is unlikely that homeowners will recoat outdoor products," where "a few months" means an estimated maximum of seven.

For all of these reasons, this code proposal should be disapproved.

Bibliography: Study cited by FCAC: "Effect of Fire-Retardant Coatings and Weathering on the Flammability of Wood-Based Materials in WUI Communities," by Laura Dubrulle, Mauro Zammarano, Douglas Fox, Rick Davis, Kathryn Butler, Erik Johnsson and Alexander Maranghides. It was presented at the 2019 BCC Research Conference on May 19-22, 2019, in San Antonio, TX and later published as NIST TN 2094 in 2020 (https://doi.org/10.6028/NIST.TN.2094).

Cost Impact: The net effect of the public comment and code change proposal will not increase or decrease the cost of construction
No change to code.

Public Comment# 2894

WUIC11-21

Proposed Change as Submitted

Proponents: T. Eric Stafford, representing Insurance Institute for Business and Home Safety (estafford@ibhs.org); Milad Shabanian, Insurance Institute for Business and Home Safety, representing Insurance Institute for Business and Home Safety (mshabanian@ibhs.org)

2021 International Wildland-Urban Interface Code

Revise as follows:

504.5 Exterior walls. Exterior surfaces of exterior walls shall be noncombustible for a minimum of 6 inches vertically from horizontal surfaces such as ground or attached decking. Exterior walls of buildings or structures shall be constructed with one of the following methods:

1. Materials *approved* for not less than 1-hour *fire-resistance-rated construction* on the exterior side.
2. *Approved noncombustible* materials.
3. Heavy timber or *log wall construction*.
4. Fire-retardant-treated wood on the exterior side. The fire-retardant-treated wood shall be labeled for exterior use and meet the requirements of Section 2303.2 of the International Building Code.
5. Ignition-resistant materials complying with Section 503.2 on the exterior side.

Such material shall extend from the top of the foundation to the underside of the roof sheathing.

Reason: Buildings located in Wildland Urban Interface (WUI) areas can be ignited through three main mechanisms: Wind-blown embers, radiant heat, and direct flame contact [1]. A previous study shows that embers (firebrands) are the most common cause of building ignitions during a wildfire [2]. The ember distribution around a building strongly depends on wind flow, which changes drastically around vertical objects as the wind's kinetic energy is converted to high-pressure points. IBHS lab studies and field investigations identified that one of the most vulnerable locations is at the base of the exterior walls [3]. Where embers accumulate, they are typically in direct contact or close proximity to the exterior walls. Embers are hot, and transfer heat to the surfaces they are in contact with. There is a high potential that embers will ignite combustible surfaces that they are in direct or close contact with. This issue is more critical for construction located in the Class 1 Ignition-Resistant (IR1) category. In this class, exterior walls are particularly vulnerable to exposure from flames or prolonged exposure to radiant heat, such as from burning vegetation, a neighboring home or outbuilding, and embers. Protecting exterior walls with a 6-inch noncombustible material from horizontal surfaces will minimize the chance of ignition of any part of the exterior wall assembly from embers, thereby minimizing the chance of fire spread to the potentially weaker components of the wall. A required 6-in vertical noncombustible zone at the base of the wall is important because embers accumulate in that area (see picture) due to wind flow around the building (eddies created by blockage flow) and crevices [90-degree corner] tend to trap the embers. The 6 inches of noncombustible material on exterior walls is also required in NFPA 1144 [4]. In the photographs below, the top photograph illustrates the ember distribution around a building tested at the IBHS research center [5] and performance of the exterior walls with and without 6-inch vertical separation. In the bottom photograph, note that ignition did not occur on the wall section where there was a 6-inch vertical separation between the ground and the start of the combustible siding material.

Accumulation of embers at the base of the exterior wall.

Ignition of wall section where combustible siding material extended to the ground.

Bibliography: [1] Caton, S. E., Hakes, R. S., Gorham, D. J., Zhou, A., & Gollner, M. J. (2017). Review of pathways for building fire spread in the wildland urban interface part I: exposure conditions. Fire technology, 53(2), 429-473.
[2] Mell WE, Manzello SL, Maranghides A et al (2010) The wildland–urban interface fire problem—current approaches and research needs. Int J Wildland Fire 19:238. doi:10.1071/WF07131

[3] Quarles S, Leschak P, Cowger R et al (2012) Lessons learned from Waldo Canyon: fire adapted communities mitigation assessment team findings. Insurance Institute of Business & Home Safety, Richburg https://fireadapted.org/wp-content/uploads/2018/06/waldo-canyon-report.pdf

[4] National Fire Protection Association (2018) NFPA 1144 Standard for reducing structure ignition hazards from wildland fire.

[5] Quarles S (2017) Vulnerability of Vents to Wind-Blown Embers. Insurance Institute of Business & Home Safety, Richburg. https://ibhs.org/wp-content/uploads/wpmembers/files/Vulnerability-of-Vents-to-Wind-Blown-Embers_IBHS.pdf

Cost Impact: The code change proposal will increase the cost of construction
Construction costs may increase for certain materials and construction types but the impact will be minimal.

WUIC11-21

Public Hearing Results

Committee Action: Disapproved

Committee Reason: The committee stated that the reason for disapproval was that the way that it's written it could be confusing in that it is not clear if the requirement applies to both above and below the attached decking. Additionally it was noted that the proponent specifically stated that it worked at 2 inches but they decided to go with 6 inches which would exceed as stated as a minimum code requirement. (Vote: 12-2)

WUIC11-21

Individual Consideration Agenda

Public Comment 1:

IWUIC: 504.5, 504.5.1 (New)

Proponents: Milad Shabanian, representing Insurance Institute for Business and Home Safety (mshabanian@ibhs.org); T. Eric Stafford, representing Insurance Institute for Business and Home Safety (testafford@charter.net) requests As Modified by Public Comment

Modify as follows:

2021 International Wildland-Urban Interface Code

504.5 Exterior walls . ~~Exterior surfaces of exterior walls shall be noncombustible for a minimum of 6 inches vertically from horizontal surfaces such as ground or attached decking.~~ Exterior walls of buildings or structures shall be constructed with one of the following methods:

1. Materials *approved* for not less than 1-hour *fire-resistance-rated construction* on the exterior side.
2. *Approved noncombustible* materials.
3. Heavy timber or *log wall construction*.
4. Fire-retardant-treated wood on the exterior side. The fire-retardant-treated wood shall be labeled for exterior use and meet the requirements of Section 2303.2 of the International Building Code.
5. Ignition-resistant materials complying with Section 503.2 on the exterior side.

Such material shall extend from the top of the foundation to the underside of the roof sheathing.

<u>**504.5.1 Flashing**</u> **.**

<u>A minimum of 6 inches of metal flashing or noncombustible material applied vertically on the exterior of the wall shall be installed at the ground, decking, and roof intersections.</u>

Commenter's Reason: This public comment addresses some of the comments provided by the committee on the original proposal and improves upon the language for clarity. Some on the committee indicated the language was confusing and didn’t clearly specify the required location of noncombustible siding. Additionally, there was also some confusion regarding the location of the noncombustible siding at deck-to-wall intersections. The new language proposed in this public comment clearly specifies where the noncombustible material is required to be installed and is worded similarly to a comparable section in Chapter 7A of the California Building Code.

Tests performed at the IBHS Research Center show the importance of preventing ignition of the siding due to wind-blown embers. Figures 1 and 2 depict a full-scale experiment on exterior walls and an attached deck assembly exposed to wind-blown embers. According to these studies, wind-flow will trap the embers and combustible debris at the base of the exterior walls and at the base of other horizontal surfaces such as attached decks [1,2]. The figures clearly show the ember accumulation at these locations. Protecting the exterior walls at these locations with noncombustible materials will improve the fire-performance of these walls and break the fuel load path toward the main structural elements.

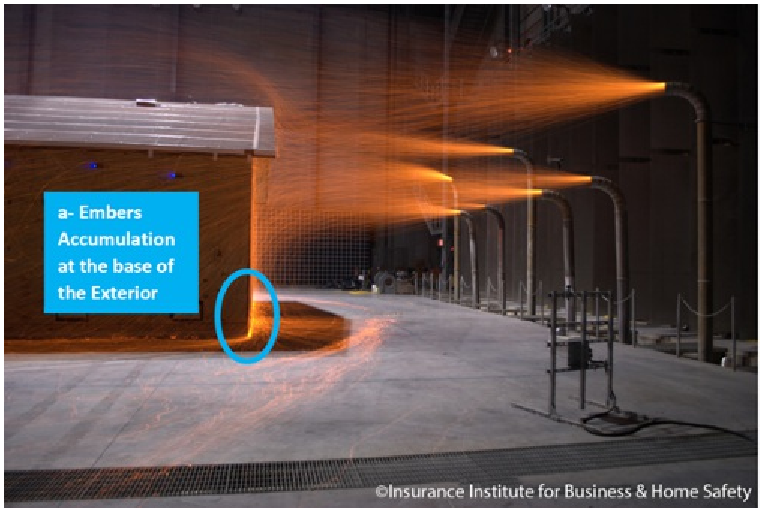

Figure 1. Ember accumulation at the intersection of exterior walls and ground [2].

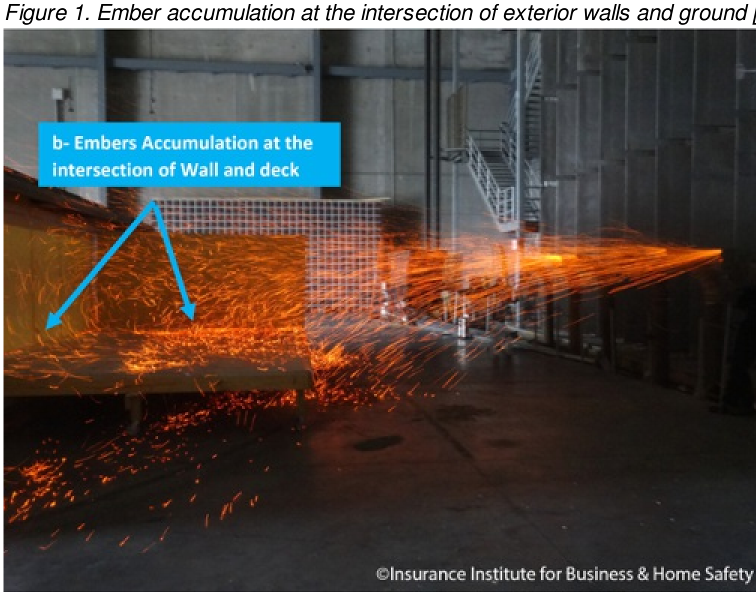

Figure 2. Ember accumulation at the intersection of exterior walls and a deck assembly [2].

To determine the necessary noncombustible vertical clearance to protect these walls from igniting, IBHS conducted two additional experiments on exposed exterior walls. In the first experiment, three different wall configurations were exposed to wind-blown embers without combustible debris located at the base of the wall. These assemblies included the following:

- No separation between the base and combustible siding,
- 2 inches of noncombustible material between the base and combustible siding, and
- 6 inches of noncombustible material between the base and combustible siding.

As shown in Figure 3, the wall assembly with no separation was ignited by embers even in the absence of combustible debris at the base of the wall. The assemblies with 2 and 6 inches of noncombustible material between the base of the wall and combustible siding did not ignite by the embers.

Figure 3. Accumulation of embers at the base of the exterior walls.

In the second experiment, an exterior wall assembly with combustible debris approximately 1 inch in thickness at the base was exposed to a small fire. During this test, the heat distribution along the walls was recorded by 18 thermocouples and an infrared camera. Thermocouples were placed at 2, 4, and 6 inches vertically from the ground level to record the heat distribution along the wall. Figures 4 and 5 depict the exterior wall assembly during the fire test and identifies the thermocouple arrangement.

Figure 4. Exterior wall exposed to a small fire with 6-in noncombustible vertical clearance.

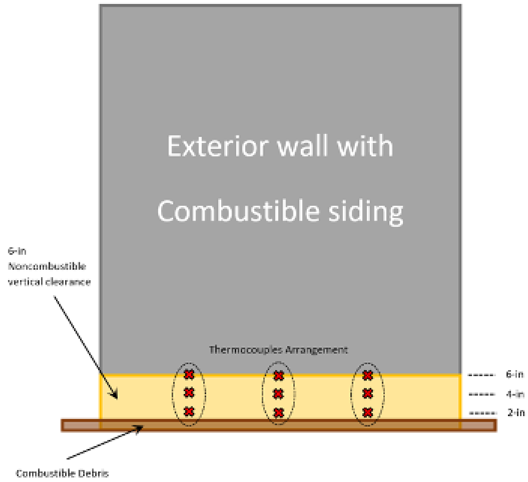

Figure 5. Exterior wall and thermocouples arrangement.

The heat distribution recorded along the wall confirms that even small fires can easily ignite combustible siding at 2 and 4 inches from the ground level. The photograph in Figure 6 was taken with an infrared camera and shows heat distribution at the base of the wall at 2 inches from the ground level. The measured temperature at this level was 276 °C which is high enough to ignite the plywood siding panel.

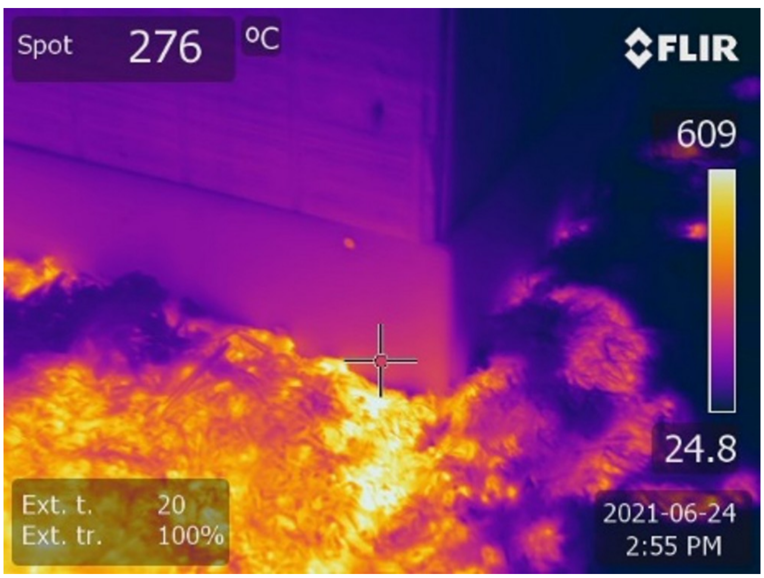

Figure 6. Heat distribution at 2 inches above ground level with the base of the exterior wall exposed to the small fire.

The photograph in Figure 7 shows heat distribution at the base of the wall at 6 inches from the ground level. The measured temperature at 6 inches from the ground level was significantly lower than 2- and 4-inch heights. It's important to note that the combustible siding, which was separated from the ground by 6 inches of noncombustible material, did not ignite during the test.

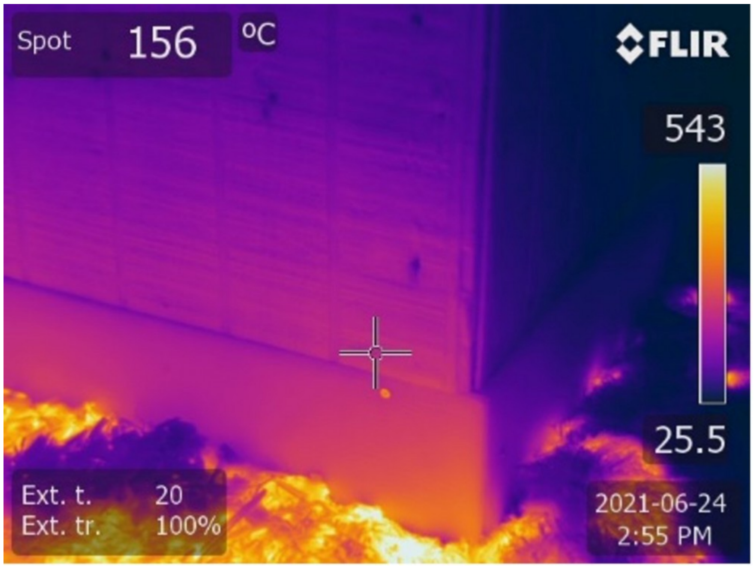

Figure 7. Heat distribution at 6 inches above ground level with the base of the exterior wall exposed to the small fire.

Figure 8 reveals the average heat distribution at the base and in different heights of 2-, 4-, and 6-in. Based on the recorded heat distribution along the wall and the likelihood of having trapped combustible debris at these locations, the tests clearly demonstrate that having a minimum of 6 inches of noncombustible material between horizontal surfaces and exterior combustible siding will significantly reduce the potential for ignition of combustible siding. This code change would make the IWUIC consistent with NFPA 1144 which also requires a minimum of 6 inches of noncombustible material between base of horizontal surfaces and combustible siding.

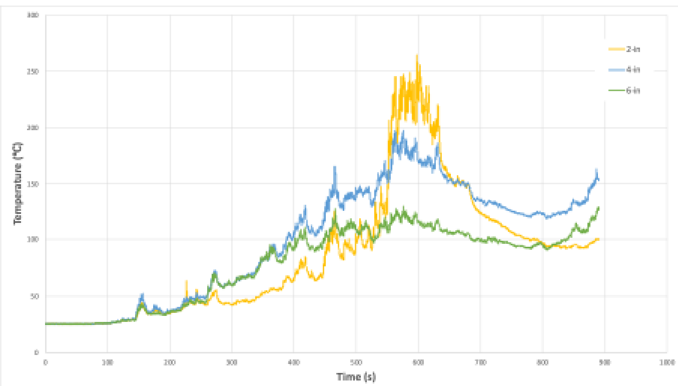

Figure 8. Average heat distribution at the base of the exterior wall.

Bibliography: [1] Quarles S (2017) Vulnerability of Vents to Wind-Blown Embers. Insurance Institute of Business & Home Safety, Richburg

Cost Impact: The net effect of the public comment and code change proposal will increase the cost of construction
This code change proposal may increase the cost of construction slightly as it will likely increase the cost of construction with some additional flashing necessary to comply with this section.

Public Comment# 2701

WUIC13-21

Proposed Change as Submitted

Proponents: William Koffel, representing Fire Safe North America (wkoffel@koffel.com)

2021 International Wildland-Urban Interface Code

Revise as follows:

504.5 Exterior walls. ~~Exterior walls~~
Exterior wall coverings or *exterior wall assemblies* of buildings or structures shall ~~be constructed with one of the following methods:~~ comply with Sections 504.5.1 and 504.5.2.

1. ~~Materials *approved* for not less than 1-hour *fire-resistance-rated construction* on the exterior side.~~
2. ~~*Approved noncombustible* materials.~~
3. ~~Heavy timber or *log wall construction*.~~
4. ~~Fire-retardant-treated wood on the exterior side. The fire-retardant-treated wood shall be labeled for exterior use and meet the requirements of Section 2303.2 of the International Building Code.~~
5. ~~Ignition-resistant materials complying with Section 503.2 on the exterior side.~~

Such materials shall extend from the top of the foundation to the underside of the roof sheathing.

Add new text as follows:

504.5.1 Flame propagation of exterior wall coverings or exterior wall assemblies.
Exterior wall coverings or *exterior wall assemblies* shall be constructed of *noncombustible materials* or *ignition-resistance materials*.

Exceptions:

1. Fire-retardant-treated wood on the exterior side. The fire-retardant-treated wood shall be labeled for exterior use and meet the requirements of Section 2303.2 of the *International Building Code*.
2. *Approved wall coverings* or *exterior wall assemblies* that have been tested in accordance with the test procedures for a 10-minute direct flame contact exposure test set forth in ASTM E2707 with the conditions of acceptance shown in Section 504.5.3.
3. Combustible components conforming to Section 1402.5 of the *International Building Code*.

504.5.2 Flame impingent of exterior wall coverings or exterior wall assemblies.
Exterior walls shall have a *fire resistance rating* of not less than 1-hour when tested in accordance with ASTM E119 or UL 263 from the exterior side.

Exceptions: Any of the following shall be deemed to meet the assembly performance criteria and the intent of this section:

1. Heavy timber or log wall construction.
2. Wall assemblies that have been tested in accordance with the test procedures for a 10-minute direct flame contact exposure test set forth in ASTM E2707 with the conditions of acceptance in Section 504.5.4.

504.5.3 Conditions of acceptance for flame propagation.
Testing in accordance with ASTM E2707 in Section 504.5.1 shall not exhibit flame propagation to the top of the test specimen during the full duration of the test when tested with a modified flame exposure of 100kW.

504.5.4 Conditions of acceptance for flame impingement.
Testing in accordance with ASTM E2707 in Section 504.5.2 shall comply with all of the following:

1. Not exhibit evidence of glowing combustion on the interior surface of the assembly during the full duration of the test.
2. Have no evidence of flame penetration through the wall assembly during the full duration of the test.

Add new standard(s) as follows:

ASTM International

ASTM

100 Barr Harbor Drive, P.O. Box C700
West Conshohocken, PA 19428-2959

ASTM E2707-15	Standard Test Method for Determining Fire Penetration of Exterior Wall Assemblies Using a Direct Flame Impingement Exposure

Reason: This proposal reorganizes section 504.5 and adds a new performance option to address the potential for flame propagation on an exterior wall. There is a need to evaluate two separate and distinct aspects of fire safety pertaining to exterior walls. This proposal separates the requirements for flame impingement into an exterior wall from the flame spread across an exterior wall. The proposed language maintains the provisions that address fire migrating to the interior of an *exterior wall*, while adding language that addresses the tendency for flames to spread across the exterior of an *exterior wall*.The reorganization separates the requirements for protection against flame impingement from flame propagation. Flame propagation is addressed currently addressed by ASTM E136 (noncombustibility) and by extended ASTM E84 provisions. It then creates a separate section to address flame impingement by referencing ASTM E119 and ASTM E2707 as currently exists. ASTM E2707 Standard Test Method for Determining Fire Penetration of Exterior Wall Assemblies Using a Direct Flame Impingement Exposure was adapted from the California State Fire Marshal Standard 12-7A Materials and Construction Methods for Exterior Wildfire Exposure that is referenced in the Chapter 7A [SFM] Materials and Construction Methods for Exterior Wildfire Exposure within the California Building Code.

With respect to the five methods current accepted, they are all incorporated into the reorganization. The first method is in the charging language to Section 504.5.2. The second method is included in the charging language to Section 504.5.1. The third method (heavy timber) is moved to an Exception in Section 504.5.2. The fourth method (fire retardant treated wood) is moved to an Exception in Section 504.5.1. The fifth method is moved to the charging language in Section 504.5.1.

The additional option being proposed is to utilize a modified ASTM E2707 test to address flame propagation. Testing has been conducted both in a 2011 Research program conducted at UL, as well as in 2019 and 2020 as part of work being done through ASTM Committee E05. The ASTM activity has been dormant since early 2020 due to the current restrictions. Multiple assemblies have been successfully tested to date, including some with wood and vinyl siding. The UL research report is available at https://ulfirefightersafety.org/research-projects/residential-attic-fire-mitigation-tactics-and-exterior-fire-spread-hazards.html.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
All of the compliance methods currently permitted by the Code are retained with an additional method added. As such, there is no impact on the cost of construction.

Staff Analysis: A review of the standard proposed for inclusion in the code, ASTM E2707-15:Standard Test Method for Determining Fire Penetration of Exterior Wall Assemblies Using a Direct Flame Impingement Exposure, with regard to some of the key ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before March 20, 2021.

WUIC13-21

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The committee stated that the reason for disapproval was based on opposition to the changing the condition of acceptance for flame propagation to a modified flame exposure of 100kW. (Vote: 13-1)

WUIC13-21

Individual Consideration Agenda

Public Comment 1:

IWUIC: 504.5, 504.5.1, 504.5.2, 504.5.3, 504.5.4,

Proponents: William Koffel, representing Fire Safe North America (wkoffel@koffel.com) requests As Modified by Public Comment

Modify as follows:

2021 International Wildland-Urban Interface Code

504.5 Exterior walls . *Exterior wall coverings* or *exterior wall assemblies* of buildings or structures shall comply with Sections 504.5.1 and 504.5.2. Such materials shall extend from the top of the foundation to the underside of the roof sheathing.

504.5.1 Flame propagation of exterior wall coverings or exterior wall assemblies . *Exterior wall coverings* or *exterior wall assemblies* shall be constructed of *noncombustible materials* or *ignition-resistance materials*.

Exceptions:

1. Fire-retardant-treated wood on the exterior side. The fire-retardant-treated wood shall be labeled for exterior use and meet the requirements of Section 2303.2 of the *International Building Code*.
2. *Approved wall coverings* or *exterior wall assemblies* that have been tested in accordance with the test procedures for a 10-minute direct flame contact exposure test set forth in ASTM E2707 with the conditions of acceptance shown in Section 504.5.3.
3. Combustible components conforming to Section 1402.5 of the *International Building Code*.

504.5.2 Flame impingent of exterior wall coverings or exterior wall assemblies . Exterior walls shall have a *fire resistance rating* of not less than 1-hour when tested in accordance with ASTM E119 or UL 263 from the exterior side.

Exceptions: Any of the following shall be deemed to meet the assembly performance criteria and the intent of this section:

1. Heavy timber or log wall construction.
2. Wall assemblies that have been tested in accordance with the test procedures for a 10-minute direct flame contact exposure test set forth in ASTM E2707 with the conditions of acceptance in Section 504.5.4.

504.5.3 Conditions of acceptance for flame propagation. Testing in accordance with ASTM E2707 in Section 504.5.1 shall not exhibit flame propagation to the top of the test specimen during the full duration of the test when tested with a modified flame exposure of ~~100kW~~ 150 kW .

504.5.4 Conditions of acceptance for flame impingement . Testing in accordance with ASTM E2707 in Section 504.5.2 shall comply with all of the following:

1. Not exhibit evidence of glowing combustion on the interior surface of the assembly during the full duration of the test.
2. Have no evidence of flame penetration through the wall assembly during the full duration of the test.

,

ASTM E2707-15	Standard Test Method for Determining Fire Penetration of Exterior Wall Assemblies Using a Direct Flame Impingement Exposure

Commenter's Reason: The Public Comment responds to the Committee Reason for Disapproval which was "changing the acceptance for flame propagation to a modified flame exposure of 100kW."

Research undertaken by the UL Firefighter Safety Research Institute used modified E2707 apparatus with exposures ranging from 25kW to 300kW while exploring the effect of burning mulch adjacent to a structure. After considering the Committee's reason for Disapproval, it would reasonable to use the 150kW exposure as required in ASTM E2707 and based upon UL's research. Further justifying the 150kW exposure, authors representing the USDA, University of Florida and NIST found that the range of exposures for burning mulch ranged from 50kW to 300kW. A value of 150kW is an appropriate middle-ground exposure for the assessment of these assemblies. The original selection of 100 kW exposure represented an alternative exposure, for which additional test data is also available. However, it was clear from the discussions during the hearing that the 150 kW exposure is preferred.

Bibliography: Zipperer, W. (2007, April 9). Mulch flammability. Proceedings of Emerging Issues Along Urban-Rural Interfaces II: Linking Land-Use Science and Society: 192-195
Kerber, S.(2014). https://ulfirefightersafety.org/research-projects/residential-attic-firemitigation-tactics-and-exterior-fire-spread-hazards.HTML

Cost Impact: The net effect of the public comment and code change proposal will not increase or decrease the cost of construction
All of the compliance methods currently permitted by the Code are retained with an additional method added. It is understood that some materials may be impacted by the proposed requirements but other alternative compliance methods remain.

Public Comment# 2848

WUIC15-21

Proposed Change as Submitted

Proponents: Michael O'Brian, representing FCAC (fcac@iccsafe.org)

2021 International Wildland-Urban Interface Code

Revise as follows:

504.10 Vents. ~~Attic ventilation openings, foundation or underfloor vents, or other ventilation openings in vertical exterior walls and vents through roofs shall not exceed 144 square inches (0.0929 m^2) each. Such vents shall be covered with *noncombustible* corrosion-resistant mesh with openings not to exceed $^{1}/_{4}$ inch (6.4 mm), or shall be designed and *approved* to prevent flame or ember penetration into the structure.~~ Where provided, ventilation openings for enclosed attics, gable ends, ridge ends, under eaves and cornices, enclosed eave soffit spaces, enclosed rafter spaces formed where ceilings are applied directly to the underside of roof rafters, underfloor ventilation, foundations and crawl spaces, or any other opening intended to permit ventilation, either in a horizontal or vertical wall, shall be in accordance with Section 504.10.1 to resist building ignition from the intrusion of burning embers and flame through the ventilation openings.

Add new text as follows:

504.10.1 Requirements.
Ventilation openings shall be fully covered with listed vents, tested in accordance with ASTM E2886, to demonstrate compliance with all the following requirements:

1. There shall be no flaming ignition of the cotton material during the Ember Intrusion Test.
2. There shall be no flaming ignition during the Integrity Test portion of the Flame Intrusion Test.
3. The maximum temperature of the unexposed side of the vent shall not exceed 662°F (350°C).

Revise as follows:

~~**504.10.1**~~ **504.10.2 Vent locations.** Attic ventilation openings shall not be located in soffits, in eave overhangs, between rafters at eaves, or in other overhang areas. Gable end and dormer vents shall be located not less than 10 feet (3048 mm) from lot lines. Underfloor ventilation openings shall be located as close to grade as practical.

505.10 Vents. ~~Attic ventilation openings, foundation or underfloor vents or other ventilation openings in vertical exterior walls and vents through roofs shall not exceed 144 square inches (0.0929 m^2) each. Such vents shall be covered with *noncombustible* corrosion-resistant mesh with openings not to exceed $^{1}/_{4}$ inch (6.4 mm) or shall be designed and *approved* to prevent flame or ember penetration into the structure.~~ Where provided, ventilation openings for enclosed attics, gable ends, ridge ends, under eaves and cornices, enclosed eave soffit spaces, enclosed rafter spaces formed where ceilings are applied directly to the underside of roof rafters, underfloor ventilation, foundations and crawl spaces, or any other opening intended to permit ventilation, either in a horizontal or vertical wall, shall be in accordance with Section 505.10.1 to resist building ignition from the intrusion of burning embers and flame through the ventilation openings.

Add new text as follows:

505.10.1 Requirements.
Ventilation openings shall be fully covered with listed vents tested in accordance with ASTM E2886, to demonstrate compliance with all the following requirements:

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2. There shall be no flaming ignition during the Integrity Test portion of the Flame Intrusion Test.
3. The maximum temperature of the unexposed side of the vent shall not exceed 662°F (350°C).

Revise as follows:

~~**505.10.1**~~ **505.10.2 Vent locations.** Attic ventilation openings shall not be located in soffits, in eave overhangs, between rafters at eaves, or in other overhang areas. Gable end and dormer vents shall be located not less than 10 feet (3048 mm) from lot lines. Underfloor ventilation openings shall be located as close to grade as practical.

Add new text as follows:

506.5 Vents.
Where provided, attic ventilation openings, foundation or underfloor vents, or other ventilation openings in vertical exterior walls and vents through roofs shall not exceed 144 square inches (0.0929 m2) each. Such vents shall be covered with noncombustible corrosion-resistant mesh with

openings not to exceed 1/8 inch (3.2 mm), or shall be designed and approved to prevent flame or ember penetration into the structure.

Add new standard(s) as follows:

ASTM

ASTM International
100 Barr Harbor Drive, P.O. Box C700
West Conshohocken, PA 19428-2959

ASTM E2886/E2886M-20	Standard Test Method for Evaluating the Ability of Exterior Vents to Resist the Entry of Embers and Direct Flame Impingement

Reason:

Photo shows IBHS research on vent intrusion from embers.

The main thrust of this proposal is to make the vent screens smaller for homes constructed in wildland hazard zones. The current code limits the screen size to no larger than ¼”. This was put in to the code as a starting point, and was not based on any testing. Testing using an ember generator was undertaken, and it was shown that 1/4' vents did not prevent fire ignition. screening at 1/8' or 1/16" was effective at preventing ember intrusion.[1]In 2013, IBHS conducted a study on the vulnerability of vents to wind-blown embers. It demonstrated that 1/4 inch openings are not sufficiently small to prevent the penetration of flames via the vents. Therefore it is important to modify the section to get better protection. Even the use of 1/8 inch openings only minimizes the size and number of embers and does not eliminate them entirely; making it very important to reduce what’s stored in the attic and crawl space. The same information has been gathered as a result of the wildfires in California.

A link to a key IBHS publication follows:https://ibhs.org/wp-content/uploads/wpmembers/files/Vulnerability-of-Vents-to-Wind-Blown-Embers_IBHS.pdf

NFPA’s Standard for Reducing Structure Ignition Hazards from Wildland Fire [NFPA 1144-2018] has, since at least 2008, set minimum requirements for screen size for attic vents at 1/8” maximum diameter openings, see Sec. 5.3.3 (1) based on the same testing mentioned above. (Note that NFPA 1144 will become part of NFPA 1140 in the next edition.)

ASTM E2886 was included for applications in the high hazard and moderate hazard zones, but not in the lowest hazard zones, where a simpler prescriptive approach is used instead of a performance approach. Thus, the proposal recommends the performance approach for the more severe IR1 and IR2 areas (i.e. ignition resistant construction classes 1 and 2), which have the same requirements in the present code (albeit insufficient ones). It recommends a simpler, and probably cheaper, prescriptive approach (1/8 inch openings in vents) for IR3 (ignition resistant construction class 3), which has no requirements now, but should have them.

As seen in the fires in Santa Rosa, and Paradise (in California), structure ignition from embers can involve structures not in a high hazard zone. In these zones, the use of vents tested to the ASTM standard would help prevent structure ignition in both of the zones. Because ASTM E2886 includes the information to be assessed but does not include performance criteria for failure, the provisions found in 504.10.1 and 505.10.1 provide the information needed to address the performance of vents under the test.

In recognition of that, the California Wildland chapter (Chapter 7A of the California Building Code) has adopted a performance standard approach instead of a prescriptive approach. It uses ASTM E2886, a consensus standard developed by ASTM E5 (committee on fire standards) to assess the performance of vents to protect against ember penetration. It is important to point out that (like most ASTM E5 standards), ASTM E2886 does not have pass/fail criteria but it notes the information needed to be reported and this was adopted as pass/fail criteria by the California code. Note also that this proposal recommends that the vents be listed for the application and that multiple manufacturers already list such systems, for California.

The ASTM standard proposed was issued by ASTM committee E05 on Fire Standards and complies with ICC CP 28. It is fully written in mandatory language and was issued by a consensus standards organization.

This proposal is submitted by the ICC Fire Code Action Committee (FCAC). The FCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance assigned International Codes with regard to fire and life safety in new and existing buildings and facilities as well as the protection of life and property in wildland urban interface areas. In 2020 and 2021 the Fire-CAC held multiple virtual meetings that were open to any interested party. In addition, there were numerous virtual specific working group meetings that were also open to any interested parties, to develop, discuss and debate the proposed changes. Related documentation and reports are posted on the FCAC website at:

https://www.iccsafe.org/products-and-services/i-codes/code-development/cs/fire-code-action-committee-fcac

Bibliography: 1 National Fire Protection Association. "NFPA 1144 Standard for reducing structure ignition hazards from wildland fire." 2018.

Cost Impact: The code change proposal will increase the cost of construction
Requiring listed vents will increase the cost of construction. Requiring vent screens with smaller openings will also increase the cost of construction.

Staff Analysis: A review of the standard proposed for inclusion in the code, E2886/E2886M-20, Standard Test Method for Evaluating the Ability of Exterior Vents to Resist the Entry of Embers and Direct Flame Impingement, with regard to some of the key ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before March 20, 2021.

WUIC15-21

Public Hearing Results

Committee Action: **As Submitted**

Committee Reason: The committee stated that the reasons for approval were that the vents need to be listed in both the high and extreme zones and based on the actual experience with wildland fires where homes probably more than likely could have been saved had there been better ember intrusion resistance on these vents. (Vote: 7-6)

WUIC15-21

Individual Consideration Agenda

Public Comment 1:

IWUIC: 504.10, 504.10.1, 504.10.2 (New), 504.10.2, 505.10, 505.10.1, 505.10.2 (New), 505.10.2, 506.5

Proponents: Marcelo Hirschler, representing self (mmh@gbhint.com); Michael O'Brian, representing FCAC (fcac@iccsafe.org); Mike Nugent, representing ICC Building Code Action Committee (bcac@iccsafe.org) requests As Modified by Public Comment

Modify as follows:

2021 International Wildland-Urban Interface Code

504.10 Vents . Where provided, ventilation openings for enclosed attics, gable ends, ridge ends, under eaves and cornices, enclosed eave soffit spaces, enclosed rafter spaces formed where ceilings are applied directly to the underside of roof rafters, underfloor ventilation, foundations and crawl spaces, or any other opening intended to permit ventilation, either in a horizontal or <u>vertical surface</u>~~wall~~, shall be in accordance with Section 504.10.1 <u>or Section 504.10.2</u> to resist building ignition from the intrusion of burning embers and flame through the ventilation openings.~~ vertical~~

504.10.1 Performance Requirements . Ventilation openings shall be fully covered with listed vents, tested in accordance with ASTM E2886, to demonstrate compliance with all the following requirements:

1. There shall be no flaming ignition of the cotton material during the Ember Intrusion Test.
2. There shall be no flaming ignition during the Integrity Test portion of the Flame Intrusion Test.
3. The maximum temperature of the unexposed side of the vent shall not exceed 662°F (350°C).

504.10.2 Prescriptive requirements . Where provided, attic ventilation openings, foundation or underfloor vents, or other ventilation openings in vertical or horizontal surfaces and vents through roofs shall not exceed 144 square inches (0.0929 m^2) each. Such vents shall be covered with noncombustible corrosion-resistant mesh with openings not to exceed 1/8 inch (3.2 mm), or shall be designed and approved to prevent flame or ember penetration into the structure.

~~504.10.2~~ 504.10.3 Vent locations . Attic ventilation openings shall not be located in soffits, in eave overhangs, between rafters at eaves, or in other overhang areas. Gable end and dormer vents shall be located not less than 10 feet (3048 mm) from lot lines. Underfloor ventilation openings shall be located as close to grade as practical.

505.10 Vents . Where provided, ventilation openings for enclosed attics, gable ends, ridge ends, under eaves and cornices, enclosed eave soffit spaces, enclosed rafter spaces formed where ceilings are applied directly to the underside of roof rafters, underfloor ventilation, foundations and crawl spaces, or any other opening intended to permit ventilation, either in a horizontal or vertical surface ~~wall~~, shall be in accordance with Section 505.10.1 or Section 505.10.2 to resist building ignition from the intrusion of burning embers and flame through the ventilation openings.~~vertical~~

505.10.1 Performance Requirements . Ventilation openings shall be fully covered with listed vents tested in accordance with ASTM E2886, to demonstrate compliance with all the following requirements:

1. There shall be no flaming ignition of the cotton material during the Ember Intrusion Test.
2. There shall be no flaming ignition during the Integrity Test portion of the Flame Intrusion Test.
3. The maximum temperature of the unexposed side of the vent shall not exceed 662°F (350°C).

505.10.2 Prescriptive requirements .
Where provided, attic ventilation openings, foundation or underfloor vents, or other ventilation openings in vertical or horizontal surfaces and vents through roofs shall not exceed 144 square inches (0.0929 m^2) each. Such vents shall be covered with noncombustible corrosion-resistant mesh with openings not to exceed 1/8 inch (3.2 mm), or shall be designed and approved to prevent flame or ember penetration into the structure.

~~505.10.2~~ 505.10.3 Vent locations . Attic ventilation openings shall not be located in soffits, in eave overhangs, between rafters at eaves, or in other overhang areas. Gable end and dormer vents shall be located not less than 10 feet (3048 mm) from lot lines. Underfloor ventilation openings shall be located as close to grade as practical.

506.5 Vents . Where provided, attic ventilation openings, foundation or underfloor vents, or other ventilation openings in vertical exterior walls and vents through roofs shall not exceed 144 square inches (0.0929 m2) each. Such vents shall be covered with noncombustible corrosion-resistant mesh with openings not to exceed 1/8 inch (3.2 mm), or shall be designed and approved to prevent flame or ember penetration into the structure.

Commenter's Reason: The technical committee approved both WUIC14 and WUIC15 as submitted. This public comment combines the two proposals by providing an alternative: a prescriptive requirement (for 1/8 inch) or a performance requirement (based on the standard).
California currently uses listed vents and those have been successful. Some of them use 1/8" vent screening, but there are other designs that utilize a baffle system. Any of these style vents will make buildings safer, and do not cost substantially more. In fact, California has a listing of "Low cost retrofits" that can be found at www.readyforwildfire.org, and vents such as those required by this code change are on that list.

And while 1/16" vents will also accomplish similar goals, there is a concern about maintenance of the smaller vent screen size since it will clog easier.

Cost Impact: The net effect of the public comment and code change proposal will increase the cost of construction
Though this proposal overall will likely increase the cost of construction the PC does not. The option being added is already recognized by the approval of WUIC14-21.

Public Comment# 2408

Public Comment 2:

IWUIC: 504.10, 504.10.1, 504.10.2 (New), 504.10.2, 505.10, 505.10.1, 505.10.2 (New), 505.10.2, 506.5

Proponents: Aaron Phillips, representing Asphalt Roofing Manufacturers Association (aphillips@asphaltroofing.org) requests As Modified by Public

Comment

Modify as follows:

2021 International Wildland-Urban Interface Code

504.10 Vents . Where provided, ventilation openings for enclosed attics, gable ends, ridge ends, ~~under eaves and cornices, enclosed eave soffit spaces, enclosed rafter spaces formed where ceilings are applied directly to the underside of roof rafters,~~ underfloor ventilation, foundations and crawl spaces, or any other opening intended to permit ventilation, ~~either in a horizontal or vertical wall,~~ shall be in accordance with Section 504.10.1 <u>or Section 504.10.2</u> to resist building ignition from the intrusion of burning embers and flame through the ventilation openings.

504.10.1 Requirements . Ventilation openings shall be fully covered with listed vents, tested in accordance with ASTM E2886, to demonstrate compliance with all the following requirements:

1. There shall be no flaming ignition of the cotton material during the Ember Intrusion Test.
2. There shall be no flaming ignition during the Integrity Test portion of the Flame Intrusion Test.
3. The maximum temperature of the unexposed side of the vent shall not exceed 662°F (350°C).

<u>**504.10.2**</u> <u>**Prescriptive Alternative**</u> **.** <u>Ventilation openings shall not exceed 144 square inches (0.0929 m^2) each. Such vents shall be covered with noncombustible corrosion-resistant mesh with openings not to exceed 1/8 inch (3.2 mm) or shall be designed and approved to prevent flame or ember penetration into the structure.</u>

<u>**504.10.3**</u> ~~**504.10.2**~~ **Vent locations .** Attic ventilation openings shall not be located in soffits, in eave overhangs, between rafters at eaves, or in other overhang areas. Gable end and dormer vents shall be located not less than 10 feet (3048 mm) from lot lines. Underfloor ventilation openings shall be located as close to grade as practical.

505.10 Vents . Where provided, ventilation openings for enclosed attics, gable ends, ridge ends, ~~under eaves and cornices, enclosed eave soffit spaces, enclosed rafter spaces formed where ceilings are applied directly to the underside of roof rafters,~~ underfloor ventilation, foundations and crawl spaces, or any other opening intended to permit ventilation, ~~either in a horizontal or vertical wall,~~ shall be in accordance with Section 505.10.1 <u>or Section 505.10.2</u> to resist building ignition from the intrusion of burning embers and flame through the ventilation openings.

505.10.1 Requirements . Ventilation openings shall be fully covered with listed vents tested in accordance with ASTM E2886, to demonstrate compliance with all the following requirements:

1. There shall be no flaming ignition of the cotton material during the Ember Intrusion Test.
2. There shall be no flaming ignition during the Integrity Test portion of the Flame Intrusion Test.
3. The maximum temperature of the unexposed side of the vent shall not exceed 662°F (350°C).

<u>**505.10.2**</u> <u>**Prescriptive Alternative**</u> **.** <u>Ventilation openings shall not exceed 144 square inches (0.0929 m^2) each. Such vents shall be covered with noncombustible corrosion-resistant mesh with openings not to exceed 1/8 inch (3.2 mm) or shall be designed and approved to prevent flame or ember penetration into the structure.</u>

<u>**505.10.3**</u> ~~**505.10.2**~~ **Vent locations .** Attic ventilation openings shall not be located in soffits, in eave overhangs, between rafters at eaves, or in other overhang areas. Gable end and dormer vents shall be located not less than 10 feet (3048 mm) from lot lines. Underfloor ventilation openings shall be located as close to grade as practical.

506.5 Vents . Where provided, attic ventilation openings, foundation or underfloor vents, or other ventilation openings in vertical exterior walls and vents through roofs shall not exceed 144 square inches (0.0929 m2) each. Such vents shall be covered with noncombustible corrosion-resistant mesh with openings not to exceed 1/8 inch (3.2 mm), or shall be designed and approved to prevent flame or ember penetration into the structure.

Commenter's Reason: Both proposals WUIC15 and WUIC14 address the same issue (ember intrusion through ventilation openings into the interior of a structure), and both were approved as submitted during the Committee Action Hearings. WUIC14 addresses ember intrusion via a simple prescriptive approach that establishes a maximum corrosion-resistant mesh opening size of 1/8" for Classes 1, 2, and 3 Ignition Resistant Construction. In contrast, WUIC15 relies on ASTM E2886 to qualify ventilation opening covers for Classes 1 and 2 Ignition Resistant Construction and introduces the same prescriptive requirement as is used in WUIC14 for Class 3 IR Construction.
This public comment attempts to merge the two proposals by permitting compliance via either the test method evaluation of WUIC15 or the prescriptive approach of WUIC14.

In addition to merging two proposals that were both recommended as submitted during the Committee Action Hearings, this public comment is needed because test method E2886, which is referenced as the sole compliance option in WUIC15 for Classes 1 and 2 IR construction, explicitly excludes testing of roof top vents by stating in the standard's scope, "Roof ridge and off-ridge (field) vents are excluded from this standard." Therefore, having a prescriptive compliance option is essential, and the one offered by WUIC14 is supported by research completed by the Insurance Institute for Business and Home Safety that is cited in the original proposal Reason statement.

This public comment also corrects an issue with the scoping sections of WUIC15. Specifically, Sections 504.10 and 505.10 include ventilation opening locations that are expressly excluded in existing “Vent location” code Sections 504.10.1 and 505.10.1 (renumbered as 504.10.2 and 505.10.2 in the original proposal and as 504.10.3 and 505.10.3 in this public comment). These ventilation opening locations are removed from the scoping sections to create consistency with existing provisions.

Cost Impact: The net effect of the public comment and code change proposal will increase the cost of construction
The original proposal is expected to increase the cost of construction by requiring vents to be listed or have mesh with smaller openings. Through introduction of a prescriptive alternative, this public comment may make the expected increase in cost of construction slightly less than the original proposal in situations where the prescriptive alternative can be followed.

Public Comment# 2358

Public Comment 3:

Proponents: Gary Ehrlich, representing NAHB (gehrlich@nahb.org) requests Disapprove

Commenter's Reason: This public comment urges disapproval of WUIC15. The proposal would unreasonably increase cost by requiring builders constructing dwellings and multifamily buildings in 2 of the 3 wildfire zones use tested and listed fire-resistant vent products for every exterior vent on a building, regardless of location on the building or exposure to embers, rather than continuing to use commonly-available, generic materials, but with a tighter mesh spacing.
Requiring tested and listed products for all vents on a dwelling or multifamily building is not consistent with the IBHS research cited in the reason statement for the proposal. The IBHS research focused on attic vents (i.e. gable end vents, ridge vents, off-ridge vents and eave vents) and did not look at crawlspace vents or other foundation vents. Foundation vents may have less exposure as they are closer to the ground, may be smaller in size than gable, eave or ridge vents or other roof vents, and may be sheltered by porches, patios, eaves and other projecting elements. No other evidence was provided to the committee to suggest a tested and listed product is required for such vents, or even that a tighter mesh spacing is called for.

The only vents for which the IBHS research clearly demonstrated a tested and listed fire-resistant vent were required gable end vents, due to their larger area and, by virtue of their vertical orientation high on a gable end wall, greater exposure to ember streams. The IBHS research showed vents in the bottom of an enclosed soffit were less vulnerable to ember intrusion and only need a tighter 1/8" mesh spacing to provide a high level of protection. In addition, the research indicated standard off-ridge turbine vents and ridge vents with external baffles (like those used in high-wind regions) provided good protection without requiring such vents be a tested and listed product. The IBHS report did recommend 1/8” steel mesh be installed over the gaps in the roof sheathing.

NAHB is also concerned about the cost impact changing to a tested and listed product. In particular, a quick comparison of costs using vents available at big-box stores and information from one manufacturer of ember-resistant vents suggests the cost of tested soffit vents is 10 times that of standard vents (approximately $2 for a standard 4” x 16” product versus $20+ for a 4” x 14” ember-resistant product). For a typical dwelling with continuous soffit vents that could easily be a $1,500-$2,000 increase.

Product availability of tested and listed vents in all areas of the country where the IWUIC has or may be adopted is also a concern. The website of one manufacturer of ember-resistant vents suggested their product was a special order even in California, and only a handful of dealers outside of California, all but one of those in Oregon and Washington, offered the product (again on special order). NAHB’s members have long experience with building codes requiring specialized products (e.g. AFCI’s and hail-resistant shingles) long before they are readily available across the country and needing to have such products specially-ordered and shipped at a significant premium.

Finally, it is noted WUIC15 was a controversial proposal that passed by a single vote (7-6). This contrasts with proposal WUIC14 which referenced the same IBHS research but simply increased the mesh spacing to 1/8” and did not require a tested and listed product. WUIC14 was unanimously approved 13-0, with the IFC Committee specifically noting the proposal addressed the concerns about protecting vents against intrusion by embers while still allowing the use of traditional products. NAHB testified in support of WUIC14.

Cost Impact: The net effect of the public comment and code change proposal will not increase or decrease the cost of construction
No change to code.

Public Comment# 2713

WUIC18-21

Proposed Change as Submitted

Proponents: T. Eric Stafford, representing Insurance Institute for Business and Home Safety (estafford@ibhs.org); Milad Shabanian, representing Insurance Institute for Business and Home Safety (mshabanian@ibhs.org)

2021 International Wildland-Urban Interface Code

Add new text as follows:

603.2.3.1 Combustible mulch.
The required defensible space shall be kept free of combustible materials used for mulch such as small pieces of bark or pine needles.

Reason: This proposal is primarily a clarification. The code clearly contemplates that ground cover materials in the required defensible space must not be capable of transmitting fire to any structure. Additionally, the 2018 IWUIC Commentary more explicitly clarifies that combustible mulch should not be used in the required defensible space [1]. The following is an excerpt from the commentary to Section 603.2.3 from the 2018 IWUIC Commentary:
“A common practice in many areas is to rake the pine needles, or pine straw, together and use them as a type of mulch. This is often placed around the trunk of a tree or along the exterior wall of the building. This practice is not in concert with creating a defensible space. Pine needles will carry fire to the structure. Many structures have been ignited simply from a cigarette discarded into this pine straw. The pine straw smolders and ignites, then ignites the structure itself. In a wildland fire situation, an ember can land in the pine straw and smolder even after the fire has passed, later igniting and consuming the structure. See Commentary Figure 603.2.3.”

Based on post-fire investigations, combustible mulch such as bark and rubber are not recommended near structures in wildland-urban interface areas. Burning mulch can ignite adjacent building materials and can result in fire spread to the structure. The photographs below relate to investigations of buildings in Paradise, CA after the devastating 2018 Camp Fire. These pictures show damage to windows due to the direct contact with flames produced by burning combustible mulch. In both cases, the fire did not spread vertically as the cladding system was noncombustible. However, the direct flame contact caused failures of the glazing. Tests performed at the IBHS research center confirmed that flammable debris on the ground near the building ignited and caused a rapid upward flame to spread on the side of the house [2]. There are also other studies investigated the flammability of different types of mulches. In these experimental studies, most of the dried fuel beds were observed to achieve glowing or flaming ignition [3-6]. According to the conducted studies, shredded rubber, pine needles, and shredded western red cedar demonstrated the most hazardous fire behavior [6].

Failure of the outer layer of a double-glazed window

Complete failure of the glazing

Bibliography: [1] International Code Council (ICC) (2018) International Wildland Urban Interface Code (IWUIC) and Commentary.
[2] Quarles, S., Leschak, P., Cowger, R., Worley, K., Brown, R., Iskowitz, C., 2012. Lessons Learned from Waldo Canyon: Fire Adapted Communities Mitigation Assessment Team Findings. https://fireadapted.org/wp-content/uploads/2018/06/waldo-canyon-report.pdf

[3] Manzello, S.L., Cleary, T.G., Shields, J.R., Yang, J.C., 2006a. On the ignition of fuel beds by firebrands. Fire Mater. 30, 77–87. doi:10.1002/fam.901. https://onlinelibrary.wiley.com/doi/abs/10.1002/fam.901

[4] Manzello, S.L., Cleary, T.G., Shields, J.R., Yang, J.C., 2006b. Ignition of mulch and grasses by firebrands in wildland–urban interface fires. Int. J. Wildl. Fire 15, 427. doi:10.1071/WF06031 http://www.marioloureiro.net/ciencia/firebrand/f06031.pdf

[5] Steward, L.G., Sydnor, T.D., Bishop, B., 2003. The ease of ignition of 13 Landscape Mulches. Journal of Arboriculture 29(6) 317-321. http://ucanr.edu/sites/UrbanHort/files/117293.pdf [Last Accessed Jan. 05, 2021]

[6] Quarles, S. and Smith, E., 2004, The combustibility of landscape mulches. University of Nevada Cooperative Extension. https://ucanr.edu/sites/MarinMG/files/321642.pdf [Last Accessed Jan. 05, 2021]

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal is a clarification.

WUIC18-21

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The committee stated that the reasons for disapproval were that the 100 feet distance is extreme even in a high fire zone and that the requirement is unenforceable. (Vote: 14-0)

WUIC18-21

Individual Consideration Agenda

Public Comment 1:

IWUIC: 603.2.3.1

Proponents: Milad Shabanian, representing Insurance Institute for Business and Home Safety (mshabanian@ibhs.org); T. Eric Stafford, representing Insurance Institute for Business and Home Safety (testafford@charter.net) requests As Modified by Public Comment

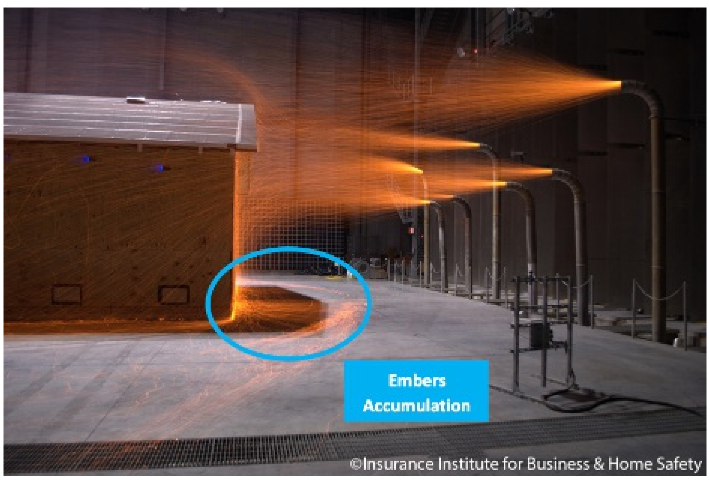
Modify as follows:

2021 International Wildland-Urban Interface Code

603.2.3.1 Combustible mulch . ~~The required defensible space shall be kept free of~~ Combustible materials used for mulch, such as small pieces of bark or pine needles, shall be prohibited within 5 feet horizontally of exterior walls and decks.

Commenter's Reason:
This public comment addresses the committee's concerns with the original proposal. Some on the committee indicated that prohibiting combustible mulch in the required defensible space was extreme, as the required defensible space is a minimum of 100 feet for extreme hazards.

Accumulation of embers has been identified as a big threat for igniting the fuel they land on in literature such as combustible mulch. Burning mulch can ignite adjacent building materials and can result in fire spread to the structure. IBHS research identified two main accumulation locations around a structure: (1) 5-ft from the building, and (2) at the base of the wall [1]. These locations are shown below:



Therefore, in order to address the committee comments and based on IBHS studies, this distance has been reduced to 5-ft from the building.

Bibliography: [1] Hedayati, F., Stansell, C., Gorham, D., Quarles, S. (2018), Near-Building Noncombustible Zone, Insurance Institute for Business and Home Safety (IBHS)

Cost Impact: The net effect of the public comment and code change proposal will not increase or decrease the cost of construction

This proposal will not increase the cost. It will clarify the intent of the code.

Public Comment# 2725

F1-21

Proposed Change as Submitted

Proponents: Mark Hopkins, representing TERPconsulting (mhopkins@terpconsulting.com)

2021 International Fire Code

Revise as follows:

AUTOMATIC SPRINKLER SYSTEM. ~~An *automatic sprinkler system*, for fire protection purposes, is an integrated system of underground and overhead piping designed in accordance with fire protection engineering standards. The system includes a suitable water supply. The portion of the system above the ground is a network of specially sized or hydraulically designed piping installed in a structure or area, generally overhead, and to which automatic sprinklers are connected in a systematic pattern. The system is usually activated by heat from a fire and discharges water over the fire area.~~ An automatic sprinkler system is an integrated network of piping designed in accordance with fire protection engineering standards, commonly activated by heat from a fire and discharges water over the fire area, that consists of sprinklers, a water supply source, a water control valve, a waterflow alarm, and a drain. The portion of the sprinkler system above ground is a network of specifically sized or hydraulically designed piping installed in a building, structure, or area, generally overhead, and to which sprinklers are attached in a systematic pattern.

2021 International Building Code

Revise as follows:

[F] AUTOMATIC SPRINKLER SYSTEM. ~~An*automatic sprinkler system*, for fire protection purposes, is an integrated system of underground and overhead piping designed in accordance with fire protection engineering standards. The system includes a suitable water supply. The portion of the system above the ground is a network of specially sized or hydraulically designed piping installed in a structure or area, generally overhead, and to which *automatic* sprinklers are connected in a systematic pattern. The system is usually activated by heat from a fire and discharges water over the *fire area*.~~ An automatic sprinkler system is an integrated network of piping designed in accordance with fire protection engineering standards, commonly activated by heat from a fire and discharges water over the fire area, that consists of sprinklers, a water supply source, a water control valve, a waterflow alarm, and a drain. The portion of the sprinkler system above ground is a network of specifically sized or hydraulically designed piping installed in a building, structure, or area, generally overhead, and to which sprinklers are attached in a systematic pattern.

Reason: The definition of *automatic sprinkler system* is no longer consistent with the definition in the referenced standard. The definition in Section 202 aligns with the definition found in NFPA 13 (2010) which has been modified several times over past several revision cycles, e.g. 2013, 2016 and 2019 editions of NFPA 13. It is recommended to replace the definition for *automatic sprinkler system* with a definition consistent with the current edition of NFPA 13 (2019).
The importance of this change is to clarify that in a multiple story building, or a building having a footprint exceeding the area limitations of NFPA 13 for a single sprinkler system (52,000 sf or 40,000 sf), would be considered to have one system based on the definition included in Section 202; however, the building would be considered to have multiple systems based upon the definition in NFPA 13 (2019). For example, a 32-story high-rise building having a footprint area of 50,000 sf per floor would be considered as having a single sprinkler system based on the current definition included in Section of 202 while it would be considered as having 32 or more systems based on the definition included of NFPA 13 (2019). Similarly, in a single-story building having an area of 80,000 sf would be considered as having a single sprinkler system based on the definition in Section of 202 while it would be considered as having 2 or more systems based on the definition of NFPA 13 (2019).

The definition could also have an impact on the application of inspection, testing and maintenance requirements since NFPA 25 (2020 and prior eds.) provides system related requirements. Using the example above with respect to internal examination of sprinkler piping per system based on the 5 yr. requirement of NFPA 25. A 32-story high-rise building having a single sprinkler system could be interpreted as requiring four (4) internal examination points for the entire building while NFPA 25 would require four (4) internal examination points in sprinkler systems on alternating floors (e.g. 16 systems) resulting in 64 examination points.

It is recommended to replace the definition to allow for consistency between the *International Building Code* and its referenced standards to ensure consistency in application in all jurisdictions.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
Changing the definition does not affect the cost of construction.

F1-21

Public Hearing Results

Committee Action: **As Submitted**

Committee Reason: The committee stated that the reason for the approval was that the proposal aligns the code definition with the referenced standard definition which the designers are currently using and it improves the code and makes it consistent with the standards. (Vote: 12-2)

F1-21

Individual Consideration Agenda

Public Comment 1:

IFC: SECTION 202; IBC: SECTION 202

Proponents: Jeffrey Shapiro, representing Self (jeff.shapiro@intlcodeconsultants.com) requests As Modified by Public Comment

Replace as follows:

2021 International Fire Code

AUTOMATIC SPRINKLER SYSTEM .

An automatic sprinkler system is an integrated network of piping and fire sprinklers designed in accordance with fire protection standards.
~~An *automatic sprinkler system*, for fire protection purposes, is an integrated system of underground and overhead piping designed in accordance with fire protection engineering standards. The system includes a suitable water supply. The portion of the system above the ground is a network of specially sized or hydraulically designed piping installed in a structure or area, generally overhead, and to which automatic sprinklers are connected in a systematic pattern. The system is usually activated by heat from a fire and discharges water over the fire area.~~

2021 International Building Code

[F] AUTOMATIC SPRINKLER SYSTEM .

An automatic sprinkler system is an integrated network of piping and fire sprinklers designed in accordance with fire protection standards.
~~An *automatic sprinkler system*, for fire protection purposes, is an integrated system of underground and overhead piping designed in accordance with fire protection engineering standards. The system includes a suitable water supply. The portion of the system above the ground is a network of specially sized or hydraulically designed piping installed in a structure or area, generally overhead, and to which *automatic* sprinklers are connected in a systematic pattern. The system is usually activated by heat from a fire and discharges water over the *fire area*.~~

Commenter's Reason: The current and proposed definitions contain extraneous and incomplete text and are unnecessarily complicated. The alternative in this public comment eliminates "commonly..." "generally..." and other unnecessary text. It also clarifies that sprinkler standards may or may not be viewed as "engineering" standards. Whether they are or aren't isn't necessary to a definition and avoids legal questions regarding who may or may not be qualified to use such a standard.
I am a consultant to NFSA but this proposal is my own and is not submitted on NFSA's behalf

Cost Impact: The net effect of the public comment and code change proposal will not increase or decrease the cost of construction
No technical change to code application.

Public Comment# 2982

F8-21

Proposed Change as Submitted

Proponents: Tracie Dutter, Contra Costa County Fire Protection District, representing California Fire Chiefs Association

2021 International Fire Code

Add new definition as follows:

VALET WASTE.
A waste collection service that collects and removes the waste from the doorsteps of tenants.

304.1 Waste accumulation prohibited. Combustible waste material creating a fire hazard shall not be allowed to accumulate in buildings or structures or upon premises.

Add new text as follows:

304.1.1 Valet Waste.
Valet waste collection is prohibited.

Exception: Where *approved* by the *fire code official.*

Revise as follows:

~~**304.1.1**~~ **304.1.2 Waste material.** Accumulations of wastepaper, wood, hay, straw, weeds, litter or combustible or flammable waste or rubbish of any type shall not be permitted to remain on a roof or in any *court*, yard, vacant lot, alley, parking lot, open space, or beneath a *grandstand*, *bleacher*, pier, wharf, manufactured home, recreational vehicle or other similar structure.

~~**304.1.2**~~ **304.1.3 Vegetation.** Weeds, grass, vines or other growth that is capable of being ignited and endangering property, shall be cut down and removed by the *owner* or occupant of the premises. Vegetation clearance requirements in wildland-urban interface areas shall be in accordance with the *International Wildland-Urban Interface Code*.

~~**304.1.3**~~ **304.1.4 Space underneath seats.** Spaces underneath *grandstand* and *bleacher* seats shall be kept free from combustible and flammable materials. Except where enclosed in not less than 1-hour *fire-resistance-rated* construction in accordance with the *International Building Code*.

~~**304.1.3.1**~~ **304.1.4.1 Spaces underneath grandstands and bleachers.** Spaces underneath *grandstands* and *bleachers* shall not be occupied or utilized for purposes other than *means of egress* except where equipped with an *automatic sprinkler system* in accordance with Section 903.2.1.5.1, or separated with *fire barriers* and *horizontal assemblies* in accordance with Section 1030.1.1.1.

Reason: Valet waste collection services allow tenants, typically in R-2 occupancies, to place their trash and recyclables in the corridor outside their units to be picked up by a collection service, which comes by on a regularly scheduled basis.
This code change proposal would prohibit valet waste collection unless approved by the fire code official. There are currently no provisions in the IFC that specifically allow or prohibit valet waste; however, this code change proposal to prohibit valet waste is consistent with the current requirements of the IFC, including the following sections:

304.1: Combustible waste material creating a fire hazard shall not be allowed to accumulate in buildings or structures or upon premises.

304.2: Storage of combustible rubbish shall not produce conditions that will create a nuisance or a hazard to the public health, safety or welfare.

1031.2: Required exit accesses, exits and exit discharges shall be continuously maintained free from obstructions or impediments to full instant use in the case of fire or other emergency where the building area served by the means of egress is occupied.

1031.3: A means of egress shall be free from obstructions that would prevent its use, including the accumulation of snow and ice.

1031.6: … Furnishings, decorations or other objects shall not be placed so as to obstruct exits, access thereto, egress therefrom, or visibility thereof….

Valet waste collection will increase the amount of combustibles in corridors, which can lead to increased fires in corridors. Fires in corridors and the accumulation of combustibles impeding the path of egress through corridors can prevent tenants from safely exiting a building during a fire.

Valet waste will also have an impact on firefighters. Waste and collection containers will interfere with hose lines being pulled along corridors. Additionally, in limited visibility firefighters follow the wall to find their way. Waste and collection containers will create obstructions for firefighters attempting to follow the wall.

The fire code has long protected means of egress and provided for fire safety in buildings. We need to continue to protect means of egress, because when all else goes wrong, people must be able to get out of a building.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
There is no cost impact. The proposal is intended to provide clarification of the section requirements.

F8-21

Public Hearing Results

Committee Action: **As Modified**

Committee Modification:

VALET ~~WASTE~~ TRASH COLLECTION. A service that removes trash or recycling materials placed outside of dwelling units or sleeping units for collection ~~A waste collection service that collects and removes the waste from the doorsteps of tenants~~.

304.1.1 Valet trash ~~Waste.~~ *Valet trash collection* shall only be permitted where *approved.* The *owner* and *valet trash collection* service provider shall comply with the rules and limitations established by the *jurisdiction.* ~~Valet waste collection is prohibited.~~

~~**Exception:** Where *approved* by the *fire code official*.~~

Committee Reason: The approval of this proposal was consistent with the actions taken on F236-21 and F237-21 as modified. The first modification revises the definition to be consistent with the modification to F236-21. The second modification rewords the proposed language to both make the owner responsible and provide the necessary language to give the jurisdiction the authority to allow or prohibit such services. The code is currently silent on the issue and provisions are necessary to address the hazard however is appropriate to the jurisdiction. Generally this proposal is intended to work together with the new appendix proposed by F236-21 and F237-21. (Vote: 13-1)

F8-21

Individual Consideration Agenda

Public Comment 1:

IFC: , 304.1.1

Proponents: Andrew Klein, representing Valet Living (andrew@asklein.com) requests As Modified by Public Comment

Further modify as follows:

2021 International Fire Code

VALET TRASH COLLECTION . ~~A~~ An intermediary service that removes trash or recycling materials placed outside of dwelling units or sleeping units for final collection.

304.1.1 Valet trash . The *fire code official* has the authority to establish a permitting requirement for the operation of *valet trash collection* services.~~*Valet trash collection* shall only be permitted where approved. The *owner* and *valet trash collection* service provider shall comply with the rules and limitations established by the jurisdiction~~.

Commenter's Reason: After two cycles of debate, most code officials now agree that the Code does not prohibit the proven safe practice of valet trash removal from apartment occupancies. Fire inspectors in the field have asked dozens and dozens of times for just one thing: Put something in the Code that we can point to and use to prohibit the practice when it is not being performed safely.
Without a mention of valet trash collection, a jurisdiction that already has any of the 3 million apartment homes with the service will have no way of enforcing rules. as enforcement and adoption of the an appendix are two separate required steps.

Valet trash collection is the most popular and fastest-growing amenity and already in service at more than 15 percent of the nation's apartment homes. This PC provides a fire official with a great deal of authority over a proven low-risk, low-hazard common service that actually improves the fire safety of every building it is in by assuring the nightly removal of trash from the building.

In addition, the language as originally passed at the CAH could be taken as to prohibit regular private trash collection as is commonly thought of at single family homes. This PC fixes the definition of "valet trash collection" to not include traditional trash collection at single family homes.

Furthermore, it is unreasonable for a model code to put the burden of establishing rules and limitations on a jurisdiction. “Jurisdiction,” as used by the code, refers to the adopting body. This gives the fire code official no authority over the rules and limitations that are set forth.

Cost Impact: The net effect of the public comment and code change proposal will not increase or decrease the cost of construction
The net effect of the public comment and code change proposal will not increase or decrease the cost of construction This PC does not affect construction costs, but will have a positive effect on building valuations for resale.

Public Comment# 2716

Public Comment 2:

IFC:

Proponents: William Koffel, representing Affinity Waste Solutions (wkoffel@koffel.com) requests As Modified by Public Comment

Further modify as follows:

2021 International Fire Code

VALET TRASH COLLECTION . ~~A~~ <u>An intermediary </u>service that removes trash or recycling materials placed outside of dwelling units or sleeping units for <u>final </u>collection.

Commenter's Reason: The language as originally passed at the CAH could be taken as to prohibit regular private trash collection as is commonly thought of at single family homes. The Public Comment fixes the definition of "valet trash collection" to not include traditional trash collection at single family homes.

Cost Impact: The net effect of the public comment and code change proposal will not increase or decrease the cost of construction
The Public Comment simply modifies the definition approved during the CAH.

Public Comment# 2995

Public Comment 3:

Proponents: John Catlett, representing BOMA International (catlettcodeconsulting@gmail.com) requests Disapprove

Commenter's Reason: This proposal should have been vetted by the FCAC along with the other valet trash proposals, which received a year of consideration and debate before submission. It was not and was then the subject of specious testimony at the CAH. It will create what will practically be a ban on this legitimate business activity which occurs now in more than 15 percent of all apartment homes, is the most popular and fastest growing amenity in the industry and has never produced a single reported life-safety incident in 25 years of existence.
Door-step trash service also provides significant net operating income for apartment owners, having resulted to date in $10 billion of asset value creation nationwide. Allowing local fire officials to ban such a service would have an unintended deleterious effect on values and, as such, on their very own budgets. On average, a single valet trash building increases a taxable valuation of the property by $853,370.

In Riverside County, Calif., for instance, banning the service in just one building would cost their budget $8,107. In Lakewood, Colo., losing one valet trash building would cost $4,694 to the city budget in lost property taxes. Losing one building In Wayne County, Mich., would cost $20,054.
Please disapprove this proposal and send it back to the FCAC for a proper vetting for the next cycle.

Cost Impact: The net effect of the public comment and code change proposal will not increase or decrease the cost of construction
No change to code.

Public Comment# 2860

Public Comment 4:

Proponents: William Koffel, representing National Valet Trash and Recycling Valet Trash Association (wkoffel@koffel.com); Andrew Klein, representing Valet Living (andrew@asklein.com) requests Disapprove

Commenter's Reason: The intent of F8-21 is to restrict a viable business model that is currently operating without adverse fire experience for over 25 years. It should be noted that there are inconsistencies within the Reason Statement for F8-21 that need to be addressed.
"Valet waste collection services allow tenants.......to place their trash and recyclables in the corridor...." It should be noted that nothing in the Code prohibits trash and recyclables being placed in a corridor today, with or without valet waste collection services. With the impact of COVID-19, many hotels have asked guests to place their trash in the corridor so that housekeeping does not need to enter the guest room. There are no restrictions on the construction or integrity of the containers unless the containers exceed 40 gallons or are in specific occupancies address in Section 808. Even before COVID-19, I would see trash placed outside the doors of hotel rooms and timeshare units by occupants who did not want the trash in their room or were too lazy to carry the trash to the trash collection room.

"Valet waste collection will increase the amount of combustibles in corridors...." While a true statement, what is the increase in risk? The limitation on container size along with the removal of the combustibles from the corridor present less of a risk than what can commonly be found in corridors without restriction (upholstered furniture, ash receptacles, etc). The provisions that have been put forth by the industry and the FCAC all require that the required egress width be maintained which means the combustibles themselves will not be an impediment to egress.

The above argument also totally ignores the amount of combustibles within the dwelling unit which is where most fatal fires originate. Is it possible that the convenience of valet waste services will reduce the combustible load within dwelling units, encourage people to more quickly dispense of trash and waste (due to the limited container size), and therefore reduce the risk to occupants within a dwelling unit?

"Valet waste will also have an impact on firefighters." Having fire service experience, I have dealt with fire scenarios in which items are in the corridor. Yes, I too received training to "follow the wall." However, what about other items that are permitted to be in the corridor that also would not allow me to maintain constant contact with the wall?

This issue has been put before the legislature in several states, and generally the legislatures have approved valet trash collection. Do we really want the state legislatures to make these decisions and write the requirements or will everyone be better served to have fire protection professionals write a reasonable set of requirements that address all the issues? The Committee approved as modified F236-21 and F237-21 as a new Appendix O. The Code would be inconsistent to then also include a restriction on valet trash collection and require the industry to approach each and every jurisdiction to gain approval.

Cost Impact: The net effect of the public comment and code change proposal will not increase or decrease the cost of construction
While the cost of construction will not be impacted the market value of properties will be impacted significantly by the Public Comment (favorably) and by the Code Change Proposal (negatively).

Public Comment# 2896

F9-21

Proposed Change as Submitted

Proponents: Tim Earl, representing GBH International (tearl@gbhinternational.com)

2021 International Fire Code

Revise as follows:

304.3 Containers. ~~Combustible~~ Containers for combustible rubbish and waste material ~~kept~~ located within or near a structure shall ~~be stored in accordance~~ comply with Sections 304.3.1 through 304.3. 7~~4~~.

Add new text as follows:

304.3.2 Low heat release materials.
Where required by this section, low heat release materials shall exhibit a peak rate of heat release not exceeding 300 kW/m2 where tested in accordance with ASTM E1354 at an incident heat flux of 50 kW/m2 in the horizontal orientation.

Revise as follows:

~~**304.3.2**~~ **304.3.3 Capacity exceeding 5.33 cubic feet.** Containers with a capacity exceeding 5.33 cubic feet (40 gallons) (0.15 m^3) shall be provided with lids. Containers and lids shall be constructed of noncombustible materials or low heat release materials in accordance with Section 304.3.2. ~~of combustible materials with a peak rate of heat release not exceeding 300 kW/m2 where tested in accordance with ASTM E1354 at an incident heat flux of 50 kW/m2 in the horizontal orientation.~~

~~**Exception:** Wastebaskets complying with Section 808.~~

304.3.4 Capacity of 1 cubic yard or more. Dumpsters with an individual capacity of 1.0 cubic yard [200 gallons (0.76 m^3)] or more shall not be stored in buildings or placed within 5 feet (1524 mm) of combustible walls, openings or combustible roof eave lines unless the dumpsters are constructed of noncombustible materials or low heat release materials in accordance with Section 304.3.2.~~of combustible materials with a peak rate of heat release not exceeding 300 kW/m2 where tested in accordance with ASTM E1354 at an incident heat flux of 50 kW/m2 in the horizontal orientation.~~

Exceptions:

1. Dumpsters in areas protected by an *approved automatic sprinkler system* installed throughout in accordance with Section 903.3.1.1, 903.3.1.2 or 903.3.1.3.
2. Storage in a structure shall not be prohibited where the structure is of Type I or IIA construction, located not less than 10 feet (3048 mm) from other buildings and used exclusively for dumpster or container storage.

~~**304.3.3**~~ **304.3.5 Capacity exceeding 1.5 cubic yards.** Dumpsters and containers with an individual capacity of 1.5 cubic yards [40.5 cubic feet (1.15 m^3)] or more shall not be stored in buildings or placed within 5 feet (1524 mm) of combustible walls, openings or combustible roof eave lines.

Exceptions:

1. Dumpsters or containers that are placed inside buildings in areas protected by an *approved automatic sprinkler system* installed throughout in accordance with Section 903.3.1.1, 903.3.1.2 or 903.3.1.3.
2. Storage in a structure shall not be prohibited where the structure is of Type I or IIA construction, located not less than 10 feet (3048 mm) from other buildings and used exclusively for dumpster or container storage.
3. Dumpsters or containers that are located adjacent to buildings where the exterior area is protected by an *approved automatic sprinkler system*.

Add new text as follows:

304.3.6 Waste and linen containers in Group I-1, I-2, and I-3 occupancies and Group B ambulatory care facilities.
Waste and linen containers located in Group I-1, I-2 and I-3 occupancies and Group B ambulatory care facilities shall be constructed of noncombustible materials or low heat release materials in accordance with Section 304.3.2. Metal wastebaskets and other metal waste containers with a capacity of 20 gallons (75.7 L) or more shall be listed in accordance with UL 1315 and shall be provided with a noncombustible lid. Portable containers exceeding 32 gallons(121 L) shall be stored in an area classified as a waste and linen collection room and constructed in accordance with Table 509 of the International Building Code.

Exception: Recycling containers complying with Section 304.3.6.2 are not required to be stored in waste and linen collection rooms.

304.3.6.1 Capacity Density.
The average capacity density of containers located in an individual room or space, other than waste and linen collection rooms, shall not be greater than 0.5 gal/ft^2 (20.4 L/m^2).

304.3.6.2 Recycling clean waste containers.
Recycling clean waste containers, including their lids, shall not exceed an individual capacity of 96 gallons (363 L).

304.3.7 Waste containers with a capacity of 20 gallons or more in Group R-2 college and university dormitories.
Waste containers, including their lids, located in Group R-2 college and university dormitories, and with a capacity of 20gallons (75.7 L) or more, shall be constructed of noncombustible materials or low heat release materials in accordance with Section 304.3.2. Metal wastebaskets and other metal waste containers with a capacity of 20 gallons (75.7 L) or more shall be listed in accordance with UL 1315 and shall be provided with a noncombustible lid. Portable containers exceeding 32 gallons (121 L) shall be stored in an area classified as a waste and linen collection room constructed in accordance with Table 509 of the International Building Code.

Revise as follows:

808.1 ~~Wastebaskets and l~~ Linen containers in Group I-1, I-2 and I-3 occupancies and Group B ambulatory care facilities. ~~Wastebaskets, l~~ Linen containers ~~and other waste containers, including their lids,~~ located in Group I-1, I-2 and I-3 occupancies and Group B ambulatory care facilities shall comply with Section 304.3.6 ~~be constructed of noncombustible materials or of materials that meet a peak rate of heat release not exceeding 300 kW/m^2 when tested in accordance with ASTM E1354 at an incident heat flux of 50 kW/m^2 in the horizontal orientation. Metal wastebaskets and other metal waste containers with a capacity of 20 gallons (75.7 L) or more shall be *listed* in accordance with UL 1315 and shall be provided with a noncombustible lid. Portable containers exceeding 32 gallons (121 L) shall be stored in an area classified as a waste and linen collection room and constructed in accordance with Table 509.1 of the International Building Code~~.

> ~~**Exception:** Recycling containers complying with Section 808.1.2 are not required to be stored in waste and linen collection rooms.~~

Delete without substitution:

~~**808.1.1 Capacity density.**~~
~~The average capacity density of containers located in an individual room or space, other than waste and linen collection rooms, shall not be greater than 0.5 gal/ft^2 (20.4 L/m^2).~~

~~**808.1.2 Recycling clean waste containers.**~~
~~Recycling clean waste containers, including their lids, shall not exceed an individual capacity of 96 gallons (363 L).~~

~~**808.2 Waste containers with a capacity of 20 gallons or more in Group R-2 college and university dormitories.** Waste containers, including their lids, located in Group R-2 college and university dormitories, and with a capacity of 20 gallons (75.7 L) or more, shall be constructed of noncombustible materials or of materials that meet a peak rate of heat release not exceeding 300 kW/m^2 when tested in accordance with ASTM E1354 at an incident heat flux of 50 kW/m^2 in the horizontal orientation. Metal wastebaskets and other metal waste containers with a capacity of 20 gallons (75.7 L) or more shall be *listed* in accordance with UL 1315 and shall be provided with a noncombustible lid. Portable containers exceeding 32 gallons (121 L) shall be stored in an area classified as a waste and linen collection room constructed in accordance with Table 509.1 of the International Building Code.~~

Reason: The intent of this proposal is to clean up the requirements for waste containers and make them easier for users to find.
Specifically:

- It eliminates some duplication between sections 304 and 808.
- It places all requirements for waste containers in Chapter 3, where they belong. When asked, code officials told me they wouldn't go looking for waste container requirements in the chapter on Interior Finish, Decorative Materials, and Furnishings. (Waste containers are none of those things). One code official stated that they didn't even know there were waste container requirements in Chapter 8.
- The heat release requirements are restated several times in different places, so I created a new label (low heat release materials) and then reference it in where applicable.
- 304 was reordered in size order, since the current language goes from small to large to medium.
- A pointer was left in 808 for linen containers, since they're not really waste containers.

Again, there are no technical changes in this proposal. It is a reorganization to make the code more user friendly. The intent is to bring more visibility to these requirements, which are often overlooked.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This is a reorganization of information with no impact on cost.

F9-21

Public Hearing Results

Committee Action: **As Submitted**

Committee Reason: The committee stated that the reason for approval was that it makes sense to locate and consolidate these requirements in Chapter 3 and the improvement of having the test specifications in one section that can be pointed to. (Vote: 12-2)

F9-21

Individual Consideration Agenda

Public Comment 1:

IFC: 304.3.6, 304.3.6.1, 304.3.6.2, 304.3.7, 808.1

Proponents: John Williams, representing Healthcare Committee (ahc@iccsafe.org) requests As Modified by Public Comment

Modify as follows:

2021 International Fire Code

304.3.6 Waste and linen containers in Group I-1, I-2, and I-3 occupancies and ~~Group B~~ ambulatory care facilities . Waste and linen containers located in Group I-1, I-2 and I-3 occupancies and ~~Group B~~ ambulatory care facilities shall be constructed of noncombustible materials or low heat release materials in accordance with Section 304.3.2. Metal ~~wastebaskets and other metal~~ waste containers with a capacity of 20 gallons (75.7 L) or more shall be listed in accordance with UL 1315 and shall be provided with a noncombustible lid. Portable waste and linen containers exceeding 32 gallons(121 L) shall be stored in an area classified as a waste and linen collection room and constructed in accordance with Table 509 of the International Building Code.

> **Exception:** Recycling clean waste containers complying with Section 304.3.6.2 are not required to be stored in waste and linen collection rooms.

304.3.6.1 Capacity Density . The average capacity density of containers located in an individual room or space, other than waste and linen collection rooms, shall not be greater than 0.5 gal/ft^2 (20.4 L/m^2).

304.3.6.2 Recycling clean waste containers . Recycling clean waste containers, including their lids, shall not exceed an individual capacity of 96 gallons (363 L).

304.3.7 Waste containers with a capacity of 20 gallons or more in Group R-2 college and university dormitories . Waste containers, including their lids, located in Group R-2 college and university dormitories, and with a capacity of 20gallons (75.7 L) or more, shall be constructed of noncombustible materials or low heat release materials in accordance with Section 304.3.2. Metal ~~wastebaskets and other metal~~ waste containers with a capacity of 20 gallons (75.7 L) or more shall be listed in accordance with UL 1315 and shall be provided with a noncombustible lid. Portable waste containers exceeding 32 gallons (121 L) shall be stored in an area classified as a waste ~~and linen~~ collection room constructed in accordance with Table 509 of the International Building Code.

808.1 Waste and linen ~~Linen~~ containers in Group I-1, I-2 and I-3 occupancies and ~~Group B~~ ambulatory care facilities . Waste and linen ~~Linen~~ containers located in Group I-1, I-2 and I-3 occupancies and ~~Group B~~ ambulatory care facilities shall comply with Section 304.3.6 .

Commenter's Reason: In Section 808.1, the proposal removed the requirement for waste containers in this pointer. The Healthcare committee does not object to the move, but both types of containers need to remain to match federal licensure requirements.
This modifications also provides for consistent language throughout this section. The current text uses containers and wastebaskets – which leads to the question if there is a difference intended. In Section 304.3.7, there are no requirements for linen collections. Removing 'Group B' in the text is consistent with G3-21 which was approved for IBC, IFC, IPC and IMC. When this item was first introduced to the codes, it was believed that it was needed to add 'Group B' in front of the term. This proposal removes it as no longer necessary, and will make this consistent with the numerous other locations throughout the codes where 'Group B' in not included. The intent is to not appear to have two different types of 'ambulatory care facilities'.

This public comment is submitted by the Committee on Healthcare (CHC).

The CHC was established by the ICC Board to evaluate and assess contemporary code issues relating to healthcare facilities. This is a joint effort between ICC and the American Society for Healthcare Engineering (ASHE), a subsidiary of the American Hospital Association, to eliminate duplication and conflicts in healthcare regulation. In 2020 and 2021 the CHC held several virtual meeting, which included members of the committees as well as any interested parties, to discuss and debate the proposed changes. Information on the CHC, including: meeting agendas; minutes; reports; resource documents; presentations; and all other materials developed in conjunction with the CHC effort can be downloaded from the CHC website at CHC.

Cost Impact: The net effect of the public comment and code change proposal will not increase or decrease the cost of construction
This is a reorganization of information with no impact on cost.

Public Comment# 2614

F12-21

Proposed Change as Submitted

Proponents: Jonathan Roberts, representing UL LLC (jonathan.roberts@ul.com)

2021 International Fire Code

Revise as follows:

309.2 ~~**Use in hazardous (classified) locations**~~ **Listing.** Fuel powered industrial trucks shall be *listed* in accordance with UL 558. Electric battery-powered industrial trucks shall be *listed* in accordance with UL 583. Powered industrial trucks used in areas designated as hazardous (classified) locations in accordance with NFPA 70 shall be *listed* and *labeled* for use in the environment intended in accordance with NFPA 505.

Add new standard(s) as follows:

UL

Underwriters Laboratories LLC
333 Pfingsten Road
Northbrook, IL 60062

558-2012	Standard for Industrial Trucks, Internal Combustion Engine-Powered
583-2012	Electric-Battery-Powered Industrial Trucks

Reason: This proposal adds a listing requirement for industrial trucks to ensure equipment used and regulated by the IFC is evaluated for safety in accordance with published standards. This would be consistent with OSHA requirements. There are many industrial trucks currently certified (listed) under both proposed new reference standards.

Cost Impact: The code change proposal will increase the cost of construction
The proposal has the potential to increase the cost of powered industrial trucks, although many of these are already listed in accordance with the standards referenced.

Staff Analysis: A review of the following standards proposed for inclusion in the code, with regard to some of the key ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before March 20, 2021.

- UL 558-2012: Standard for Industrial Trucks, Internal Combustion Engine-Powered
- UL 583-2012: Electric-Battery-Powered Industrial Trucks

F12-21

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The committee stated that the reasons for disapproval were the specifics of this section are for hazardous locations and by adding in criteria that is just generic is inappropriate for this to go in this location and in addition the current referenced standard NFPA 505 lists NFPA 583 and NFPA 558 as reference standards within it so it would be redundant to add them. (Vote: 12-1)

F12-21

Individual Consideration Agenda

Public Comment 1:

IFC: 309.2,

Proponents: Jonathan Roberts, representing UL LLC (jonathan.roberts@ul.com) requests As Modified by Public Comment

Modify as follows:

2021 International Fire Code

309.2 Listing . ~~Fuel powered~~ Powered industrial trucks ~~shall be *listed* in accordance with UL 558. Electric battery-powered industrial trucks shall be *listed* in accordance with UL 583. Powered industrial trucks used in areas designated as hazardous (classified) locations in accordance with NFPA 70~~ shall be *listed* and *labeled* for use in the environment intended in accordance with NFPA 505.

,

~~558-2012~~	~~Standard for Industrial Trucks, Internal Combustion Engine-Powered~~

,

~~583-2012~~	~~Electric-Battery-Powered Industrial Trucks~~

Commenter's Reason: Regardless of where used, powered industrial trucks should be listed and labeled for use in the environment intended in accordance with NFPA 505. The scope of NFPA 505 is for all environments. The standards UL 558 and UL 583 are included within NFPA 505, and address the associated hazards for both internal combustion engine powered (such as LP gas, gasoline, diesel, and CNG) and electric battery powered (such as lithium ion)

Cost Impact: The net effect of the public comment and code change proposal will not increase or decrease the cost of construction
This NFPA standard is already in use so there will be no cost impact.

Public Comment# 2687

F15-21 Part I

Proposed Change as Submitted

Proponents: Michael O'Brian, representing FCAC (fcac@iccsafe.org); Mike Nugent, Chair, representing ICC Building Code Action Committee (bcac@iccsafe.org)

THIS IS A TWO PART CODE CHANGE. PART 1 WILL BE HEARD BY THE FIRE CODE COMMITTEE AND PART 2 WILL BE HEARD BY THE INTERNATIONAL BUILDING CODE FIRE SAFETY COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THESE COMMITTEES

2021 International Fire Code

Add new definition as follows:

LANDSCAPED ROOF. An area on a roof incorporating planters, vegetation, hardscaping, or other similar decorative appurtenances that are not part of a roof assembly.

VEGETATIVE ROOF. A roof assembly of interacting components designed to waterproof a building's top surface that includes, by design, vegetation and related landscape elements.

Revise as follows:

SECTION 317
VEGETATIVE ~~LANDSCAPED~~ ROOFS

317.1 General. Vegetative ~~Landscaped~~ roofs shall comply with ~~be installed and maintained in accordance with Sections 317.2 through 317.5 and~~ Sections 1505 and 1507.15 of the International Building Code and be installed and maintained in accordance with Sections 317,2 through 317.5.

317.2 Vegetative ~~Landscaped~~ roof size. Vegetative ~~Landscaped~~ roof areas shall not exceed 15,625 square feet (1450 m^2) in size for any single area with a maximum dimension of 125 feet (39 m) in length or width. A minimum 6-foot-wide (1.8 m) clearance consisting of a *listed* Class A roof assembly tested in accordance with ASTM E108 or UL 790 shall be provided between adjacent vegetative ~~landscaped~~ roof areas.

317.4.3 Maintenance plan. The *fire code official* is authorized to require a maintenance plan for vegetation placed on roofs due to the size of a vegetative ~~landscaped~~ roof, materials used or where a fire hazard exists to the building or exposures due to the lack of maintenance.

905.3.8 Landscaped or vegetative roofs. Buildings or structures that have landscaped or vegetative roofs and that are equipped with a standpipe system shall have the standpipe system extended to the roof level on which the landscaped or vegetative roof is located.

504.3 Stairway access to roof. New buildings four or more stories above grade plane, except those with a roof slope greater than four units vertical in 12 units horizontal (33.3-percent slope), shall be provided with a *stairway* to the roof. *Stairway* access to the roof shall be in accordance with Section 1011.12. Such *stairway* shall be marked at street and floor levels with a sign indicating that the *stairway* continues to the roof. Where roofs are used for landscaped roofs , vegetative roofs or for other purposes, stairways shall be provided as required for such occupancy classification.

Reason: This is an editorial proposal covering both the IFC and the IBC to consistently use the term “vegetative roof”.
The term “landscaped roofs” has been used by the public interchangeably with “vegetative roofs”. This has created confusion in the building code and conflicts with industry standards that have coalesced around the term “vegetative roof”. . Moreover, some of the sections presently identified as “landscaped roofs” should refer to “vegetative roofs” as they really addresses roofs that are part of the building envelope and, thus, are associated with the existing definition of “vegetative roofs”. In these locations, the code is revised to properly use “vegetative roof”. In other places, both terms are retained as the language could apply either to a vegetative roof where the membrane, growth medium and vegetation are incorporated as part of the roof assembly, or a landscaped roof where planters, hardscapes, or other features are provided above the roof assembly and not integrated into it. A definition for “landscaped roof” is proposed to capture such features and better distinguish between a true “vegetative roof” as defined in the IBC and industry standards.

Neither the IFC nor the IBC define the term “landscaped roof”, but the IBC does contain a definition for the term “vegetative roofs” that reads as follows.

[BS] VEGETATIVE ROOF. *An assembly of interacting components designed to waterproof a building's top surface that includes, by design, vegetation and related landscape elements.*

This proposal also copies the existing definition from the IBC to the IFC.

This proposal is submitted by the ICC Fire Code Action Committee (FCAC) and the ICC Building Code Action Committee (BCAC).

BCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2020 the BCAC has held several virtual meetings open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the BCAC website at BCAC.

The FCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance assigned International Codes with regard to fire and life safety in new and existing buildings and facilities as well as the protection of life and property in wildland urban interface areas. In 2020 and 2021 the Fire-CAC held multiple virtual meetings that were open to any interested party. In addition, there were numerous virtual specific working group meetings that were also open to any interested parties, to develop, discuss and debate the proposed changes. Related documentation and reports are posted on the FCAC website at: FCAC.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The proposal is editorial and will not impact how vegetative and landscaped roofs are designed and constructed.

F15-21 Part I

Public Hearing Results

Committee Action: **As Submitted**

Committee Reason: The committee stated that the reasons for approval were that it cleans up the language and makes it consistent and the previous action on Part II by the IBC FS committee. (Vote 14-0)

F15-21 Part I

Individual Consideration Agenda

Public Comment 1:

IFC: SECTION 202, SECTION 317, 317.1, 317.2, 317.4.3, 905.3.8, 504.3

Proponents: Chadwick Collins, representing Protected Membrane Roofing Institute (ccollins@kellencompany.com); John Woestman, representing Extruded Polystyrene Foam Association (XPSA) (jwoestman@kellencompany.com) requests As Modified by Public Comment

Modify as follows:

2021 International Fire Code

LANDSCAPED ROOF . An area ~~on~~ over a roof assembly incorporating planters, vegetation, hardscaping, or other similar decorative appurtenances that are not part of ~~a~~ the roof assembly.

VEGETATIVE ROOF . A roof assembly of interacting components designed to waterproof a building's top surface that includes, by design, ~~vegetation and related landscape elements.~~ a vegetative surface.

SECTION 317
VEGETATIVE AND LANDSCAPED ROOFS

317.1 General . Vegetative roofs and landscaped roofs shall comply with Sections 1505 and 1507.15 of the International Building Code and be installed and maintained in accordance with Sections 317.2 through 317.5.

317.2 Vegetative roof and Landscaped roof size . Vegetative roof or landscaped roof areas shall not exceed 15,625 square feet (1450 m^2) in size for any single area with a maximum dimension of 125 feet (39 m) in length or width. A minimum 6-foot-wide (1.8 m) clearance consisting of a *listed* Class A roof assembly tested in accordance with ASTM E108 or UL 790 shall be provided between adjacent vegetative roof and landscaped roof areas.

317.4.3 Maintenance plan . The *fire code official* is authorized to require a maintenance plan for vegetation placed on roofs due to the size of a vegetative roof or landscaped roof area, materials used or where a fire hazard exists to the building or exposures due to the lack of maintenance.

905.3.8 ~~Landscaped or vegetative roofs~~ Vegetative roof and Landscaped roof standpipe systems . Buildings or structures that have landscaped roofs or vegetative roofs and that are equipped with a standpipe system shall have the standpipe system extended to the roof level on which the landscaped roof or vegetative roof is located.

504.3 Stairway access to roof . New buildings four or more stories above grade plane, except those with a roof slope greater than four units vertical in 12 units horizontal (33.3-percent slope), shall be provided with a *stairway* to the roof. *Stairway* access to the roof shall be in accordance with Section 1011.12. Such *stairway* shall be marked at street and floor levels with a sign indicating that the *stairway* continues to the roof. Where ~~roofs are used for landscaped roofs, vegetative roofs or~~ the roof is a vegetative roof, includes a landscaped roof area, or is used for other purposes, stairways shall be provided as required for such occupancy classification.

Commenter's Reason: This public comment adds clarity to the definitions in the original proposal. The original definitions contradicted themselves by saying that a Landscape Roof was not part of a roof assembly only to have the Vegetative Roof definition included it as part of its assembly. This clarifies the intent of the proposal and will prevent interpretation issues in the field.
Coordinating terminology changes were made to the subsequent sections to appropriately include Vegetative Roofs and Landscaped Roofs and avoid any further misinterpretations.

This proposal coordinates with F15 part 2.

Cost Impact: The net effect of the public comment and code change proposal will increase the cost of construction
The changes made in the original proposal and public comment do not affect the cost of construction. The modifications only clarifies the intent of the language.

Public Comment# 2332

F15-21 Part II

Proposed Change as Submitted

Proponents: Michael O'Brian, representing FCAC (fcac@iccsafe.org); Mike Nugent, Chair, representing ICC Building Code Action Committee (bcac@iccsafe.org)

2021 International Building Code

Add new definition as follows:

LANDSCAPED ROOF. An area on a roof incorporating planters, vegetation, hardscaping, or other similar decorative appurtenances that are not part of a roof assembly.

Revise as follows:

[BS] VEGETATIVE ROOF. A roof ~~An~~ assembly of interacting components designed to waterproof a building's top surface that includes, by design, vegetation and related landscape elements.

[BF] 1505.10 Vegetative ~~Landscaped~~ roofs. Vegetative ~~Landscaped~~ roofs shall comply with Sections 1505.1 and 1507.15 and shall be installed in accordance with ANSI/SPRI VF-1.

[BF] 1507.15.1 Structural fire resistance. The structural frame and roof construction supporting the load imposed on the roof by the *vegetative roof* or landscaped roofs shall comply with the fire resistance rating requirements of Table 601.

Reason: This is an editorial proposal covering both the IFC and the IBC to consistently use the term "vegetative roof".
The term "landscaped roofs" has been used by the public interchangeably with "vegetative roofs". This has created confusion in the building code and conflicts with industry standards that have coalesced around the term "vegetative roof". . Moreover, some of the sections presently identified as "landscaped roofs" should refer to "vegetative roofs" as they really addresses roofs that are part of the building envelope and, thus, are associated with the existing definition of "vegetative roofs". In these locations, the code is revised to properly use "vegetative roof". In other places, both terms are retained as the language could apply either to a vegetative roof where the membrane, growth medium and vegetation are incorporated as part of the roof assembly, or a landscaped roof where planters, hardscapes, or other features are provided above the roof assembly and not integrated into it. A definition for "landscaped roof" is proposed to capture such features and better distinguish between a true "vegetative roof" as defined in the IBC and industry standards.

Neither the IFC nor the IBC define the term "landscaped roof", but the IBC does contain a definition for the term "vegetative roofs" that reads as follows.

[BS] VEGETATIVE ROOF. *An assembly of interacting components designed to waterproof a building's top surface that includes, by design, vegetation and related landscape elements.*

This proposal also copies the existing definition from the IBC to the IFC.

This proposal is submitted by the ICC Fire Code Action Committee (FCAC) and the ICC Building Code Action Committee (BCAC).

BCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2020 the BCAC has held several virtual meetings open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the BCAC website at BCAC.

The FCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance assigned International Codes with regard to fire and life safety in new and existing buildings and facilities as well as the protection of life and property in wildland urban interface areas. In 2020 and 2021 the Fire-CAC held multiple virtual meetings that were open to any interested party. In addition, there were numerous virtual specific working group meetings that were also open to any interested parties, to develop, discuss and debate the proposed changes. Related documentation and reports are posted on the FCAC website at: FCAC.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The proposal is editorial and will not impact how vegetative and landscaped roofs are designed and constructed.

F15-21 Part II

Public Hearing Results

Committee Action: **As Submitted**

Committee Reason: The committee concluded the proposal coordinates the proper terminology. The proposal covers both the IFC and the IBC to use the term "vegetative roof" consistently". (Vote: 13-0)

F15-21 Part II

Individual Consideration Agenda

Public Comment 1:

IBC: SECTION 202

Proponents: Chadwick Collins, representing Protected Membrane Roofing Institute (ccollins@kellencompany.com); John Woestman, representing Extruded Polystyrene Foam Association (jwoestman@kellencompany.com) requests As Modified by Public Comment

Modify as follows:

2021 International Building Code

LANDSCAPED ROOF . An area ~~on~~ over a roof assembly incorporating planters, vegetation, hardscaping, or other similar decorative appurtenances that are not part of ~~a~~ the roof assembly.

[BS] VEGETATIVE ROOF . A roof assembly of interacting components designed to waterproof a building's top surface that includes, by design, ~~vegetation and related landscape elements.~~ a vegetative surface.

Commenter's Reason: This public comment adds clarity to the definitions in the original proposal. The original definitions contradicted themselves by saying that a Landscape Roof was not part of a roof assembly only to have the Vegetative Roof definition included it as part of its assembly. This clarifies the intent of the proposal and will prevent interpretation issues in the field.
This proposal coordinates with F15 part 1.

Cost Impact: The net effect of the public comment and code change proposal will increase the cost of construction
The changes made in the original proposal and public comment do not affect the cost of construction. The modifications only clarify the intent of the language.

Public Comment# 2763

Public Comment 2:

IBC: [BF] 1505.10

Proponents: Marcelo Hirschler, representing self (mmh@gbhint.com); Michael O'Brian, representing FCAC (fcac@iccsafe.org); Mike Nugent, representing ICC Building Code Action Committee (bcac@iccsafe.org) requests As Modified by Public Comment

Modify as follows:

2021 International Building Code

[BF] 1505.10 ~~Vegetative~~ Landscaped and vegetative roofs . ~~Vegetative~~ Landscaped and vegetative roofs shall comply with Sections 1505.1 and 1507.15 . Vegetative roofs ~~and~~ shall be installed in accordance with ANSI/SPRI VF-1.

Commenter's Reason: Proposal F16 Part II was approved as submitted and contains the language proposed in this public comment for section 1505.10. The language in F16 part II is the correct one because the fire test needs to apply to all types of roofs (and that is covered by 1505.1 and 1507.16) while the SPRI standard covers installation but only for vegetative roofs.

Cost Impact: The net effect of the public comment and code change proposal will not increase or decrease the cost of construction
This is still editorial and corrects an error in the original proposal.

F18-21

Proposed Change as Submitted

Proponents: Michael O'Brian, representing FCAC (fcac@iccsafe.org)

2021 International Fire Code

Revise as follows:

105.5.32 Mobile food preparation vehicles. An operational permit is required for mobile food preparation vehicles equipped with appliances that produce smoke or grease-laden vapors.

319.1 General. Mobile food preparation vehicles that are equipped with appliances that produce smoke or grease-laden vapors for the purpose of preparing, cooking, or serving food shall comply with NFPA 96 and this section. Indoor use of mobile food preparation vehicles is prohibited unless approved by the fire code official.

319.2 Permit required. Permits shall be required as set forth in Section 105.5.

319.3 Exhaust hood. Cooking equipment that produces grease-laden vapors shall be provided with a kitchen exhaust hood constructed in accordance with Section 606.

319.4 ~~Fire protection.~~ Maintenance. ~~Fire protection shall be provided in accordance with Sections 319.4.1 and 319.4.2.~~
Maintenance of systems on mobile food preparation vehicles shall be in accordance with Sections 319.4.1 through 319.4.3.

319.4.1 ~~Fire protection for cooking equipment~~ Exhaust System. ~~Cooking equipment shall be protected by automatic fire-extinguishing systems in accordance with Section 904.13.~~
The exhaust system, including hood, grease-removal devices, fans, ducts, and other appurtenances, shall be inspected and cleaned in accordance with NFPA 96.

319.4.2 ~~Fire extinguisher~~ Fire protection systems and devices. ~~Portable fire extinguishers shall be provided in accordance with Section 906.4.~~
Fire protection systems and devices shall be maintained in accordance with Section 901.6.

319.4.3 Fuel gas systems. Fuel gas systems shall be maintained in accordance with 319.4.3.1 through 319.4.3.4.

319.4.3.1 LP-gas systems. LP-gas containers installed on the vehicle and fuel gas piping systems shall be inspected annually by an approved inspection agency, person or special expert who is qualified to ensure that system components are free from damage, suitable for the intended service and not subject to leaking.

319.4.3.2 CNG systems. CNG containers and fuel gas piping systems shall be inspected annually by an approved inspection agency, person or special expert who is qualified to ensure that system components are free from damage, suitable for the intended service and not subject to leaking.

319.4.3.3 Annual leakage test. All fuel gas piping systems and appliances shall be checked annually for leakage at the operating pressure of the system using a manometer or pressure gauge. Where leakage is indicated, the gas supply shall be turned off until repairs have been made and the system no longer leaks.

319.4.3.4 Inspection tag. Upon a satisfactory annual inspection, the approved inspection agency, person or special expert shall affix a tag on the fuel gas system or within the vehicle indicating the name of the inspection agency and the date of the satisfactory inspection.

319.5 ~~Appliance connection to fuel supply piping~~ Manual system operation for the automatic fire extinguishing system(s). ~~Gas cooking appliances shall be secured in place and connected to fuel-supply piping with an appliance connector complying with ANSI Z21.69/CSA 6.16. The connector installation shall be configured in accordance with the manufacturer's installation instructions. Movement of appliances shall be limited by restraining devices installed in accordance with the connector and appliance manufacturer's instructions.~~
A manual activation device shall be provided for the automatic fire extinguishing system(s) provided for the cooking appliance(s). The manual activation device shall be unobstructed and in view from the means of egress, located at or near a means of egress from the cooking area, and at a location acceptable to the fire code official. The manual actuation device shall be installed not more than 48 inches (1200 mm) nor less than 42 inches (1067 mm) above the walking surface of the means of egress and shall clearly identify the hazard protected. The manual actuation shall require a maximum force of 40 pounds (178 N) and a maximum movement of 14 inches (356 mm) to actuate the fire suppression system.

~~**319.6 Cooking oil storage containers.** Cooking oil storage containers within mobile food preparation vehicles shall have a maximum aggregate volume not more than 120 gallons (454 L), and shall be stored in such a way as to not be toppled or damaged during transport.~~

~~**319.7 Cooking oil storage tanks.** Cooking oil storage tanks within mobile food preparation vehicles shall comply with Sections 319.7.1 through 319.7.5.2.~~

~~**319.7.1 Metallic storage tanks.** Metallic cooking oil storage tanks shall be *listed* in accordance with UL 80 or UL 142, and shall be installed in accordance with the tank manufacturer's instructions.~~

Delete without substitution:

~~**319.7.2 Nonmetallic storage tanks.**~~
~~Nonmetallic cooking oil storage tanks shall be installed in accordance with the tank manufacturer's instructions and shall comply with both of the following:~~

1. ~~Tanks shall be *listed* for use with cooking oil, including maximum temperature to which the tank will be exposed during use.~~
2. ~~Tank capacity shall not exceed 200 gallons (757 L) per tank.~~

Revise as follows:

~~**319.7.3 Cooking oil storage system components.** Metallic and nonmetallic cooking oil storage system components shall include, but are not limited to, piping, connections, fittings, valves, tubing, hose, pumps, vents and other related components used for the transfer of cooking oil.~~

~~**319.7.4 Design criteria.** The design, fabrication and assembly of system components shall be suitable for the working pressures, temperatures and structural stresses to be encountered by the components.~~

~~**319.7.5 Tank venting.** Normal and emergency venting shall be provided for cooking oil storage tanks.~~

~~**319.7.5.1 Normal vents.** Normal vents shall be located above the maximum normal liquid line, and shall have a minimum effective area not smaller than the largest filling or withdrawal connection. Normal vents are not required to vent to the exterior.~~

~~**319.7.5.2 Emergency vents.** Emergency relief vents shall be located above the maximum normal liquid line, and shall be in the form of a device or devices that will relieve excessive internal pressure caused by an exposure fire. For nonmetallic tanks, the emergency relief vent shall be allowed to be in the form of construction. Emergency vents are not required to discharge to the exterior.~~

~~**319.8 LP-gas systems.** Where LP-gas systems provide fuel for cooking appliances, such systems shall comply with Chapter 61 and Sections 319.8.1 through 319.8.5.~~

~~**319.8.1 Maximum aggregate volume.** The maximum aggregate capacity of LP-gas containers transported on the vehicle and used to fuel cooking appliances only shall not exceed 200 pounds (91 kg) propane capacity.~~

~~**319.8.2 Protection of container.** LP-gas containers installed on the vehicle shall be securely mounted and restrained to prevent movement.~~

~~**319.8.3 LP-gas container construction.** LP-gas containers shall be manufactured in compliance with the requirements of NFPA 58.~~

~~**319.8.4 Protection of system piping.** LP-gas system piping, including valves and fittings, shall be adequately protected to prevent tampering, impact damage, and damage from vibration.~~

~~**319.8.5 LP-gas alarms.** A *listed* LP-gas alarm shall be installed within the vehicle in the vicinity of LP-gas system components, in accordance with the manufacturer's instructions.~~

~~**319.9 CNG systems.** Where CNG systems provide fuel for cooking appliances, such systems shall comply with Sections 319.9.1 through 319.9.4.~~

~~**319.9.1 CNG containers supplying only cooking fuel.** CNG containers installed solely to provide fuel for cooking purposes shall be in accordance with Sections 319.9.1.1 through 319.9.1.3.~~

~~**319.9.1.1 Maximum aggregate volume.** The maximum aggregate capacity of CNG containers transported on the vehicle shall not exceed 1,300 pounds (590 kg) water capacity.~~

~~**319.9.1.2 Protection of container.** CNG containers shall be securely mounted and restrained to prevent movement. Containers shall not be installed in locations subject to a direct vehicle impact.~~

~~**319.9.1.3 CNG container construction.** CNG containers shall be an NGV-2 cylinder.~~

~~**319.9.2 CNG containers supplying transportation and cooking fuel.** Where CNG containers and systems are used to supply fuel for cooking purposes in addition to being used for transportation fuel, the installation shall be in accordance with NFPA 52.~~

~~**319.9.3 Protection of system piping.** CNG system piping, including valves and fittings, shall be adequately protected to prevent tampering, impact damage and damage from vibration.~~

~~**319.9.4 Methane alarms.** A *listed* methane gas alarm shall be installed within the vehicle in accordance with manufacturer's instructions.~~

~~**319.10 Maintenance.** Maintenance of systems on mobile food preparation vehicles shall be in accordance with Sections 319.10.1 through 319.10.3.~~

~~**319.10.1 Exhaust system.** The exhaust system, including hood, grease-removal devices, fans, ducts and other appurtenances, shall be inspected and cleaned in accordance with Section 606.3.~~

~~**319.10.2 Fire protection systems and devices.** *Fire protection systems* and devices shall be maintained in accordance with Section 901.6.~~

~~**319.10.3 Fuel gas systems.** LP-gas containers installed on the vehicle and fuel-gas piping systems shall be inspected annually by an *approved* inspection agency or a company that is registered with the US Department of Transportation to requalify LP-gas cylinders, to ensure that system components are free from damage, suitable for the intended service and not subject to leaking. CNG containers shall be inspected every 3 years in a qualified service facility. CNG containers shall not be used past their expiration date as listed on the manufacturer's container label. Upon satisfactory inspection, the *approved* inspection agency shall affix a tag on the fuel gas system or within the vehicle indicating the name of the inspection agency and the date of satisfactory inspection.~~

904.2.2 Commercial hood and duct systems. Each required commercial kitchen exhaust hood and duct system required by Sections 606 <u>and 319</u> to have a Type I hood shall be protected with an *approved* automatic fire-extinguishing system installed in accordance with this code.

904.13.1 Manual system operation. A manual actuation device shall be located at or near a *means of egress* from the cooking area not less than 10 feet (3048 mm) and not more than 20 feet (6096 mm) from the kitchen exhaust system. The manual actuation device shall be installed not more than 48 inches (1200 mm) nor less than 42 inches (1067 mm) above the floor and shall clearly identify the hazard protected. The manual actuation shall require a maximum force of 40 pounds (178 N) and a maximum movement of 14 inches (356 mm) to actuate the fire suppression system.

~~**Exception**~~ <u>**Exceptions**</u>**:**

1. *Automatic sprinkler systems* shall not be required to be equipped with manual actuation means.
2. <u>*Mobile food preparation vehicles* in accordance with Section 319.</u>

906.1 Where required. Portable fire extinguishers shall be installed in all of the following locations:

1. In new and existing Group A, B, E, F, H, I, M, R-1, R-2, R-4<u>,</u> ~~and~~ S occupancies~~.~~ <u>and mobile food preparation vehicles in accordance with Section 319.</u>

   Exceptions:

   1. In Group R-2 occupancies, portable fire extinguishers shall be required only in locations specified in Items 2 through 6 where each dwelling unit is provided with a portable fire extinguisher having a minimum rating of 1-A:10-B:C.
   2. In Group E occupancies, portable fire extinguishers shall be required only in locations specified in Items 2 through 6 where each classroom is provided with a portable fire extinguisher having a minimum rating of 2-A:20-B:C.
   3. In storage areas of Group S occupancies where forklift, powered industrial truck or powered cart operators are the primary occupants, fixed extinguishers, as specified in NFPA 10, shall not be required where in accordance with all of the following:

      3.1. Use of vehicle-mounted extinguishers shall be *approved* by the *fire code official*.

      3.2. Each vehicle shall be equipped with a 10-pound, 40A:80B:C extinguisher affixed to the vehicle using a mounting bracket *approved* by the extinguisher manufacturer or the *fire code official* for vehicular use.

      3.3. Not less than two spare extinguishers of equal or greater rating shall be available on-site to replace a discharged extinguisher.

      3.4. Vehicle operators shall be trained in the proper operation, use and inspection of extinguishers.

      3.5. Inspections of vehicle-mounted extinguishers shall be performed daily.

2. Within 30 feet (9144 mm) distance of travel from commercial cooking equipment and from domestic cooking equipment in Group I-1; I-2, Condition 1; and R-2 college dormitory occupancies.
3. In areas where *flammable* or *combustible liquids* are stored, used or dispensed.
4. On each floor of structures under construction, except Group R-3 occupancies, in accordance with Section 3316.1.
5. Where required by the sections indicated in Table 906.1.
6. Special-hazard areas, including but not limited to laboratories, computer rooms and generator rooms, where required by the *fire code official*.

Exception: Portable fire extinguishers are not required at normally unmanned Group U occupancy buildings or structures where a portable fire extinguisher suitable to the hazard of the location is provided on the vehicle of visiting personnel.

Reason: The overarching application of NFPA 96 to this code section provides for a cohesive and systemic code proposal, clarification and consistency of application. However, specifically with respect to maintenance of the fire protection systems, the 2021 edition of NFPA 96, Sections 12.2.1 and 12.2.1.1 exempts maintenance of the fire protection systems. In order to ensure that maintenance to address the exhaust system is still required, the existing code section for maintenance is retained. Note that the maintenance to address the exhaust system is still referenced from NFPA 96. However, the existing requirement to maintain the fire protection system is retained without change, to ensure that this maintenance

continues. Additionally, details are added to the criteria for maintenance of fuel gas systems, such as the criteria for an annual leakage test. For clarity to the users, the maintenance criteria for fuel gas systems is reformatted into subsections.
The proposal also includes a specific section to address manual system operation of the extinguishing system. The section is modeled after existing IFC Section 904.12. However, in many cases, the expected separation distance from cooking appliances to the manual actuation device will not be in compliance with the 10-20 feet separation criteria found in Section 904.12. As such, the proposal is to eliminate the specific distance criteria and instead provide performance criteria for the device to be unobstructed, in view from the means of egress, and located at or near the means of egress from the cooking area, subject to approval by the fire code official. This type of code language for placement of the manual activation device is similar to how this topic is treated in the 2021 edition of NFPA 96, Section 11.4. The proposal is added to the IFC to clarify how placement of these devices can differ from those of permanent installations within buildings, which are still governed by the overall criteria of IFC Section 904.12. To clarify the intent for the user, an exception is proposed for Section 904.12.1, so that the separation distance of 10-20 feet does not apply to mobile food preparation vehicles.

This proposal is submitted by the ICC Fire Code Action Committee (FCAC). The FCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance assigned International Codes with regard to fire and life safety in new and existing buildings and facilities as well as the protection of life and property in wildland urban interface areas. In 2020 and 2021 the Fire-CAC held multiple virtual meetings that were open to any interested party. In addition, there were numerous virtual specific working group meetings that were also open to any interested parties, to develop, discuss and debate the proposed changes. Related documentation and reports are posted on the FCAC website at: https://www.iccsafe.org/products-and-services/i-codes/code-development/cs/fire-code-action-committee-fcac/

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The code proposal will not have an impact to the cost of construction as the intent of the code change is to provide clarity and consistency of application and enforcement.

F18-21

Public Hearing Results

Committee Action: **As Submitted**

Committee Reason: The committee stated that the reason for approval was that NFPA 96 is the appropriate referenced standard and that committee has the expertise to really address all the issues that were heard in testimony. It was noted to be a very comprehensive standard and the place that the inspectors need to go for all the requirements for these systems. Finally, it was stated that mobile food trucks are very complex, and they are best dealt with now in the standard that involves all the experts for how these systems are designed, installed, operated, maintained and tested. Thus, as stated, the correct pointer is to NFPA 96. (Vote: 9-5)

F18-21

Individual Consideration Agenda

Public Comment 1:

Proponents: Daniel Nichols, representing Metropolitan Transportation Authority, Construction and Development (dnichols@mnr.org) requests Disapprove

Commenter's Reason: The adoption of NFPA 96 to for mobile food vehicles will create much confusion to the users of the IFC. With the adoption, as proposed, significant conflicts will be created between the IFC and what is within the proposed standard. These include:
1. The title of the chapter in NFPA 96 "Additional Provisions for mobile...." indicates the application is the entire document. How are the conflicts between NFPA 96 and the IMC (still proposed to remain by the reference to IFC Section 606) handled?

2. How is the certain electric-only cooking appliances allowed by the IMC permitted to be used without a hood (just like inside a building)?

3. How are transient-style trucks, like lunch and coffee "wagons" handled that travel from site-to-site, when NFPA 96 requires them to be on jacks or otherwise supported?

4. How are small LPG appliances handled since NFPA 96 requires ASME tested tanks instead of common DOT cylinders?

We feel that there is much work to be done on this topic for both technical and permitting prior to the inclusion of NFPA 96. The IFC committee has an established committee of not adopting NFPA 96 as a standard for inspections since it felt that operational and maintenance provisions should be best aligned with the IMC (through Section 606) and the fire-suppression requirements in Section 904.

Cost Impact: The net effect of the public comment and code change proposal will not increase or decrease the cost of construction
This is an operational provision.

Public Comment# 2969

F20-21

Proposed Change as Submitted

Proponents: Daniel Nichols, Metropolitan Transportation Authority, Construction and Development, representing Metropolitan Transportation Authority, Construction and Development (dnichols@mnr.org)

2021 International Fire Code

Revise as follows:

319.3 Exhaust hood. Cooking equipment that produces grease-laden vapors shall be provided with a kitchen exhaust hood in accordance with ~~Section 606~~ the *International Mechanical Code*.

319.4.1 Fire protection for cooking equipment. Cooking equipment required to have a Type I hood shall be protected by automatic fire-extinguishing systems in accordance with Section 904.13.

319.8 ~~319.7.3~~ Cooking oil storage system components. Metallic and nonmetallic cooking oil storage system components shall include, but are not limited to, piping, connections, fittings, valves, tubing, hose, pumps, vents and other related components used for the transfer of cooking oil.

319.8.1 ~~319.7.4~~ Design criteria. The design, fabrication and assembly of system components shall be suitable for the working pressures, temperatures and structural stresses to be encountered by the components.

Reason: The purpose of this code change is to better align the requirements within the section with that of a fixed commercial kitchen; including addressing requirements that are more restrictive.
Exhaust Hood- There is a difference of triggering events between the Fire Code and Mechanical Code on what requires a Type I hood. Under IMC 507, certain light-duty appliances and smokers with integrated exhaust are exempted. This makes the requirements for a mobile food truck more restrictive than a commercial kitchen within a new building.

Fire suppression system- The barometer of the hazard caused by grease laden vapors is dependent on the need for a Type I hood in the IMC, specifically recognized in IMC Section 509. The current language does not take into account the coverage of a Type I hood. Therefore, any vehicle that is regulated by this section is required to have all cooking equipment protected by a fire suppression system, regardless of duty level, output type or hazard.

System Components and Design Criteria- These sections are not part of the "tank" and are only being moved to ensure they are considered separately.

Cost Impact: The code change proposal will decrease the cost of construction
By limiting the applicability of ventilation and fire suppression requirements to that of fixed commercial kitchens, the hazard protection remains comparable while decreasing the cost of building a mobile food truck.

F20-21

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The committee stated that the reasons for disapproval were based on the action on F18-21 and the requirements are already in the code and the proposed language is not necessary. (Vote: 13-1)

F20-21

Individual Consideration Agenda

Public Comment 1:

IFC: 319.3, 319.4.1, 319.8 , 319.8.1

Proponents: Daniel Nichols, representing Metropolitan Transportation Authority, Construction and Development (dnichols@mnr.org) requests As Modified by Public Comment

Modify as follows:

2021 International Fire Code

319.3 Exhaust hood . Cooking equipment that produces grease-laden vapors shall be provided with a kitchen exhaust hood in accordance with ~~the~~ Section 606 . ~~with~~ and the *International Mechanical Code*.

319.4.1 Fire protection for cooking equipment. Cooking equipment required to have a Type I hood by Section 606 shall be protected by automatic fire-extinguishing systems in accordance with Section 904.13.

319.8 Cooking oil storage system components . Metallic and nonmetallic cooking oil storage system components shall include, but are not limited to, piping, connections, fittings, valves, tubing, hose, pumps, vents and other related components used for the transfer of cooking oil.

319.8.1 Design criteria . The design, fabrication and assembly of system components shall be suitable for the working pressures, temperatures and structural stresses to be encountered by the components.

Commenter's Reason: As an alternative to the adoption of NFPA 96 in F18-21, this provides a couple needed improvements to the section. The committee rejected it in favor of F18 but feel the requirements should still remain within the IFC. The original proposal substantiation still applies.

Cost Impact: The net effect of the public comment and code change proposal will not increase or decrease the cost of construction
Operational Issue

Public Comment# 2970

F23-21

Proposed Change as Submitted

Proponents: Marcelo Hirschler, representing self (mmh@gbhint.com)

2021 International Fire Code

Revise as follows:

SECTION 321
~~ARTIFICIAL COMBUSTIBLE VEGETATION~~ COMBUSTIBLES ON ROOFS AND NEAR BUILDINGS

321.1 Artificial combustible vegetation on roofs and near buildings. Artificial combustible vegetation exceeding 6 feet (1829 mm) in height and permanently installed outdoors within 5 feet (1524 mm) of a building or on the roof of a building shall comply with Section 807.4.1. The placement of artificial combustible vegetation shall also comply with Sections 806.3 and 807.4.2.

Exception: Artificial decorative vegetation located more than 30 feet (9144 mm) from the exterior wall of a building.

Add new text as follows:

321.2 Combustible Furniture on Roofs.
Combustible furniture permanently installed on roofs shall comply with any one of the following, unless exempted by Section 321.4:

1. The combustible product shall be constructed entirely of materials that exhibit a flame spread index not exceeding 200, in accordance with Section 803.1, and/or of noncombustible materials.
2. The combustible product shall be constructed entirely of materials that exhibit a peak rate of heat release not exceeding 300 kW/m2 when tested in accordance with ASTM E1354, at an incident heat flux of 50 kW/m2 in the horizontal orientation, and/or of noncombustible materials.
3. The entire combustible product item shall exhibit a maximum rate of heat release not exceeding 100 kW when tested in accordance with NFPA 289 using the 20 kW ignition source.

321.3 Other Combustibles on Roofs.
The requirements of Section 321.2 shall apply also to combustible products permanently installed on roofs if they have either comparable mass or comparable fuel content to that of permanently installed furniture.

321.4 Distance exception.
The requirements of Section 321.2 shall not apply if the combustible product is installed at a distance of not less than 10 feet (3048 mm) from another combustible product or from an opening.

Reason: This is a companion proposal to one that addresses heavy combustible furniture, and other combustible products of similar mass or fuel content, permanently installed near buildings. This proposal extends the concept contained in the existing section dealing with combustible vegetation.
The fire safety requirements for the furniture on roofs is the same as for the proposal for furniture and other combustibles near buildings. The background for this particular proposal is the fire on a roof of the Cosmopolitan Hotel in Las Vegas on July 2015.

Research has shown that plastic benches can generate very high heat releases. ATF conducted tests on several plastic lumber benches simulating an actual incident. In the incident, a plastic lumber bench attached to a brick wall, from the outside, at a school and under an overhang, was ignited with a small ignition source (child’s coat) and the entire school was destroyed soon after ignition. Tests conducted by GBH International showed that a Southern Yellow Pine (standard park bench lumber) would have performed much better and that even some plastic lumber materials could have done much better. The maximum heat release rate of plastic lumber bench ignited in this type of scenario is very high and can be above 4 MW, while the wood bench performed adequately.

The requirements do not apply if the combustible product is far away from any other combustible product or from an opening.

Four photographs are shown below, and the same ones have been added to the proposal on furniture near buildings:

First photograph shows the effect of a plastic bench just a few minutes after ignition of a small coat on the bench.

The second photograph shows the same bench just before it had to be manually extinguished.

The third photograph shows the effect of a wood bench ignited the same way, with the flames causing minimal damage.

The fourth photograph shows the wood bench after the fire stopped (no manual extinguishment needed).

Cost Impact: The code change proposal will increase the cost of construction
Combustible furniture will have to be fire tested.

F23-21

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The committee stated that the reason for disapproval was consistent with the action on F22-21, which had similar reasons for disapproval. (Vote: 14-0)

F23-21

Individual Consideration Agenda

Public Comment 1:

IFC: 321.1, 321.2, 321.3, 321.4

Proponents: Marcelo Hirschler, representing self (mmh@gbhint.com) requests As Modified by Public Comment

Modify as follows:

2021 International Fire Code

321.1 Artificial combustible vegetation on roofs and near buildings . Artificial combustible vegetation exceeding 6 feet (1829 mm) in height and permanently installed outdoors within 5 feet (1524 mm) of a building or on the roof of a building shall comply with Section 807.4.1. The placement of artificial combustible vegetation shall also comply with Sections 806.3 and 807.4.2.

Exception: Artificial decorative vegetation located more than 30 feet (9144 mm) from the exterior wall of a building.

321.2 ~~Combustible Furniture~~ Park Benches on Roofs . Park benches shall not be permitted to be located on roofs unless they comply with either one of the following.
~~Combustible furniture permanently installed on roofs shall comply with any one of the following, unless exempted by Section 321.4:~~

1. ~~The combustible product shall be constructed entirely of materials that exhibit a flame spread index not exceeding 200, in accordance with Section 803.1, and/or of noncombustible materials.~~ The park bench shall be constructed entirely of wood or noncombustible materials.
2. ~~The combustible product shall be constructed entirely of materials that exhibit a peak rate of heat release not exceeding 300 kW/m2 when tested in accordance with ASTM E1354, at an incident heat flux of 50 kW/m2 in the horizontal orientation, and/or of noncombustible materials.~~ The park bench shall be constructed entirely of materials that exhibit a peak rate of heat release not exceeding 300 kW/m^2 when tested in accordance with ASTM E1354, at an incident heat flux of 50 kW/m^2 in the horizontal orientation.
3. ~~The entire combustible product item shall exhibit a maximum rate of heat release not exceeding 100 kW when tested in accordance with NFPA 289 using the 20 kW ignition source.~~

Exception. Section 321.2 shall not apply if the park bench is located at a distance of not less than 10 feet (3048 mm) from an unprotected opening.

~~**321.3 Other Combustibles on Roofs .** The requirements of Section 321.2 shall apply also to combustible products permanently installed on roofs if they have either comparable mass or comparable fuel content to that of permanently installed furniture.~~

~~**321.4 Distance exception exception .** The requirements of Section 321.2 shall not apply if the combustible product is installed at a distance of not less than 10 feet (3048 mm) from another combustible product or from an opening.~~

Commenter's Reason: Note that combustible park benches can cause a much more severe fire than combustible artificial vegetation, which is regulated now on roofs.
The committee and testifiers pointed out that the fire hazard of large combustible products, like park benches, is the same whether they are just located on a roof or permanently installed. Therefore, this public comment addressed the issue of permanently installed by replacing it with "located". The public comment also simplified the requirements and restricted them only to park benches.

The heat release requirements (using ASTM E1354) are the same as those for large waste containers throughout the IFC.

The proposal does not address permits just like the existing section on combustible artificial vegetation does not address permits and has been in the code for at least one cycle.

If someone wants to put a wood bench on the roof everything is OK. If a plastic bench is to be used, there needs to be documentation that it is low heat release.

Cost Impact: The net effect of the public comment and code change proposal will increase the cost of construction
Plastic park benches on roofs will have to be fire tested.

Public Comment# 2406

F25-21

Proposed Change as Submitted

Proponents: Robert J Davidson, Davidson Code Concepts, LLC, representing Self (rjd@davidsoncodeconcepts.com)

2021 International Fire Code

CHAPTER 2
DEFINITIONS

SECTION 202
GENERAL DEFINITIONS

Add new definition as follows:

POWERED MICROMOBILITY DEVICES.
Motorized bicycles, motorized scooters and other personal mobility devices powered by a lithium-ion or lithium metal battery. The term does not include motor vehicles that are required to be registered with the Department of Motor Vehicles for the state or jurisdiction

CHAPTER 3
GENERAL REQUIREMENTS

Add new text as follows:

SECTION 322
POWERED MICROMOBILITY DEVICES

322.1 General.
Lithium-ion and lithium metal battery *powered micromobility devices* shall be operated and maintained in accordance with this section.

Exceptions:

1. Storage, repair and charging in residential occupancies of not more than 5 battery *powered mobility devices* , provided that such devices are for personal use by its owner.
2. Charging of a single *powered mobility device* in any occupancy by its owner.

322.1.1 Prohibited locations.
The use of a residential occupancy as a business for the charging of commercially owned *powered mobility devices* as part of a rental or sales service shall not be permitted.

322.2 Battery chargers and equipment.
Powered micromobility devices shall be charged in accordance with their listing and the manufacturer's instructions using only the original equipment manufacturer-supplied charging equipment or charging equipment in accordance with the listing and manufacturer's instructions.

322.3 Listing.
Powered micromobility devices shall be listed and labeled in accordance with UL 2272 or UL 2849, as applicable.

322.4 Battery charging areas.
Where approved, *powered micromobility devices* shall permitted to be charged in a room or area that complies with all of the following:

1. Only listed devices utilizing listed charging equipment shall be permitted to be charged.
2. Is provided with sufficient electrical receptacles to allow the charging equipment for each device to be directly connected to a receptacle. Extension cords and relocatable power taps shall not be used.
3. Storage of combustible materials, combustible waste or hazardous materials shall not be permitted.
4. The charging operation shall not be conducted in or obstruct any required means of egress.
5. Removable storage batteries shall not be stacked or charged in an enclosed cabinet unless the cabinet is specially designed and approved for such purpose.
6. A minimum distance of 18 inches (457.2 mm) shall be maintained between each removable storage battery during charging operations unless each battery is isolated from neighboring batteries by an approved fire-resistant material.

7. A minimum of 18 inches (457.2 mm) shall be maintained between each powered *micromobility* devices during charging operations.
8. The indoor room or area shall be protected by a fire alarm system utilizing air-aspirating smoke detectors or radiant energy-sensing fire detection.

322.5 Fire safety plan.
A fire safety plan shall be provided in accordance with Section 403.10.6. In addition, the fire safety plan shall include emergency response actions to be taken upon detection of a fire or possible fire involving lithium-ion or lithium metal battery storage.

CHAPTER 80
REFERENCED STANDARDS

Add new standard(s) as follows:

UL

Underwriters Laboratories LLC
333 Pfingsten Road
Northbrook, IL 60062

UL 2272-2016	Electrical Systems for Personal E-Mobility Devices
UL 2849-2020	Electrical Systems for eBikes

Reason: There has been a significant increase in the use of micromobility devices in the past few years and the improper charging of these devices can lead to a thermal runaway incident. There have been significant fires due to these devices including a recent 4 alarm fire in NYC. This proposal sets reasonable safety requirements for the indoor charging of these devices with lithium-ion and lithium metal type batteries. Requirement for the listing of the device and the associated charging equipment that is compatible with the device and its battery is also a critical safety requirement. There is a clear prohibition of utilizing a residential occupancy for operating a rental, sales and service business for these devices, an occurrence fire departments have reported.

Cost Impact: The code change proposal will increase the cost of construction
This will increase the cost of construction because of the requirements for the proper number of electrical receptacles and the requirement for a fire detection system.

Staff Analysis: A review of the following standards proposed for inclusion in the code, with regard to some of the key ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before March 20, 2021.

- UL 2272-2016: Electrical Systems for Personal E-Mobility Devices
- UL 2849-2020: Electrical Systems for eBikes

Note that proposed Section 322.5 refers to proposed Section 403.10.6 within proposal F28-21.

F25-21

Public Hearing Results

Committee Action: **As Submitted**

Committee Reason: The committee stated that although there is need for requirements for these devices, they had multiple concerns with the proposal. These included the exception for not more than five battery powered mobility devices, which was noted to be unenforceable in a residential occupancy and also would technically prohibit more than five tenants in a multifamily building renting micro mobility devices. Other concerns included the device name difference between the proposed section and the referenced standard and the restriction on the charging equipment and 18-inch distance during charging operations. (Vote: 8-6)

Staff Analysis: Note that proposed Section 322.5 refers to proposed Section 403.10.6 within proposal F28-21.

F25-21

Individual Consideration Agenda

Public Comment 1:

IFC: 322.1, 322.4

Proponents: Michael O'Brian, representing FCAC (fcac@iccsafe.org) requests As Modified by Public Comment

Modify as follows:

2021 International Fire Code

322.1 General . Lithium-ion and lithium metal battery *powered micromobility devices* shall be operated and maintained in accordance with this section.

Exceptions:

1. Storage, repair and charging in residential occupancies of ~~not more than 5 battery battery~~ *powered mobility devices*, provided that such devices are for personal use by its owner.
2. Charging of a single *powered mobility device* in any occupancy by its owner.

322.4 Battery charging areas . Where approved, *powered micromobility devices* shall permitted to be charged in a room or area that complies with all of the following:

1. Only listed devices utilizing listed charging equipment shall be permitted to be charged.
2. Is provided with sufficient electrical receptacles to allow the charging equipment for each device to be directly connected to a receptacle. Extension cords and relocatable power taps shall not be used.
3. Storage of combustible materials, combustible waste or hazardous materials shall not be permitted.
4. The charging operation shall not be conducted in or obstruct any required means of egress.
5. Removable storage batteries shall not be stacked or charged in an enclosed cabinet unless the cabinet is specially designed and approved for such purpose.
6. A minimum distance of 18 inches (457.2 mm) shall be maintained between each removable storage battery during charging operations unless each battery is isolated from neighboring batteries by an approved fire-resistant material.
7. A minimum of 18 inches (457.2 mm) shall be maintained between the locations of the batteries on each powered *micromobility* devices during charging operations.
8. The indoor room or area shall be protected by a fire alarm system utilizing air-aspirating smoke detectors or radiant energy-sensing fire detection.

Commenter's Reason: During testimony it was identified that the limit on the number of personal use devices in residential occupancies would be problematic and a number is not necessary, the exception identifying that they are for personal use addresses the issue of using a residential occupancy as a base for commercial use. This proposal simply deletes the number limitation. There was mention of the difference in the title of the proposed section and the title of the referenced standard, however, the section captures more devices that the applicability of the referenced standard and proposed section 322.3 on listing only apply the standards "as applicable". Finally, there was concern about the 18 inch separation, however, thermal runaway from a devices battery can jet that far. This modification does clarify that the distance is between battery locations on the device.
This Public Comment is submitted by the ICC Fire Code Action Committee (FCAC). The FCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance assigned International Codes with regard to fire and life safety in new and existing buildings and facilities as well as the protection of life and property in wildland urban interface areas. In 2020 and 2021 the Fire-CAC held multiple virtual meetings that were open to any interested party. In addition, there were numerous virtual specific working group meetings that were also open to any interested parties, to develop, discuss and debate the proposed changes. Related documentation and reports are posted on the FCAC website at: FCAC.

Cost Impact: The net effect of the public comment and code change proposal will not increase or decrease the cost of construction
The net effect of the proposal does not increase construction costs, but will increase operation costs for those leasing or utilizing the devices in a commercial setting. The Public comment can have a beneficial cost impact by clarifying the language.

Public Comment# 2455

Public Comment 2:

IFC: CHAPTER 2, SECTION 202, , CHAPTER 3, SECTION 322, 322.1, 322.1.1, 322.2, 322.3, 322.4, 322.5

Proponents: Steven Rosenstock, representing Edison Electric Institute (srosenstock@eei.org) requests As Modified by Public Comment

Modify as follows:

2021 International Fire Code

CHAPTER 2
DEFINITIONS

SECTION 202
GENERAL DEFINITIONS

POWERED MICROMOBILITY DEVICES . Motorized bicycles, motorized scooters and other personal mobility devices powered by a ~~lithium-ion or lithium metal~~ rechargeable battery. The term does not include motor vehicles that are required to be registered with the Department of Motor Vehicles for the state or jurisdiction

CHAPTER 3
GENERAL REQUIREMENTS

SECTION 322
POWERED MICROMOBILITY DEVICES

322.1 General . Lithium-ion and lithium metal battery *powered micromobility devices* shall be operated and maintained in accordance with this section.

~~Exceptions~~ Exception:

~~1.~~ Storage, repair ~~and~~ or charging in individual residential ~~occupancies~~ dwelling units of not more than 5 battery *powered mobility devices*~~, provided that such devices are for personal use by its owner.~~

~~2. Charging of a single *powered mobility device* in any occupancy by its owner.~~

~~**322.1.1 Prohibited locations .** The use of a residential occupancy as a business for the charging of commercially owned *powered mobility devices* as part of a rental or sales service shall not be permitted.~~

322.2 Battery chargers and equipment . *Powered micromobility devices* shall be charged in accordance with their listing and the manufacturer's instructions using only the original equipment manufacturer-supplied charging equipment or charging equipment in accordance with the listing and manufacturer's instructions.

322.3 Listing . *Powered micromobility devices* shall be listed and labeled in accordance with UL 2272 or UL 2849, as applicable.

322.4 Battery charging areas . Where approved, *powered micromobility devices* in buildings or portions of buildings used for the commercial sales or rentals of more than 5 devices, shall permitted to be charged in a room or area that complies with all of the following:

1. Only listed devices utilizing listed charging equipment shall be permitted to be charged.
2. Is provided with sufficient electrical receptacles to allow the charging equipment for each device to be directly connected to a receptacle. Extension cords and relocatable power taps shall not be used.
3. Storage of combustible materials, combustible waste or hazardous materials shall not be permitted.
4. The charging operation shall not be conducted in or obstruct any required means of egress.
5. Removable storage batteries shall not be stacked or charged in an enclosed cabinet unless the cabinet is specially designed and approved for such purpose.
6. A minimum distance of 18 inches (457.2 mm) shall be maintained between each removable storage battery during charging operations unless each battery is isolated from neighboring batteries by an approved fire-resistant material.
7. A minimum of 18 inches (457.2 mm) shall be maintained between each powered *micromobility* devices during charging operations.
8. The indoor room or area shall be protected by a fire alarm system utilizing air-aspirating smoke detectors or radiant energy-sensing fire detection.

322.5 Fire safety plan . In buildings or portions of buildings used for commercial sales or rentals of more than 5 *powered micromobility devices*, ~~A~~ a fire safety plan shall be provided in accordance with Section 403.10.6. In addition, the fire safety plan shall include emergency response actions to be taken upon detection of a fire or possible fire involving lithium-ion or lithium metal battery storage.

Commenter's Reason: As currently written, the current proposal is not enforceable. This modification improves the proposal in the following ways:
-It improves the definition, since other metals may be used in the device batteries.

-It allows the storage and recharging of these devices in multi-family buildings.

-It allows people to recharge these devices at their homes similar to people recharging electric vehicles and working for a company like Uber or Lyft.

-It requires commercial operations to meet more stringent standards.

It was noted that the chargers on these devices are rated at 1 or 2 Amps input, for a 115-120 Volt receptacle. Therefore, if they are listed and labeled, they are safe to operate in a home, on a 20 Amp circuit (meeting National Electrical Code). Other home appliances, such as refrigerators and microwave ovens, safely use between 5 and 10 Amps on a receptacle.

Cost Impact: The net effect of the public comment and code change proposal will increase the cost of construction
In buildings with commercial sales or rentals of these devices, the requirements in Section 322.4 will increase the cost of construction.

Public Comment# 2551

F27-21

Proposed Change as Submitted

Proponents: Chad Sievers, representing NYS Dept. of State (chad.sievers@dos.ny.gov); Kevin Duerr-Clark, New York State Department of State, representing New York State Department of State (kevin.duerr-clark@dos.ny.gov)

2021 International Fire Code

Revise as follows:

403.9 Group R occupancies. Group R occupancies shall comply with Sections 403.9.1 through ~~403.9.3.4.~~ 403.9.4.4

Add new text as follows:

403.9.3 Group R-3 transient occupancies.
Group R-3 lodging houses, transient congregate living facilities and transient boarding houses shall comply with Sections 403.9.3.1 and 403.9.3.2.

403.9.3.1 Evacuation diagrams for transient occupancies.
A diagram depicting two evacuation routes and the location of the nearest fire alarm boxes shall be posted on or immediately adjacent to every required egress door from each sleeping unit.

403.9.3.2 Emerergancy Instructions.
The evacuation diagram will include the following instructions:

1. Procedures to be followed when a smoke alarm activates or fire alarm signal sounds.
2. Procedures to be followed in case of fire or appearance of smoke.

Reason: The diagrams will provide quick and important information to the occupants in case of an emergency. This information will be readily available and consistent with other transient lodging occupancies such as hotels. Even though the R - 3 classification typically represents a smaller building than a R - 1 occupancy, some of the buildings' layouts may be more confusing as many transient lodging houses (Bed and Breakfasts) are converted from older homes. The transient occupants will likely not be familiar with the structure to use an alternative route for egress or activate the alarm system.

Cost Impact: The code change proposal will increase the cost of construction
The requirement to provide diagrams and some supplemental information will cause a very minor cost increase in the construction cost of a R-3 building with transient occupants.

F27-21

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: These occupancies do not require fire alarm systems so there would not be fire alarm boxes. (Vote: 13-0)

F27-21

Individual Consideration Agenda

Public Comment 1:

IFC: 403.9.3.1

Proponents: Chad Sievers, representing NYS Dept. of State (chad.sievers@dos.ny.gov); Kevin Duerr-Clark, representing New York State Department of State (kevin.duerr-clark@dos.ny.gov) requests As Modified by Public Comment

Modify as follows:

2021 International Fire Code

403.9.3.1 Evacuation diagrams for transient occupancies . A diagram depicting two evacuation routes ~~and the location of the nearest fire alarm boxes~~ shall be posted on or immediately adjacent to every required egress door from each sleeping unit.

Commenter's Reason: During the Committee Action Hearing, it was identified that fire alarm boxes are not required for these buildings, therefore the requirement to the nearest fire alarm boxes has been removed.

Cost Impact: The net effect of the public comment and code change proposal will increase the cost of construction
The requirement to provide diagrams and some supplemental information will cause a very minor cost increase in the construction cost of a R-3 building with transient occupants.

Public Comment# 2565

F28-21

Proposed Change as Submitted

Proponents: Robert J Davidson, Davidson Code Concepts, LLC, representing Tesla, USA (rjd@davidsoncodeconcepts.com)

2021 International Fire Code

Revise as follows:

403.1 General. In addition to the requirements of Section 401, occupancies, uses and outdoor locations shall comply with the emergency preparedness requirements set forth in Sections 403.2 through 403.11.3.3. Where a fire safety and evacuation plan is required by Sections 403.2 through ~~403.10.5~~ 403.10.6, evacuation drills shall be in accordance with Section 405 and employee training shall be in accordance with Section 406.

403.10 Special uses. Special uses shall be in accordance with Sections 403.10.1 through ~~403.10.5~~ 403.10.6.

Add new text as follows:

403.10.6 Lithium-ion and lithium metal batteries.
An approved fire safety and evacuation plan in accordance with Section 404 shall be prepared and maintained for occupancies that involve activities for the research and development, testing, manufacturing, handling, storage of lithium-ion batteries or lithium metal batteries or the repair or servicing of vehicles powered by lithium-ion batteries or lithium metal batteries.

Exceptions. A fire safety and evacuation plan is not required for the storage or merchandizing of any of the following:

1. New or refurbished batteries installed for use in the equipment or vehicles they are designed to power
2. New or refurbished batteries packed for use with the equipment or vehicles they are designed to power for merchandizing purposes;
3. New or refurbished lithium-ion batteries rated at no more than 300 Watt-hours and lithium metal batteries containing no more than 25 grams of lithium metal in their original retail packaging;
4. The storage, repair and charging activities in detached one- and two-family dwellings and townhouses, provided that such devices are for personal use.

403.10.6.1 Mitigation planning.
The *approved* fire safety and evacuation plan shall include thermal runaway event mitigation measures addressing activities undertaken to prevent thermal runaway, early detection of a thermal runaway event and mitigations measures to be undertaken to limit the size and impact of the event on occupants and the facility.

Reason: Lithium-ion and lithium batteries have been a contributing factor in a growing number of fire incidents for several years, and they are being used in an ever increasing number of products and applications. This proposal requires a fire safety and evacuation plan to be prepared and maintained for occupancies involving battery related activities, and storage, handling and use. Emergency action plans and early mitigation are key elements in providing for occupant and facility safety and for reducing the size of an event.

403.10.6 identifies a broad range of occupancies, use and activities that involve lithium-ion and lithium metal batteries that have the potential of a large event due to a thermal runaway.
The exceptions to 403.10.6 are designed to not require a fire safety and evacuation plan for the storage and merchandizing of products containing lithium-ion or lithium metal batteries, or the storage and merchandizing of small batteries in retail packaging. An exception is included for personal use vehicle and devices in detached one- and two-family dwellings and townhouses. These exceptions are similar to those in other proposals this cycle.

At 403.10.6.1 the fire safety and evacuation plan must take into consideration mitigation planning for a thermal runaway event involving the lithium-ion and lithium metal batteries. Early mitigation is a key to preventing events and controlling the size of event should one occur.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
There will be an operational cost related to writing and maintaining the plan and employee training. However many of these occupancies are already required to maintain fire response plans and provide employee training.

F28-21

Public Hearing Results

Committee Action: **As Modified**

Committee Modification:

403.10.6 Lithium-ion and lithium metal batteries. An approved fire safety and evacuation plan in accordance with Section 404 shall be prepared and maintained for occupancies that involve activities for the research and development, testing, manufacturing, handling, or storage of lithium-ion batteries or lithium metal batteries, or the repair or servicing of vehicles powered by lithium-ion batteries or lithium metal batteries.

Exceptions. A fire safety and evacuation plan is not required for the storage or merchandizing of any of the following:

1. New or refurbished batteries installed for use in the equipment or vehicles they are designed to power
2. New or refurbished batteries packed for use with the equipment or vehicles they are designed to power for merchandizing purposes;
3. New or refurbished lithium-ion batteries rated at no more than 300 Watt-hours and lithium metal batteries containing no more than 25 grams of lithium metal in their original retail packaging;
4. The storage, repair and charging activities in detached one- and two-family dwellings and townhouses, provided that such devices are for personal use.
5. The storage, repair and charging activities associated with personal use in sleeping units and dwelling units of Group R-1 and R-2 occupancies.

Committee Reason: This proposal is correlates with the actions taken on F21-21 and F25-21. This proposal was felt necessary to address the fire hazards that activities associated with lithium ion or lithium metal batteries create. A fire safety and evacuation plan is critical. Each occupancy may need to be treated differently but this provides the general framework with appropriate exceptions. The modification provides an exemption for multifamily dwelling units to be consistent with existing exceptions for one and two family dwellings. (Vote: 13-1)

F28-21

Individual Consideration Agenda

Public Comment 1:

IFC: 403.10.6

Proponents: Steven Rosenstock, representing Edison Electric Institute (srosenstock@eei.org) requests As Modified by Public Comment

Modify as follows:

2021 International Fire Code

403.10.6 Lithium-ion and lithium metal batteries . An approved fire safety and evacuation plan in accordance with Section 404 shall be prepared and maintained for occupancies that involve activities for the research and development, testing, manufacturing, handling, storage of lithium-ion batteries or lithium metal batteries or the repair or servicing of vehicles powered by lithium-ion batteries or lithium metal batteries.

Exceptions. A fire safety and evacuation plan is not required for the storage or merchandizing of any of the following:

1. New or refurbished batteries installed for use in the equipment or vehicles they are designed to power
2. New or refurbished batteries packed for use with the equipment or vehicles they are designed to power for merchandizing purposes;
3. New or refurbished lithium-ion batteries rated at no more than 300 Watt-hours and lithium metal batteries containing no more than 25 grams of lithium metal in their original retail packaging;
4. The storage, repair and charging activities in detached one- and two-family dwellings and townhouses, ~~provided that such devices are for personal use.~~ .
5. The storage, repair and charging activities ~~associated with personal use~~ in sleeping units and dwelling units of Group R-1 and R-2 occupancies.

Commenter's Reason: The language about "personal use" is not enforceable. How is a code official supposed to know whether a vehicle is being used for personal or non-personal use? What is someone is using the vehicle for personal use 10% of the time? Or 90%?
In terms of the vehicles or batteries, how would it make a difference if a "personal" vehicle is operated in the same city or town for several hours a day, traveling X miles compared to a "non-personal" vehicle traveling for the same number of hours and the same number of miles? It would have the same impact on the vehicle and the batteries.

The proposed modification improves the language in this proposal by removing unenforceable language.

Cost Impact: The net effect of the public comment and code change proposal will not increase or decrease the cost of construction
This modification just removes unenforceable language from the original proposal and has no construction cost impact.

Public Comment# 2641

F30-21

Proposed Change as Submitted

Proponents: Chase Browning, representing Medford Fire Department

2021 International Fire Code

Revise as follows:

503.1 Where required. Fire apparatus access roads shall be provided and maintained in accordance with Sections 503.1.1 through ~~503.1.3~~ 503.6

Exceptions:

1. The *fire code official* is authorized to modify or exempt fire apparatus access roads where any of the following conditions occur:
   1.1. The building is equipped throughout with an *approved automatic sprinkler system* installed in accordance with Section 903.3.1.1, 903.3.1.2 or 903.3.1.3.
   1.2. Fire apparatus access roads cannot be installed because of location on property, topography, waterways, nonnegotiable grades or other similar conditions, and an approved alternative means of fire protection is provided.
   1.3. There are not more than two Group R-3 or Group U occupancies.
   1.4. Solar photovoltaic power generation facilities.

503.1.1 Buildings and facilities. *Approved* fire apparatus access roads shall be provided for every facility, building or portion of a building hereafter constructed or moved into or within the jurisdiction. The fire apparatus access road shall ~~comply with the requirements of this section and shall~~ extend to within 150 feet (45 720 mm) of all portions of the facility and all portions of the *exterior walls* of the first story of the building as measured by an *approved* route around the exterior of the building or facility.

~~**Exceptions:**~~

~~1. The *fire code official* is authorized to increase the dimension of 150 feet (45 720 mm) where any of the following conditions occur:~~
   ~~1.1. The building is equipped throughout with an *approved automatic sprinkler system* installed in accordance with Section 903.3.1.1, 903.3.1.2 or 903.3.1.3.~~
   ~~1.2. Fire apparatus access roads cannot be installed because of location on property, topography, waterways, nonnegotiable grades or other similar conditions, and an *approved* alternative means of fire protection is provided.~~
   ~~1.3. There are not more than two Group R-3 or Group U occupancies.~~
~~2. Where *approved* by the *fire code official*, fire apparatus access roads shall be permitted to be exempted or modified for solar photovoltaic power generation facilities.~~

Reason: The current language in 503.1.1 includes "The fire apparatus access road shall **comply with the requirements of this section** and shall extend to within 150 ft...." (bold text added by proponent for emphasis). If the intent is for access roads to meet all of 503 in order to 'comply,' then the text should be revised in 503.1 to include all of 503.1 through 503.6.
Also, the exceptions were revised slightly to provide more flexibility when addressing site-specific conditions that would benefit from modifications to the road beyond extending the 150 ft dimension. This is already a common practice to provide incentives for developers to include sprinklers, and this revised text will provide clearer support for modifying widths, allowing steeper grades, turning radii, etc.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The intent is to provide additional design flexibility and equivalency.

F30-21

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: There were several concerns with moving from Section 503.1.1 under the general section for fire apparatus access roads (Section 503.1). The current location is felt to be the right balance between water supply and access. With this movement maintenance requirements may be lost and the ability to use these provisions to negotiate for additional fire protection will be lost. This will also make it more difficult to get proper access from developers. Finally, as written, item 1.4 is unclear that the intention is only for solar farms and not for photovoltaics on buildings. (Vote: 13-1)

F30-21

Individual Consideration Agenda

Public Comment 1:

IFC: 503.1, 503.1.1

Proponents: Tanner Fairrington, representing Medford Fire-Rescue (tfairrington@yahoo.com) requests As Modified by Public Comment

Modify as follows:

2021 International Fire Code

503.1 Where required . Fire apparatus access roads shall be provided and maintained in accordance with Sections 503.1.1 through 503.6
Exceptions:

1. *Approved* fire apparatus access roads shall be provided for every facility, building or portion of a building hereafter constructed or moved into or within the jurisdiction and shall comply with the requirements of this section. Where approved by the ~~The~~ *fire code official*, ~~is authorized to modify or exempt~~ fire apparatus access roads shall be permitted to be exempted or modified where any of the following conditions occur:
   1.1. The building is equipped throughout with an *approved automatic sprinkler system* installed in accordance with Section 903.3.1.1, 903.3.1.2 or 903.3.1.3.

   1.2. Fire apparatus access roads cannot be installed because of location on property, topography, waterways, nonnegotiable grades or other similar conditions, and an approved alternative means of fire protection is provided.

   1.3. There are not more than two Group R-3 or Group U occupancies.

   1.4. ~~Solar~~ Ground-mounted photovoltaic power generation facilities.

503.1.1 Buildings and facilities . ~~*Approved* fire apparatus access roads shall be provided for every facility, building or portion of a building hereafter constructed or moved into or within the jurisdiction. The fire~~ Fire apparatus access ~~road~~ roads shall extend to within 150 feet (45 720 mm) of all portions of ~~the facility~~ facilities and all portions of the *exterior walls* of the first story of ~~the building~~ buildings as measured by an *approved* route around the exterior of ~~the building~~ buildings or ~~facility~~ facilities.

Commenter's Reason: This public comment is intended to address the concerns raised in the committee action hearing report for this proposal while maintaining the intention of the proposal. The primary objective of the proposal and this public comment is to clarify these code sections, and to expand the use of tools available to fire code officials when meeting the access requirements of Section 503 is challenging. The public comment attempts to further clarify that the fire code official maintains the authority to require fire apparatus access roads to meet the requirements of Section 503, including maintenance, and the authority to approve exemptions and modifications.
Based on experience and discussion with fire code officials across the country, the proposal and public comment would:

- Provide clarity to the user by moving all general code requirements from 503.1.1 to 503.1.
  - The model code language creates confusion by providing general and specific code requirements in 503.1.1.
- Provide clarity that the requirements of Section 503 shall be provided for and maintained. Concerns were raised with the original proposal that maintenance requirements would be lost. Currently, the general requirement in 503.1 to maintain fire apparatus access roads is limited to 503.1.1 to 503.1.3. Expanding this general requirement fixes a loophole in the code.
  - For example, clarifying that the entirety of Section 503 shall be maintained provides a path to requiring trimming of vegetation to maintain the vertical clearance requirements of 503.2.1
- Give fire code officials a clear code path to approve tradeoffs, such as fire protection systems, when access requirements are not met
  - The concern was raised by the committee that the proposal would limit the fire code officials ability to approve trade offs. Currently, fire

code officials are limited to using tradeoffs, such as a sprinkler system, to the specific 150 ft reach requirement of 503.1.1. The proposal and public comment intend the expand the fire code official's ability to use of tradeoffs such as sprinklers for other requirements in 503, such as the dead-end requirements of 503.2.5 or the grade requirement of 503.2.7.

- Align the code language with how the code is being used and provide clear language that the fire code official has the authority to approve trade-offs. Concerns were raised that the original proposal would result in weakening the fire code officials opportunity to approve tradeoffs when access requirements are not met, and make it challenging for fire code officials to require developers to provide adequate access. The model code language, the proposal, and this public comment do not provide an outright code path for developers / designers to use exceptions. Instead, they provide the fire code official with clear authority to approve modifications and exemptions for all of section 503.
- The exception for photovoltaic systems was modified based on input from the committee to correlate to the commentary which clarifies that this section is intended to apply to ground-mounted photovoltaic systems.

Cost Impact: The net effect of the public comment and code change proposal will not increase or decrease the cost of construction
The intent is to provide fire code officials with additional flexibility and options to provide tradeoffs that provided a reasonable level of safety when the strict letter of the code cannot be met for fire apparatus access. This additional flexibility has the potential to significantly reduce the cost of construction which could provide housing opportunities in locations with housing challenges.

Public Comment# 2804

F43-21

Proposed Change as Submitted

Proponents: Alan Perdue, Safer Buildings Coalition, representing Safer Buildings Coalition (alan.perdue@saferbuildings.org)

2021 International Fire Code

Revise as follows:

510.4.2 System design. The in-building, two-way emergency responder communication coverage system shall be designed in accordance with Sections 510.4.2.1 through 510.4.2.8 and NFPA <u>1225</u> ~~1221~~.

510.5 Installation requirements. The installation of the in-building, two-way emergency responder communication coverage system shall be in accordance with NFPA <u>1225</u> ~~1221~~ and Sections 510.5.2 through 510.5.5.

Delete without substitution:

NFPA

National Fire Protection Association
1 Batterymarch Park
Quincy, MA 02169-7471

~~1221—19~~ ~~Standard for the Installation, Maintenance and Use of Emergency Services Communications Systems~~

Add new standard(s) as follows:

NFPA

National Fire Protection Association
1 Batterymarch Park
Quincy, MA 02169-7471

<u>1225-2021</u> <u>Standards for Emergency Services Communications</u>

Reason: Through the NFPA consolidation process, NFPA standard 1221 was changed to NFPA 1225. This proposal aligns the subject of Emergency Responder Communications with the correct NFPA standard. NFPA 1225 2022 Edition will need to be added to the referenced standards.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This is a simple change of NFPA standard numbers due to the NFPA consolidation process.

Staff Analysis: A review of the standard proposed for inclusion in the code, NFPA 1225-2021, Standards for Emergency Services Communications, with regard to some of the key ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before March 20, 2021.

F43-21

Public Hearing Results

Committee Action: **As Submitted**

Committee Reason: The proposal was approved based upon the consolidation of NFPA standards. NFPA 1221 has now been consolidated into NFPA 1225. (Vote: 13-1)

F43-21

Individual Consideration Agenda

Public Comment 1:

Proponents: CP28 Administration requests As Submitted

Commenter's Reason: The administration of ICC Council Policy 28 (CP28) is not taking a position on this code change. This public comment is being submitted to bring a procedural requirement to the attention of the ICC voting membership. In accordance with Section 3.6.3.1.1 of ICC Council Policy 28 (partially reproduced below), the new referenced standard(s) NFPA 1225-2021 must be completed and readily available prior to the Public Comment Hearing in order for this public comment to be considered.
(CP28) 3.6.3.1.1 Proposed New Standards. In order for a new standard to be considered for reference by the Code, such standard shall be submitted in at least a consensus draft form in accordance with Section 3.4. If the proposed new standard is not submitted in at least consensus draft form, the code change proposal shall be considered incomplete and shall not be processed. The code change proposal shall be considered at the Committee Action Hearing by the applicable code development committee responsible for the corresponding proposed changes to the code text. If the committee action at the Committee Action Hearing is either As Submitted or As Modified and the standard is not completed, the code change proposal shall automatically be placed on the Public Comment Agenda with the recommendation stating that in order for the public comment to be considered, the new standard shall be completed and readily available prior to the Public Comment Hearing.

Cost Impact: The net effect of the public comment and code change proposal will not increase or decrease the cost of construction
N/A

Public Comment# 2989

F49-21

Proposed Change as Submitted

Proponents: Jonathan Roberts, representing UL LLC (jonathan.roberts@ul.com)

2021 International Fire Code

Revise as follows:

601.1 Scope. The provisions of this chapter shall apply to the installation, operation, testing and maintenance of the following building services and systems:

1. Electrical systems, equipment and wiring.
2. Information technology server rooms.
3. Elevator systems, emergency operation and recall.
4. Fuel-fired appliances, heating systems, chimneys and fuel oil storage.
5. Commercial cooking equipment and systems.
6. Commercial cooking oil storage.
7. Mechanical refrigeration systems.
8. Hyperbaric facilities.
9. Clothes dryer exhaust systems.

SECTION 603
ELECTRICAL EQUIPMENT, WIRING AND HAZARDS

603.1 General. Electrical equipment, wiring and systems required by this code or the International Building Code shall be installed, used and maintained in accordance with NFPA 70 and Sections 603.2 through 603.10.

Add new text as follows:

603.4.2 Disconnect means marking.
The disconnecting means for each service, feeder or branch circuit originating on a switchboard or panelboard shall be legibly and durably marked to indicate its purpose unless such purpose is clearly evident.

603.4.3 Multiple supply connections marking.
Where buildings or structures are supplied by more than one power source, markings shall be provided at each service equipment location and at all interconnected electric power production sources identifying all electric power sources at the premises in accordance with NFPA 70.

Revise as follows:

603.4.1 ~~Labeling~~ Electrical room marking. Doors into electrical control panel rooms shall be marked with a plainly visible and legible sign stating "ELECTRICAL ROOM" or similar *approved* wording.
~~The disconnecting means for each service, feeder or branch circuit originating on a switchboard or panelboard shall be legibly and durably marked to indicate its purpose unless such purpose is clearly evident.~~
~~Where buildings or structures are supplied by more than one power source, markings shall be provided at each service equipment location and at all interconnected electric power production sources identifying all electric power sources at the premises in accordance with NFPA 70.~~

603.5.1 Listing. Relocatable power taps shall be *listed* and *labeled* in accordance with UL 1363. Current taps shall be *listed* and *labeled* in accordance with UL 498A.

603.5.1.1 Listing in Group I-2 occupancies and ambulatory care facilities. In Group I-2 occupancies and ambulatory care facilities, relocatable power taps shall be *listed* and *labeled* in accordance with UL 1363 except under the following conditions:

1. In Group I-2, Condition 2 occupancies, relocatable power taps providing power to patient care-related electrical equipment in the patient care vicinity, as defined by NFPA 99, shall be *listed* and *labeled* in accordance with UL 1363A or UL 60601-1.
2. In Group I-2, Condition 1 facilities, in care recipient rooms using line-operated patient care-related electrical equipment, relocatable power taps in the patient care vicinity, as defined by NFPA 99, shall be *listed* and *labeled* in accordance with UL 1363A or UL 60601-1.
3. In ambulatory care facilities, relocatable power taps providing power to patient care-related electrical equipment in the patient care vicinity, as defined by NFPA 99, shall be *listed* and *labeled* in accordance with UL 1363A or UL 60601-1.

603.6.2 Ampacity. The ampacity of the extension cords shall be not less than the rated ~~capacity~~ ampacity of the portable appliance supplied by the cord.

604.5 Maintenance of elevators. Elevator features and lobbies required by Section 3006 of the *International Building Code* shall be inspected, tested and maintained in accordance with Sections 604.5.1 through 604.5.4.

605.5 Portable unvented heaters. Portable unvented fuel-fired heating equipment shall be prohibited in occupancies in Groups A, E, I, R-1, R-2, R-3 and R-4 and ambulatory care facilities.

Exceptions:

1. Portable unvented fuel-fired heaters *listed* and *labeled* in accordance with UL 647 are permitted to be used in one- and two-family dwellings, where operated and maintained in accordance with the manufacturer's instructions.
2. Portable outdoor gas-fired heating appliances in accordance with Section 605.5.2.

606.3 Operations and maintenance. Commercial cooking systems shall be operated, inspected and maintained in accordance with Sections 606.3.1 through 606.3.4.

608.2 Permits. An operational permit ~~Permits~~ shall be obtained for refrigeration systems as set forth in section 105.5.44.~~in accordance with Sections 105.5 and 105.6.~~

Reason: This proposal is a "clean-up" of several items inadvertently overlooked in the comprehensive Chapter 6 re-organization submitted by F-CAC and approved last cycle. This proposal:

1. Makes the language and terminology consistent throughout the chapter; adds "testing" and "inspection" to the scoping sections where appropriate.
2. Adds "and labeled" after "listing" where appropriate and to be consistent with other requirements in this Chapter for listing and labeling of equipment.
3. Moves the permit requirement from the Chapter General Section to Section 608 for mechanical refrigeration; removes references for permits for equipment or operations no longer regulated by this Chapter.
4. Revised and or added section titles for additional clarity.

Note that Section 603.4.1 was broken into several sections as follows:

603.4.1 ~~Labeling.~~ Electrical room marking. Doors into electrical control panel rooms shall be marked with a plainly visible and legible sign stating “ELECTRICAL ROOM” or similar approved wording.

603.4.2 Disconnect means marking. The disconnecting means for each service, feeder or branch circuit originating on a switchboard or panelboard shall be legibly and durably marked to indicate its purpose unless such purpose is clearly evident.

603.4.3 Multiple supply connections marking. Where buildings or structures are supplied by more than one power source, markings shall be provided at each service equipment location and at all interconnected electric power production sources identifying all electric power sources at the premises in accordance with NFPA 70.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal does not add any new technical requirements

F49-21

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: This proposal was disapproved with concerns to the deletion of the permit requirements. (Vote: 12-1)

F49-21

Individual Consideration Agenda

Public Comment 1:

Proponents: Jonathan Roberts, representing UL LLC (jonathan.roberts@ul.com) requests As Submitted

Commenter's Reason: The original proposal was just a "clean-up" of a few items inadvertently overlooked in the comprehensive Chapter 6 re-organization submitted by F-CAC and approved last cycle. Unfortunately the original public input showed the 601.2 permit section being deleted. We are unsure where that deletion came from because there is no Section 601.2 in the IFC. There was no testimony against the proposed cleanup and the only question raised by the committee was about the deletion of the permit requirements.

Cost Impact: The net effect of the public comment and code change proposal will not increase or decrease the cost of construction
This is a simple clean up of a chapter therefore there will be no additional financial impact.

Staff Analysis: Note that Section 601.2 was shown as deleted in the original monograph for the Committee Action Hearings but the section was not actually in the 2021 IFC. This section was deleted by F59-18. This version has been updated to remove that section from the original proposal.

Public Comment# 2796

F50-21

Proposed Change as Submitted

Proponents: Jonathan Roberts, representing UL LLC (jonathan.roberts@ul.com)

2021 International Fire Code

Revise as follows:

603.5.1 Listing. Relocatable power taps shall be *listed* in accordance with UL 1363. Relocatable power taps attached to furnishings shall be listed and labeled in accordance with UL 962A. Current taps shall be *listed* and *labeled* in accordance with UL 498A.

603.5.1.1 Listing in Group I-2 occupancies and ambulatory care facilities. In Group I-2 occupancies and ambulatory care facilities, relocatable power taps shall be listed in accordance with UL 1363 except under the following conditions:

1. In Group I-2, Condition 2 occupancies, relocatable power taps providing power to patient care-related electrical equipment in the patient care vicinity, as defined by NFPA 99, shall be listed in accordance with UL 1363A, UL 2930, or UL 60601-1.
2. In Group I-2, Condition 1 facilities, in care recipient rooms using line-operated patient care-related electrical equipment, relocatable power taps in the patient care vicinity, as defined by NFPA 99, shall be listed in accordance with UL 1363A, UL 2930, or UL 60601-1.
3. In ambulatory care facilities, relocatable power taps providing power to patient care-related electrical equipment in the patient care vicinity, as defined by NFPA 99, shall be listed in accordance with UL 1363A, UL 2930, or UL 60601-1.

Add new standard(s) as follows:

UL

Underwriters Laboratories LLC
333 Pfingsten Road
Northbrook, IL 60062

UL 962A-2018	Furniture Power Distribution Units (with revisions through September 1, 2020)
UL 2930-2020	Outline of Investigation for Cord-and-Plug-Connected Health Care Facility Outlet Assemblies

Reason: UL 1363 is for general use relocatable power taps. UL 962A is used for relocatable power taps that are attached to furnishings, such as desks or curio cabinets.

Healthcare facility outlet assemblies (HFOAs) are another type of relocatable power tap used in healthcare facilities, and are listed in accordance with UL 2930. HFOAs are intended for use as movable connections to the power supply for cord-and-plug-connected medical electrical utilization equipment in health care facilities in accordance with Article 517 of ANSI/NFPA 70, National Electrical Code (NEC) and ANSI/NFPA 99, Health Care Facilities Code, for use in Category 2 (General Patient Care) spaces or Category 1 (Critical Patient Care) spaces, including patient care vicinities.

HFOAs include a patient equipment grounding point terminal or jack that is intended to be connected to the patient equipment grounding point of the health care facility to create a redundancy in the grounding path. If a malfunction or insulation breakdown occurs, the grounding point terminal or jack provides a secondary path of least resistance for the current and reduces the risk of electric shock to a patient. HFOAs are intended for cord-and-plug connection of medical utilization equipment that has been authorized by the health care facility governing body and that has been verified as having touch and leakage current suitably low for patient care use.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal recognizes alternatives for different types of relocatable power taps for specific uses.

Staff Analysis: A review of the following standards proposed for inclusion in the code, with regard to some of the key ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before March 20, 2021.

- UL 962A-2018: Furniture Power Distribution Units (with revisions through September 1, 2020)
- UL 2930-2020: Outline of Investigation for Cord-and-Plug-Connected Health Care Facility Outlet Assemblies.

F50-21

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The proposal was disapproved due to concern with the reference to UL 2930 which is only an outline of investigation. This reference will be problematic for the healthcare industry. (Vote: 13-0)

F50-21

Individual Consideration Agenda

Public Comment 1:

IFC: 603.5.1, 603.5.1.1,

Proponents: Jonathan Roberts, representing UL LLC (jonathan.roberts@ul.com) requests As Modified by Public Comment

Modify as follows:

2021 International Fire Code

603.5.1 Listing . Relocatable power taps shall be *listed* in accordance with UL 1363. Relocatable power taps attached to furnishings shall be listed and labeled in accordance with UL 962A. Current taps shall be *listed* and *labeled* in accordance with UL 498A.

603.5.1.1 Listing in Group I-2 occupancies and ambulatory care facilities . In Group I-2 occupancies and ambulatory care facilities, relocatable power taps shall be listed in accordance with UL 1363 except under the following conditions:

1. In Group I-2, Condition 2 occupancies, relocatable power taps providing power to patient care-related electrical equipment in the patient care vicinity, as defined by NFPA 99, shall be listed in accordance with UL 1363A~~, UL 2930,~~ or UL 60601-1.
2. In Group I-2, Condition 1 facilities, in care recipient rooms using line-operated patient care-related electrical equipment, relocatable power taps in the patient care vicinity, as defined by NFPA 99, shall be listed in accordance with UL 1363A~~, UL 2930,~~ or UL 60601-1.
3. In ambulatory care facilities, relocatable power taps providing power to patient care-related electrical equipment in the patient care vicinity, as defined by NFPA 99, shall be listed in accordance with UL 1363A~~, UL 2930,~~ or UL 60601-1.

,

UL 962A-2018	Furniture Power Distribution Units (with revisions through September 1, 2020)

,

~~UL 2930-2020~~	~~Outline of Investigation for Cord-and-Plug-Connected Health Care Facility Outlet Assemblies~~

Commenter's Reason: The only concern raised by the committee was in regards to referencing UL 2930 for use in healthcare facilities. UL 2930 is not being included in this proposal for that reason. Therefore there will be no changes in this proposal to section 603.5.1.1 at this time.
UL 962A needs to be added as an alternative to UL 1363 because UL 1363 is for general use relocatable power taps, whereas UL 962A is used for relocatable power taps that are attached to furnishings, such as desks or curio cabinets.

Cost Impact: The net effect of the public comment and code change proposal will not increase or decrease the cost of construction
There will be no significant cost impact as many of these products already meet the requirements of the listing.

Public Comment# 2686

F55-21

Proposed Change as Submitted

Proponents: Jeffrey Shapiro, representing IIAR (jeff.shapiro@intlcodeconsultants.com)

2021 International Fire Code

Revise as follows:

608.1.1 Refrigerants other than ammonia. Where a refrigerant other than ammonia is used, refrigeration systems and the buildings in which such systems are installed shall be in accordance with ASHRAE 15. Refrigeration systems containing carbon dioxide as the refrigerant shall also comply with BSR/IIAR CO2.

Add new standard(s) as follows:

IIAR

International Institute of Ammonia Refrigeration
1001 N. Fairfax Street, Suite 503
Alexandria, VA 22314

BSR/IIAR CO2-2021 Safety Standard for Closed-Circuit Carbon Dioxide Refrigeration Systems

Reason: BSR/IIAR CO2 is in the process of completion for issuance in 2021. It is a new standard governing refrigeration systems that use carbon dioxide as the refrigerant, and it is designed to be a companion to ASHRAE 15, providing additional design requirements that are unique to carbon dioxide systems to supplement ASHRAE 15 and going beyond the scope of ASHRAE 15 by regulating the complete life-cycle of carbon dioxide systems. Carbon dioxide has become increasingly popular as an industrial refrigerant because it is considered efficient and climate friendly. Including IIAR's new standard will assure that these systems are properly regulated.

Cost Impact: The code change proposal will increase the cost of construction
The new standard includes requirements that reflect industry good practice but are not currently mandatory. By including the standard as a mandatory reference standard in the IMC, following industry good practice will no longer be optional for carbon dioxide systems.

Staff Analysis: A review of the standard proposed for inclusion in the code, BSR/IIAR CO2-2021: Safety Standard for Closed-Circuit Carbon Dioxide Refrigeration Systems, with regard to some of the key ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before March 20, 2021.

F55-21

Public Hearing Results

Committee Action: **As Modified**

Committee Modification:

608.1.1Refrigerants other than ammonia. Where a refrigerant other than ammonia is used, refrigeration systems and the buildings in which such systems are installed shall be in accordance with ASHRAE 15. Refrigeration systems containing carbon dioxide as the refrigerant shall also comply with ~~BSR/~~IIAR CO2.

ANSI~~BSR~~/IIAR CO2-2021 Safety Standard for Closed-Circuit Carbon Dioxide Refrigeration Systems

Committee Reason: Approval is based upon the proponents reason statement. The modification merely addresses the fact that the standards is now an ANSI approved standard. (Vote: 14-0)

F55-21

Individual Consideration Agenda

Public Comment 1:

Proponents: CP28 Administration

Commenter's Reason: The administration of ICC Council Policy 28 (CP28) is not taking a position on this code change. This public comment is being submitted to bring a procedural requirement to the attention of the ICC voting membership. In accordance with Section 3.6.3.1.1 of ICC Council Policy 28 (partially reproduced below), the new referenced standard(s) ANSI/IAR CO2-2021 must be completed and readily available prior to the Public Comment Hearing in order for this public comment to be considered.

(CP28) 3.6.3.1.1 Proposed New Standards. In order for a new standard to be considered for reference by the Code, such standard shall be submitted in at least a consensus draft form in accordance with Section 3.4. If the proposed new standard is not submitted in at least consensus draft form, the code change proposal shall be considered incomplete and shall not be processed. The code change proposal shall be considered at the Committee Action Hearing by the applicable code development committee responsible for the corresponding proposed changes to the code text. If the committee action at the Committee Action Hearing is either As Submitted or As Modified and the standard is not completed, the code change proposal shall automatically be placed on the Public Comment Agenda with the recommendation stating that in order for the public comment to be considered, the new standard shall be completed and readily available prior to the Public Comment Hearing.

Public Comment# 2990

NOTE: F60-21 PART I DID NOT RECEIVE A PUBLIC COMMENT AND IS REPRODUCED FOR INFORMATIONAL PURPOSES ONLY

F60-21 Part I

Proposed Change as Submitted

Proponents: Jeffrey Shapiro, representing Self (jeff.shapiro@intlcodeconsultants.com); Tim Earl, representing GBH International (tearl@gbhinternational.com)

THIS IS A TWO PART CODE CHANGE. PART 1 WILL BE HEARD BY THE INTERNATIONAL FIRE CODE COMMITTEE AND PART 2 WILL BE HEARD BY THE INTERNATIONAL BUILDING CODE FIRE SAFETY COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THESE COMMITTEES.

2021 International Fire Code

Revise as follows:

803.11.1 Foam plastics ~~combustibility characteristics~~. Foam plastics ~~materials~~ shall be allowed to be used as interior wall and ceiling finish only where in accordance with ~~on the basis of fire tests that substantiate their combustibility characteristics for the use intended under actual fire conditions, as indicated in~~ Section 2603.9 of the *International Building Code*. This section shall apply both to exposed foam plastics and to foam plastics used in conjunction with a textile or vinyl facing or cover.

Reason: The revision to IFC Section 803.11 is for correlation with the approach taken by the companion IBC section, 803.4. IBC Section 803.4 simply references compliance with IBC Section 2603.9. However, IFC Section 803.11 (covers the same topic) currently includes additional text that partially duplicates text from IBC Section 2603.9. There is no reason for IFC Section 803.11 to partially duplicate IBC text when the section already specifically directs you to the IBC section, where the text is being pulled from.
Regarding the change to Section 2603.9, the current text "**such as, but not limited to**, NFPA 286 (with the acceptance criteria of Section 803.1.1.1), FM 4880, UL 1040 or UL 1715" and "such testing **shall be related to the actual end-use configuration** and be performed on the finished manufactured foam plastic assembly" creates an opportunity for "creative" compliance that I recently became aware of. This "creative" solution is does not seem to meet the spirit of the codes' foam plastic regulations. So what is it?

I've learned that two testing laboratories are recognizing permissible use of exposed foam plastic based on a full-scale test that evaluates controlling a fire by oxygen depletion. From what I gather, the approach involves having a sealed attic and requiring a sealing cover over attic stair/hatch opening, perhaps with a sign requiring that the stairs be kept closed. In theory, with a limited oxygen supply in the space, any fire that starts in the space and involves exposed foam plastic (without a thermal barrier) would flash quickly, consume oxygen in the space and, at least temporarily, self-extinguish. While that might seem OK, the ability to maintain such spaces as airtight during the life of a structure certainly seems questionable, and do we really want to allow unprotected foam in these spaces under the philosophy of accepting almost instantaneous fire growth with the hope of self-extinguishment? I've seen exposed foam flashover a room corner test in less than 20 seconds, and relying on self-extinguishment by oxygen depletion doesn't seem like a sound strategy for fire safety for the life of a structure. Further, I wonder about the risk of a backdraft explosion when firefighters responding to the attic fire open the attic and introduce new oxygen into a well-insulated and previously superheated space. I also understand that there is an engineer's report that accompanies test reports for this approach that is being presented to jurisdictions to encourage approval of the approach.

When I contacted one of the laboratories reportedly conducting this test and asked for test documentation or a copy of the engineering report or engineer's letter, I was told that all of this is proprietary and could not be shared. Hence, I've prepared this proposal to bring this "loophole" (in my opinion) out in the open. I am hopeful that the testing labs and/or industry who are promoting the acceptability of this approach to fire safety for exposed foam plastic will show up at the code development hearing to provide sufficient technical justification, as perhaps there's something that's not yet come forward that should be considered. Lacking acceptable justification, it is my opinion that the enabling text in ICC codes should be deleted to close what I regard as a loophole in our approach to fire safety for foam plastics. It is important that the International Code prescribe reasonable and appropriate approval parameters for the use of foam plastics, because ICC Evaluation Service, who produce AC377 and ICC 1100 Standard for Spray-applied Polyurethane Foam Plastic Insulation, and other evaluation and testing companies are otherwise without limitation with respect to what they choose to develop as acceptable testing and approval parameters. If the code provides specific regulations, evaluation services and test labs will be obliged to follow the code, or at least explain variances in their approval criteria.

Furthermore, it is worth noting that, when this "loose" code text was added to legacy codes, standardized testing of foam plastics had not yet reached maturity. Today however, we have several recognized and standardized tests for this purpose, and continuing to maintain "loose" text in the code seems unjustified. If the oxygen depletion strategy is one that ICC might ultimately choose to recognize, then that strategy should become associated with a standardized test procedure that can be included in the code versus leaving the current loophole.

It is noted that similar text appears in Section 316.6 of the IRC, and it is my intent to process a correlating code proposal to the IRC in Group B.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The proposal does not add any requirements but deletes a permitted approach for approval of foam plastic materials. There is the potential that materials that materials that had been approved based on non standard tests would have to be retested.

F60-21 Part I

Public Hearing Results

Committee Action: **As Submitted**

Committee Reason: The committee stated that the reason for approval was that the proposal is correlating language and IBC Section 2603 has all the information necessary and there is no need to redirect people to Section 104.10 since it is known that it is there and additionally the action correlates with the decision that's already made being by the IBC FS committee unanimously on Part II. (Vote: 13-1)

F60-21 Part I

F60-21 Part II

Proposed Change as Submitted

Proponents: Jeffrey Shapiro, representing Self (jeff.shapiro@intlcodeconsultants.com); Tim Earl, representing GBH International (tearl@gbhint.com)

2021 International Building Code

Revise as follows:

2603.9 Special approval. Foam plastic shall not be required to comply with the requirements of Section 2603.4 or those of Section 2603.6 where specifically approved based on<u>one of the following </u>large-scale tests<u>. </u>~~such as, but not limited to,~~

1. <u>1.</u> NFPA 286 ~~(with~~ <u>using </u>the acceptance criteria of Section 803.1.1.1~~)~~
2. <u>2.</u> FM 4880
3. <u>3.</u> UL 1040
4. <u>4.</u> UL 1715

Such testing shall be ~~related to the actual end-use configuration and be~~ performed on the finished manufactured foam plastic assembly in the maximum thickness intended for use. Foam plastics that are used as *interior finish* on the basis of <u> these</u> ~~special~~ tests shall <u>also </u>conform to the *flame spread* and smoke-developed requirements of Chapter 8. Assemblies tested shall include seams, joints and other typical details used in the installation of the assembly and shall be tested in the manner intended for use.

Reason: The revision to IFC Section 803.11 is for correlation with the approach taken by the companion IBC section, 803.4. IBC Section 803.4 simply references compliance with IBC Section 2603.9. However, IFC Section 803.11 (covers the same topic) currently includes additional text that partially duplicates text from IBC Section 2603.9. There is no reason for IFC Section 803.11 to partially duplicate IBC text when the section already specifically directs you to the IBC section, where the text is being pulled from.
Regarding the change to Section 2603.9, the current text "<u>**such as, but not limited to**</u>, NFPA 286 (with the acceptance criteria of Section 803.1.1.1), FM 4880, UL 1040 or UL 1715" and "such testing <u>**shall be related to the actual end-use configuration**</u> and be performed on the finished manufactured foam plastic assembly" creates an opportunity for "creative" compliance that I recently became aware of. This "creative" solution is does not seem to meet the spirit of the codes' foam plastic regulations. So what is it?

I've learned that two testing laboratories are recognizing permissible use of exposed foam plastic based on a full-scale test that evaluates controlling a fire by oxygen depletion. From what I gather, the approach involves having a sealed attic and requiring a sealing cover over attic stair/hatch opening, perhaps with a sign requiring that the stairs be kept closed. In theory, with a limited oxygen supply in the space, any fire that starts in the space and involves exposed foam plastic (without a thermal barrier) would flash quickly, consume oxygen in the space and, at least temporarily, self-extinguish. While that might seem OK, the ability to maintain such spaces as airtight during the life of a structure certainly seems questionable, and do we really want to allow unprotected foam in these spaces under the philosophy of accepting almost instantaneous fire growth with the hope of self-extinguishment? I've seen exposed foam flashover a room corner test in less than 20 seconds, and relying on self-extinguishment by oxygen depletion doesn't seem like a sound strategy for fire safety for the life of a structure. Further, I wonder about the risk of a backdraft explosion when firefighters responding to the attic fire open the attic and introduce new oxygen into a well-insulated and previously superheated space. I also understand that there is an engineer's report that accompanies test reports for this approach that is being presented to jurisdictions to encourage approval of the approach.

When I contacted one of the laboratories reportedly conducting this test and asked for test documentation or a copy of the engineering report or engineer's letter, I was told that all of this is proprietary and could not be shared. Hence, I've prepared this proposal to bring this "loophole" (in my opinion) out in the open. I am hopeful that the testing labs and/or industry who are promoting the acceptability of this approach to fire safety for exposed foam plastic will show up at the code development hearing to provide sufficient technical justification, as perhaps there's something that's not yet come forward that should be considered. Lacking acceptable justification, it is my opinion that the enabling text in ICC codes should be deleted to close what I regard as a loophole in our approach to fire safety for foam plastics. It is important that the International Code prescribe reasonable and appropriate approval parameters for the use of foam plastics, because ICC Evaluation Service, who produce AC377 and ICC 1100 Standard for Spray-applied Polyurethane Foam Plastic Insulation, and other evaluation and testing companies are otherwise without limitation with respect to what they choose to develop as acceptable testing and approval parameters. If the code provides specific regulations, evaluation services and test labs will be obliged to follow the code, or at least explain variances in their approval criteria.

Furthermore, it is worth noting that, when this "loose" code text was added to legacy codes, standardized testing of foam plastics had not yet reached maturity. Today however, we have several recognized and standardized tests for this purpose, and continuing to maintain "loose" text in the code seems unjustified. If the oxygen depletion strategy is one that ICC might ultimately choose to recognize, then that strategy should become associated with a standardized test procedure that can be included in the code versus leaving the current loophole.

It is noted that similar text appears in Section 316.6 of the IRC, and it is my intent to process a correlating code proposal to the IRC in Group B.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The proposal does not add any requirements but deletes a permitted approach for approval of foam plastic materials. There is the potential that materials that materials that had been approved based on non standard tests would have to be retested.

F60-21 Part II

Public Hearing Results

Committee Action: **As Submitted**

Committee Reason: The committee determined that the four prescriptive paths in this section are already allowed using section 104.11. The committee sees no issue with allowing different tests and standards for Foam plastic, special approval. The four different prescriptive paths need to be considered individually. The committee also prefers to reference chapter 1, section 104.11, Alternative materials, design, and methods of construction and equipment.
One of the committee members mentioned unintended consequences. In some instances, AHJ's use this section for products that pass the prescriptive tests, but they think it was not the same as the application, and they use this section to require a full-scale test. (Vote: 13-0)

F60-21 Part II

Individual Consideration Agenda

Public Comment 1:

IBC: 2603.9

Proponents: Eric Banks, representing North American Modern Building Alliance (NAMBA) (eric.banks@ewbanksconsulting.com) requests As Modified by Public Comment

Modify as follows:

2021 International Building Code

2603.9 Special approval . Foam plastic shall not be required to comply with the requirements of Section 2603.4 or those of Section 2603.6 where specifically approved based on one of the following large-scale tests.

1. NFPA 286 using the acceptance criteria of Section 803.1.1.1
2. FM 4880
3. UL 1040
4. UL 1715
5. Other *approved* large-scale fire test for uses identified in Section 2603.4.1

Such testing shall be related to the actual end-use configuration and be performed on the finished manufactured foam plastic assembly in the maximum thickness intended for use. Foam plastics that are used as *interior finish* on the basis of these tests shall also conform to the *flame spread* and smoke-developed requirements of Chapter 8. Assemblies tested shall include seams, joints and other typical details used in the installation of the assembly and shall be tested in the manner intended for use.

Commenter's Reason: F60-21 Part II, as submitted, removed options and guidance language for large-scale fire tests to permit foam plastics in certain uses, limiting users to a list of four standard tests. Testimony and committee comments questioned the need to treat foam plastic differently than other materials in the code. Foam plastics behave differently than other combustibles and their fire performance can only be adequately assessed through large scale fire tests related to the actual end-use configuration. This Public Comment restores the requirements that the fire tests be large-scale and that the testing be related to actual end use configurations.
Guidance regarding the use of these large-scale tests is necessary to ensure a high level of fire safety and help code officials determine if an alternate test is appropriate. This public comment is intended to provide that guidance. Without it, inappropriate tests could be submitted and approved under the provisions of Section 104.11 that reduce fire safety.This public comment is necessary because F60-21 Part II is limited in focus to uses of foam plastic insulation with a thermal barrier and as an interior finish. Section 2603.4.1 describes uses of foam plastics where the prescribed thermal barrier is not required; uses such as attics, floors, and crawl spaces. F60-21 Part II eliminated the requirement for testing related to actual end use configurations and large scale testing, thereby creating a barrier to obtaining approvals for these other uses under Section

2603.4.1. While attempting clarity, F60-21 Part II resulted in confused language in the code and a potential reduction in fire safety that needs to be addressed.

This Public Comment will:

- Maintain the stringency of the code by clarifying that small scale tests are not sufficient to determine end use fire performance.
- Provide code officials more relevant information to make decisions.
- Preserve use of special testing tailored to specific end-use configurations, such as exposed foam plastic insulation and use of non-prescriptive coverings typically found in attics, crawl spaces and other uses where a thermal barrier is not required.

Without this public comment, F60-21 Part II will result in:·

- Implicit allowance of small-scale and other testing for attics and crawl spaces, creating a reduction in fire safety
- Increased workload, confusion, and variability in the application, use, and enforcement of Section 2603.9 by Building Departments.
- Increased confusion and variability in the application, use, testing and enforcement of Section 2603.9 by Evaluation and Certification Agencies.

We respectfully request <u>Approved as Modified by this Public Comment</u>. The modification is an improvement to the existing Code language and we feel addresses the Proponent's concerns expressed in the original reason statement and subsequent testimony.

<u>Background</u>

The four (4) methods identified in F60-21 Part II (NFPA 286, FM 4880, UL 1040, and UL 1715) are all test methods that apply to qualify alternative uses of foam plastic insulation as a wall and/or ceiling interior finish where a thermal barrier is required. These test methods are not appropriate for all the foam plastic uses that are regulated under Section 2603.4.1 where a thermal barrier is not required, such as roof, attic, header/rim joist, crawl space, or floor assemblies. Additionally, as stated in their respective scopes, these four tests are not appropriate to evaluate uses subject to Section 2603.6 Roofing.

When F60-21 Part II strikes "…related to actual end use configuration…" it removes key guidance and information for code officials to reasonably apply ANSI/FM 4880 under 2603.9, as well as NFPA 286 and UL 1715, where multiple test specimen configuration options are permitted. Both UL 1715 and NFPA 286 contain provisions regarding installation of test specimens:

- On walls only
- On ceilings only
- On both walls and ceilings

The code, since the 2000 IBC and the preceding legacy codes going back to the 1976 ICBO *Uniform Building Code,* has provided an allowance for alternate large-scale tests with the specific requirement that they must be representative of the end use configuration AND tested in maximum thickness. Proponents of F60-21 Part II argued that these tests should be removed in favor of the alternative testing that is allowed in Section 104.11 but, in so doing, the wording change loses the associated special requirements for large scale test so it has reduced the stringency of the Code by implying that small scale tests might then be acceptable. This reduction in stringency is opposed by the foam plastic insulation industry and deviates from the FTC Consent Order in 1974 (The Society of the Plastics Industry, Inc., et al, F.T.C. Docket No. C-2596. November 4, 1974) that cautioned against small scale tests alone as the basis for the safe use of foam plastic insulation.

F60-21 Part II will create a conflict with Section 2603.4 that effectively eliminates the ability to obtain Special Approval for uses, such as attics, crawl spaces, rims/headers, roofing, floors and other applications, identified under Section 2603.4 (Sections 2603.4.1.1 - 2603.4.1.14) where the thermal barrier prescribed under Section 2603.4 is not required. The provisions for these uses range from allowances to leave the foam plastic exposed (i.e. no covering or protection) to allowing protection by materials other than a thermal barrier material or an interior finish in accordance with Section 803.1.1.1.

Since the inclusion of this Special Approvals Section in the code, the following widely accepted evaluation and performance standards have been developed and used for evaluating foam plastic insulations for compliance with the IBC, IRC, IFC, and IECC. These standards include provisions for uses without prescriptive thermal barriers and uses without prescriptive ignition barriers

- ICC-Evaluation Service (ICC-ES) *Acceptance Criteria for Foam Plastic Insulation (AC12)*,
  - Appendix A – Testing for Use in Attics and Crawl Spaces without a Code-prescribed Ignition Barrier
  - Appendix B – Alternative Fire Test Method for Attics and Crawl Spaces
  - Appendix C – Test Method for Crawl Space Evaluation
- ICC-ES *Acceptance Criteria for Spray-applied Foam Plastic Insulation (AC377)*, and
  - Appendix D – Alternate Testing for Use in Attics and Crawl Spaces with Alternates to Code-prescribed Ignition Barrier
  - Appendix E – Test Method for Crawl Space Evaluation
  - Appendix X – Testing for Use in Attics and Crawl Spaces with Alternatives to Code-prescribed Ignition Barrier
  - Appendix Y – Testing for Use on Sill Plates and Headers without a Code-prescribed Thermal Barrier

- ICC-1100 *Standard for Spray-applied Polyurethane Foam Plastic Insulation*.
  - Section 302.4 – Alternative thermal barrier assembly—room corner fire tests
  - Section 302.5 – Testing for alternative ignition barrier assembly for use in attics
    - Section 302.5.1 Test Method A
    - Section 302.5.2 Test Method B
  - Section 302.6 – Testing for alternative ignition barrier assembly for use in crawl spaces
    - Section 302.6.1 Test Method C
    - Section 302.6.1.2 Test Method D

This public comment restores essential language to require large-scale testing related to the actual end-use configuration while accepting and supporting the clarifying language of the original F60-21 Part II proposal.

Recommendation

We respectfully request Approved as Modified by this Public Comment. The modification is an improvement to the existing Code language and we feel addresses the Proponent's concerns expressed in the original reason statement and subsequent testimony.

The North American Modern Building Alliance (NAMBA) is focused on addressing fire safety through the development and enforcement of building codes. Members of NAMBA are: ACC Center for the Polyurethanes Industry (CPI), ACC North American Flame Retardant Alliance (NAFRA), Atlas Roofing Corp., BASF Corporation, Carlisle Construction Materials, Covestro, DuPont, EIFS Industry Members Association (EIMA), EPS Industry Alliance (EPS-IA), GAF, Huntsman, Kingspan Insulation LLC, Metal Construction Association (MCA), Owens Corning, Polyisocyanurate Insulation Manufacturers Association (PIMA), and Rmax - A Business Unit of the Sika Corporation.

Cost Impact: The net effect of the public comment and code change proposal will not increase or decrease the cost of construction
The original cost impact statement indicated the proposal sought to eliminate a permitted approach to approval and, therefore, there is potential for retesting [of approved] materials [in accordance with one of the four standard tests identified] - arguably presenting additional testing cost incurred by manufacturers and possibly other stakeholders. The net effect of the proposal as Modified by this Public Comment is that no new requirements are added.

Public Comment# 2679

F63-21

Proposed Change as Submitted

Proponents: Timothy Stacy, representing Southern Oregon Fire Code Officials

2021 International Fire Code

Revise as follows:

903.2.1.1 Group A-1. An *automatic sprinkler system* shall be provided throughout stories containing Group A-1 occupancies and throughout all stories from the Group A-1 occupancy to and including the *levels of exit discharge* serving that occupancy where one of the following conditions exists:

1. The *fire area* exceeds 12,000 square feet (1115 m^2).
2. The *fire area* has an *occupant load* of 300 or more.
3. The *fire area* where alcoholic beverages are being consumed has an *occupant load* of 100 or more.
~~3.~~ 4. The *fire area* is located on a floor other than a *level of exit discharge* serving such occupancies.
~~4.~~ 5. The *fire area* contains a multiple-theater complex.

903.2.1.3 Group A-3. An *automatic sprinkler system* shall be provided throughout stories containing Group A-3 occupancies and throughout all stories from the Group A-3 occupancy to and including the *levels of exit discharge* serving that occupancy where one of the following conditions exists:

1. The *fire area* exceeds 12,000 square feet (1115 m^2).
2. The *fire area* has an *occupant load* of 300 or more.
3. The *fire area* where alcoholic beverages are being consumed has an *occupant load* of 100 or more.
~~3.~~ 4. The *fire area* is located on a floor other than a *level of exit discharge* serving such occupancies.

903.2.1.4 Group A-4. An *automatic sprinkler system* shall be provided throughout stories containing Group A-4 occupancies and throughout all stories from the Group A-4 occupancy to and including the *levels of exit discharge* serving that occupancy where one of the following conditions exists:

1. The *fire area* exceeds 12,000 square feet (1115 m^2).
2. The *fire area* has an *occupant load* of 300 or more.
3. The *fire area* where alcoholic beverages are being consumed has an *occupant load* of 100 or more.
~~3.~~ 4. The *fire area* is located on a floor other than a *level of exit discharge* serving such occupancies.

2021 International Building Code

Revise as follows:

[F] 903.2.1.1 Group A-1. An *automatic sprinkler system* shall be provided throughout stories containing Group A-1 occupancies and throughout all stories from the Group A-1 occupancy to and including the *levels of exit discharge* serving that occupancy where one of the following conditions exists:

1. The *fire area* exceeds 12,000 square feet (1115 m^2).
2. The *fire area* has an *occupant load* of 300 or more.
3. The *fire area* where alcoholic beverages are being consumed has an *occupant load* of 100 or more.
~~3.~~ 4. The *fire area* is located on a floor other than a *level of exit discharge* serving such occupancies.
~~4.~~ 5. The *fire area* contains a multi-theater complex.

[F] 903.2.1.3 Group A-3. An *automatic sprinkler system* shall be provided throughout stories containing Group A-3 occupancies and throughout all stories from the Group A-3 occupancy to and including the *levels of exit discharge* serving that occupancy where one of the following conditions exists:

1. The *fire area* exceeds 12,000 square feet (1115 m^2).

2. The *fire area* has an *occupant load* of 300 or more.
<u>3. The *fire area* where alcoholic beverages are being consumed has an *occupant load* of 100 or more.</u>

~~3.~~ <u>4.</u> The *fire area* is located on a floor other than a *level of exit discharge* serving such occupancies.

[F] 903.2.1.4 Group A-4. An *automatic sprinkler system* shall be provided throughout stories containing Group A-4 occupancies and throughout all stories from the Group A-4 occupancy to and including the *levels of exit discharge* serving that occupancy where one of the following conditions exists:

1. The *fire area* exceeds 12,000 square feet (1115 m^2).
2. The *fire area* has an *occupant load* of 300 or more.

<u>3. The *fire area* where alcoholic beverages are being consumed has an *occupant load* of 100 or more.</u>

~~3.~~ <u>4.</u> The *fire area* is located on a floor other than a *level of exit discharge* serving such occupancies.

Reason: Serving and consuming alcohol occurs across a variety of assembly use-groups, which can result in an increased hazard to the community. Cognitive impairment can result in delayed response and evacuation during emergencies, which increases the risk to occupants in assembly spaces. It is not uncommon to see alcohol being served and consumed in an A-3 gymnasium-type occupancy, for example, or in the seating area of a theater designated as A-1. Revision to the A-2 section is not being proposed since the 100 occupant provision is already provided in the code.

Cost Impact: The code change proposal will increase the cost of construction
Reducing the threshold for the sprinkler scoping provisions will likely increase construction costs, but design benefits also live inside the code that should be examined case by case.

F63-21

<u>Public Hearing Results</u>

Committee Action: **Disapproved**

Committee Reason: The committee stated that the reasons for disapproval were based on the issues discussed regarding occupancy classification and additionally the specific proposed requirement criteria of fire area. (Vote: 10-4)

F63-21

<u>Individual Consideration Agenda</u>

Public Comment 1:

IFC: 903.2.1.1, 903.2.1.3, 903.2.1.4; IBC: [F] 903.2.1.1, [F] 903.2.1.3, [F] 903.2.1.4

Proponents: Chase Browning, representing Medford Fire Department (chase.browning@cityofmedford.org); Andrew Bevis, representing National Fire Sprinkler Association (bevis.andrew1988@gmail.com) requests As Modified by Public Comment

Modify as follows:

2021 International Fire Code

903.2.1.1 Group A-1 . An *automatic sprinkler system* shall be provided throughout stories containing Group A-1 occupancies and throughout all stories from the Group A-1 occupancy to and including the *levels of exit discharge* serving that occupancy where one of the following conditions exists:

1. The *fire area* exceeds 12,000 square feet (1115 m^2).
2. The *fire area* has an *occupant load* of 300 or more.

~~3. The *fire area* where alcoholic beverages are being consumed has an *occupant load* of 100 or more.~~

<u>3.</u> ~~4.~~ The *fire area* is located on a floor other than a *level of exit discharge* serving such occupancies.

4. ~~5.~~ The *fire area* contains a multiple-theater complex.

903.2.1.3 Group A-3 . An *automatic sprinkler system* shall be provided throughout stories containing Group A-3 occupancies and throughout all stories from the Group A-3 occupancy to and including the *levels of exit discharge* serving that occupancy where one of the following conditions exists:

1. The *fire area* exceeds 12,000 square feet (1115 m^2).
2. The *fire area* has an *occupant load* of 300 or more.
3. The *fire area* where alcoholic beverages are being consumed has an *occupant load* of 100 or more.
4. The *fire area* is located on a floor other than a *level of exit discharge* serving such occupancies.

903.2.1.4 Group A-4 . An *automatic sprinkler system* shall be provided throughout stories containing Group A-4 occupancies and throughout all stories from the Group A-4 occupancy to and including the *levels of exit discharge* serving that occupancy where one of the following conditions exists:

1. The *fire area* exceeds 12,000 square feet (1115 m^2).
2. The *fire area* has an *occupant load* of 300 or more.
~~3. The *fire area* where alcoholic beverages are being consumed has an *occupant load* of 100 or more.~~
3. ~~4.~~ The *fire area* is located on a floor other than a *level of exit discharge* serving such occupancies.

2021 International Building Code

[F] 903.2.1.1 Group A-1 . An *automatic sprinkler system* shall be provided throughout stories containing Group A-1 occupancies and throughout all stories from the Group A-1 occupancy to and including the *levels of exit discharge* serving that occupancy where one of the following conditions exists:

1. The *fire area* exceeds 12,000 square feet (1115 m^2).
2. The *fire area* has an *occupant load* of 300 or more.
~~3. The *fire area* where alcoholic beverages are being consumed has an *occupant load* of 100 or more.~~
~~4.~~ 3. The *fire area* is located on a floor other than a *level of exit discharge* serving such occupancies.
~~5.~~ 4. The *fire area* contains a multi-theater complex.

[F] 903.2.1.3 Group A-3 . An *automatic sprinkler system* shall be provided throughout stories containing Group A-3 occupancies and throughout all stories from the Group A-3 occupancy to and including the *levels of exit discharge* serving that occupancy where one of the following conditions exists:

1. The *fire area* exceeds 12,000 square feet (1115 m^2).
2. The *fire area* has an *occupant load* of 300 or more.
3. The *fire area* where alcoholic beverages are being consumed has an *occupant load* of 100 or more.
4. The *fire area* is located on a floor other than a *level of exit discharge* serving such occupancies.

[F] 903.2.1.4 Group A-4 . An *automatic sprinkler system* shall be provided throughout stories containing Group A-4 occupancies and throughout all stories from the Group A-4 occupancy to and including the *levels of exit discharge* serving that occupancy where one of the following conditions exists:

1. The *fire area* exceeds 12,000 square feet (1115 m^2).
2. The *fire area* has an *occupant load* of 300 or more.
~~3. The *fire area* where alcoholic beverages are being consumed has an *occupant load* of 100 or more.~~
3. ~~4.~~ The *fire area* is located on a floor other than a *level of exit discharge* serving such occupancies.

Commenter's Reason: This public comment revision is on behalf of the original proponent of F63.We have revised to focus solely on the A-3 group. An A-2, as defined, is where the intended use is for food and drink. An A-3 use is not primarily intended for alcohol consumption, however, the use of alcohol often does occur, and this proposal addresses that risk. This closes an unintentional loophole in the code that would permit alcohol being present and the risk of not being addressed. The 'fire area' description for where alcohol is consumed is intended to correlate in concept with the other three conditions in 903.2.1.3 as a threshold for sprinkler scoping provisions, which would result in sprinklers throughout all stories of an A-3 and all stories to and including the level of exit discharge serving that occupancy.

Cost Impact: The net effect of the public comment and code change proposal will increase the cost of construction
This modification would increase the cost of construction but since it focuses only on Group A-3, the impact will be less than the original proposal.

Public Comment# 2423

F68-21

Proposed Change as Submitted

Proponents: Steve Skalko, Stephen V. Skalko P.E. & Associates LLC, representing Precast Concrete Institute (svskalko@svskalko-pe.com); Edith Smith, representing PCI (esmith@pci.org)

2021 International Fire Code

Revise as follows:

903.2.10 Group S-2 enclosed parking garages. An *automatic sprinkler system* shall be provided throughout buildings classified as enclosed parking garages where ~~any~~ either of the following conditions exist:

1. Where the *fire area* of the enclosed parking garage, in accordance with Section 406.6 of the *International Building Code*, exceeds 12,000 square feet (1115 m^2).
2. Where the enclosed parking garage, in accordance with Section 406.6 of the *International Building Code*, is located beneath other groups.

   Exception: Enclosed parking garages located beneath Group R-3 occupancies.

3. ~~Where the *fire area* of the open parking garage, in accordance with Section 406.5 of the *International Building Code*, exceeds 48,000 square feet (4460 m^2).~~

903.2.11.3 Buildings 55 feet or more in height. An *automatic sprinkler system* shall be installed throughout buildings that have one or more stories with an *occupant load* of 30 or more located 55 feet (16 764 mm) or more above the lowest level of fire department vehicle access, measured to the finished floor.

Exceptions:

1. Occupancies in Group F-2.
2. Open parking garages

2021 International Building Code

Revise as follows:

[F] 903.2.10 Group S-2 enclosed parking garages. An *automatic sprinkler system* shall be provided throughout buildings classified as enclosed parking garages where ~~any~~ either of the following conditions exists:

1. Where the fire area of the enclosed parking garage in accordance with Section 406.6 exceeds 12,000 square feet (1115 m^2).
2. Where the enclosed parking garage in accordance with Section 406.6 is located beneath other groups.

   Exception: Enclosed parking garages located beneath Group R-3 occupancies.

3. ~~Where the *fire area* of the *open parking garage* in accordance with Section 406.5 exceeds 48,000 square feet (4460 m^2).~~

[F] 903.2.11.3 Buildings 55 feet or more in height. An *automatic sprinkler system* shall be installed throughout buildings that have one or more stories with an *occupant load* of 30 or more located 55 feet (16 764 mm) or more above the lowest level of fire department vehicle access, measured to the finished floor.

Exceptions:

1. Occupancies in Group F-2.
2. Open parking garages

Reason: Code change F110-18 that modified Section 903.2.10 of the International Fire Code (and International Building Code) to require sprinkler protection in open parking garages was based on a single fire incident that occurred in the UK in January, 2018. All the details of this incident were not known at the time of the 2018 Code Action Hearing (CAH). However, upon review of the final report by the Merseyside Fire and Rescue Service (MFRS), the parking garage in question, referred to as a car park in the UK, had design features that likely contributed to fire spread between floors resulting in a far larger number of vehicles becoming involved than typical for vehicle fire incidences [Merseyside Fire Rescue Service, *Kings Dock Car Park Fire Protection Report,* April 2018, Merseyside, UK].
The following are two of the most notable differences of these design features contributing to the spread of fire in the UK car park incident:

1. The car park had a light gauge aluminum drainage tray attached to the underside of each precast floor panel and in line with the joint of the precast floor system. The trays led to plastic vertical piping to transfer liquids to the building storm water drainage system. The design called for a 1/2-inch gap between floor panels to permit drainage into the aluminum tray below. This gap in the floor joints allowed burning fuel spills from vehicle gas tanks to flow into the aluminum tray, which has a low melting point, thus allowing the spill to continue directly to floors below and spread fire to vehicles on lower floors.
    - In the United States the floor joints are not commonly left open. They are typically sealed by a combination backer rod and sealant or covered by the placement of a concrete topping with tooled and sealed joints. This not only minimizes spread of fire by leaking fuels to floors below, but also inhibits the spread of flames from the incident floor to vehicles on floors above.
2. The building code requirements in the UK permitted only a 15-minutes structural fire resistance of the precast concrete floors for the Kings Dock car park. The fire exposure from the initial vehicle (and subsequent vehicles) damaged the underside of the floor panels above sufficient enough to permit the fire to extend upward to vehicles on the next parking level.
    - In the US the typical precast floor systems in open parking garages meet at least a minimum of a 1-hour fire resistance, which increases significantly the ability to prevent fire spread between floors.

Further, data on fire incidences in the United States show that fires in open parking garages are very low. The US Fire Administration statistics show an average of over 1.7 million fires for the period from 1999 to 2002 [FA-311, *Fire in the United States 1994-2004,* 14th edition, August 2007] . When compared to the 1760 average total parking garage fires described in an NFPA study of parking garage fires [M. Ahrens, *Structure and Vehicle Fires in General Vehicle Parking Garages,* NFPA, January 2006], the parking garage fires represent less than 0.1% of the fire incidences.

F110-18 also cited changing material composition in vehicles increases risk of fire incidences. Fire experience in the United States, as noted above, does not support this premise. In fact, one of the conclusions in a recent study of fire incidences in parking structures funded by the National Fire Protection Association Research Foundation [*Modern Vehicle Hazards in Parking Structures and Vehicle Carriers*, July 2020], states "*Though fires in vehicles are not uncommon, large fires in parking structures are fairly rare".* The study also noted most of the recent fire incidences "*have not involved any human fatalities and few injuries".* Improvements to fire safety requirements in the International Building Code in the last decade have focused on life safety, which usually includes requiring sprinkler protection. However, the NFPA-RF Study affirms that life safety in open parking garages, both in terms of injuries and fatalities, is not an issue. Other factors cited in F110-18 include the increased use stored energy systems in vehicles (i.e., electric vehicles). No doubt electric vehicles are on the rise, albeit somewhat slowly. The most common electric vehicles use lithium-ion batteries as their source of power. The risk of fire from these batteries is when a thermal runaway of the battery cells occurs. Though there have been isolated incidences of thermal runaway in lithium-ion batteries with no apparent cause, most instances of thermal runaway occurrences happen in vehicles related to damage when the vehicle is involved in an accident. The NFPA-RF study points out that *"lithium-ion batteries are more difficult to extinguish than gasoline or diesel fires, requiring large amounts of water to fully contain and mitigate the hazard".* This raises questions, even with increased electric vehicle use, whether adding sprinklers is an effective measure since the sprinkler protection will not deliver large quantities of water to the seat of the battery fire. As a side note, the move to electric vehicles reduces the risk of fire spread from liquid fuels in vehicle gas tanks.

Based on the information above the requirement for mandatory sprinkler protection in open parking garages should be removed from the IFC. It imposes an unnecessary and unwarranted cost to the owners both in terms of installation as well as long term maintenance of the system. This is especially compounded in colder climates subject to freezing where dry pipe systems will be required.

Cost Impact: The code change proposal will decrease the cost of construction
The net effect of this code change proposal will be to decrease the cost of construction by eliminating an unnecessary and unwarranted expense for the cost to install a sprinkler protection system.

F68-21

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The committee stated that the reason for disapproval was that this is a new code section and it has only been in a published code for about a couple months and it hasn't been applied yet as it was intended in the last code cycle. Additionally, it was stated that throughout the entire executive summary of the NFPA report that is referenced in the reason statement, it talks about the need for viable sprinkler protection with more research to be done and until that research is done that shows that sprinkler protection is not going to be effective, it should be remaining in the code. (Vote: 13-1)

F68-21

Individual Consideration Agenda

Public Comment 1:

IFC: 903.2.10, 903.2.11.3; IBC: [F] 903.2.10, [F] 903.2.11.3

Proponents: Stephen Skalko, representing Precast Concrete Institute (svskalko@svskalko-pe.com); Edith Smith, representing PCI (esmith@pci.org) requests As Modified by Public Comment

Modify as follows:

2021 International Fire Code

903.2.10 Group S-2 ~~enclosed~~ parking garages. An *automatic sprinkler system* shall be provided throughout buildings classified as ~~enclosed~~ parking garages where ~~either of enclosed~~ any of the following conditions exist:

1. Where the *fire area* of the enclosed parking garage, in accordance with Section 406.6 of the *International Building Code*, exceeds 12,000 square feet (1115 m^2).
2. Where the enclosed parking garage, in accordance with Section 406.6 of the *International Building Code*, is located beneath other groups.

   Exception: Enclosed parking garages located beneath Group R-3 occupancies.

3. Where the fire area of the open parking garage in accordance with Section 406.5 of the International Building Code exceeds 48,000 square feet (4460 m).

   Exception: Open parking garages of Type I or IIA construction where uniformly distributed openings are provided on at least three sides of the structure in accordance with Section 406.5.2. The area of such openings shall be not less than 40 percent of the total perimeter wall area of each tier.

903.2.11.3 Buildings 55 feet or more in height. An *automatic sprinkler system* shall be installed throughout buildings that have one or more stories with an *occupant load* of 30 or more located 55 feet (16 764 mm) or more above the lowest level of fire department vehicle access, measured to the finished floor.

Exceptions:

1. Occupancies in Group F-2.
2. Open parking garages of Type I or IIA construction where uniformly distributed openings are provided on at least three sides of the structure in accordance with Section 406.5.2 of the *International Building Code*. The area of such openings shall be not less than 40 percent of the total perimeter wall area of each tier

2021 International Building Code

[F] 903.2.10 Group S-2 ~~enclosed~~ parking garages. An *automatic sprinkler system* shall be provided throughout buildings classified as ~~enclosed~~ parking ~~enclosed~~ garages where ~~either of~~ any of the following conditions exists:

1. Where the fire area of the enclosed parking garage in accordance with Section 406.6 exceeds 12,000 square feet (1115 m^2).
2. Where the enclosed parking garage in accordance with Section 406.6 is located beneath other groups.

   Exception: Enclosed parking garages located beneath Group R-3 occupancies.

3. Where the fire area of the open parking garage in accordance with Section 406.5 exceeds 48,000 square feet (4460 m).

   Exception: Open parking garages of Type I or IIA construction where uniformly distributed openings are provided on at least three sides of the structure in accordance with Section 406.5.2. The area of such openings shall be not less than 40 percent of the total perimeter wall area of each tier

[F] 903.2.11.3 Buildings 55 feet or more in height. An *automatic sprinkler system* shall be installed throughout buildings that have one or more stories with an *occupant load* of 30 or more located 55 feet (16 764 mm) or more above the lowest level of fire department vehicle access, measured to the finished floor.

Exceptions:

1. Occupancies in Group F-2.
2. Open parking garages of Type I or IIA construction where uniformly distributed openings are provided on at least three sides of the structure in accordance with Section 406.5.2. The area of such openings shall be not less than 40 percent of the total perimeter wall area of each tier

Commenter's Reason: The original proposal (F68-21) referred to the recent study funded by the National Fire Protection Association Research Foundation [*Modern Vehicle Hazards in Parking Structures and Vehicle Carriers*, July 2020]. In recommending disapproval of F68-21, the Fire Code Development Committee noted that the study infers a need for viable sprinkler protection. However, in the Executive Summary of the report the authors did not state that premise. Instead, they advise that one of the current knowledge gaps for open parking garage fires is viable sprinkler protection. They go on to state the focus of research is needed *"to better evaluate and analyze the threat of modern vehicle fires in open parking garages. This understanding is also critical to determine the best approach to reduce the risk of catastrophic fire*s". In arriving at that premise, the authors of the study based some of their conclusions from fire incidences at the Kings Park (Echo Arena) in the U.K and a fire at a car park at Stavanger Airport – Norway. The study cited large economic losses that occurred in these open parking structures for their conclusions. However, the present fire history in the United States does not show this same level of economic loss.
Data on fire incidences in the United States shows that fires in open parking garages are very low. The following is a recap of the readily available data from independent sources provided in the original proposal showing that open parking structures have not been experiencing significant fire incidences like that which was used to justify mandatory sprinkler protection in open parking garages when F110-18 was submitted:

- US Fire Administration statistics show an average of over 1.7 million fires [FA-311, *Fire in the United States 1994-2004,* 14th edition, August 2007] for the period from 1999 to 2002. When compared to the average total parking garage fires (1760 incidents) described in an NFPA study of parking garage fires [M. Ahrens, *Structure and Vehicle Fires in General Vehicle Parking Garages,* NFPA, January 2006] represent less than 0.1% of the fire incidences.

- NFPA fire incident data on its online database that was collected and analyzed for the period from 2014 to 2018 show a total of 2,453 vehicle fires in vehicle storage structures or fire stations. This data excluded single family dwellings. The total number of fire incidences reported for that period for all occupancy types is 493,797 fires. Thus, these vehicle fires represent less than 0.5% of the total fire incidences in the U.S. The property loss from these 2,453 vehicle fires totaled $41,739,297. This represents about $17,000 per incident. (www.nfpa.org/News-and-Research/Data-research-and-tools/US-Fire-Problem/Fires-by-Occupancy-or Property-Type/).

Code change F110-18 that modified Section 903.2.10 of the International Fire Code (and International Building Code) to require sprinkler protection in open parking garages was based on the single fire incident known as the Kings Dock or Echo Arena car park fire.

All the details of this incident were not known at the time of the 2018 Code Action Hearing (CAH). However, upon review of the final report by the Merseyside Fire and Rescue Service (MFRS), the parking garage in question, referred to as a car park in the UK, had design features and operating conditions that likely contributed to fire spread between floors resulting in a far larger number of vehicles becoming involved than typical for vehicle fire incidences [Merseyside Fire Rescue Service, *Kings Dock Car Park Fire Protection Report,* April 2018, Merseyside, UK]. Those features included little fire resistance for the floor systems of the structure, open drain slots in the floors and reduced openings on each tier for natural ventilation.

The building code requirements in the UK permitted only a 15-minutes structural fire resistance of the precast concrete floors for the Kings Dock car park. The building code regulations in Norway allowed a performance-based design which provided a 10-minute fire resistance for the car park at Stavanger Airport. In the United States the typical precast floor systems in open parking garages meets at least a minimum of a 1-hour fire resistance, which increases significantly the ability to prevent fire spread between floors.

Open drainage slots in the Kings Park car park floors allowed leaking fuel from gas tanks, hastened by water being discharged into the building by the fire service, to readily flow down into the next level of parking thus spreading the fire between floors. Such floor designs with slots are not commonly used in open parking structure designs in the United States.

Finally, natural ventilation for the Kings Park car park was hindered by reduced openings in the sides of the parking structure which hampered the ability for the fire service to perform interior suppression activities due to heat and smoke accumulating within the garage.

To be proactive in keeping the risk of catastrophic open parking garage fires lower, while still recognizing the excellent fire record in open parking garages, this public comment proposes to maintain the requirement for sprinkler protection of open parking garages. However, the proposal will permit sprinklers to be omitted from open parking garages that utilize noncombustible materials for the structure, provide a minimum of one hour of fire resistance for the structure, and provide increased openings around three sides of the structure for enhanced natural ventilation and access for the fire service. These three parameters were the ones lacking in the Kings Park fire incident used for justification in the original submittal of F110-18. Reduced structural fire resistance was also one of the deficiencies in the Stavanger Airport car park fire.

Recommend Approval as Modified by this public comment.

Cost Impact: The net effect of the public comment and code change proposal will decrease the cost of construction
The net effect of this code change proposal will be to decrease the cost of construction by eliminating an unnecessary and unwarranted expense for the cost to install a sprinkler protection system in open parking garages of noncombustible construction which have at least one-hour of structural fire resistance and are provided with increased openings on at least three sides.

Public Comment# 2903

F69-21

Proposed Change as Submitted

Proponents: Andrew Bevis, representing National Fire Sprinkler Association (bevis.andrew1988@gmail.com); Jeffrey Hugo, representing NFSA (hugo@nfsa.org); Joe Scibetta, representing BuildingReports (jscibetta@buildingreports.com)

2021 International Fire Code

Add new definition as follows:

ANIMAL HOUSING FACILITY. Area of a building or structure, including interior and adjacent exterior spaces, where animals are fed, rested, worked, exercised, treated, exhibited, or used for production. Such facilities include but are not limited to barns and stables; kennels; animal shelters; animal hospitals and veterinary facilities; zoos; laboratories; agricultural facilities housing animals; and mercantile or business occupancies with animals.

Add new text as follows:

SECTION 322
ANIMAL HOUSING FACILITIES

322.1 Sources of Ignition.
Smoking or the use of heating or other devices employing an open flame, or the use of spark-producing equipment is prohibited in all areas of an animal housing facility, including agricultural buildings housing livestock or poultry.

322.2 Waste Housekeeping.
Permanent storage of waste shall be prohibited in aisles, hallways, or other types of egress components.

903.2.11.6 Animal housing facilities.
An automatic sprinkler system in accordance with Section 903.3 shall be provided throughout animal housing facilities that contain Group R occupancies or where occupants are expected to delay their emergency egress to care for animals.

2021 International Building Code

Add new definition as follows:

ANIMAL HOUSING FACILITY. Area of a building or structure, including interior and adjacent exterior spaces, where animals are fed, rested, worked, exercised, treated, exhibited, or used for production. Such facilities include but are not limited to barns and stables; kennels; animal shelters; animal hospitals and veterinary facilities; zoos; laboratories; agricultural facilities housing animals; and mercantile or business occupancies with animals.

Add new text as follows:

[F] 903.2.11.6 Animal housing facilities.
An *automatic sprinkler system* in accordance with Section 903.3 shall be provided throughout *animal housing facilities* that contain Group R occupancies or where occupants are expected to delay their emergency egress to care for animals.

Reason: This proposal does two things: it addresses a special type of occupancy that is not covered by IBC or IFC by providing a definition of animal housing and it addresses when residential occupancies are mixed with animal housing facilities. It is important for the IBC to recognize the special operations that take place in these unique facilities, where a secondary population is wholly reliant on a primary population for the necessary, prompt attention required during a fire emergency. Additionally, this proposal addresses the concerns of the code committee from the previous cycle. Further clarification is provided within the definition of what type of facilities are considered animal housing facilities. This proposal's main goal is to make the protection of human occupant's paramount, i.e., where residential dwelling or sleeping units are part of the animal housing facility. It also addresses the concern from the committee that the protection of occupant's lives was secondary. The model codes currently do not adequately address facilities in which people may delay evacuation for the care of animals.
Many states exempt agricultural buildings and is often and traditionally lumped in with "animal housing". A lot of jurisdictions and residents unconsciously do not get permits or inquire about construction codes because of being classified as an agricultural community. The addition of a dwelling unit to a barn, stable, or veterinary office triggers permits and automatic fire sprinkler systems.

Fire data indicates that 98% of civilian injuries in livestock or poultry storage properties were due to structure fires. While 64% of those fires were caused by heating equipment and electrical distribution and lighting equipment. Fires within livestock production properties, 84% of civilian injuries were due to structure fires. While 53% of those fires were caused by heating equipment and electrical distribution and lighting equipment.

Fire sprinklers are installed in some animal housing facilities and have a significant impact saving lives and property. The McKinney, TX Fire Department responded to an incident at The Collin County Animal Shelter. First responders upon arrival noted the fire alarm was sounding and strobes activated. The investigation revealed the fire sprinkler system had activated and extinguished the fire within the shelter. A single sprinkler is credited for the minimal fire damage and reinforced the value of fire sprinkler systems. Shelter staff reported no injuries to the 124 sheltered animals. “This successful sprinkler save continues to demonstrate the effectiveness of automatic fire sprinkler systems in a commercial environment. Had a fire sprinkler system not been present, the outcome may have been very different,” said Deputy Fire Marshal Andrew Barr.

Another fire occurred in the Sea Life Center’s avian curatorial on the second floor of the facility. Firefighters saw smoke coming from the building upon arrival and discovered that the fire sprinkler system had already extinguished what was believed to have been a small electrical fire. No staff or other animals were injured in the fire.

Cost Impact: The code change proposal will increase the cost of construction
The change may increase the cost of construction due to the increased level of life safety for the occupants.

F69-21

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The committee stated that the reasons for disapproval were that the proposal is scoped too large and the proposed definition includes very different types of uses of buildings and Group R occupancies are already covered under the sprinkler sections currently and could be enforced for that type. Additionally, it was noted that the cost increase for some of these buildings would be very significant. However it was acknowledged that there should be some type of protection, but the request was made to include informational data on the incidents that have occurred. (Vote: 12-2)

F69-21

Individual Consideration Agenda

Public Comment 1:

IFC: SECTION 202, SECTION 322, 322.1, 322.2, 322.3 (New), 903.2.11.6; IBC: SECTION 202, [F] 903.2.11.6

Proponents: Andrew Bevis, representing National Fire Sprinkler Association requests As Modified by Public Comment

Modify as follows:

2021 International Fire Code

ANIMAL HOUSING FACILITY . Area of a building or structure, including interior and adjacent exterior spaces, where animals are fed, rested, worked, exercised, treated, exhibited, or used for production. Such facilities include but are not limited to barns and stables; ~~kennels; animal shelters; animal hospitals and veterinary facilities;~~ zoos; laboratories; agricultural facilities housing animals; ~~and mercantile or business occupancies with animals~~ <u>and similar uses but excludes one- and two-family dwellings, townhouses and multifamily residential buildings.</u>

SECTION 322
ANIMAL HOUSING FACILITIES

322.1 Sources of Ignition . Smoking or the use of heating or other devices employing an open flame, or the use of spark-producing equipment is prohibited in all areas of an animal housing facility, including agricultural buildings housing livestock or poultry.

322.2 Waste Housekeeping . Permanent storage of waste shall be prohibited in aisles, hallways, or other types of egress components.

<u>**322.3 Fire Protection .**</u>
<u>Fire protection shall be provided in accordance with Section 903.2.11.6</u>

903.2.11.6 Animal housing facilities . An automatic sprinkler system in accordance with Section 903.3 shall be provided ~~contain Group R occupancies or~~ throughout *animal housing facilities* that <u>are greater than 10,000 sq. ft.</u>~~or where occupants are expected to delay their emergency~~

~~egress to care for animals.~~

2021 International Building Code

ANIMAL HOUSING FACILITY . Area of a building or structure, including interior and adjacent exterior spaces, where animals are fed, rested, worked, exercised, treated, exhibited, or used for production. Such facilities include but are not limited to barns and stables; ~~kennels; animal shelters; animal hospitals and veterinary facilities;~~ zoos; laboratories; agricultural facilities housing animals; ~~and mercantile or business occupancies with animals. with animals~~ and similar uses but excludes one- and two-family dwellings, townhouses and multifamily residential buildings.

[F] 903.2.11.6 Animal housing facilities . An *automatic system* in accordance with Section 903.3 shall be provided throughout *animal housing facilities* ~~that contain Group R occupancies or~~ that are greater than 10,000 sq. ft. ~~or where occupants are expected to delay their emergency egress to care for animals.~~

Commenter's Reason: We agree with the committee's statement that the R occupancies would already by covered by the protection requirements of the Section 903. The reference to R occupancies has been removed. Additionally, the committee felt that definition was scoped too large and contained too many types of uses. The business and mercantile uses were taken out of the definition, only leaving the large agricultural uses that house a large amount of animals or exotic animals that would need to be protected. A square footage threshold has now been provided that will trigger when sprinklers would be required. The threshold of 10,000 sq. ft. was chosen because this is a common threshold provided in other standards of similar uses. This is also double the square footage of a permittable type VB, U use not including a frontage increase. This provides a reasonable cushion and design ability left in the hands of owners and designers. By providing sprinkler protection in these occupancies provides a higher level of fire fighter safety. Fire fighters often feel compelled to save these animals. This provides more time to rescue the highly valued animals and provide a level of protection for those participating in the rescue operations.

The committee also asked for fire additional fire date to substantiate the proposal. Since the Committee Action Hearings in April, there have been three major fires that have resulted in millions of dollars in property damage. A barn fire in Minnesota, that took nine departments and twenty tankers to extinguish the fire, resulted in approximately 12,000 pigs being lost in addition to the structure. Another barn fire in Columbus, Nebraska resulted in 10,000 hogs lost along with the structure. Finally, in Protivin, Iowa an additional 4,400 sows were lost in yet another barn fire in addition to the entire structure. Based on current USDA's report, "Weekly Average Weight of Barrows and Gilts," (week ending 6/1321) the average weight of a hog was 212.3 lbs. The USDA's report, "National Daily Hog and Pork Summary" (dated 6/17/21) states that national average of a pig carcass ranged from $114.40-$137.00. Based on those numbers the three previously mentioned fires resulted in $3-$3.6 million dollars in property loss and that does not include the structures and equipment.
Below are just few more barn fire statistics provided the Animal Welfare Institute.

Arizona - 3/6/21 - 166,000 chickens

Michigan - 2/15/21 - 16,500 turkeys

Pennsylvania - 1/21/21 - 67,000 chickens

New York - 4/29/21 - 60 cows

Missouri - 2/18/21 - 10 horses

The list goes on and on and on. Not only are livestock at risk but millions of dollars worth of racing horses and exotic animals.

Additionally, the NFPA report, "" indicates that 98% of civilian injuries in livestock or poultry storage properties were due to structure fires. While 64% of those fires were caused by heating equipment and electrical distribution and lighting equipment. Fires within livestock production properties, 84% of civilian injuries were due to structure fires. While 53% of those fires were caused by heating equipment and electrical distribution and lighting equipment.

It is abundantly clear that it is time to protect these use groups. This proposal is a reasonable approach in solving this fire problem that costing the farmers of America millions and millions of dollars.

Resources:

https://awionline.org/content/2021-barn-fire-statistics-state

https://www.ams.usda.gov/mnreports/ams_2705.pdf

https://www.ams.usda.gov/mnreports/lsddhps.pdf

https://www.keyc.com/2021/05/17/waseca-barn-fire-kills-an-estimated-pigs/

https://theindependent.com/news/state-and-regional/crime-and-courts/10-000-hogs-killed-building-destroyed-in-fire-at-pillen-family-farms/article_3de3b8cc-adc5-5090-b3da-754bd73f4d3e.html

http://www.crescotimes.com/news/about-4400-sows-lost-fire

Cost Impact: The net effect of the public comment and code change proposal will increase the cost of construction
The code change proposal will increase the cost of construction The change may increase the cost of construction due to the increased level of property protection.

Public Comment# 2375

F72-21

<u>Proposed Change as Submitted</u>

Proponents: Andrew Bevis, National Fire Sprinkler Association, representing National Fire Sprinkler Association; Jeffrey Hugo, representing NFSA (hugo@nfsa.org); Paula Cino, representing National Multifamily Housing Council (pcino@nmhc.org); Dan Buuck, National Association of Home Builders, representing National Association of Home Builders (dbuuck@nahb.org); Margo Thompson, Newport Ventures, representing National Multifamily Housing Council (mthompson@newportventures.net)

2021 International Fire Code

Revise as follows:

903.3.1.2 NFPA 13R sprinkler systems. *Automatic sprinkler systems* in Group R occupancies shall be permitted to be installed throughout in accordance with NFPA 13R where the Group R occupancy meets all of the following conditions:

1. Four stories or less above *grade plane*.
2. The floor level of the highest story is ~~30~~ <u>35</u> feet (~~9144~~ 10668 mm) or less above the lowest level of fire department vehicle access.
3. The floor level of the lowest story is ~~30~~ <u>35</u> feet (~~9144~~ 10668 mm) or less below the lowest level of fire department vehicle access.

The number of stories of Group R occupancies constructed in accordance with Sections 510.2 and 510.4 of the International Building Code shall be measured from *grade plane*.

2021 International Building Code

Revise as follows:

[F] 903.3.1.2 NFPA 13R sprinkler systems. *Automatic sprinkler systems* in Group R occupancies shall be permitted to be installed throughout in accordance with NFPA 13R where the Group R occupancy meets all of the following conditions:

1. Four stories or fewer above *grade plane*.
2. The floor level of the highest *story* is ~~30~~ <u>35</u> feet (~~9144~~ <u>10668</u> mm) or less above the lowest level of fire department vehicle access.
3. The floor level of the lowest *story* is ~~30~~ <u>35</u> feet (~~9144~~ <u>10668</u> mm) or less below the lowest level of fire department vehicle access.

The number of stories of Group R occupancies constructed in accordance with Sections 510.2 and 510.4 shall be measured from grade plane.

Reason: During the previous code development cycle, an issue of significant concern was rectified with respect to NFPA 13R sprinklers in Group R occupancies in podium-style buildings and allowance for as many as four stories up to 60' in height above grade to be constructed on top of the horizontal building separation. However, while continuing to allow for NFPA 13R systems in four story Group R occupancies, the height limit from fire department vehicle access to the floor level of the highest story was changed to only 30'. In most cases, this height limit will not allow for NFPA 13R sprinklers in a four-story apartment building.
According to feedback from contractors, developers, and design professionals, typical height of floor assembly framing in multifamily buildings is slightly less than twelve inches. A four-story apartment building with 8'-6" ceiling heights and the necessary 8" to 12" foundation exposure above grade, would exceed this 30' limit. Likewise, a very common mixed use building type of three stories of residential occupancy above ground level retail space would also exceed the 30' limit. The current 30' limit is at the very low end of fourth-story floor level height and offers little flexibility for floor-to-ceiling heights greater than 8'-0". With the current 30' limitation, NFPA 13R sprinkler systems are essentially limited to three-story buildings: The NFPA 13R standard was specifically created to permit these systems in buildings up to four stories. This proposal will allow the use of NFPA 13R sprinkler systems as envisioned by the standard.

It is also important to understand that the floor level measurement is not taken from the grade adjacent to the building but from the lowest level of fire department vehicle access, which can be up to 150 feet away. The difference in elevation over that distance can be significant, further limiting the number of buildings which can meet this section. Below is an example of a 4-story multifamily building. The 4th floor is at a height of 32' above grade. However, the dimension used as the threshold for a 13R system increases where the lowest level of fire department vehicle access is below the level of grade at the building.

The dimension of 35' was selected as the limit because it allows more flexibility for building design and floor-to-ceiling height while still remaining well within the 75' reach of typical fire truck ladders. It is also significantly lower than the 60' height limit which had been in place prior to the code change in 2021.

NFPA 13R systems have been extremely effective in protecting human lives as well as preventing significant property damage from fire in low-rise residential buildings since the NFPA 13R Standard was first published in 1989. A 2016 issue of the NFPA Journal published the findings of a workshop attended by subject matter experts that focused on the adequacy of 13R sprinklers. Overarching conclusions were 1) that major fires in 13R-protected buildings were the exception – not the rule and 2) that there was not sufficient evidence to indicate that 13R sprinklers have not been effective in protecting human life and reducing property damage. To quote the June 2016 NFPA Report describing the outcomes of the workshop:

- *"NFPA 13R/13D are effective standards that reduces loss of life and building damage due to a fire event."*
- *"To consider or make any changes to NFPA 13R/13D, better (more refined) data needs to be identified as well as collected on a consistent basis. A national database that describes fire events with information on building type/codes would assist in making intelligent changes to any sprinkler standards."*

Essentially limiting the use of NFPA 13R sprinkler systems to Group R buildings three-stories or less does not recognize other significant changes in the codes in recent cycles that offer increased fire protection. Furthermore, there may be some unintended consequences with respect to the current language. Recent cycles have seen changes such as sprinkler requirements for balconies in buildings where 13R sprinklers are used, increased attic protection if it is not sprinklered such as construction of the attic using fire retardant wood or non-combustible materials, and the recent 2021 requirement for special inspections of sealing fire penetrations and draft stopping. All of these ancillary provisions have increased fire protection and stringency of the fire code. Furthermore, by reducing the use of NFPA 13R systems in R-2 occupancies, requirements for sprinkler protection of balconies in these buildings have also been reduced – historically, an issue of significant concern. By extending requirements for NFPA 13 sprinklers in R-2 occupancies, sprinkler requirements for balconies are fewer or non-existent when compared to the absolute mandate of sprinklers on balconies for NFPA 13R systems through the IBC.

Census data reports that of the 13,000 multifamily buildings completed in 2019, more than 10,000 (77%) of these buildings were four stories or less. By reducing the percentage of multifamily buildings where NFPA 13R sprinklers are permitted, the code language as it currently stands will significantly impact housing affordability. The National Multifamily Housing Council estimates that moving from NFPA 13R to NFPA 13 sprinkler systems would carry an incremental installed cost increase of approximately $1.00/sq. ft. to $2.00/sq. ft. of overall building area on average across the US.

NFPA 13R sprinklers are a very effective means of assuring life safety and property protection in Group R buildings four stories and less while maintaining housing affordability. An increase in height to 35' above or below the lowest level of fire department vehicle access is reasonable and modest and can easily be reached by the typical fire truck ladder.' This proposal recognizes the long-standing effectiveness of 13R life safety systems, which have been allowed since the early years of the I-codes as well as the legacy codes.

Cost Impact: The code change proposal will decrease the cost of construction
Costs associated with requirements for attic protection in NFPA 13 systems not only includes the additional sprinklers and piping but also costs associated with increased hydraulic demand and water supply as well as necessary freeze protection in cold and even moderate climates. Greater density and spacing of sprinklers, larger pipe diameter, sprinklers in concealed spaces, and especially, requirements for attic protection (with some exceptions) all contribute to the added cost. This cost increase does not include the final cost with markup to the building owner or the potential need to add a fire pump in the NFPA 13 system. Moving from a 13R system to a 13 system for a $9,342,688, four-story, 48-unit apartment building increased construction costs by $102,255 or a little over $2,100/unit. (Home Innovation Research Labs, *Cost Analysis of Proposed Group A Code Changes (2018-2019 ICC Code Development Cycle)* – October 2018). This would have a substantial impact on both tenant rental rates and owner-occupied units. The detailed cost analysis is shown below.

Four-Story Building on Grade, 48 Units & Common Areas

[ELEVATION]

Table F117-A. Cost of NFPA 13 Sprinkler System Compared to NFPA 13R System

Component	Unit	Material	Labor	Total	w/O&P	Qty	Cost
Residential sprinkler heads	EA	16	21.50	37.5	53	292	15,476
3/4" diameter CPVC piping (NFPA 13R)	LF	7	6.90	13.9	19.05	4292	81,763
Wet standpipe riser, schedule 20, 4" diameter pipe	FL	5800	2875	--	8675	4	34,700
						Total NFPA 13R System	**131,939**
Additional sprinkler heads (attic)	EA	16	21.50	37.5	53	44	2,332
Additional sprinkler heads (non-exempt bathrooms)	EA	16	21.50	37.5	53	2	106
3/4" diameter CPVC piping (NFPA 13R)	LF	7	6.90	13.9	19.05	(4292)	(81,763)
1-1/2" CPVC piping (NFPA 13)	LF	18.55	9.75	28.3	36.50	4292	156,658
Additional 1-1/2" CPVC piping for new sprinkler heads (NFPA 13)	LF	18.55	9.75	28.3	36.50	618	22,557
Additional floor, wet standpipe riser, schedule 20, 4" diameter pipe	FL	1475	890	--	2365	1	2,365
						Total NFPA 13 System	**234,194**
						Total to Builder	**102,255**

F72-21

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The committee stated that the reasons for disapproval were that during the last code cycle there was a very lengthy conversation and discussion regarding this requirement where it went to the floor and it went through the process and the members were able to speak. The past testimony about lowering it to 30 feet was regarding ladder access as most fire engines today per the NFPA standard carry 35-foot ladders which will reach 30 feet high and will reach a window. As noted, there is a need to stay at the current requirement until there is proof otherwise since it hasn't even been used yet. Additionally, there was concern about going lower below grade as it was brought up in the testimony and it was questioned why it's even being considered. (Vote: 9-5)

Individual Consideration Agenda

Public Comment 1:

IFC: 903.3.1.2; IBC: [F] 903.3.1.2

Proponents: Chase Browning, representing Medford Fire Department (chase.browning@cityofmedford.org); Jeffrey Hugo, representing NFSA (hugo@nfsa.org) requests As Modified by Public Comment

Replace as follows:

2021 International Fire Code

903.3.1.2 NFPA 13R sprinkler systems . *Automatic sprinkler systems* in Group R occupancies shall be permitted to be installed throughout in accordance with NFPA 13R where the Group R occupancy meets all of the following conditions:

1. Four stories or less above *grade plane*.
2. The floor level of the highest story is 30 feet (9144 mm) or less above the lowest level of fire department vehicle access.

   Exception: For Group R-2 occupancies, the floor level of the highest story is permitted to be 35 feet (10668 mm) or less above the lowest level of fire department vehicle access. This exception shall only apply where *firewalls* have not been used to define multiple buildings in accordance with Section 503.1 of the *International Building Code*.

3. The floor level of the lowest story is 30 feet (9144 mm) or less below the lowest level of fire department vehicle access.

The number of stories of Group R occupancies constructed in accordance with Sections 510.2 and 510.4 of the International Building Code shall be measured from *grade plane*.

2021 International Building Code

[F] 903.3.1.2 NFPA 13R sprinkler systems . *Automatic sprinkler systems* in Group R occupancies shall be permitted to be installed throughout in accordance with NFPA 13R where the Group R occupancy meets all of the following conditions:

1. Four stories or fewer above *grade plane*.
2. The floor level of the highest *story* is 30 feet (9144 mm) or less above the lowest level of fire department vehicle access.

   Exception: For Group R-2 occupancies, the floor level of the highest story is permitted to be 35 feet (10668 mm) or less above the lowest level of fire department vehicle access. This exception shall only apply where *firewalls* have not been used to define multiple buildings in accordance with Section 503.1.

3. The floor level of the lowest *story* is 30 feet (9144 mm) or less below the lowest level of fire department vehicle access.

The number of stories of Group R occupancies constructed in accordance with Sections 510.2 and 510.4 shall be measured from grade plane.

Commenter's Reason: In response to feedback received during the committee hearing and afterwards, the scope of the original proposal has been narrowed to only apply to R-2 and only for cases where the entire structure complies with the area limits of Chapter 5, with no additional buildings or increased area associated with the use of firewalls to create additional buildings. A 35 foot threshold for an R-2 will provide a path to utilizing 13R for low-rise residential, four story buildings, which is important to achieve affordable and available safe housing. The 35 ft. threshold provides a reasonable and appropriate measurement that is still much more conservative than what has been allowed by code for decades until the 2021 edition, and by eliminating the allowance to create multiple buildings at this height using firewalls, demand on fire service resources is significantly diminished. Essentially, this change will take the code back to allowing basic 4-story garden apartments using 13R sprinklers. Larger buildings will still be required to use the current 30-foot above the lowest level of fire department access threshold that mandates full NFPA 13 protection.
Many communities are facing available housing issues, and cost is a major factor. A NFPA 13R system is substantially more affordable than a NFPA13 system, and the 5-foot increase proposed by this public comment will not measurably impact fire suppression tactics or the level of life safety.

Cost Impact: The net effect of the public comment and code change proposal will decrease the cost of construction

The permissible use of NFPA 13R systems reduces cost vs. NFPA 13 systems.

Public Comment# 2972

Public Comment 2:

IFC: 903.3.1.2; IBC: [F] 903.3.1.2

Proponents: Dan Buuck, representing National Association of Home Builders (dbuuck@nahb.org); Margo Thompson, representing Nat (mthompson@newportventures.net) requests As Modified by Public Comment

Replace as follows:

2021 International Fire Code

903.3.1.2 NFPA 13R sprinkler systems . *Automatic sprinkler systems* in Group R occupancies shall be permitted to be installed throughout in accordance with NFPA 13R where the Group R occupancy meets all of the following conditions:

1. Four stories or less above *grade plane*.
2. The floor level of the highest story is ~~30~~ 35 feet (~~9144~~ 10668 mm) or less above the lowest level of fire department vehicle access.
3. The floor level of the lowest story is 30 feet (9144 mm) or less below the lowest level of fire department vehicle access.

The number of stories of Group R occupancies constructed in accordance with Sections 510.2 and 510.4 of the International Building Code shall be measured from *grade plane*.

2021 International Building Code

[F] 903.3.1.2 NFPA 13R sprinkler systems . *Automatic sprinkler systems* in Group R occupancies shall be permitted to be installed throughout in accordance with NFPA 13R where the Group R occupancy meets all of the following conditions:

1. Four stories or fewer above *grade plane*.
2. The floor level of the highest *story* is ~~30~~ 35 feet (~~9144~~ 10668mm) or less above the lowest level of fire department vehicle access.
3. The floor level of the lowest *story* is 30 feet (9144 mm) or less below the lowest level of fire department vehicle access.

The number of stories of Group R occupancies constructed in accordance with Sections 510.2 and 510.4 shall be measured from grade plane.

Commenter's Reason: NFPA 13R has been the standard for installing fire sprinkler in low-rise residential occupancies since 1989. It is scoped to multifamily buildings with a maximum of four stories, but the 2013 edition allowed these buildings to be on top of a fire-separated podium or pedestal, significantly increasing their overall allowed height to 60 feet. The 2018 editions of the IFC and IBC added requirements to address concerns regarding the fire safety of the attics in these podium-style buildings.
Last cycle, instead of reverting back to the pre-2013 limits of four stories total, which would have rectified all concerns about pedestal buildings, a much more restrictive requirement was adopted by a narrow margin. This was done before the effects of the increased fire safety measures in the 2018 edition could be assessed. This public comment is a compromise between the result of last cycle and the original four-story threshold in the standard.

13R sprinklers are currently allowed by the NFPA standard in buildings up to 4 stories and 60 feet in height. The 35-foot height proposed in this public comment is well below the 60-foot threshold and more realistically allows for 4-story Group R buildings with floor-to-ceiling heights of 8 to 10 feet which is common in multifamily buildings.

One reason given during the Committee Action Hearings for not approving even the adjustment from 30 to 35 feet is the reach of ladders carried on most fire engines. This is despite the fact that egress/ingress openings are not required on buildings protected by a 13R system.

13R sprinklers have proved effective with respect to both life safety and minimizing property damage in the event of a fire. The 2015 NFPA-sponsored workshop on the effectiveness of 13R sprinklers also concluded that there was not sufficient evidence to warrant changes to the NFPA 13R standard.

Based on testimony heard at the Committee Action Hearings, we have removed any revisions to the floor level of the lowest story.

Bibliography: National Fire Protection Association, *Workshop on Life Safety Sprinkler System Challenge - December 15-16, 2015 Lake Buena Vista, FL*, June 2016.

Cost Impact: The net effect of the public comment and code change proposal will decrease the cost of construction
Requiring a NFPA 13R system instead of a 13 system for a multifamily building can save over $2,100/unit. (*Home Innovation Research Labs, Cost Analysis of Proposed Group A Code Changes (2018-2019 ICC Code Development Cycle) – October 2018*). This would have a substantial impact on both tenant rental rates and owner-occupied units.

A detailed cost analysis is included with the original proposal.

Public Comment# 2711

Public Comment 3:

IFC: 903.3.1.2; IBC: [F] 903.3.1.2

Proponents: Jeffrey Shapiro, representing Self (jeff.shapiro@intlcodeconsultants.com) requests As Modified by Public Comment

Replace as follows:

2021 International Fire Code

903.3.1.2 NFPA 13R sprinkler systems . *Automatic sprinkler systems* in Group R occupancies shall be permitted to be installed throughout in accordance with NFPA 13R where the Group R occupancy meets all of the following conditions:

1. Four stories or less above *grade plane*.
2. For other than Group R-2 occpancies, ~~T~~ the floor level of the highest story is 30 feet (9144 mm) or less above the lowest level of fire department vehicle access.

   For Group R-2 occupancies, the roof assembly is less than 45 feet (13716 mm) above the lowest level of fire department vehicle access. The height of the roof assembly shall be determined by measuring the distance from the lowest required fire vehicle access road surface adjacent to the building to the eave of the highest pitched roof, the intersection of the highest roof to the exterior wall, or the top of the highest parapet, whichever yields the greatest distance.
3. The floor level of the lowest story is 30 feet (9144 mm) or less below the lowest level of fire department vehicle access.

The number of stories of Group R occupancies constructed in accordance with Sections 510.2 and 510.4 of the International Building Code shall be measured from *grade plane*.

2021 International Building Code

[F] 903.3.1.2 NFPA 13R sprinkler systems . *Automatic sprinkler systems* in Group R occupancies shall be permitted to be installed throughout in accordance with NFPA 13R where the Group R occupancy meets all of the following conditions:

1. Four stories or fewer above *grade plane*.
2. For other than Group R2 occupancies,~~T~~ the floor level of the highest *story* is 30 feet (9144 mm) or less above the lowest level of fire department vehicle access.

   For Group R-2 occupancies, the roof assembly is less than 45 feet (13716 mm) above the lowest level of fire department vehicle access. The height of the roof assembly shall be determined by measuring the distance from the lowest required fire vehicle access road surface adjacent to the building to the eave of the highest pitched roof, the intersection of the highest roof to the exterior wall, or the top of the highest parapet, whichever yields the greatest distance.
3. The floor level of the lowest *story* is 30 feet (9144 mm) or less below the lowest level of fire department vehicle access.

The number of stories of Group R occupancies constructed in accordance with Sections 510.2 and 510.4 shall be measured from grade plane.

Commenter's Reason: When Proposal F117-18 was considered and approved last cycle, changing the limit for NFPA 13R systems to the current 30-foot value, the justification provided in the proponent's reason statement was entirely oriented towards addressing concerns with pedestal style buildings, and the chosen 30-foot threshold for triggering NFPA 13 protection was justified based on correlation with the trigger value for requiring standpipes. The logic offered was that standpipes require larger supply and riser piping, so the cost of upgrading to NFPA 13 protection would already be partially offset. While that's true, the piping cost offset versus the overall cost of increasing to NFPA 13 protection is insignificant. No specific life-safety or property protection basis or loss data justified the 30-foot threshold versus a few feet in either direction. Nevertheless, the approach of simply changing the current value to 35 feet doesn't address a bigger issue with the current provisions.
What was overlooked in selecting the current threshold is the common use of mezzanines in upper levels of Group R2 occupancies. From the

exterior, a mezzanine level in the 4th story would appear to be a 5th story, and such mezzanines often include a sleeping area. Yet, the current threshold would allow a NFPA 13R system to be used if the floor level of the 4th floor does not exceed the 30-foot limit. Meanwhile, a building not having mezzanine levels with a slightly higher 4th floor level, perhaps due to a slightly sloping lot and a lower fire-department access road, would be forced into using NFPA 13. The requirement to use a higher level of fire protection for a lesser risk condition makes no sense and is not justified.

This public comment offers a different approach modeled after what has already been approved by the ICC membership to address attic protection in NFPA 13R buildings in Section 903.3.1.2.3 in the 2018 edition. The approach triggers NFPA 13 protection based on the height of the attic, set at a threshold of 45 feet to reasonably allow a typical 4-story apartment building with 9-foot ceilings and 1-foot floor ceiling assemblies. The additional 5 feet accommodates the height of a grade-level slab and downward slope away from a building on a nearly-flat lot to accommodate drainage in the distance between the building and a fire access road, from which the lowest level of fire department vehicle access is measured.

In summary, this public comment will close the loophole that currently exists in the text that was added to the code in the 2021 edition, permitting a 13R protected building to have a 55-foot attic height with a tall 4th floor mezzanine without attic protection as long as the floor level of the highest occupied floor isn't over 30 feet above the lowest level of fire department vehicle access. In approving this proposal, the code will still strictly limit the permissible use of NFPA 13R to R2 occupancies that don't exceed 4 stories and which cannot include a combination of tall ceilings and upper level mezzanines. The proposal has been limited to R2 occupancies recognizing the different operational, occupant and architectural attributes of R2 vs. R1 occupancies.

Although I am a consultant to NFSA and NFSA supported the original proposal, this public comment is my own, based on having been involved in developing ICC's fire protection requirements for multifamily buildings for over 20 years, and it is not submitted on NFSA's behalf.

Cost Impact: The net effect of the public comment and code change proposal will not increase or decrease the cost of construction
This proposal cannot be specifically tied to increasing or decreasing the cost of construction, as its application is dependent on architectural choices that may or may not lead to a change in cost vs. the cost of compliance with the 2021 edition. In some cases, such as tall buildings with mezzanines, a cost increase could be experienced. In other cases, a cost reduction could be experienced, the proposal may have no impact on cost.

Public Comment# 2976

F73-21

Proposed Change as Submitted

Proponents: Chase Browning, representing Medford Fire Department

2021 International Fire Code

Revise as follows:

903.4.2 Alarms. For *automatic sprinkler systems* installed in accordance with Section 903.3.1.1 or 903.3.1.2 , ~~A~~ an *approved* audible device, located on the exterior of the building in an *approved* location, shall be connected to each *automatic sprinkler system*. Such sprinkler waterflow alarm devices shall be activated by water flow equivalent to the flow of a single sprinkler of the smallest orifice size installed in the system. Where a fire alarm system is installed, actuation of the *automatic sprinkler system* shall actuate the building fire alarm system.

2021 International Building Code

Revise as follows:

[F] 903.4.2 Alarms. For *automatic sprinkler systems* installed in accordance with Section 903.3.1.1 or 903.3.1.2, ~~A~~ an approved audible device, located on the exterior of the building in an approved location, shall be connected to each *automatic sprinkler system*. Such sprinkler waterflow alarm devices shall be activated by water flow equivalent to the flow of a single sprinkler of the smallest orifice size installed in the system. Where a fire alarm system is installed, actuation of the *automatic sprinkler system* shall actuate the building fire alarm system.

Reason: It is appropriate to provide an audible alarm for NFPA 13 and NFPA 13R systems,
however, NFPA 13D (903.3.1.3) does not require such a device.

Cost Impact: The code change proposal will decrease the cost of construction
Not including the exterior bell will reduce costs.

F73-21

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The committee stated that the reason for disapproval was that an exception already exists in the section charging text and all the other sections are subsections to that charging text. Additionally, it was noted that NFPA 13D systems are allowed for some structures that are not single family dwellings, which could be historic resources, and not having a bell that is going to tell you that there's a water flow going on inside is potentially going to damage those structures beyond repair. (Vote: 8-7)

F73-21

Individual Consideration Agenda

Public Comment 1:

IFC: 903.4 (New), 903.4, 903.4.1, 903.4.2, 903.4.3; IBC: 903.4 (New), [F] 903.4, [F] 903.4.1, [F] 903.4.2, [F] 903.4.3

Proponents: Jeffrey Shapiro, representing Self (jeff.shapiro@intlcodeconsultants.com); Chase Browning, representing Medford Fire Department requests As Modified by Public Comment

Replace as follows:

2021 International Fire Code

903.4 Sprinkler system supervision and alarms . *Automatic sprinkler system* supervision and alarms shall comply with Sections 903.4.1 through 903.4.3.

~~**903.4**~~ **903.4.1** **Electronic supervision** ~~**Sprinkler system supervision and alarms**~~ **.** Valves controlling the water supply for *automatic sprinkler* *systems*, pumps, tanks, water levels and temperatures, critical air pressures and waterflow switches on all sprinkler systems shall be electrically supervised by a *listed* fire alarm control unit.

Exceptions:

1. *Automatic sprinkler systems* protecting one- and two-family *dwellings*.
2. Limited area sprinkler systems in accordance with Section 903.3.8, provided that backflow prevention device test valves located in limited area sprinkler system supply piping shall be locked in the open position unless supplying an occupancy required to be equipped with a fire alarm system, in which case the backflow preventer valves shall be electrically supervised by a tamper switch installed in accordance with NFPA 72 and separately annunciated.
3. *Automatic sprinkler systems* installed in accordance with NFPA 13R where a common supply main is used to supply both domestic water and the *automatic sprinkler system*, and a separate shutoff valve for the *automatic sprinkler system* is not provided.
4. Jockey pump control valves that are sealed or locked in the open position.
5. Control valves to commercial kitchen hoods, paint spray booths or dip tanks that are sealed or locked in the open position.
6. Valves controlling the fuel supply to fire pump engines that are sealed or locked in the open position.
7. Trim valves to pressure switches in dry, preaction and deluge sprinkler systems that are sealed or locked in the open position.
8. Underground key or hub gate valves in roadway boxes.

~~**903.4.1**~~ **903.4.2 Monitoring .** Alarm, supervisory and trouble signals shall be distinctly different and shall be automatically transmitted to an *approved* supervising station or, where *approved* by the *fire code official*, shall sound an audible signal at a constantly attended location.

~~**Exception:** Backflow prevention device test valves located in limited area sprinkler system supply piping shall be locked in the open position. In occupancies required to be equipped with a fire alarm system, the backflow preventer valves shall be electrically supervised by a tamper switch installed in accordance with NFPA 72 and separately annunciated.~~

~~**903.4.2**~~ **903.4.3 Alarms .** An *approved* audible and visual sprinkler waterflow alarm device, located on the exterior of the building in an *approved* location, shall be connected to each *automatic sprinkler system*. Such sprinkler waterflow alarm devices shall be activated by water flow equivalent to the flow of a single sprinkler of the smallest orifice size installed in the system. Where a water flow switch is required by Section 903.4.1 to be electrically supervised, such sprinkler waterflow alarm devices shall be powered by a fire alarm control unit or, where provided, a fire alarm system. Where a fire alarm system is provided ~~installed~~, actuation of the *automatic sprinkler system* shall actuate the building fire alarm system.

Exception: *Automatic sprinkler systems* protecting one- and two-family dwellings.

903.3.9 ~~**903.4.3**~~ **High-rise building floor** ~~**Floor**~~ **control valves .** *Approved* supervised indicating control valves shall be provided at the point of connection to the riser on each floor in high-rise buildings.

2021 International Building Code

903.4 Sprinkler system supervision and alarms .
Automatic sprinkler system supervision and alarms shall comply with Sections 903.4.1 through 903.4.3.

[F] ~~**903.4**~~ **903.4,1 Electronic supervision** ~~**Sprinkler system supervision and alarms**~~ **.** Valves controlling the water supply for *automatic sprinkler systems*, pumps, tanks, water levels and temperatures, critical air pressures, and waterflow switches on all sprinkler systems shall be electrically supervised by a *listed* fire alarm control unit.

Exceptions:

1. *Automatic sprinkler systems* protecting one- and two-family *dwellings*.
2. Limited area sprinkler systems in accordance with Section 903.3.8, provided that backflow prevention device test valves located in limited area sprinkler system supply piping shall be locked in the open position unless supplying an occupancy required to be equipped with a fire alarm system, in which case the backflow preventer valves shall be electrically supervised by a tamper switch installed in accordance with NFPA 72 and separately annunciated.
3. *Automatic sprinkler systems* installed in accordance with NFPA 13R where a common supply main is used to supply both domestic water and the *automatic sprinkler system*, and a separate shutoff valve for the *automatic sprinkler system* is not provided.
4. Jockey pump control valves that are sealed or locked in the open position.
5. Control valves to commercial kitchen hoods, paint spray booths or dip tanks that are sealed or locked in the open position.
6. Valves controlling the fuel supply to fire pump engines that are sealed or locked in the open position.
7. Trim valves to pressure switches in dry, preaction and deluge sprinkler systems that are sealed or locked in the open position.
8. Underground key or hub gate valves in roadway boxes.

[F] ~~**903.4.1**~~ **903.4.2** **Monitoring .** Alarm, supervisory and trouble signals shall be distinctly different and shall be automatically transmitted to an *approved* supervising station or, where *approved* by the fire code official, shall sound an audible signal at a *constantly attended location*.

> ~~**Exception:** Backflow prevention device test valves located in limited area sprinkler system supply piping shall be locked in the open position. In occupancies required to be equipped with a fire alarm system, the backflow preventer valves shall be electrically supervised by a tamper switch installed in accordance with NFPA 72 and separately annunciated.~~

[F] ~~**903.4.2**~~ **903.4,3** **Alarms .** An *approved* audible and visual sprinkler waterflow alarm device, located on the exterior of the building in an *approved* location, shall be connected to each *automatic sprinkler system*. Such sprinkler waterflow alarm devices shall be activated by water flow equivalent to the flow of a single sprinkler of the smallest orifice size installed in the system. Where a water flow switch is required by Section 903.4.1 to be electrically supervised, such sprinkler waterflow alarm devices shall be powered by a fire alarm control unit or, where provided, a fire alarm system. Where a fire alarm system is provided ~~installed~~, actuation of the *automatic sprinkler system* shall actuate the building fire alarm system.

> **Exception:** *Automatic sprinkler systems* protecting one- and two-family dwellings.

[F] ~~**903.4.3**~~ **903.3.9** **High-rise building floor** ~~**Floor**~~ **control valves .** *Approved* supervised indicating control valves shall be provided at the point of connection to the riser on each floor in high-rise buildings.

Commenter's Reason: Discussion at the committee hearing and the 8:7 vote clearly demonstrated varying interpretations of how Section 903.4 should be applied and that the section needs a more comprehensive rewrite to fix the existing issues. This public comment does the following to address all points of concern:

1. Creates a scoping section. Some interpret the existing exceptions in 903.4 as applying to the subsections under Section 903.4, while others do not. The revision clarifies scoping and that the exceptions in 903.4 of the 2021 edition only apply to that section, and not the subsections that followed.
2. Moves/merges the exception currently under 903.4.1 (monitoring) into the retitled section above (electronic supervision). The exception primarily relates to the need for electronic supervision, not monitoring by a supervising station or constantly attended location. Thereby, it was misplaced. Further, the current exception #2 in 903.4 exempted ALL limited area systems from any electronic supervision, so one could have argued that the exception under "monitoring" never applied. Merging the exceptions fixes that conflict in a way that clarifies logical application of the current code provisions.
3. Incorporates the committee recommendation on F74 but with improved text vs. the floor amendment that was accepted by the committee. The intent of F74 is to add visual alarm devices where audible devices are currently required. As modified by the committee, F74 also clarified that water flow switches required to be electrically supervised have to be be powered by a fire alarm control unit or a fire alarm system. If this public comment is approved, it is intended to replace the committee action on F74 since this will be the last action on this section in the 2024 edition cycle.
4. Section 903.4.3 is being relocated to Section 903.3 (installation). The requirement is more appropriately co-located with installation provisions because it is requiring floor control valves.
5. The original F73 proposed exception for one- and two-family dwellings is being added to Section 903.4.3. There was general agreement at the hearing that one- and two-family dwellings should not require exterior water flow alarms, but some felt that the original proposal was unnecessary (per the scoping misinterpretation issue discussed in #1 above). Others did not support extending an outdoor water flow alarm exception to all 13D installations, as originally proposed, so this public comment only applies the exception to one- and two-family dwellings.

Cost Impact: The net effect of the public comment and code change proposal will decrease the cost of construction
Outside alarm will now clearly not be required for one- and two-family dwelling sprinkler systems. Remainder of the proposal is cleanup of existing text and new provisions added by F74.

Public Comment# 2879

Public Comment 2:

Proponents: Dan Nichols, representing ICC Code Correlation Committee (ccc@iccsafe.org)

Commenter's Reason: The Code Correlation Committee (CCC) is not taking a position on this code change. The CCC submitted this public comment in order to bring a correlation issue to the attention of the full voting membership for the Public Comment Hearings and the Online Governmental Consensus Vote to allow the voting membership to coordinate actions on Code Changes F73-21 and F74-21. If the final actions on F73-21 is AMPC and F74-21 is AM, the resulting text will not be correlated.
The Code Correlation Committee is a standing committee of the International Code Council whose objectives, procedures and organization are set forth in Council Policy CP#44-13. The objective of the Code Correlation Committee is to maintain technical and editorial consistency among the International Codes and to assist staff in the evaluation and processing of code change proposals and comments that are exclusively editorial.

F74-21

Proposed Change as Submitted

Proponents: Michael OBrian, representing Self (mobrian@codesavvyconsultants.com); Richard Boisvert, Michigan Fire Inspectors Society, representing Michigan Fire Inspectors Society (rboisvert@brightonareafire.com)

2021 International Fire Code

Revise as follows:

903.4.2 Alarms. An*approved* audible and visual device, located on the exterior of the building in an *approved* location, shall be connected to each *automatic sprinkler system*. Such sprinkler water flow alarm devices shall be activated by water flow equivalent to the flow of a single sprinkler of the smallest orifice size installed in the system. The exterior audible and visual device shall be powered by the fire alarm control unit or fire alarm system. Where a fire alarm system is installed, actuation of the automatic sprinkler system shall actuate the building fire alarm system.

2021 International Building Code

Revise as follows:

[F] 903.4.2 Alarms. An approved audible and visual device, located on the exterior of the building in an approved location, shall be connected to each *automatic sprinkler system*. Such sprinkler waterflow alarm devices shall be activated by water flow equivalent to the flow of a single sprinkler of the smallest orifice size installed in the system. The exterior audible and visual device shall be powered by the fire alarm control unit or fire alarm system. Where a fire alarm system is installed, actuation of the *automatic sprinkler system* shall actuate the building fire alarm system.

Reason: Fire Code Officials have long found that the exterior device is not properly maintained and have changed the exterior bell to a audio/visual device. This code change does two things. The first is to update the external alarm device to be an AV Device. This device is a weather proof Horn/Strobe device that is common on many fire alarm and sprinkler system. This proposal also adds that the device is powered by the Fire Alarm System or Fire Alarm Control Unit (When required by IFC 903.4).
Most automatic fire sprinkler systems are required to be monitored and have the ability to include an exterior horn/strobe or similar device located in an approved location. By adding this requirement, we truly increase the ability of system maintenance for the life of the building. In directly this proposal:

1. Removes the need for an electrician to wire the new exterior bell which is many times powered by 110v.
2. Adding the device to the fire alarm system as required by 903.4 or 907, creates a system which will be maintained on a regular basis.
3. The added visual component, can aid in the location of exterior features such as the FDC and alert others to a water flow alarm.

This proposal does not add alarm system requirements as found by IFC/IBC 907.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The existing exterior bell and the cost of the audible/visual notification device have similar cost comparisons.

F74-21

Public Hearing Results

Committee Action: **As Modified**

Committee Modification:

2021 International Fire Code

903.4.2 Alarms. An *approved* audible and visual device, located on the exterior of the building in an *approved* location, shall be connected to each *automatic sprinkler system*. Such sprinkler water flow alarm devices shall be activated by water flow equivalent to the flow of a single sprinkler of the smallest orifice size installed in the system. When the water flow switch is required by 903.4 to be supervised by a Fire Alarm Control Unit, the exterior audible and visual device shall be powered by the fire alarm control unit or fire alarm system. Where a fire alarm system is installed, actuation of the automatic sprinkler system shall actuate the building fire alarm system.

2021 International Building Code

[F] 903.4.2 Alarms. An approved audible and visual device, located on the exterior of the building in an approved location, shall be connected to each *automatic sprinkler system*. Such sprinkler waterflow alarm devices shall be activated by water flow equivalent to the flow of a single sprinkler of the smallest orifice size installed in the system. When the water flow switch is required by 903.4 to be supervised by a Fire Alarm Control Unit, The exterior audible and visual device shall be powered by the fire alarm control unit or fire alarm system. Where a fire alarm system is installed, actuation of the *automatic sprinkler system* shall actuate the building fire alarm system.

Committee Reason: The committee stated that reason for the approval of the modification is that it a good clarification that identifies when you have a water flow switch that this is required, and it does satisfy the issue about not wanting to require a fire alarm system. The stated reason for the approval of the proposal was that it is a good way to improve the response and that having the device monitored it will be known exactly when it's broken and it will be able to be fixed much sooner than during quarterly inspections. (Vote: 11-3)

F74-21

Individual Consideration Agenda

Public Comment 1:

Proponents: Dan Nichols, representing ICC Code Correlation Committee (ccc@iccsafe.org)

Commenter's Reason: The Code Correlation Committee (CCC) is not taking a position on this code change. The CCC submitted this public comment in order to bring a correlation issue to the attention of the full voting membership for the Public Comment Hearings and the Online Governmental Consensus Vote to allow the voting membership to coordinate actions on Code Changes F73-21 and F74-21. If the final actions on F73-21 is AMPC and F74-21 is AM, the resulting text will not be correlated.
The Code Correlation Committee is a standing committee of the International Code Council whose objectives, procedures and organization are set forth in Council Policy CP#44-13. The objective of the Code Correlation Committee is to maintain technical and editorial consistency among the International Codes and to assist staff in the evaluation and processing of code change proposals and comments that are exclusively editorial.

Public Comment# 2997

F76-21

Proposed Change as Submitted

Proponents: Kevin Kelly, representing Victaulic (kevin.kelly@victaulic.com)

2021 International Fire Code

Add new text as follows:

904.12 Hybrid Systems.
Hybrid Fire Extinguishing Systems shall be installed, maintained, periodically inspected, and tested in accordance with NFPA 770. Records of inspection and testing shall be maintained.

Add new standard(s) as follows:

NFPA

National Fire Protection Association
1 Batterymarch Park
Quincy, MA 02169-7471

NFPA 770-2021 Standard on Hybrid (Water and Inert Gas) Fire Extinguishing Systems

2021 International Building Code

Add new text as follows:

[F] 904.12 Hybrid Systems.
Hybrid Fire Extinguishing Systems shall be installed, maintained, periodically inspected, and tested in accordance with NFPA 770. Records of inspection and testing shall be maintained.

Add new standard(s) as follows:

NFPA

National Fire Protection Association
1 Batterymarch Park
Quincy, MA 02169-7471

NFPA 770-2021 Standard on Hybrid (Water and Inert Gas) Fire Extinguishing Systems

Reason: NFPA 770 is a new NFPA standard on Hybrid (Water and Inert Gas) Fire Extinguishing Systems. This new standard should be added to the list of Alternative Automatic Fire-Extinguishing Systems that could potentially be used for fire protection. NFPA 770 should also be added to the referenced document section.

Bibliography: NFPA 770, Standard on Hybrid (Water and Inert Gas) Fire Extinguishing Systems, 2021 Edition

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This code change should not increase cost. It adds a new standard to the list of Alternative Automatic Fire-Extinguishing Systems that could potentially be used for fire protection.

Staff Analysis: A review of the standard proposed for inclusion in the code, NFPA 770-2021: Standard on Hybrid (Water and Inert Gas) Fire Extinguishing Systems, with regard to some of the key ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before March 20, 2021.

F76-21

Public Hearing Results

Committee Action: **As Modified**

Committee Modification:

2021 International Fire Code

904.12 Hybrid Fire Extinguishing Systems. Hybrid Fire Extinguishing Systems shall be designed, installed, maintained, periodically inspected, and tested in accordance with NFPA 770. Records of inspection and testing shall be maintained.

2021 International Building Code

[F] 904.12 Hybrid Fire Extinguishing Systems. Hybrid Fire Extinguishing Systems shall be designed, installed, maintained, periodically inspected, and tested in accordance with NFPA 770. Records of inspection and testing shall be maintained.

2021 International Fire Code

Add new definition as follows:

HYBRID FIRE EXTINGUISHING SYSTEM. A system which utilizes a combination of atomized water and inert gas to extinguish fire.

Committee Reason: The committee stated that the reason for the approval of the proposal with the modification was that it is an important addition to fire suppression systems with hybrid systems and it is expected to see expanded use and it provides a means to put it in the code and move forward along with the reason statement. (Vote: 14-0)

F76-21

Individual Consideration Agenda

Public Comment 1:

IBC: 202 (New)

Proponents: Kevin Kelly, representing Victaulic (kevin.kelly@victaulic.com) requests As Modified by Public Comment

Further modify as follows:

2021 International Building Code

HYBRID FIRE EXTINGUISHING SYSTEM . A system which utilizes a combination of atomized water and inert gas to extinguish fire.

Commenter's Reason: Add a definition of Hybrid Fire Extinguishing Systems to the IBC to be consistent with the IFC. NFPA 770, Standard on Hybrid (Water and Inert gas) Fire Extinguishing Systems, was added to Chapter 904 of both the IFC and the IBC. A definition of Hybrid Fire Extinguishing Systems was only added to the IFC and the definition should have also been added to the IBC.

Bibliography: NFPA 770, Standard on Hybrid (Water and Inert Gas) Fire Extinguishing Systems

Cost Impact: The net effect of the public comment and code change proposal will not increase or decrease the cost of construction
Adding a definition of Hybrid Fire Extinguishing Systems will not increase or decrease the cost of construction.

Public Comment# 2923

F80-21

Proposed Change as Submitted

Proponents: Jeffrey S. Grove, P.E. FSFPE, Jensen Hughes, representing Jensen Hughes (jgrove@jensenhughes.com)

2021 International Fire Code

Revise as follows:

905.4 Location of Class I standpipe hose connections. Class I standpipe hose connections shall be provided in all of the following locations:

1. In every required *interior exit stairway*, a hose connection shall be provided for each story above and below *grade plane*. Hose connections shall be located at the main floor landing unless otherwise *approved* by the *fire code official*.

   Exception: A single hose connection shall be permitted to be installed in the open *corridor* or open breezeway between open *stairs* that are not greater than 75 feet (22 860 mm) apart.

2. On each side of the wall adjacent to the *exit* opening of a horizontal *exit*.

   Exception: Where floor areas adjacent to a horizontal *exit* are reachable from an *interior exit stairway* hose connection by a 30-foot (9144 mm) hose stream from a nozzle attached to 100 feet (30 480 mm) of hose, a hose connection shall not be required at the horizontal *exit* <u>on the side of the exit opening closest to the interior exit stairway</u>.

3. In every *exit passageway*, at the entrance from the *exit passageway* to other areas of a building.

   Exception: Where floor areas adjacent to an *exit passageway* are reachable from an *interior exit stairway* hose connection by a 30-foot (9144 mm) hose stream from a nozzle attached to 100 feet (30 480 mm) of hose, a hose connection shall not be required at the entrance from the *exit passageway* to other areas of the building.

4. In covered mall buildings, adjacent to each exterior public entrance to the mall and adjacent to each entrance from an *exit passageway* or *exit corridor* to the mall. In open mall buildings, adjacent to each public entrance to the mall at the perimeter line and adjacent to each entrance from an *exit passageway* or *exit corridor* to the mall.
5. Where the roof has a slope less than 4 units vertical in 12 units horizontal (33.3-percent slope), a hose connection shall be located to serve the roof or at the highest landing of an *interior exit stairway* with access to the roof provided in accordance with Section 1011.12.
6. Where the most remote portion of a nonsprinklered floor or story is more than 150 feet (45 720 mm) from a hose connection or the most remote portion of a sprinklered floor or story is more than 200 feet (60 960 mm) from a hose connection, the *fire code official* is authorized to require that additional hose connections be provided in *approved* locations.

2021 International Building Code

Revise as follows:

[F] 905.4 Location of Class I standpipe hose connections. Class I standpipe hose connections shall be provided in all of the following locations:

1. In every required *interior exit stairway*, a hose connection shall be provided for each story above and below *grade plane*. Hose connections shall be located at the main floor landing unless otherwise *approved* by the fire code official.

   Exception: A single hose connection shall be permitted to be installed in the open corridor or open breezeway between open *stairs* that are not greater than 75 feet (22 860 mm) apart.

2. On each side of the wall adjacent to the exit opening of a *horizontal exit*.

   Exception: Where floor areas adjacent to a *horizontal exit* are reachable from an *interior exit stairway* hose connection by a 30-foot (9144 mm) hose stream from a nozzle attached to 100 feet (30 480 mm) of hose, a hose connection shall not be required at the *horizontal exit* <u>on the side of the exit opening closest to the interior exit stairway</u>.

3. In every *exit passageway*, at the entrance from the *exit passageway* to other areas of a building.

   Exception: Where floor areas adjacent to an *exit passageway* are reachable from an *interior exit stairway* hose connection by a 30-foot (9144 mm) hose stream from a nozzle attached to 100 feet (30 480 mm) of hose, a hose connection shall not be required at the entrance from the *exit passageway* to other areas of the building.

4. In covered mall buildings, adjacent to each exterior public entrance to the mall and adjacent to each entrance from an exit *passageway* or exit *corridor* to the mall. In *open mall buildings*, adjacent to each public entrance to the mall at the perimeter line and adjacent to each

entrance from an exit *passageway* or *exit* corridor to the mall.

5. Where the roof has a slope less than 4 units vertical in 12 units horizontal (33.3-percent slope), a hose connection shall be located to serve the roof or at the highest landing of an *interior exit stairway* with access to the roof provided in accordance with Section 1011.12.
6. Where the most remote portion of a nonsprinklered floor or *story* is more than 150 feet (45 720 mm) from a hose connection or the most remote portion of a sprinklered floor or *story* is more than 200 feet (60 960 mm) from a hose connection, the fire code official is authorized to require that additional hose connections be provided in *approved* locations.

Reason: As currently worded, the exception could be interpreted to allow elimination of the hose connections on both sides of the horizontal exit where floor areas adjacent to the horizontal exit are within 130 feet of the interior exit stairway hose connection. It has also been interpreted that this exception only allows for elimination of the hose connection on only one side of the horizontal exit. Clarification is needed to ensure consistent application of this exception.
The proposed language clarifies that the hose connection may be eliminated when it is located on the same side of the horizontal exit as the exit stairway having the hose connection within 130 feet of travel from the horizontal exit.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This is a clarification for existing code language.

F80-21

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The committee stated that the reason for disapproval was that the proposed language is cluttering up what is already written. Specifically that the proposed language of putting the hose connection now on the other side is unnecessary since it already clearly says if it's reachable from the adjacent floor area to the horizontal exit, then you don't need the other one. (Vote: 12-1)

F80-21

Individual Consideration Agenda

Public Comment 1:

IFC: 905.4; IBC: [F] 905.4

Proponents: Jeffrey Grove, representing Jensen Hughes (jgrove@jensenhughes.com) requests As Modified by Public Comment

Modify as follows:

2021 International Fire Code

905.4 Location of Class I standpipe hose connections . Class I standpipe hose connections shall be provided in all of the following locations:

1. In every required *interior exit stairway*, a hose connection shall be provided for each story above and below *grade plane*. Hose connections shall be located at the main floor landing unless otherwise *approved* by the *fire code official*.

   Exception: A single hose connection shall be permitted to be installed in the open *corridor* or open breezeway between open *stairs* that are not greater than 75 feet (22 860 mm) apart.

2. On each side of the wall adjacent to the *exit* opening of a horizontal *exit*.

   Exception: Where floor areas adjacent to a horizontal *exit* are reachable from an *interior exit stairway* hose connection by a 30-foot (9144 mm) hose stream from a nozzle attached to 100 feet (30 480 mm) of hose, a hose connection shall not be required at the horizontal *exit* ~~on the side of the exit opening closest to the interior exit stairway stairway~~ on either side of the exit opening.

3. In every *exit passageway*, at the entrance from the *exit passageway* to other areas of a building.

   Exception: Where floor areas adjacent to an *exit passageway* are reachable from an *interior exit stairway* hose connection by a 30-foot

(9144 mm) hose stream from a nozzle attached to 100 feet (30 480 mm) of hose, a hose connection shall not be required at the entrance from the *exit passageway* to other areas of the building.

4. In covered mall buildings, adjacent to each exterior public entrance to the mall and adjacent to each entrance from an *exit passageway* or *exit corridor* to the mall. In open mall buildings, adjacent to each public entrance to the mall at the perimeter line and adjacent to each entrance from an *exit passageway* or *exit corridor* to the mall.
5. Where the roof has a slope less than 4 units vertical in 12 units horizontal (33.3-percent slope), a hose connection shall be located to serve the roof or at the highest landing of an *interior exit stairway* with access to the roof provided in accordance with Section 1011.12.
6. Where the most remote portion of a nonsprinklered floor or story is more than 150 feet (45 720 mm) from a hose connection or the most remote portion of a sprinklered floor or story is more than 200 feet (60 960 mm) from a hose connection, the *fire code official* is authorized to require that additional hose connections be provided in *approved* locations.

2021 International Building Code

[F] 905.4 Location of Class I standpipe hose connections . Class I standpipe hose connections shall be provided in all of the following locations:

1. In every required *interior exit stairway*, a hose connection shall be provided for each story above and below *grade plane*. Hose connections shall be located at the main floor landing unless otherwise *approved* by the fire code official.

   Exception: A single hose connection shall be permitted to be installed in the open corridor or open breezeway between open *stairs* that are not greater than 75 feet (22 860 mm) apart.

2. On each side of the wall adjacent to the exit opening of a *horizontal exit*.

   Exception: Where floor areas adjacent to a *horizontal exit* are reachable from an *interior exit stairway* hose connection by a 30-foot (9144 mm) hose stream from a nozzle attached to 100 feet (30 480 mm) of hose, a hose connection shall not be required at the *horizontal exit* ~~on the side of the exit opening closest to the interior exit stairway stairway.~~ on either side of the exit opening .

3. In every *exit passageway*, at the entrance from the *exit passageway* to other areas of a building.

   Exception: Where floor areas adjacent to an *exit passageway* are reachable from an *interior exit stairway* hose connection by a 30-foot (9144 mm) hose stream from a nozzle attached to 100 feet (30 480 mm) of hose, a hose connection shall not be required at the entrance from the *exit passageway* to other areas of the building.

4. In covered mall buildings, adjacent to each exterior public entrance to the mall and adjacent to each entrance from an exit *passageway* or exit *corridor* to the mall. In *open mall buildings*, adjacent to each public entrance to the mall at the perimeter line and adjacent to each entrance from an exit *passageway* or *exit* corridor to the mall.
5. Where the roof has a slope less than 4 units vertical in 12 units horizontal (33.3-percent slope), a hose connection shall be located to serve the roof or at the highest landing of an *interior exit stairway* with access to the roof provided in accordance with Section 1011.12.
6. Where the most remote portion of a nonsprinklered floor or *story* is more than 150 feet (45 720 mm) from a hose connection or the most remote portion of a sprinklered floor or *story* is more than 200 feet (60 960 mm) from a hose connection, the fire code official is authorized to require that additional hose connections be provided in *approved* locations.

Commenter's Reason: As currently worded, the exception could be interpreted to allow elimination of the hose connection only on the side of the horizontal exit that is within 130 feet of the interior exit stairway hose connection. The original intent of this exception was to eliminate the hose connections on both sides of the horizontal exit opening. Clarification is needed to ensure consistent application of this exception.
Alternatively, language could be added to the Commentary to the 2024 IBC to clarify that the intent of exception would be for the hose connection to be eliminated on both sides of the horizontal exit opening provided at least one of the sides of the exit opening is within 130 feet of the interior exit stairway hose connection.

The Committee was clear that the intent of the existing exception is that the hose connection can be omitted on both sides of the horizontal exit. The issue with the current language is that AHJs and Design Professionals are interpreting it to mean that a hose connection can only be eliminated on one side of the horizontal exit (and the specific side that it can be eliminated varies with the AHJ and Design Professional as well). Revision is necessary to ensure consistent understanding and application of the exception’s intent that the hose connection can be eliminated on both sides of the horizontal exit when at least one side is within 130 feet of an interior exit stairway hose connection.

Cost Impact: The net effect of the public comment and code change proposal will not increase or decrease the cost of construction
This is a clarification for existing code language.

F86-21

Proposed Change as Submitted

Proponents: Deborah Ohler, Ohio Board of Building Standards, representing Ohio Board of Building Standards, Staff Engineer (dohler@com.state.oh.us)

2021 International Fire Code

Revise as follows:

907.2.1 Group A. A manual fire alarm system that activates the occupant notification system in accordance with Section 907.5 shall be installed in Group A occupancies where the *occupant load* due to the assembly occupancy is 300 or more, or where the Group A *occupant load* is more than 100 persons above or below the lowest *level of exit discharge*. Group A occupancies not separated from one another in accordance with Section 707.3.10 of the International Building Code shall be considered as a single occupancy for the purposes of applying this section. Portions of Group E occupancies occupied for assembly purposes shall be provided with a fire alarm system as required for the Group E occupancy.

Exceptions:

1. Manual fire alarm boxes are not required where the building is equipped throughout with an automatic sprinkler system installed in accordance with Section 903.3.1.1 and the occupant notification appliances will activate throughout the notification zones upon sprinkler water flow.

2. Manual fire alarm boxes and the associated occupant notification system or emergency voice/alarm communication system are not required for Group A-5 outdoor bleacher-type seating having an occupant load of greater than or equal to 300 and less than 15,000 occupants provided all of the following are met:
   2.1 A public address system with standby power is provided;
   2.2 Enclosed spaces attached to or within 5 ft (1.5 m) of the outdoor bleacher-type seating comprise, in the aggregate, a maximum of 10 percent or less of the overall area of the outdoor bleacher-type seating or 1000 ft2 (92.9 m2), whichever is less;
   2.3 Enclosed accessory spaces under or attached to the outdoor bleacher-type seating shall be separated from the bleacher-type seating in accordance with Section 1030.1.1.1 of this code;
   2.4 All means of egress from the bleacher-type seating are open to the outside.

3. Manual fire alarm boxes and the associated occupant notification system or emergency voice/alarm communication system are not required for temporary Group A-5 outdoor bleacher-type seating provided all of the following are met:
   3.1 There are no enclosed spaces under or attached to the outdoor bleacher-type seating;
   3.2 The bleacher-type seating is erected for a period of less than 180 days; and
   3.3 Evacuation of the bleacher-type seating is included in an approved fire safety plan.

2021 International Building Code

Revise as follows:

[F] 907.2.1 Group A. A manual fire alarm system that activates the occupant notification system in accordance with Section 907.5 shall be installed in Group A occupancies where the *occupant load* due to the assembly occupancy is 300 or more, or where the Group A *occupant load* is more than 100 persons above or below the *lowest level of exit discharge*. Group A occupancies not separated from one another in accordance with Section 707.3.10 shall be considered as a single occupancy for the purposes of applying this section. Portions of Group E occupancies occupied for assembly purposes shall be provided with a fire alarm system as required for the Group E occupancy.

Exceptions:

1. Manual fire alarm boxes are not required where the building is equipped throughout with an *automatic sprinkler system* installed in accordance with Section 903.3.1.1 and the occupant notification appliances will activate throughout the notification zones upon sprinkler water flow.
2. Manual fire alarm boxes and the associated occupant notification system or emergency voice/alarm communication system are not required for Group A-5 outdoor bleacher-type seating having an occupant load of greater than or equal to 300 and less than 15,000 occupants provided all of the following are met:
   2.1. A public address system with standby power is provided;
   2.2. Enclosed spaces attached to or within 5 ft (1.5 m) of the outdoor bleacher-type seating comprise, in the aggregate, a maximum of

10 percent or less of the overall area of the outdoor bleacher-type seating or 1000 ft2 (92.9 m2), whichever is less;

2.3. Enclosed accessory spaces under or attached to the outdoor bleacher-type seating shall be separated from the bleacher-type seating in accordance with Section 1030.1.1.1 of this code;

2.4. All means of egress from the bleacher-type seating are open to the outside.

3. Manual fire alarm boxes and the associated occupant notification system or emergency voice/alarm communication system are not required for temporary Group A-5 outdoor bleacher-type seating provided all of the following are met:

3.1. There are no enclosed spaces under or attached to the outdoor bleacher-type seating;

3.2. The bleacher-type seating is erected for a period of less than 180 days; and

3.3. Evacuation of the bleacher-type seating is included in an approved fire safety plan.

Reason: According to the IBC Section 303.6, outdoor bleacher-type seating is classified as Group A-5. Although not a typical building with walls and ceilings easily allowing for the installation of manual fire alarm boxes and occupant notification appliances, the outdoor bleacher-type seating structure, as a Group A-5 classification, results in a requirement for a manual fire alarm system with occupant notification appliances when the occupant load is 300 or more. According to Section 907.2.1.1, when the occupant load is 1000 or more, this triggers the initiation of an emergency voice/alarm communication system instead of the typical horn/strobe alarm notification appliances used for occupant notification.
The IBC Section 907.4.2 requirements for manual fire alarm boxes do not fit very well when trying to apply the requirements to outdoor bleacher-type seating. For example, let's consider a typical high school football or track field with outdoor bleacher-type seating. According to the code, the manual fire alarm box shall be located not more than 5 feet from the entrance to each exit. In this case, where is the exit and where should the boxes be mounted. Additional structures would likely need to be constructed in order to mount the manual fire alarm boxes and they would need to be weather-resistant and tamper-proof. A similar problem occurs when trying to apply the IBC Section 907.5.2 code requirements for the occupant notification devices (audible and visual alarm notification appliances). The ambient noise level at a football game could possibly far exceed 105 dBA. If this happens, the OBC Section 907.5.2.1.2 would allow the elimination of the audible alarm notification appliances provided that visible alarm notification appliances are installed. Where should the visible notification devices be mounted so that those sitting in the bleachers could see them without having to create additional mounting structures that may block the view? Given that the events are outside and sometimes occur during the daylight, it would be possible that the visible notification appliances may not even be effective at alerting those in attendance. It seems to be a huge expense, without much guaranteed benefit, especially for small outdoor bleacher-type seating structures.

After discussing this with several architects and code officials, I discovered a lot of inconsistency in the design and enforcement of this requirement for a manual fire alarm system and notification appliances for bleachers. Many designers are not providing the system and many code officials are approving the structure without the fire alarm system.

After researching the NFPA standards 101 (Life Safety Code), 102 (Standard for Grandstands, Folding and Telescopic Seating, Tents, and Membrane Structures), and 5000 (Building Construction and Safety Code), I discovered that the requirement for a fire alarm system seems to be consistent. However, the NFPA standards offer an exception that allows an alternative to the visible alarm signals such as using the scoreboard, message board, or other electronic device as a notification means. There is no such exception in the IBC.

It wasn't until after reviewing the code forum blogs that I thought to look at the ICC standard 300 which is referenced from the IBC Chapter 10, Section 1030. Section 309.1 of the ICC 300 standard offers a few exceptions to the emergency voice/alarm communication systems. I fail to understand why this exception is hidden in the standard which is referenced only from the IBC means of egress chapter and it is not clear whether the exception was also intended to apply to the manual fire alarm system with notification appliances. I contacted the proponent of the ICC 300 Section 309.1, Gene Boecker, and the author of the public comment, Greg Nicholls, to get their input regarding the intent. Both told me that they believe the exception in the ICC 300 standard is intended to exempt the required fire alarm systems from the outdoor bleacher-type seating structures in addition to exempting the emergency voice/alarm communication system.

Therefore, I am proposing to bring the ICC 300 exceptions into the fire protection system chapter of the IBC and the IFC where it is more appropriately located and more likely to be seen. I have also proposed a few modifications to the ICC 300 exceptions to remove the subjectivity and add clarity.

Bibliography: 1. ICC 300 Standard on Bleachers, Folding and Telescopic Seating and Grandstands; 2017 edition, International Code Council (ICC), Washington, DC; Section 309.1
2. NFPA 101 Life Safety Code, 2021 edition, National Fire Protection Association (NFPA), Quincy, MA, Sections 9.6 and 12.3.4

3. NFPA 102 Standard for Grandstands, Folding and Telescopic Seating, Tents, and Membrane Structures; 2016 edition; National Fire Protection Association (NFPA); Quincy, MA; Section 9.6.3.5

4. NFPA 5000 Building Construction Safety Code; 2021 edition; National Fire Protection Association (NFPA); Quincy, MA; Sections 16.3.4, 16.4.9, 32.7, and 55.2

Cost Impact: The code change proposal will decrease the cost of construction

This proposal is intended to bring into the IBC and the IFC a few exceptions for fire alarm systems and emergency voice alarm communication systems. These exceptions are buried in a standard that is not referenced from Chapter 9 of the IBC or the IFC. As a result, designers and code officials may not be aware that the exception already exists.

F86-21

Public Hearing Results

Committee Action: **As Submitted**

Committee Reason: The committee stated that the reasons for approval were that it addresses a situation not previously anticipated for Group A-5 occupancies, includes information contained in ICC 300 that has not previously been introduced and it adds reasonable exemptions for manual fire alarm boxes serving a Group A-5 outdoor bleacher type seating. Additionally, it was noted that is does not burden the end user with buying another standard when it could easily be put into the body of the code and it is probably already being done. (Vote: 9-5)

F86-21

Individual Consideration Agenda

Public Comment 1:

IFC: 907.2.1; IBC: [F] 907.2.1

Proponents: Ali Fattah, representing City of San Diego Development Services Department (afattah@sandiego.gov) requests As Modified by Public Comment

Modify as follows:

2021 International Fire Code

907.2.1 Group A . A manual fire alarm system that activates the occupant notification system in accordance with Section 907.5 shall be installed in Group A occupancies where the *occupant load* due to the assembly occupancy is 300 or more, or where the Group A *occupant load* is more than 100 persons above or below the lowest *level of exit discharge*. Group A occupancies not separated from one another in accordance with Section 707.3.10 of the International Building Code shall be considered as a single occupancy for the purposes of applying this section. Portions of Group E occupancies occupied for assembly purposes shall be provided with a fire alarm system as required for the Group E occupancy.

Exceptions:

1. Manual fire alarm boxes are not required where the building is equipped throughout with an automatic sprinkler system installed in accordance with Section 903.3.1.1 and the occupant notification appliances will activate throughout the notification zones upon sprinkler water flow.

2. Manual fire alarm boxes and the associated occupant notification system or emergency voice/alarm communication system are not required for Group A-5 outdoor bleacher-type seating having an occupant load ~~of greater than or equal to 300 and~~ less than 15,000 occupants provided all of the following are met:
   2.1 A public address system with standby power is provided;
   2.2 Enclosed spaces attached to or within 5 ft (1.5 m) of the outdoor bleacher-type seating comprise, in the aggregate, a maximum of 10 percent or less of the overall area of the outdoor bleacher-type seating or 1000 ft2 (92.9 m2), whichever is less;
   2.3 Enclosed accessory spaces under or attached to the outdoor bleacher-type seating shall be separated from the bleacher-type seating in accordance with Section 1030.1.1.1 of this code;
   2.4 All means of egress from the bleacher-type seating are open to the outside.

3. Manual fire alarm boxes and the associated occupant notification system or emergency voice/alarm communication system are not required for temporary Group A-5 outdoor bleacher-type seating ~~provided all of the following are met:~~ when evacuation of the bleacher-type seating is included in an approved fire safety plan.
   ~~3.1 There are no enclosed spaces under or attached to the outdoor bleacher-type seating;~~

~~3.2 The bleacher-type seating is erected for a period of less than 180 days; and~~

~~3.3 Evacuation of the bleacher-type seating is included in an approved fire safety plan.~~

2021 International Building Code

[F] 907.2.1 Group A . A manual fire alarm system that activates the occupant notification system in accordance with Section 907.5 shall be installed in Group A occupancies where the *occupant load* due to the assembly occupancy is 300 or more, or where the Group A *occupant load* is more than 100 persons above or below the *lowest level of exit discharge*. Group A occupancies not separated from one another in accordance with Section 707.3.10 shall be considered as a single occupancy for the purposes of applying this section. Portions of Group E occupancies occupied for assembly purposes shall be provided with a fire alarm system as required for the Group E occupancy.

Exceptions:

1. Manual fire alarm boxes are not required where the building is equipped throughout with an *automatic sprinkler system* installed in accordance with Section 903.3.1.1 and the occupant notification appliances will activate throughout the notification zones upon sprinkler water flow.
2. Manual fire alarm boxes and the associated occupant notification system or emergency voice/alarm communication system are not required for Group A-5 outdoor bleacher-type seating having an occupant load ~~of greater than or equal to 300 and~~ less than 15,000 occupants provided all of the following are met:
   2.1. A public address system with standby power is provided;
   2.2. Enclosed spaces attached to or within 5 ft (1.5 m) of the outdoor bleacher-type seating comprise, in the aggregate, a maximum of 10 percent or less of the overall area of the outdoor bleacher-type seating or 1000 ft2 (92.9 m2), whichever is less;
   2.3. Enclosed accessory spaces under or attached to the outdoor bleacher-type seating shall be separated from the bleacher-type seating in accordance with Section 1030.1.1.1 of this code;
   2.4. All means of egress from the bleacher-type seating are open to the outside.
3. Manual fire alarm boxes and the associated occupant notification system or emergency voice/alarm communication system are not required for temporary Group A-5 outdoor bleacher-type seating ~~provided all of the following are met:~~ when evacuation of the bleacher-type seating is included in an approved fire safety plan.
   ~~3.1. There are no enclosed spaces under or attached to the outdoor bleacher-type seating;~~
   ~~3.2. The bleacher-type seating is erected for a period of less than 180 days; and~~
   ~~3.3. Evacuation of the bleacher-type seating is included in an approved fire safety plan.~~

Commenter's Reason: This public comment is submitted by proponent representing myself. I served on the ICC 300 bleacher standards committee and it is not clear to me why a temporary portable bleacher that is in service for a few days or weeks requires a fire alarm system regardless of the number of seats and duration of use. By definition temporary is less than 180 days. It is not clear how the presence of a use beneath a temporary bleacher, an unusual occurrence that I have not experienced, would necessitate the placement of a manual pull station presumably beneath the bleacher, or possibly at egress paths passing beneath the bleacher, even if the seating exceeds 300. Bleacher Sections with 300 seats are not very large and travel distances are very short. Additionally, the openness of the lattice structure will allow for smoke due to a fire below to be visible to occupants above and it appears to be an un-necessary burden and an addition of complexity to a temporary structure. Furthermore visual alarms would also be required for what possibly will be mostly a daytime service period such as at many sporting events. Exception 2 is proposed to be revised since the 300 threshold is not necessary due to an upper bound of 15,000 seats is provided. You are exempt up to and through 300 and exempt greater than 300 but less than 15,000. ICC 300 Section 309 Exception 2 needs to be deleted in a separate standards development cycle.

Cost Impact: The net effect of the public comment and code change proposal will decrease the cost of construction
The code change will reduce the cost of construction by eliminating the need for a fire alarm system on a temporary portable bleacher used outdoors.

Public Comment# 2245

Public Comment 2:

IFC: 907.2.1; IBC: [F] 907.2.1

Proponents: Kevin Scott, representing KH Scott & Associates LLC (khscottassoc@gmail.com) requests As Modified by Public Comment

Modify as follows:

2021 International Fire Code

907.2.1 Group A . A manual fire alarm system that activates the occupant notification system in accordance with Section 907.5 shall be installed in Group A occupancies where the *occupant load* due to the assembly occupancy is 300 or more, or where the Group A *occupant load* is more than 100 persons above or below the lowest *level of exit discharge*. Group A occupancies not separated from one another in accordance with Section 707.3.10 of the International Building Code shall be considered as a single occupancy for the purposes of applying this section. Portions of Group E occupancies occupied for assembly purposes shall be provided with a fire alarm system as required for the Group E occupancy.

Exceptions:

1. Manual fire alarm boxes are not required where the building is equipped throughout with an automatic sprinkler system installed in accordance with Section 903.3.1.1 and the occupant notification appliances will activate throughout the notification zones upon sprinkler water flow.

2. ~~Manual fire Manual fire alarm boxes and the associated occupant notification system or emergency voice/alarm communication system are~~ A fire alarm system is not required for Group A-5 outdoor bleacher-type seating ~~having~~ with an occupant load of greater than or equal to 300 and less than 15,000 ~~occupants~~ provided all of the following are met:
   2.1 A public address system with standby power is provided~~;~~ .
   2.2 Enclosed spaces attached to or within 5 ft (1.5 m) of the outdoor bleacher-type seating comprise, in the aggregate, a maximum of 10 percent or less of the overall area of the outdoor bleacher-type seating or 1000 ft2 (92.9 m2), whichever is less~~;~~ .
   2.3 Enclosed accessory spaces under or attached to the outdoor bleacher-type seating shall be separated from the bleacher-type seating in accordance with Section 1030.1.1.1 ~~of this code;~~ .
   2.4 All means of egress from the bleacher-type seating are open to the outside.

3. ~~Manual fire alarm boxes and the associated occupant notification system or emergency voice/alarm communication system are~~ A fire alarm system is not required for temporary Group A-5 outdoor bleacher-type seating provided all of the following are met:
   3.1 There are no enclosed spaces under or attached to the outdoor bleacher-type seating~~;~~ .
   3.2 The bleacher-type seating is erected for a period of less than 180 days~~; and~~ .
   3.3 Evacuation of the bleacher-type seating is included in an approved fire safety ~~plan.~~ and evacuation plan in accordance with Section 404.

2021 International Building Code

[F] 907.2.1 Group A . A manual fire alarm system that activates the occupant notification system in accordance with Section 907.5 shall be installed in Group A occupancies where the *occupant load* due to the assembly occupancy is 300 or more, or where the Group A *occupant load* is more than 100 persons above or below the *lowest level of exit discharge*. Group A occupancies not separated from one another in accordance with Section 707.3.10 shall be considered as a single occupancy for the purposes of applying this section. Portions of Group E occupancies occupied for assembly purposes shall be provided with a fire alarm system as required for the Group E occupancy.

Exceptions:

1. Manual fire alarm boxes are not required where the building is equipped throughout with an *automatic sprinkler system* installed in accordance with Section 903.3.1.1 and the occupant notification appliances will activate throughout the notification zones upon sprinkler water flow.
2. ~~Manual fire alarm boxes and the associated occupant notification system or emergency voice/alarm communication system are~~ A fire alarm system is not required for Group A-5 outdoor bleacher-type seating ~~having~~ with an occupant load of greater than or equal to 300 and less than 15,000 ~~occupants~~ provided all of the following are met:
   2.1. A public address system with standby power is provided~~;~~ .
   2.2. Enclosed spaces attached to or within 5 ft (1.5 m) of the outdoor bleacher-type seating comprise, in the aggregate, a maximum of 10 percent or less of the overall area of the outdoor bleacher-type seating or 1000 ft2 (92.9 m2), whichever is less~~;~~ .
   2.3. Enclosed accessory spaces under or attached to the outdoor bleacher-type seating shall be separated from the bleacher-type seating in accordance with Section 1030.1.1.1 ~~of this code;~~ .
   2.4. All means of egress from the bleacher-type seating are open to the outside.
3. ~~Manual fire alarm boxes and the associated occupant notification system or emergency voice/alarm communication system are~~ A fire alarm system is not required for temporary Group A-5 outdoor bleacher-type seating provided all of the following are met:

3.1. There are no enclosed spaces under or attached to the outdoor bleacher-type seating~~;~~ .

3.2. The bleacher-type seating is erected for a period of less than 180 days~~; and~~ .

3.3. Evacuation of the bleacher-type seating is included in an approved fire safety ~~plan.~~ and evacuation plan in accordance with Section 404 of the *International Fire Code*.

Commenter's Reason: The original proposal was approved by the committee, and these criteria are consistent with the requirements in ICC 300 for bleachers. This Public Comment is designed to clarify the requirements of the section.
Exception 2 is modified to clarify that the the fire alarm system in its entirety is not required if the 4 criteria are met, rather than listing the specific components of the fire alarm system. This simplifies the exception and will not result in the user trying to determine what was left out of the list.

The same revision is made in Exception 3. A specific reference to the fire safety and evacuation plan in Section 404 is added to Item 3.3.

Cost Impact: The net effect of the public comment and code change proposal will decrease the cost of construction
The proposal will decrease the cost of construction since a fire alarm system will not be required for the outdoor bleachers. The Public Comment will not affect the cost of construction since it only clarifies its application.

Public Comment# 2854

F90-21

Proposed Change as Submitted

Proponents: William Koffel, representing Household and Commercial Products Association (wkoffel@koffel.com)

2021 International Fire Code

Revise as follows:

907.2.16 Aerosol storage uses. Aerosol product rooms and general-purpose warehouses containing aerosol products and plastic aerosol products shall be provided with an *approved* manual fire alarm system where required by this code.

2021 International Building Code

Revise as follows:

[F] 907.2.16 Aerosol storage uses. *Aerosol product* rooms and general-purpose warehouses containing aerosol products and plastic aerosol products shall be provided with an *approved* manual fire alarm system where required by the *International Fire Code*.

Reason: Full scale fire tests are being conducted to determine the appropriate protection criteria for plastic aerosol 2 products and plastic aerosol cooking spray products.
This change is technical in nature and the requirements will be determined upon completion of the fire test program.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The proposal adds requirements for plastic aerosol products that are not currently addressed by the IFC.

F90-21

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The committee stated that the reason for the disapproval was that the fire tests have not been completed yet and thus not knowing what the ultimate requirement actually needs to be. (Vote: 10-4)

F90-21

Individual Consideration Agenda

Public Comment 1:

Proponents: William Koffel, representing Household and Commercial Products Association (wkoffel@koffel.com) requests As Submitted

Commenter's Reason: The Committee Disapproved F90 because the fire tests for plastic aerosol 2 products was not yet completed and it is still not completed. The Reason Statement associated with the original proposal erroneously referred to the full scale fire test program being yet to be completed for plastic aerosol 2 products.
However, the International Fire Code already address plastic aerosol 3 products so the proposed changes are appropriate. Therefore the proposed changes merely clarify the fire alarm system requirements when plastic aerosol 3 products are present.

Cost Impact: The net effect of the public comment and code change proposal will not increase or decrease the cost of construction
The public comment clarifies that the fire alarm system requirements should also apply to plastic aerosol 3 products.

Public Comment# 2974

F94-21

Proposed Change as Submitted

Proponents: Thomas Daly, HSCG - representing the AH&LA, representing AH&LA (Thomas.Daly@myhscg.com)

2021 International Fire Code

Add new text as follows:

907.10.1 Replacement smoke alarms.
Where the replacement of smoke alarms is required in accordance with Section 907.10, smoke alarms with a non-rechargeable, nonreplaceable primary battery capable of operating the device for at least 10 years in the normal condition, followed by 4 minutes of alarm, followed by 7 days of trouble shall be permitted.

Revise as follows:

1103.8.3 Power source. Single-station smoke alarms shall receive their primary power from the building wiring provided that such wiring is served from a commercial source and shall be equipped with a battery backup. Smoke alarms with integral strobes that are not equipped with battery backup shall be connected to an emergency electrical system. Smoke alarms shall emit a signal when the batteries are low. Wiring shall be permanent and without a disconnecting switch other than as required for overcurrent protection.

Exceptions:

1. Smoke alarms are permitted to be solely battery operated in existing buildings where construction is not taking place.
2. Smoke alarms are permitted to be solely battery operated in buildings that are not served from a commercial power source.
3. Smoke alarms are permitted to be solely battery operated in existing areas of buildings undergoing *alterations* or repairs that do not result in the removal of interior walls or ceiling finishes exposing the structure, unless there is an attic, crawl space or *basement* available that could provide access for building wiring without the removal of interior finishes.
4. Smoke alarms with a non-rechargeable, nonreplaceable primary battery capable of operating the device for at least 10 years in the normal condition, followed by 4 minutes of alarm, followed by 7 days of trouble shall be permitted.

Reason: Starting with the 2021 edition of the IFC, smoke alarms must produce a 520hz signal, see Section 907.5.2.1.3.
Current versions of listed typical 120vac/9vdc powered smoke alarms, used in multiple Group R occupancies, cannot produce the 520hz signal on secondary power.

Presently, at least one manufacturer of smoke alarms (Siterwell) has a 10-year sealed battery powered smoke alarm that can produce the required 520hz signal.

NFPA 72 has permitted the use of 10-year sealed battery smoke alarms since the 2010 edition, see Sec. 29.9 in the 2019 edition and Sec. 29.6 in earlier editions. The FCAC's Work Group on Alarms has been tasked with aligning NFPA 72 requirements with the IFC.

Cost Impact: The code change proposal will decrease the cost of construction
This code change will decrease the cost of construction/operations in existing Group R occupancies.
The 2021 IFC (Sec. 907.10) requires the replacement of smoke alarms at 10 years of age regardless of operating condition.

Group R hotels, apartments and time shares and Group I-1 congregate living facilities historically have installed smoke alarms in ‘sleeping units’ therein per the requirements of the 2021 (and earlier editions) of the IFC at Sections 907.2.11 and 1103.8.1, with the power requirements (Sec. 907.2.11.6) of 120vac normal power and a 9vdc battery backup for secondary power.

The NEW requirement in the 2021 IFC at Sec. 907.5.2.1.3.2 now requires such smoke alarms to emit a 520hz signal. No currently listed 120vac powered smoke alarms can produce the 520hz signal on secondary power.

The alternative is to install a monitored (24vdc) smoke detector with a sounder base which can produce the 520hz signal on secondary power.

The marginal cost difference for a 120vac powered smoke alarm (~$50 per unit installed or replaced) v. a 24vdc monitored smoke detector with a sounder base (~$700 per unit installed including devices, new circuits, power supplies and points in the FACP) is $650, assuming, for existing buildings, the building’s fire alarm system is capable of supporting those additional smoke detectors (initiating devices).

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The 2021 IFC impact on the Group R-1 hotel industry alone, with some 5.2 million hotel guest rooms and suites in the U.S., is therefore $3.38 BILLION, unless a more cost effective alternative is provided. That number would increase by a factor of 10 when other impacted Group R and I occupancies (apartments, time-shares and congregate living facilities) are included.

The use of a 10 year sealed battery operated smoke alarm that can produce a 520hz signal in those sleeping units of Group R & I occupancies would cost about $100 per unit installed (material, labor, taxes and shipping), resulting in a dramatic decrease in the cost of construction and operation. NFPA 72 allows for such 10 year sealed battery operated smoke alarms to protect those occupancies.

F94-21

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The committee stated that the reason for disapproval was that there are quite a few issues that need to be worked out and they are not in support of replacing hardwired with complete battery backup. (Vote: 14-0)

F94-21

Individual Consideration Agenda

Public Comment 1:

IFC: 907.10.1, 1103.8.3

Proponents: Michael O'Brian, representing FCAC (fcac@iccsafe.org) requests As Modified by Public Comment

Modify as follows:

2021 International Fire Code

907.10.1 Replacement smoke alarms . Where the replacement of smoke alarms is required in accordance with Section 907.10, smoke alarms shall not be required to include the 520hz signal unless the smoke alarms to be replaced includes that signal. ~~with a non-rechargeable, nonreplaceable primary battery capable of operating the device for at least 10 years in the normal condition, followed by 4 minutes of alarm, followed by 7 days of trouble shall be permitted.~~

1103.8.3 Power source . Single-station smoke alarms shall receive their primary power from the building wiring provided that such wiring is served from a commercial source and shall be equipped with a battery backup. Smoke alarms with integral strobes that are not equipped with battery backup shall be connected to an emergency electrical system. Smoke alarms shall emit a signal when the batteries are low. Wiring shall be permanent and without a disconnecting switch other than as required for overcurrent protection.

Exceptions:

1. Smoke alarms are permitted to be solely battery operated in existing buildings where construction is not taking place.
2. Smoke alarms are permitted to be solely battery operated in buildings that are not served from a commercial power source.
3. Smoke alarms are permitted to be solely battery operated in existing areas of buildings undergoing *alterations* or repairs that do not result in the removal of interior walls or ceiling finishes exposing the structure, unless there is an attic, crawl space or *basement* available that could provide access for building wiring without the removal of interior finishes.
4. ~~Smoke alarms with a non-rechargeable, nonreplaceable primary battery capable of operating the device for at least 10 years in the normal condition, followed by 4 minutes of alarm, followed by 7 days of trouble shall be permitted.~~

Commenter's Reason: This public comment seeks to clarify the original concern related to potential need for using smoke alarms producing the 520hz audible alarm signal alarms for replacement smoke alarms without the 520 Hz audible alarm signal. This section clarifies that such alarms are only required where they replace smoke alarms that currently have that signal. However, this public comment does not prohibit an existing non-low

frequency smoke alarm to be replaced with a new low frequency smoke alarm. The deletion of the item 4 in Section 1103.8.3 addresses the fact that item 1 would already allow the replacement with a battery-operated smoke alarm. If this proposal is approved as modified by this public comment it should be coordinated with proposal F93-21 by renumbering this section to Section 907.10.2.
This Public Comment is submitted by the ICC Fire Code Action Committee (FCAC). The FCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance assigned International Codes with regard to fire and life safety in new and existing buildings and facilities as well as the protection of life and property in wildland urban interface areas. In 2020 and 2021 the Fire-CAC held multiple virtual meetings that were open to any interested party. In addition, there were numerous virtual specific working group meetings that were also open to any interested parties, to develop, discuss and debate the proposed changes. Related documentation and reports are posted on the FCAC website at: FCAC.

Cost Impact: The net effect of the public comment and code change proposal will not increase or decrease the cost of construction
This proposal as modified simply provides more options for compliance therefore will either maintain costs or potentially lower them.

Public Comment# 2235

F102-21

Proposed Change as Submitted

Proponents: Kris Hauschildt, representing self (krishauschildt@yahoo.com)

2021 International Fire Code

CHAPTER 9
FIRE PROTECTION AND LIFE SAFETY SYSTEMS

SECTION 915 CARBON MONOXIDE DETECTION.

915.1 General. Carbon monoxide detection shall be installed in new buildings in accordance with Sections 915.1.1 through 915.6. Carbon monoxide detection shall be installed in existing buildings in accordance with Section 1103.9.

Revise as follows:

915.1.1 Where required. Carbon monoxide detection shall be provided in Group A, B, E, F, H, I, M, ~~I-1, I-2, I-4~~ and R occupancies ~~and in classrooms in Group E occupancies~~ in the locations specified in Section 915.2 where any of the conditions in Sections 915.1.2 through 915.1.6 exist.

915.1.2 F~~uel-burning appliances and f~~uel-burning fireplaces. Carbon monoxide detection shall be provided in rooms, areas, *dwelling units*, *sleeping units* and classrooms in Group E occupancies that contain ~~a fuel-burning appliance or~~ a fuel-burning fireplace.

915.1.3 Fuel-burning forced-air furnaces. Carbon monoxide detection shall be provided in ~~*dwelling units*, *sleeping units* and classrooms~~ the following locations served by a fuel-burning, forced-air furnace:

1. In a central or otherwise approved location in each HVAC zone on every floor level that is served by a fuel-burning forced air-furnace.
2. In dwelling units, sleeping units, classrooms in Group E occupancies and areas containing a swimming pool that are served by a fuel-burning forced-air furnace.

Exception: Carbon monoxide detection shall not be required to be installed in accordance with Section 915.1.3, Items 1 or 2, ~~in *dwelling units*, *sleeping units* and classrooms~~ where a carbon monoxide detector is provided in the first room or area served by each main duct leaving the furnace, and the carbon monoxide alarm signals are automatically transmitted to an *approved* onsite location or to an approved off-premises location in accordance with NFPA 72.

915.1.4 Fuel-burning appliances.~~ outside of dwelling units, sleeping units and classrooms.~~ Carbon monoxide detection shall be provided in ~~*dwelling units*, *sleeping units* and classrooms located~~ the following locations in buildings that contain fuel-burning appliances:~~ or fuel-burning fireplaces.~~

1. In rooms, areas, dwelling units, sleeping units and classrooms in Group E occupancies that contain a fuel-burning appliance.
2. In rooms, areas, dwelling units, sleeping units and classrooms in Group E occupancies that have communicating openings between the fuel-burning appliance and the room, area, dwelling unit, sleeping unit or classroom; or in an approved location between the fuel-burning appliance and the room, area dwelling unit, sleeping unit or classroom.
3. In dwelling units, sleeping units, classrooms in Group E occupancies, and areas containing a swimming pool.

Exception~~s~~: Carbon monoxide detection shall not be required to be installed in accordance with Section 915.1.4, Item 3, where a carbon monoxide detector is provided in each room, area, dwelling unit, sleeping unit, or classroom in Group E occupancies that shares a common wall, ceiling or floor with the room or area containing the fuel-burning appliance, and the carbon monoxide alarm signals are automatically transmitted to an approved onsite location or to an off-premises location in accordance with NFPA 72.

~~1. Carbon monoxide detection shall not be required in *dwelling units*, *sleeping units* and classrooms without communicating openings between the fuel-burning appliance or fuel-burning fireplace and the *dwelling unit*, *sleeping unit* or classroom.~~

~~2. Carbon monoxide detection shall not be required in *dwelling units*, *sleeping units* and classrooms where a carbon monoxide detector is provided in one of the following locations:~~

~~2.1. In an *approved* location between the fuel-burning appliance or fuel-burning fireplace and the *dwelling unit*, *sleeping unit* or classroom.~~

~~2.2. On the ceiling of the room containing the fuel-burning appliance or fuel-burning fireplace.~~

915.1.5 Private garages. Carbon monoxide detection shall be provided in rooms, areas, *dwelling units*, *sleeping units* and classrooms in Group E occupancies in buildings with attached private garages.

Exceptions:

1. Carbon monoxide detection shall not be required in rooms, areas, *dwelling units*, *sleeping units* and classrooms in Group E occupancies without communicating openings between the private garage and the room, area, *dwelling unit*, *sleeping unit* or classroom.
2. Carbon monoxide detection shall not be required in rooms, areas, *dwelling units*, *sleeping units* and classrooms in Group E occupancies located more than one story above or below a private garage.
3. Carbon monoxide detection shall not be required where the private garage connects to the building through an *open-ended corridor*.
4. Where a carbon monoxide detector is provided in an *approved* location between openings to a private garage and rooms, areas, *dwelling units*, *sleeping units* or classrooms in Group E occupancies.

915.1.6 Exempt garages. For determining compliance with Section 915.1.5, an open parking garage complying with Section 406.5 of the International Building Code or an enclosed parking garage complying with Section 406.6 of the International Building Code shall not be considered a private garage.

Revise as follows:

915.2 Locations. Where required by Section 915.1.1, carbon monoxide detection shall be installed in the locations specified in Sections 915.2.1 through 915.2.~~3~~4.

915.2.1 Dwelling units. Carbon monoxide detection shall be installed in *dwelling units* outside of each separate sleeping area in the immediate vicinity of the bedrooms. Where a fuel-burning appliance is located within a bedroom or its attached bathroom, carbon monoxide detection shall be installed within the bedroom.

915.2.2 Sleeping units. Carbon monoxide detection shall be installed in *sleeping units*.

Exception: Carbon monoxide detection shall be allowed to be installed outside of each separate sleeping area in the immediate vicinity of the *sleeping unit* where the *sleeping unit* or its attached bathroom does not contain a fuel-burning appliance and is not served by a forced-air furnace.

Revise as follows:

915.2.3 Areas containing a swimming pool. Carbon monoxide detection shall be installed in areas containing a swimming pool.

Exception: Where there is a conflict between the requirements of this code and the manufacturer's installation instructions, the manufacturer's installation instructions shall govern.

915.2.~~3~~ 4 Group E occupancies. Carbon monoxide detectors shall be installed in classrooms in Group E occupancies. Carbon monoxide alarm signals shall be automatically transmitted to an on-site location that is staffed by school personnel.

Exception:
Carbon monoxide alarm signals shall not be required to be automatically transmitted to an on-site location that is staffed by school personnel in Group E occupancies with an *occupant load* of 30 or less.

915.3 Carbon monoxide detection. Carbon monoxide detection required by Sections 915.1 through 915.2.~~3~~ 4 shall be provided by carbon monoxide alarms complying with Section 915.4 or carbon monoxide detection systems complying with Section 915.5.

915.4 Carbon monoxide alarms. Carbon monoxide alarms shall comply with Sections 915.4.1 through 915.4.~~4~~ 5.

915.4.1 Power source. Carbon monoxide alarms shall receive their primary power from the building wiring where such wiring is served from a commercial source, and when primary power is interrupted, shall receive power from a battery. Wiring shall be permanent and without a disconnecting switch other than that required for overcurrent protection.

Exception:
Where installed in buildings without commercial power, ~~battery-powered~~ carbon monoxide alarms powered by a 10-year battery shall be an acceptable alternative.

915.4.2 Listings. Carbon monoxide alarms shall be *listed* in accordance with UL 2034.

915.4.3 Locations. Carbon monoxide alarms shall only be installed in *dwelling units* and in *sleeping units*. They shall not be installed in locations where the code requires carbon monoxide detectors to be used.

915.4.4 Combination alarms. Combination carbon monoxide/smoke alarms shall be an acceptable alternative to carbon monoxide alarms. Combination carbon monoxide/smoke alarms shall be *listed* in accordance with UL 217 and UL 2034.

Revise as follows:

<u>**915.4.5 Installation requirements.**</u> <u>Where required by Sections 915.1.1 through 915.5.3, carbon monoxide alarms shall be installed in accordance with Sections 915, NFPA 72, and the manufacturer's installation instructions. Where there is a conflict between the requirements of this code, NFPA 72, and the manufacturer's installation instructions, the manufacturer's installation instructions shall govern.</u>

915.5 Carbon monoxide detection systems. Carbon monoxide detection systems shall be an acceptable alternative to carbon monoxide alarms and shall comply with Sections 915.5.1 through 915.5.3.

915.5.1 General. Carbon monoxide detection systems shall comply with NFPA 720. Carbon monoxide detectors shall be *listed* in accordance with UL 2075.

915.6 Maintenance. Carbon monoxide alarms and carbon monoxide detection systems shall be maintained in accordance with NFPA 720. Carbon monoxide alarms and carbon monoxide detectors that become inoperable or begin producing end-of-life signals shall be replaced.

915.5.2 Locations. Carbon monoxide detectors shall be installed in the locations specified in Section 915.2. These locations supersede the locations specified in NFPA 720.

915.6.1 Enclosed parking garages. Carbon monoxide and nitrogen dioxide detectors installed in enclosed parking garages in accordance with Section 404.1 of the International Mechanical Code shall be maintained in accordance with the manufacturer's instructions and their listing. Detectors that become inoperable or begin producing end-of-life signals shall be replaced.

915.5.3 Combination detectors. Combination carbon monoxide/smoke detectors installed in carbon monoxide detection systems shall be an acceptable alternative to carbon monoxide detectors, provided that they are *listed* in accordance with UL 268 and UL 2075.

Reason: This proposal seeks to establish uniform baseline requirements for CO detection in all occupancies with permanently installed fuel-burning appliances, fuel-burning fireplaces or attached garages. CO poisoning incidents resulting in deaths and injuries continue to happen with alarming regularity in occupancies not covered by the current IFC as well as those that are, demonstrating that current code requirements are not adequately inclusive and are not effectively targeting problem areas within specific occupancies.
The suggested revisions contained in this proposal are based on *"Development of a Technical Basis for CO Detector Siting," "Diffusion of CO Through Gypsum Wallboard,"* the New York State Fire Code which has required CO detection in all commercial occupancies since 2015, and data from individual case examples (see attachment and bibliography).

Requiring CO detection in all occupancies that contain known CO hazards will prevent an untold number of deaths and injuries.

<u>**Substantiation for Uniform Baseline Requirements for CO detection in All Occupancies**</u>

The lethality of CO is undisputed. The severity of poisoning injury depends not only on the level and duration of CO exposure, but also on the individual. Those most at risk from the effects of CO: infants and children, older people, pregnant women/unborn babies, and those with underlying health conditions. There is no formula that can accurately predict how CO will impact a particular person nor what level or duration of exposure can be tolerated without suffering prolonged harm, irreversible brain damage, or death. For many victims who survive a CO exposure, the effects do not end with the poisoning incident. They can be severe enough to cause death weeks to months later. They can also cause irreversible effects, including life-altering brain injury.

"In addition to the immediate onset effects of exposure, delayed-onset development of neuropsychiatric impairment typically occurs from several days to approximately 3–4 weeks after exposure, with symptoms including inappropriate euphoria, impaired judgment, poor concentration, memory loss, cognitive and personality changes, psychosis, and Parkinsonism. Symptoms of acute carbon monoxide poisoning in children are the same as those in adults. Acute carbon monoxide poisoning during pregnancy has been associated with spontaneous abortion and fetal death."

- Agency for Toxic Substances & Disease Registry, CDC

The lifesaving value of CO detection is undisputed. CO detection has been commercially available for at least 30 years and has proven reliability. There is no substitute for the early detection that these devices provide, alerting to danger before conditions escalate to a level of causing harm. In the absence of detection, it is the building occupants who are providing the alert to CO leaks, becoming ill or dying before building staff are even aware there is a problem. Some examples:

2013, North Carolina: My parents both died in a **hotel** room from a CO leak while they were on vacation. They lost consciousness and lay helpless all night, inhaling poison for over 14 hours until they died. No one in the building was even aware they were in danger. There was no CO detection onsite despite there being gas fireplaces in the guest rooms, a gas pool heater, gas dryers and gas water heaters. First responders (EMS, police, fire dept) suspected CO but thought it was more likely they both died of heart attacks so didn't bother to test the room, opting instead to wait weeks for autopsy toxicology results. The leak continued for another seven weeks, killing an 11-year-old boy and causing permanent injury to his mother in the same room before it was finally detected. Multiple people were ill at the hotel during those seven weeks, including guests and a repairman servicing the elevator which was located next to the leaking exhaust system.

2017, Michigan: A 13-year-old boy at a spring break swim party with his friends died on the deck of a **swimming pool** from CO leaking from a pool heater in an adjacent room. His friends suffered CO injury as well as head injuries when they lost consciousness and fell onto the concrete pool deck. An employee along with multiple firefighters suffered CO injuries responding to the incident.

** There is specific concern over the number of incidents in **indoor swimming pool areas** that have resulted in poisoning injuries to children. CO exposure in a pool also leads to an increased risk of drowning. These incidents are detailed on the attached spreadsheet.

2014, New York: A **restaurant** manager died from CO leaking from a fuel burning appliance in the room adjacent to his office. The assistant manager lost consciousness and suffered CO injury when she went looking for him. Multiple rescue personnel became injured as well when they rushed in to render aid, unaware they were entering a CO contaminated environment. 24 people were hospitalized including restaurant patrons. The manager had reportedly been ill for weeks prior, but neither he nor his doctors suspected it as being CO-related.

1995, California: A woman and her husband were poisoned in a **hotel** room, not found until 36 hours later – he died, she survived with permanent injury to her brain, so severe she was prevented from ever being able to work or live independently again. 25 years later, she lives in a specialized group home.

2006, Maryland: 20 **restaurant** workers suffered long term brain injury after being exposed to a CO leak that had gone unnoticed for weeks and progressed to a level of 700ppm in the dining area before problem was discovered.

2019, Ohio: CO leak at **correctional facility** caused poisoning injuries to 4 staff and 29 inmates

2019, Illinois: CO leak at a **dry cleaners**, 3 people taken to the hospital including a police officer

2019, Utah: 60 people were poisoned at a **church** from CO leaking from a boiler, having spent several hours breathing in CO levels measured at 200-500ppm. Many were projected to have long term health effects.

2021, Nebraska: 10 people poisoned at a **bowling alley**, 4 hospitalized.

According to NFIRS (National Fire Incident Reporting System) data, there were a total of 10,715 CO incidents in hotels/motels, churches, restaurants/cafeterias, bars/taverns, and K-12 schools between 1999 and 2018. This is a minimum number. Participation in the NFIRS system is voluntary and not all fire departments participate.

Further, deaths and injuries are occurring even in buildings equipped with CO detection, demonstrating the need for occupancy specific focus for future improvements beyond a baseline requirement:

2017, Texas: A couple was poisoned and found unconscious in their hotel room from CO leaking from a pool heater. The hotel was equipped with unmonitored CO detection. A couple staying a few doors down had removed the batteries from the CO alarm in their room after it had gone off multiple times during the night. The couple found unconscious later died of their CO related injuries.

2018, Tennessee: Several people were poisoned in a hotel exercise room, located on a floor with a pool but no guest rooms. The hotel reportedly had CO detection, but only on floors with guest rooms.

2019, Illinois: A couple was poisoned in their hotel room equipped with a CO alarm that was alarming, but a hotel maintenance worker told them to disregard the alarm. They ended up calling the fire department themselves and were treated at a hospital for CO poisoning.

As a homeowner it is a reasonable expectation to be aware of the hazards of CO and take responsibility to install CO detection to protect yourself. However, as an occupant of a building that is under someone else's charge, there is no way to know of equivalent hazards nor whether action has been taken to install safeguards. Combined with no human ability to detect CO, this leaves occupants critically vulnerable during any type of CO exposure incident. Their life safety is entirely at the mercy of circumstances they have no knowledge of and no control over, assuming a risk they did not choose to take.

Building and business owners rely on guidance from this code to provide basic life safety provisions for occupants. States rely on guidance from this code to pass safety legislation. People rely on this code to stay safe and keep their families safe from preventable death and harm. Emergency responders rely on this code to keep them safe from unnecessary risk in performing their already hazardous jobs.

Please act to protect people from unnecessary death and injury by approving this proposal to provide a baseline level of safety from carbon monoxide danger in all occupancies.

2021 IFC – Chapter 1 Scope and Administration

101.3 Intent.

The purpose of this code is to establish the minimum requirements consistent with nationally recognized good practice for providing a reasonable level of life safety and property protection from the hazards of fire, explosion, or dangerous conditions in new and existing buildings, structures and premises, and to provide a reasonable level of safety to fire fighters and emergency responders during emergency operations.

Bibliography: **SUPPORT DOCUMENTS FOUND AT THE FOLLOWING LINK**

- **https://thejenkinsfoundation.com/category/ifc-2024-proposal-support-do**cuments/

- Swimming Pool CO Incident Log
- Toxicological Profile for Carbon Monoxide - Agency for Toxic Substances & Disease Registry, CDC
- Development of a Technical Basis for Carbon Monoxide Detector Siting, NFPA Fire Protection Research Foundation, 2007
- 2020 Fire Code New York State
- Diffusion of Carbon Monoxide Through Gypsum Wallboard, Neil Hampson, MD
- Carbon Monoxide Poisoning, Lindell Weaver, MD, 2020
- Hotel/Motel CO Incident Log 1967-to date, Jenkins Foundation
- Commercial Building CO Incidents, Jenkins Foundation
- CO Detection and Alarm Requirements: Literature Review, NFPA Fire Protection Research Foundation, 2021
- Cost of Accidental Carbon Monoxide Poisoning: A Preventable Expense, Preventive Medicine Reports, 2016
- CO Incidents - NFIRS (National Fire Incident Reporting System) Data - REM Risk
- Carbon Monoxide Poisonings in Hotels and Motels: The Problem Silently Continues, Prev. Medicine Reports, 2019
- Carbon Monoxide Poisoning at Hotels, Motels and Resorts, Amer. Journal of Prev. Medicine, 2007
- NEMA - Life Fire Safety - Carbon Monoxide

Cost Impact: The code change proposal will increase the cost of construction
This code change proposal will increase the cost of construction but is crucial for life safety.

F102-21

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The committee stated that the reason for disapproval was that it is proposing an all-encompassing requirement to put carbon monoxide alarms everywhere without statistical data for all these other occupancies than what is currently covered in the code. Additionally, it was noted that the expansion of carbon monoxide detection throughout all the different occupancies will have very little impact to the majority of the deaths due to carbon monoxide poisoning since 54% of carbon monoxide deaths occurred in a home and over 60% of carbon monoxide poisoning deaths were due to suicide. The current minimum requirements in the IFC and IBC are helping to continue to reduce these incidents, but the leading cause is in education of the general public, increasing the cost of construction requiring these devices is not going to provide much benefit as increasing education will. An apology was given to everybody who spoke about their losses and as stated it is an awful thing to happen but the incidents that were presented were in occupancies that, the overwhelming majority, are already required by the IBC and IFC to have these devices and in existing buildings which are also already required to have these devices. Several states, including New Jersey and Washington, were discussed by the committee as examples of jurisdictions that already had specific requirements in place. In closing it was stated that this proposal is a good start in a good direction, and the committee applauded the proponents that put the proposal together. (Vote: 12-0)

F102-21

Individual Consideration Agenda

Public Comment 1:

IFC: CHAPTER 9, SECTION 915, 915.1, 915.1.1, 915.1.2, 915.1.3, 915.1.4, 915.1.5, 915.1.6, 915.2, 915.2.1, 915.2.2, 915.2.3, 915.2.4, 915.2.4 (New), 915.2.5 (New), 915.2.6 (New), 915.3, 915.3.1 (New), 915.3.2 (New), 915.3.3 (New), 915.3.4 (New), 915.4, 915.4.1, 915.4.2, 915.4.3, 915.4.4, 915.4.4 (New), 915.4.5, 915.5, 915.5.1, 915.5.2, 915.5.3, 915.5.4 (New), 915.6, 915.6.1

Proponents: Michael O'Brian, representing FCAC (fcac@iccsafe.org) requests As Modified by Public Comment

Modify as follows:

2021 International Fire Code

CHAPTER 9
FIRE PROTECTION AND LIFE SAFETY SYSTEMS

SECTION 915 CARBON MONOXIDE DETECTION .

915.1 General . Carbon monoxide detection shall be installed in new buildings in accordance with ~~Sections~~ Section 915.1.1. ~~through 915.6~~. Carbon monoxide detection shall be installed in existing buildings in accordance with Section 1103.9.

Exception: Carbon monoxide detection is not required in Group S, Group F and Group U occupancies that are not normally occupied.

915.1.1 Where required . Carbon monoxide detection shall be installed ~~provided in Group A, B, E, F, H, I, M, and R occupancies~~ in the locations specified in Section 915.2 where any of the following conditions ~~in Sections 915.1.2 through 915.1.6~~ exist.

1. In buildings that contain a CO source.
2. In buildings that contain or are supplied by a CO producing forced-air furnace
3. In buildings with attached *private garages*
4. In buildings that have a CO producing vehicle that is used within the building

~~**915.1.2 Fuel-burning fireplaces**~~.
~~Carbon monoxide detection shall be provided in rooms, areas, *dwelling units*, *sleeping units* and classrooms in Group E occupancies that contain a fuel-burning fireplace.~~

~~**915.1.3 Fuel-burning forced-air furnaces**~~.
~~Carbon monoxide detection shall be provided in the following locations served by a fuel-burning, forced-air furnace:~~

1. ~~In a central or otherwise approved location in each HVAC zone on every floor level that is served by a fuel-burning forced air-furnace.~~
2. ~~In dwelling units, sleeping units, classrooms in Group E occupancies and areas containing a swimming pool that are served by a fuel-burning forced-air furnace.~~

~~**Exception:** Carbon monoxide detection shall not be required to be installed in accordance with Section 915.1.3, Items 1 or 2, where a carbon monoxide detector is provided in the first room or area served by each main duct leaving the furnace, and the carbon monoxide alarm signals are automatically transmitted to an *approved* onsite location or to an approved off-premises location in accordance with NFPA 72.~~

~~**915.1.4 Fuel-burning appliances.**~~.
~~Carbon monoxide detection shall be provided in the following locations in buildings that contain fuel-burning appliances:~~

1. ~~In rooms, areas, dwelling units, sleeping units and classrooms in Group E occupancies that contain a fuel-burning appliance.~~
2. ~~In rooms, areas, dwelling units, sleeping units and classrooms in Group E occupancies that have communicating openings between the fuel-burning appliance and the room, area, dwelling unit, sleeping unit or classroom; or in an approved location between the fuel-burning appliance and the room, area dwelling unit, sleeping unit or classroom.~~
3. ~~In dwelling units, sleeping units, classrooms in Group E occupancies, and areas containing a swimming pool.~~

~~**Exception:** Carbon monoxide detection shall not be required to be installed in accordance with Section 915.1.4, Item 3, where a carbon monoxide detector is provided in each room, area, dwelling unit, sleeping unit, or classroom in Group E occupancies that shares a common wall, ceiling or floor with the room or area containing the fuel-burning appliance, and the carbon monoxide alarm signals are automatically transmitted to an approved onsite location or to an off-premises location in accordance with NFPA 72.~~

~~**915.1.5 Private garages**~~.
~~Carbon monoxide detection shall be provided in rooms, areas, *dwelling units*, *sleeping units* and classrooms in Group E occupancies in buildings with attached private garages.~~

~~**Exceptions:**~~

1. ~~Carbon monoxide detection shall not be required in rooms, areas, *dwelling units*, *sleeping units* and classrooms in Group E~~

~~occupancies without communicating openings between the private garage and the room, area, *dwelling unit*, *sleeping unit* or classroom.~~

2. ~~Carbon monoxide detection shall not be required in rooms, areas, *dwelling units*, *sleeping units* and classrooms in Group E occupancies located more than one story above or below a private garage.~~
3. ~~Carbon monoxide detection shall not be required where the private garage connects to the building through an *open-ended corridor*.~~
4. ~~Where a carbon monoxide detector is provided in an *approved* location between openings to a private garage and rooms, areas, *dwelling units*, *sleeping units* or classrooms in Group E occupancies.~~

~~**915.1.6 Exempt garages.** For determining compliance with Section 915.1.5, an open parking garage complying with Section 406.5 of the International Building Code or an enclosed parking garage complying with Section 406.6 of the International Building Code shall not be considered a private garage.~~

915.2 Locations . ~~Where required by Section 915.1.1, carbon~~ Carbon monoxide detection shall be installed in the locations specified in Sections 915.2.1 through 915.2.6 ~~915.2.~~.

915.2.1 Dwelling units . Carbon monoxide detection shall be installed in *dwelling units* outside of each separate sleeping area in the immediate vicinity of the bedrooms. Where a ~~fuel-burning appliance~~ CO source is located within a bedroom or its attached bathroom, carbon monoxide detection shall be installed within the bedroom.

915.2.2 Sleeping units . Carbon monoxide detection shall be installed in *sleeping units*.

Exception: Carbon monoxide detection shall be allowed to be installed outside of each separate sleeping area in the immediate vicinity of the *sleeping unit* where the *sleeping unit* or its attached bathroom does not contain a ~~fuel-burning appliance~~ CO source and is not served by a carbon monoxide producing forced-air furnace.

~~**915.2.3 Areas containing a swimming pool.**~~
~~Carbon monoxide detection shall be installed in areas containing a swimming pool.~~

~~**Exception:** Where there is a conflict between the requirements of this code and the manufacturer's installation instructions, the manufacturer's installation instructions shall govern.~~

~~**915.2.4**~~ **915.2.3 Group E occupancies .** A ~~Carbon~~ carbon monoxide system that utilizes carbon monoxide detectors shall be installed in ~~classrooms~~ in Group E occupancies. Alarm signals from ~~Carbon~~ carbon monoxide detectors ~~alarm signals~~ shall be automatically transmitted to an on-site location that is staffed by school personnel.

Exception:
Carbon monoxide alarm signals shall not be required to be automatically transmitted to an on-site location that is staffed by school personnel in Group E occupancies with an *occupant load* of 30 or less.

915.2.4 CO producing forced-air furnace .
Carbon monoxide detection, complying with Item 2 of Section 915.1.1 shall be installed in all enclosed rooms and spaces served by a fuel-burning, forced-air furnace.

Exceptions:

1. Where a carbon monoxide detector is provided in the first room or space served by each main duct leaving the furnace, and the carbon monoxide alarm signals are automatically transmitted to an approved location.
2. Dwelling units that comply with Section 915.2.1.

915.2.5 Private garages .
Carbon monoxide detection, complying with Item 3 of Section 915.1.1, shall be installed within enclosed occupiable rooms or spaces that are contiguous to the attached private garage.

Exceptions:

1. In buildings without communicating openings between the private garage and the building.
2. In rooms or spaces located more than one story above or below a private garage.
3. Where the private garage connects to the building through an open-ended corridor.
4. An open parking garage complying with Section 406.5 of the International Building Code or an enclosed parking garage complying with Section 406.6 of the International Building Code shall not be considered a private garage.
5. Dwelling units that comply with Section 915.2.1.

915.2.6 All other occupancies .
For locations other than those specified in Section 915.2.1 through 915.2.5, carbon monoxide detectors shall be installed on the ceiling of enclosed rooms or spaces containing CO producing devices or served by a CO source forced-air furnace.

> **Exception:** Where environmental conditions prohibit the installation of carbon monoxide detector in an enclosed room or space, carbon monoxide detectors shall be installed in an approved contiguous enclosed location to the room or space that contains a CO source.

915.3 Carbon monoxide detection . Carbon monoxide detection required by Sections 915.1 through ~~915.2.4~~ 915.2.6 shall be provided by carbon monoxide alarms complying with Section 915.4 or carbon monoxide detection systems complying with Section 915.5.

915.3.1 Alarm limitations. .
Carbon monoxide alarms shall only be installed in dwelling units and in sleeping units. They shall not be installed in locations where the code requires carbon monoxide detectors to be used.

915.3.2 Fire alarm system required .
New buildings that are required by Section 907.2 to have a fire alarm system and where carbon monoxide detectors are required by Section 915.2, they shall be connected to the fire alarm system in accordance with NFPA 72.

915.3.3 Fire alarm systems not required .
New buildings that are not required by Section 907.2 to have a fire alarm system, carbon monoxide detection shall be provided by one of the following:

1. Carbon monoxide detectors connected to an approved carbon monoxide detection system in accordance with NFPA 72.
2. Carbon monoxide detectors connected to an approved combination system in accordance with NFPA 72.
3. Carbon monoxide detectors connected to an approved fire alarm system in accordance with NFPA 72.
4. Where approved by the fire code official, carbon monoxide alarms are permitted to be installed where maintained in accordance with the manufacturer’s instructions.

915.3.4 Installation .
Carbon monoxide detection shall be installed in accordance with NFPA 72 and the manufacturer’s instructions.

915.4 Carbon monoxide alarms . Carbon monoxide alarms shall comply with Sections 915.4.1 through ~~915.4.5~~ 915.4.4.

915.4.1 Power source . Carbon monoxide alarms shall receive their primary power from the building wiring where such wiring is served from a commercial source, and when primary power is interrupted, shall receive power from a battery. Wiring shall be permanent and without a disconnecting switch other than that required for overcurrent protection.

> **Exception:**
> Where installed in buildings without commercial power, battery-powered carbon monoxide alarms ~~powered by a 10-year battery~~ shall be an acceptable alternative.

915.4.2 Listings . Carbon monoxide alarms shall be *listed* in accordance with UL 2034.

~~**915.4.3 Locations.**~~
~~Carbon monoxide alarms shall only be installed in *dwelling units* and in *sleeping units*. They shall not be installed in locations where the code requires carbon monoxide detectors to be used.~~

~~**915.4.4**~~ **915.4.3 Combination alarms .** Combination carbon monoxide/smoke alarms shall be an acceptable alternative to carbon monoxide alarms. Combination carbon monoxide/smoke alarms shall be *listed* in accordance with UL 217 and UL 2034.

915.4.4 Interconnection .
Where more than one carbon monoxide alarm is required to be installed, carbon monoxide alarms shall be interconnected in such a manner that the actuation of one alarm will activate all of the alarms. Physical interconnection of carbon monoxide alarms shall not be required where listed wireless alarms are installed and all alarms sound upon activation of one alarm.

~~**915.4.5 Installation requirements.**~~
~~Where required by Sections 915.1.1 through 915.5.3, carbon monoxide alarms shall be installed in accordance with Sections 915, NFPA 72, and the manufacturer's installation instructions. Where there is a conflict between the requirements of this code, NFPA 72, and the manufacturer's installation instructions, the manufacturer's installation instructions shall govern.~~

915.5 Carbon monoxide detection systems . Carbon monoxide detection systems shall be an acceptable alternative to carbon monoxide alarms and shall comply with Sections 915.5.1 through 915.5.3.

915.5.1 General . ~~Carbon monoxide detection systems shall comply with NFPA 720.~~ Carbon monoxide detectors shall be *listed* in accordance with UL 2075.

915.5.2 Locations . Carbon monoxide detectors shall be installed in the locations specified in Section 915.2. These locations supersede the locations specified in NFPA 72 ~~.~~

915.5.3 Combination detectors . Combination carbon monoxide/smoke detectors ~~installed in carbon monoxide detection systems~~ shall be an acceptable alternative to carbon monoxide detectors, provided that they are *listed* in accordance with UL 268 and UL 2075.

915.5.4 Occupant Notification .

Activation of a carbon monoxide detector shall annunciate at the control unit and shall initiate audible and visible alarm notification throughout the building.

> **Exception:** Occupant notification is permitted to be limited to the area where the carbon monoxide alarm signal originated and other signaling zones in accordance with the fire safety plan provided the alarm signal from an activated carbon monoxide detector is automatically transmitted to an *approved* on-site location or off-premises location.

915.6 Maintenance . Carbon monoxide alarms and carbon monoxide detection systems shall be maintained in accordance with NFPA 72 ~~720~~. Carbon monoxide alarms and carbon monoxide detectors that become inoperable or begin producing end-of-life signals shall be replaced.

915.6.1 Enclosed parking garages . Carbon monoxide and nitrogen dioxide detectors installed in enclosed parking garages in accordance with Section 404.1 of the International Mechanical Code shall be maintained in accordance with the manufacturer's instructions and their listing. Detectors that become inoperable or begin producing end-of-life signals shall be replaced.

Commenter's Reason: This is the first of three related public comments encompassing proposal F102-21 and proposal F116-21. This first public comment is meant to reorder the original proposed change, and address language concerns expressed by the committee.

The intent of the public comment is to require CO detection anywhere that a Carbon Monoxide Producing Device is present. The public comment will allow for either a CO detection system, or CO alarms. The proponent realizes that the cost of a full system might be cost prohibitive. In this vein, the intent is to allow for the following alternatives.

1. Permit the use of standalone CO alarms where there is no fire alarm system present
2. The addition of CO detectors (With notification) in places where a Fire Alarm System is already present
3. The addition of CO detectors attached to security systems that an occupant may have. (As allowed by NFPA 72)

This public comment reorders section 915 so that it first addresses under what circumstances CO detection is needed. The public comment is designed to cover permanent CO sources, including regularly used vehicles, and not temporary conditions such as floor cleaners that are brought in periodically, or the use of appliances such as BBQ grills that were never intended for indoor use. Similarly, the public comment is not intended to apply to things like candles or gelled alcohol cans used in chaffing dishes. The next part of the public comment specifies where CO detection devices are placed to provide the best protection. The next section deals with the installations themselves, including that the devices must comply with NFPA 72, that they need to be hardwired, and that they are interconnected.

This public comment is needed to address occupant notification because many system designers and code authorities are uncertain if carbon monoxide notification appliances (horns and strobes) are required to be installed throughout the building, like fire alarm notification appliances, or if occupant notification can be limited to specific rooms, areas, or spaces. The public comment provides clear language in the Code that carbon monoxide notification appliances are permitted, but not required, to be installed throughout the building and specifies the selective occupant notification locations. The proposed revisions are consistent with similar requirements included in Section 23.8.6.1.2 of the 2019 edition of NFPA 72.

In discussions with opponents, the cost of installation is a concern. The total installed cost of a CO detector in a commercial occupancy that already has an alarm system is approximately $325 per detector. This includes the device, a sounder base, conduit, conductors and the installation labor. A larger occupancy not already required to have CO detection under current code might require 5-6 devices, whereas smaller occupancies might only require 1 or 2. On the other hand, lawsuits from deaths and injuries due to CO poisoning have routinely settled in the millions of dollars. For example, a 2010 settlement with employees of Ruth's Chris Steakhouse cost the company $34 million. 2 devices installed for less than $1000 would have saved them the settlement, and more importantly would have prevented the injury to begin with. This also doesn't cover the lost business time from the original incident or the cost of defending the lawsuit. CO detectors and alarms are an effective way to alert occupants to the presence of CO before they become sick, or die from the exposure and is relatively inexpensive compared to other fire protection systems and the associated costs of having an incident.

Another point of contention is that CO alarms are not listed for use in all occupancies, and this public comment allows for Fire Code Official to allow their use. Currently, the scope of the UL product standard for CO alarms does not list CO alarms for use outside of dwelling units/sleeping units. However, putting a requirement in the code should not be predicated upon a UL product standard allowing it. Rather, the UL standard should test to what the code requires. An implementation several years out, UL will be able to adjust their standard, or create a new one to address the issue. The fact of the matter is that a CO alarm will detect CO regardless of the occupancy class, and a procedural issue does not change that.

We know that these devices are extremely effective at preventing CO injuries and deaths. We also know that this is something that the code can have an immediate effect on, and many states, including New York and New Jersey already have laws requiring CO detection in all occupancies where CO can accumulate.

Lastly, it is not the intent of this public comment to address temporary situations like equipment brought in for a specific maintenance task, nor is it intended to address temporary conditions like heating in tents or other special event structures that do not have permanent CO producing devices. This will be addressed in a future code change proposal in another cycle.

To avoid confusion, what follows is how the text would appear if approved:
SECTION 915 CARBON MONOXIDE DETECTION.

915.1 General. Carbon monoxide detection shall be installed in new buildings in accordance with Sections 915.1.1. Carbon monoxide detection shall be installed in existing buildings in accordance with Section 1103.9.

Exception: Carbon monoxide detection is not required in Group S, Group F and Group U occupancies that are not normally occupied.

915.1.1 Where required. Carbon monoxide detection shall be installed in the locations specified in Section 915.2 where any of the following conditions exist.

1. In buildings that contain a CO source.

2. In Buildings that contain or are supplied by a CO producing forced-air furnace

3.In buildings with attached *private garages*

4. In buildings that have a CO producing vehicle that is used within the building

915.2 Locations. Carbon monoxide detection shall be installed in the locations specified in Sections 915.2.1 through 915.2.6.

915.2.1 Dwelling units. Carbon monoxide detection shall be installed in *dwelling units* outside of each separate sleeping area in the immediate vicinity of the bedrooms. Where a CO source is located within a bedroom or its attached bathroom, carbon monoxide detection shall be installed within the bedroom.

915.2.2 Sleeping units. Carbon monoxide detection shall be installed in *sleeping units*.

Exception: Carbon monoxide detection shall be allowed to be installed outside of each separate sleeping area in the immediate vicinity of the *sleeping unit* where the *sleeping unit* or its attached bathroom does not contain a CO source and is not served by a carbon monoxide producing forced-air furnace.

915.2.3 Group E occupancies. A carbon monoxide system that utilizes carbon monoxide detectors shall be installed in in Group E occupancies. Alarm signals from carbon monoxide detectors shall be automatically transmitted to an on-site location that is staffed by school personnel.

Exception: Carbon monoxide alarm signals shall not be required to be automatically transmitted to an on-site location that is staffed by school personnel in Group E occupancies with an *occupant load* of 30 or less.

915.2.4 CO producing forced-air furnace. Carbon monoxide detection, complying with Item 2 of Section 915.1.1 shall be installed in all enclosed rooms and spaces served by a fuel-burning, forced-air furnace.

Exceptions:

1. Where a carbon monoxide detector is provided in the first room or space served by each main duct leaving the furnace, and the carbon monoxide alarm signals are automatically transmitted to an approved location.

2. Dwelling units that comply with Section 915.2.1.

915.2.5 Private garages. Carbon monoxide detection, complying with Item 3 of Section 915.1.1, shall be installed within enclosed occupiable rooms or spaces that are contiguous to the attached private garage.

Exceptions:

1.In buildings without communicating openings between the private garage and the building.

2. In rooms or spaces located more than one story above or below a private garage. 3 . Where the private garage connects to the building through an open-ended corridor. 4. An open parking garage complying with Section 406.5 of the International Building Code or an enclosed parking garage complying with Section 406.6 of the International Building Code shall not be considered a private garage. 5. Dwelling units that comply with Section 915.2.1.

915.2.6 All other occupancies. For locations other than those specified in Section 915.2.1 through 915.2.5, carbon monoxide detectors shall be installed on the ceiling of enclosed rooms or spaces containing CO producing devices or served by a CO source forced-air furnace.

Exception: Where environmental conditions prohibit the installation of carbon monoxide detector in an enclosed room or space, carbon monoxide detectors shall be installed in an approved contiguous enclosed location to the room or space that contains a CO source.

915.3 Carbon monoxide detection. Carbon monoxide detection required by Sections 915.1 through 915.2.6 shall be provided by carbon monoxide alarms complying with Section 915.4 or carbon monoxide detection systems complying with Section 915.5.

915.3.1 Alarm limitations. Carbon monoxide alarms shall only be installed in dwelling units and in sleeping units. They shall not be installed in locations where the code requires carbon monoxide detectors to be used.

915.3.2 Fire alarm system required. New buildings that are required by Section 907.2 to have a fire alarm system, where carbon monoxide detectors are required by Section 915.2 they shall be connected to the fire alarm system in accordance with NFPA 72.

915.3.3 Fire alarm systems not required. New buildings that are not required by Section 907.2 to have a fire alarm system, carbon monoxide detection shall be provided by one of the following:

1. Carbon monoxide detectors connected to an approved carbon monoxide detection system in accordance with NFPA 72.

2. Carbon monoxide detectors connected to an approved combination system in accordance with NFPA 72.

3. Carbon monoxide detectors connected to an approved fire alarm system in accordance with NFPA 72.

4. Where approved by the fire code official, carbon monoxide alarms are permitted to be installed where maintained in accordance with the manufacturer's instructions.

915.3.4 Installation. Carbon monoxide detection shall be installed in accordance with NFPA 72 and the manufacturer's instructions.

915.4 Carbon monoxide alarms. Carbon monoxide alarms shall comply with Sections 915.4.1 through 915.4.4.

915.4.1 Power source. Carbon monoxide alarms shall receive their primary power from the building wiring where such wiring is served from a commercial source, and when primary power is interrupted, shall receive power from a battery. Wiring shall be permanent and without a disconnecting switch other than that required for overcurrent protection.

Exception: Where installed in buildings without commercial power, battery-powered carbon monoxide alarms shall be an acceptable alternative.

915.4.2 Listings. Carbon monoxide alarms shall be *listed* in accordance with UL 2034.

915.4.3 Combination alarms. Combination carbon monoxide/smoke alarms shall be an acceptable alternative to carbon monoxide alarms. Combination carbon monoxide/smoke alarms shall be *listed* in accordance with UL 217 and UL 2034.

915.4.4 Interconnection. Where more than one carbon monoxide alarm is required to be installed, carbon monoxide alarms shall be interconnected in such a manner that the actuation of one alarm will activate all of the alarms in the individual dwelling unit. Physical interconnection of carbon monoxide alarms shall not be required where listed wireless alarms are installed and all alarms sound upon activation of one alarm.

915.5 Carbon monoxide detection systems. Carbon monoxide detection systems shall be an acceptable alternative to carbon monoxide alarms and shall comply with Sections 915.5.1 through 915.5.3.

915.5.1 General. Carbon monoxide detectors shall be *listed* in accordance with UL 2075.

915.5.2 Locations. Carbon monoxide detectors shall be installed in the locations specified in Section 915.2. These locations supersede the locations specified in NFPA 72

915.5.3 Combination detectors. Combination carbon monoxide/smoke detectors shall be an acceptable alternative to carbon monoxide detectors, provided that they are *listed* in accordance with UL 268 and UL 2075.

915.5.4 Occupant Notification. Activation of a carbon monoxide detector shall annunciate at the control unit and shall initiate audible and visible alarm notification throughout the building.

Exception: Occupant notification is permitted to be limited to the area where the carbon monoxide alarm signal originated and other signaling zones in accordance with the fire safety plan provided the alarm signal from an activated carbon monoxide detector is automatically transmitted to an *approved* on-site location or off-premises location.

915.6 Maintenance. Carbon monoxide alarms and carbon monoxide detection systems shall be maintained in accordance with NFPA 72 . Carbon monoxide alarms and carbon monoxide detectors that become inoperable or begin producing end-of-life signals shall be replaced.**915.6.1 Enclosed parking garages.** Carbon monoxide and nitrogen dioxide detectors installed in enclosed parking garages in accordance with Section 404.1 of the International Mechanical Code shall be maintained in accordance with the manufacturer's instructions and their listing. Detectors that become inoperable or begin producing end-of-life signals shall be replaced.

This Public Comment is submitted by the ICC Fire Code Action Committee (FCAC). The FCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance assigned International Codes with regard to fire and life safety in new and existing buildings and facilities as well as the protection of life and property in wildland urban interface areas. In 2020 and 2021 the Fire-CAC held multiple virtual meetings that were open to any interested party. In addition, there were numerous virtual specific working group meetings that were also open to any interested parties, to develop, discuss and debate the proposed changes. Related documentation and reports are posted on the FCAC website at: FCAC.

Cost Impact: The net effect of the public comment and code change proposal will increase the cost of construction The overall proposal will increase the cost of construction but it is hoped that this Public Comment will make it more clear where such protection is needed and may reduce the overall cost.
In occupancies not already required to have CO detection, the cost of installing new devices attached to a system is approximately $325 per device, with many occupancies only requiring 4-6 devices for larger occupancies, and 1-2 devices for smaller occupancies.

In places where a stand-alone alarms are allowed by the proposal, the cost of a new device will cost between $25 and $60 per device.

Public Comment# 2807

Public Comment 2:

IFC: (New); IBC: (New)

Proponents: Michael O'Brian, representing FCAC (fcac@iccsafe.org) requests As Modified by Public Comment

Modify as follows:

2021 International Fire Code

CARBON MONOXIDE SOURCE . A piece of commonly used equipment or permanently installed appliance, fireplace or process that produces or emits carbon monoxide gas.

2021 International Building Code

CARBON MONOXIDE SOURCE . A piece of commonly used equipment or permanently installed appliance, fireplace or process that produces or emits carbon monoxide gas.

Commenter's Reason: This is the second of 3 related proposals. This proposal simply adds a definition for Carbon Monoxide Source. This will clarify that only permanently installed or used sources in a building such as gas fired heaters or propane powered forklifts that are part of the daily operations of a space are included, and that things like candles and floor polishers are not intended to be captured. Additionally, this shortens the code language so that not every iteration of something that produces CO is written in several places in the code.
This Public Comment is submitted by the ICC Fire Code Action Committee (FCAC). The FCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance assigned International Codes with regard to fire and life safety in new and existing buildings and facilities as well as the protection of life and property in wildland urban interface areas. In 2020 and 2021 the Fire-CAC held multiple virtual meetings that were open to any interested party. In addition, there were numerous virtual specific working group meetings that were also open to any interested parties, to develop, discuss and debate the proposed changes. Related documentation and reports are posted on the FCAC website at: FCAC.

Cost Impact: The net effect of the public comment and code change proposal will increase the cost of construction
The overall proposal will increase the cost of construction. This PC is merely adding a new definition to the IFC and IBC to clarify how the provisions are intended to apply. This PC in and of itself does not further impact cost as it is only a definition.

Public Comment# 2808

F103-21

Proposed Change as Submitted

Proponents: Thomas Daly, HSCG - representing the HSCG, representing HSCG (thomas.daly@myhscg.com)

2021 International Fire Code

Add new definition as follows:

LIVING AREA. Spaces in Group R-1 occupancies and R-2 dormitories that are contiguous to one or more sleeping units that include provisions for eating and living and can include furnishings for sleeping purposes. Bathrooms, toilet rooms, closets, halls, storage or utility spaces and similar areas are not considered living spaces.

Revise as follows:

915.2.2 Sleeping units. Carbon monoxide detection shall be installed in *sleeping units* , including within their contiguous living area(s).

> **Exception:** Carbon monoxide detection shall be allowed to be installed outside of each separate sleeping area in the immediate vicinity of the *sleeping unit* where the *sleeping unit* or its attached bathroom does not contain a fuel-burning appliance and is not served by a forced-air furnace.

2021 International Building Code

Add new definition as follows:

LIVING AREA. Spaces in Group R-1 occupancies and R-2 dormitories that are contiguous to one or more sleeping units that include provisions for eating and living and can include furnishings for sleeping purposes. Bathrooms, toilet rooms, closets, halls, storage or utility spaces and similar areas are not considered living spaces.

Revise as follows:

[F] 915.2.2 Sleeping units. Carbon monoxide detection shall be installed in *sleeping units* , including within their contiguous living area(s).

> **Exception:** Carbon monoxide detection shall be allowed to be installed outside of each separate sleeping area in the immediate vicinity of the *sleeping unit* where the *sleeping unit* or its attached bathroom does not contain a fuel-burning appliance and is not served by a forced air furnace.

Reason: Then intent of the Proposal is to provide occupants of Group R-1 hotels and Group R-2 Dormitories with the same level of protection from exposure to carbon monoxide as they do from the dangers of fire. The Proposal requires carbon monoxide detection in spaces intended to be used for sleeping purposes such as living rooms of hotel guestrooms and suites and multi-room dormitories.The IFC, NFPA 101 and NFPA 72 currently require smoke detection in the bedroom and living room. The same requirements are needed for carbon monoxide detection. The Proposal is needed to because many system designers and code authorities are unclear if carbon monoxide detection is required in non-bedroom areas that are used for sleeping. The Proposal provides clear language that all sleeping spaces within shall be provided with the carbon monoxide detection.
In typical Group R-1 all-suite hotels, occupants of the bedroom must exit thru the living area to reach the exit corridor. Non-fire CO exposures from within or without the guest suite can and have produced harmful levels of CO with the occupants not warned as the living area is normally separated from the bedroom by a closed door.

Cost Impact: The code change proposal will increase the cost of construction
The cost impact, where it occurs, is estimated at $50 per unit installed. Note however that provisions of the 2021 IFC Sec. 915.1.4 Exception 2 obviates the need for CO detection in dwelling and sleeping units where such detection is provided in rooms and spaces with fuel-fired appliances.

F103-21

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The committee stated that the reason for disapproval was that there is not anything wrong with the section and adding these extra definitions which are also talking about living spaces is just making it more confusing. (Vote: 14-0)

Individual Consideration Agenda

Public Comment 1:

IFC: 915.2.2 (New); IBC: [F] 915.2.2

Proponents: Bryan Holland, representing National Electrical Manufacturers Association (bryan.holland@nema.org); Megan Hayes, representing NEMA (megan.hayes@nema.org) requests As Modified by Public Comment

Replace as follows:

2021 International Fire Code

915.2.2 Sleeping units . Carbon monoxide detection shall be installed in sleeping units. Where the sleeping area is in a separate room from other spaces within the sleeping unit, the carbon monoxide detection shall be located within the sleeping area and outside each sleeping area within 21 ft (6.4 m) of any door to a sleeping room, with the distance measured along a path of travel.

> ~~**Exception:** Carbon monoxide detection shall be allowed to be installed outside of each separate sleeping area in the immediate vicinity of the sleeping unit where the sleeping unit or its attached bathroom does not contain a fuel-burning appliance and is not served by a forced-air furnace.~~

2021 International Building Code

[F] 915.2.2 Sleeping units . Carbon monoxide detection shall be installed in *sleeping units*. Where the sleeping area is in a separate room from other spaces within the sleeping unit, the carbon monoxide detection shall be located within the sleeping area and outside each sleeping area within 21 ft (6.4 m) of any door to a sleeping room, with the distance measured along a path of travel.

> ~~**Exception:** Carbon monoxide detection shall be allowed to be installed outside of each separate sleeping area in the immediate vicinity of the *sleeping unit* where the *sleeping unit* or its attached bathroom does not contain a fuel-burning appliance and is not served by a forced-air furnace.~~

Commenter's Reason: This public comment to Proposal F103-21 meets the objective the original submitter was attempting to achieve and provides more precise language for clarity and enforceability. The new language being proposed ensures that CO detection is provided in the sleeping area itself as this is where the greatest risk of exposure will occur, but also adds a second CO detection location immediately outside of the sleeping area as this space is often used for sleeping (pull-out couches and roll-away beds). However, unlike the current exception, it keeps the CO detection in the sleeping unit and within 21 ft of the designated sleeping area. This better aligns the IFC with the NFPA 72 that is the source of 21 ft criteria and that does not have a similar exception for sleeping units.

Cost Impact: The net effect of the public comment and code change proposal will increase the cost of construction
Approval of this public comment will result in at least one additional carbon monoxide (CO) alarm within the sleeping units of buildings.

Public Comment# 2515

F107-21 Part I

Proposed Change as Submitted

Proponents: Michael O'Brian, representing FCAC (fcac@iccsafe.org)

THIS IS A TWO PART CODE CHANGE. PART I OF THIS PROPOSAL WILL BE HEARD BY THE FIRE CODE COMMITTEE AND PART 2 OF THIS PROPOSAL WILL BE HEARD BY THE BUILDING CODE MEANS OF EGRESS CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THESE COMMITTEES.

2021 International Fire Code

Add new text as follows:

1032.4.1 Internally illuminated exit signs.
Electrically powered, self-luminous and photoluminescent exit signs shall be maintained in accordance with Sections 1032.4.1.1 and 1032.4.1.2.

1032.4.1.1 Testing.
Testing of internally illuminated exit signs shall be on a monthly basis. The test shall be performed manually or by an automated self-testing and self-diagnostic routine. Where testing is performed by self-testing or self-diagnostics, a visual inspection of the exit sign equipment shall also be conducted to identify any equipment displaying a trouble indicator or that has become damaged or otherwise impaired. Signs are to be immediately discernable from the route of egress.

1032.4.1.2 Record Keeping.
Records shall be maintained documenting monthly testing and maintenance for exit signs. Records shall be maintained on site for a period of not less than three years.

1032.4.2 Externally illuminated exit signs.
Externally illuminated exit signs shall be inspected on a monthly basis. The function of the external illumination shall be verified and the sign inspected for damage or other impairment. Signs are to be immediately discernable from the route of egress.

1032.4.2.1 Record Keeping.
Records shall be maintained documenting monthly testing and maintenance for exit signs. Records shall be maintained on site for a period of not less than three years.

Reason: The code currently lacks provisions for the regular maintenance, testing, and record keeping for arguably one of the most common fire code violations an inspector may come across. The added language in 1032.4 mirrors language already in the code for other exit appurtenances [ie: emergency lighting]. Clearly ascertainable exits are paramount in an emergency situation. There shall be no ambiguity how to quickly and safely egress from a building in a time of critical need.
Section 1032.4.1.1, this section addresses a pervasive problem the working group has tried to address in photoluminescent exit signs. Photoluminescence is a process whereby luminescence is induced by the absorption of visible light. The use of photoluminescent exit signage in a low light areas [ie: movie theatres] has presented a problem where minimal or no ambient light is available to recharge the sign. The code lacks adequate means to address photoluminescent exit signs.

Section 1032.4.2.1, accounts for future technology and automated smart building advances. There is no additional financial impact for administering this code.

This proposal is submitted by the ICC Fire Code Action Committee (FCAC). The FCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance assigned International Codes with regard to fire and life safety in new and existing buildings and facilities as well as the protection of life and property in wildland urban interface areas. In 2020 and 2021 the Fire-CAC held multiple virtual meetings that were open to any interested party. In addition, there were numerous virtual specific working group meetings that were also open to any interested parties, to develop, discuss and debate the proposed changes. Related documentation and reports are posted on the FCAC website at: https://www.iccsafe.org/products-and-services/i-codes/code-development/cs/fire-code-action-committee-fcac/

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal is related to the testing, inspection and maintenance of existing systems and is within the intent of the code to be addressed.

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The committee stated that the reason for disapproval was that the language "immediately discernible" is subjective and not enforceable language and internally illuminated exit signs are designed to last for years and a monthly inspection of these devices including the documentation is a significant labor effort. It was additionally noted that the preference was for the section requirements to be separated out into a list. (Vote: 13-0)

F107-21 Part I

Individual Consideration Agenda

Public Comment 1:

IFC: 1032.4.1, 1032.4.1.1, 1032.4.2

Proponents: Michael O'Brian, representing FCAC (fcac@iccsafe.org) requests As Modified by Public Comment

Modify as follows:

2021 International Fire Code

1032.4.1 Internally illuminated exit signs . Electrically powered, self-luminous and photoluminescent exit signs shall be maintained in accordance with ~~Sections 1032.4.1.1 and 1032.4.1.2.~~ the manufacturer's instructions.

1032.4.1.1 Testing . Testing of electrically powered ~~internally illuminated~~ exit signs shall be on a monthly basis. The test shall be performed manually or by an automated self-testing and self-diagnostic routine. Where testing is performed by self-testing or self-diagnostics, a visual inspection of the exit sign equipment shall also be conducted to identify any equipment displaying a trouble indicator or that has become damaged or otherwise impaired. ~~Signs are to be immediately discernable from the route of egress.~~

1032.4.2 Externally illuminated exit signs . Externally illuminated exit signs shall be inspected on a monthly basis to verify~~. The~~ function of the external illumination source. ~~shall be verified and the~~ The sign shall be inspected for damage or other impairment. ~~Signs are to be immediately discernable from the route of egress.~~

Commenter's Reason: In response to committee comments the language was revised to clarify the intent to require regular testing of exit signs as a critical component of the means of egress. Reference to “immediately discernable” was removed as being unenforceable and potentially confusing.

Cost Impact: The net effect of the public comment and code change proposal will not increase or decrease the cost of construction
The code proposal is related to ongoing testing and inspection after construction so has no impact to the original construction.

Public Comment# 2503

Public Comment 2:

IFC: 1032.4.1.1, 1032.10.1

Proponents: Michael O'Brian, representing FCAC (fcac@iccsafe.org) requests As Modified by Public Comment

Modify as follows:

2021 International Fire Code

1032.4.1.1 Testing . Testing of internally illuminated exit signs shall be conducted quarterly ~~on a monthly basis.~~ . The test shall be performed manually or by an automated self-testing and self-diagnostic routine. Where testing is performed by self-testing or self-diagnostics, a visual inspection of the exit sign equipment shall also be conducted to identify any equipment displaying a trouble indicator or that has become damaged or otherwise impaired. Signs are to be immediately discernable from the route of egress.

1032.10.1 Activation test . Emergency lighting equipment shall be tested ~~monthly~~ quarterly for a duration of not less than 30 seconds. The test shall be performed manually or by an automated self-testing and self-diagnostic routine. Where testing is performed by self-testing and self-diagnostics, a visual inspection of the emergency lighting equipment shall be conducted monthly to identify any equipment displaying a trouble indicator or that has become damaged or otherwise impaired.

Commenter's Reason: The testing frequency was adjusted to reflect the overall reliability of exit signage and emergency lighting. Monthly testing is not necessary and reflects the concern of the IFC Committee. Emergency lighting is added to this proposal as the testing frequencies should be consistent.

Cost Impact: The net effect of the public comment and code change proposal will not increase or decrease the cost of construction
Technically this is cost of inspection versus construction but this PC will reduce the frequency of necessary inspections and likely reduce the cost of regulation.

Public Comment# 2541

NOTE: F107-21 PART II DID NOT RECEIVE A PUBLIC COMMENT AND IS REPRODUCED FOR INFORMATIONAL PURPOSES ONLY

F107-21 Part II

Proposed Change as Submitted

Proponents: Michael O'Brian, representing FCAC (fcac@iccsafe.org)

2021 International Fire Code

Revise as follows:

[BE] 1032.4 Exit signs. Exit signs shall be installed and maintained in accordance with the building code that was in effect at the time of construction and the applicable provisions in Section 1104. Decorations, furnishings, equipment or adjacent signage that impairs the visibility of exit signs, creates confusion or prevents identification of the *exit* shall not be allowed. <u>Regardless of type, all exit signs shall be immediately discernable to indicate the route of egress.</u>

Reason: The code currently lacks provisions for the regular maintenance, testing, and record keeping for arguably one of the most common fire code violations an inspector may come across. The added language in 1032.4 mirrors language already in the code for other exit appurtenances [ie: emergency lighting]. Clearly ascertainable exits are paramount in an emergency situation. There shall be no ambiguity how to quickly and safely egress from a building in a time of critical need.
Section 1032.4.1.1, this section addresses a pervasive problem the working group has tried to address in photoluminescent exit signs. Photoluminescence is a process whereby luminescence is induced by the absorption of visible light. The use of photoluminescent exit signage in a low light areas [ie: movie theatres] has presented a problem where minimal or no ambient light is available to recharge the sign. The code lacks adequate means to address photoluminescent exit signs.

Section 1032.4.2.1, accounts for future technology and automated smart building advances. There is no additional financial impact for administering this code.

This proposal is submitted by the ICC Fire Code Action Committee (FCAC). The FCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance assigned International Codes with regard to fire and life safety in new and existing buildings and facilities as well as the protection of life and property in wildland urban interface areas. In 2020 and 2021 the Fire-CAC held multiple virtual meetings that were open to any interested party. In addition, there were numerous virtual specific working group meetings that were also open to any interested parties, to develop, discuss and debate the proposed changes. Related documentation and reports are posted on the FCAC website at: https://www.iccsafe.org/products-and-services/i-codes/code-development/cs/fire-code-action-committee-fcac/

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal is related to the testing, inspection and maintenance of existing systems and is within the intent of the code to be addressed.

F107-21 Part II

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The proposal was disapproved because "immediately discernable" is vague. This is already addressed in Sections 1032.4 and 1013.1. This could be read to force a relocation of exit signs. (Vote: 13-0)

F110-21

Proposed Change as Submitted

Proponents: China Clarke, representing New York State Dept of State (china.clarke@dos.ny.gov); Kevin Duerr-Clark, representing New York State Department of State (kevin.duerr-clark@dos.ny.gov)

2021 International Fire Code

Add new text as follows:

1032.12 Capacity of means of egress.
The occupant load of buildings or portions thereof shall not exceed the approved capacity of the means of egress.

Reason: We are proposing this addition to the 2021 IFC to make it clear that the occupant load of an existing building is prohibited from exceeding the approved capacity of the means of egress. Other Sections of the 2021 IFC, including but not limited to Section 1004.5.1, provide that the occupant load is allowed to be increased from the values of Table 1004.5. This may mislead code users to believe that the load is permitted to be increased without regard to the approved capacity of the means of egress. This change will make the intent explicitly clear.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The intention of this proposal is to add clarification to provisions that already exist, it should not impact cost.

F110-21

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The committee stated that the reason for disapproval was that this language is necessary and the code already gives some discretion in the instance that occupant load is going to be exceeded and the fire code official needs to take into consideration the egress requirement as part of it. (Vote: 13-0)

F110-21

Individual Consideration Agenda

Public Comment 1:

IFC: 1032.12

Proponents: China Clarke, representing New York State Dept of State (china.clarke@dos.ny.gov); Kevin Duerr-Clark, representing New York State Department of State (kevin.duerr-clark@dos.ny.gov) requests As Modified by Public Comment

Modify as follows:

2021 International Fire Code

1032.12 Capacity of means of egress . ~~The~~ Unless otherwise provided in this code the occupant load of buildings or portions thereof shall not exceed the *approved* capacity of the *means of egress*.

Commenter's Reason: The comments received stated that the new section is inconsistent with the allowances made for occupant load provided in Section 1004, and does not accommodate the authority granted to a fire code official by the same section. In response, we direct your attention to the use of the phrase “approved capacity” in the proposal, which means the capacity is “acceptable to the fire code official” (as defined in Chapter 2 of the 2021 IFC). We have modified the proposal’s language to include “unless otherwise provided in this code” and italicized the word *approved* to make it explicitly clear that the proposal does not intend to negate the authority granted by other sections of the code, as well as a fire code official’s authority to modify occupancy load or contradict any other provision of the code.
In response to opposition to the placement of the new language within the code we would like to offer the following: The application of the proposed section is for existing buildings that are not undergoing construction; therefore, it is placed in section 1032, not in Section 1004 or Chapter 11. Multiple editions of the IFC commentary (2018 and 2015 IFC) explain that scoping provisions of Section 1001.1 restrict the applicability of Sections

1003 through 1031 to new construction thus leaving only Section 1032 to apply to existing buildings. These same Commentaries say that the scoping provisions of Chapter 11 provide minimum construction requirements for existing buildings.

Cost Impact: The net effect of the public comment and code change proposal will not increase or decrease the cost of construction
As the intent of the proposal is to add clarification to provisions that already exist, it will not impact cost of construction.

Public Comment# 2777

F111-21

Proposed Change as Submitted

Proponents: John Catlett, J.D. Catlett Consulting, LLC, representing BOMA International (catlettcodeconsulting@gmail.com); Dan Buuck, National Association of Home Builders, representing National Association of Home Builders (dbuuck@nahb.org)

2021 International Fire Code

CHAPTER 11
CONSTRUCTION REQUIREMENTS FOR EXISTING BUILDINGS

SECTION 1101
GENERAL

1101.2 Intent. The intent of this chapter is to provide a minimum degree of fire and life safety to persons occupying existing buildings by providing minimum construction requirements where such existing buildings do not comply with the minimum requirements of the *International Building Code*.

1101.1 Scope. The provisions of this chapter shall apply to existing buildings constructed prior to the adoption of this code.

1101.3 Permits. Permits shall be required as set forth in Sections 105.5 and 105.6 and the *International Building Code*.

Revise as follows:

1101.4 Owner notification. When a building is found to be in noncompliance with this chapter, the *fire code official* shall duly notify the *owner* of the building. ~~Upon receipt of such notice, the *owner* shall, subject to the following time limits, take necessary actions to comply with the provisions of this chapter.~~

Add new text as follows:

1101.4.1 Owners responsibility.
Upon receiving notice as required in Section 1101.4, the building *owner* is required to provide a systematic plan of correction and documentation to support a compliance path based on the provisions of section 1101.4.2 within a timeframe established by the *fire code official*. The *fire code official* is authorized to request additional documentation to support *owner's* proposed schedule.

1101.4.2 Establishing a systematic plan of correction.
Upon receipt of such notice, the owner shall take necessary actions to establish a systematic plan of correction to comply with the provisions of this chapter. The *fire code official* shall evaluate the plan submitted and provide approval of the plan if the fire code official finds the terms acceptable. When developing the plan, the *fire code official* and building *owner* shall agree to a compliance path based on all of the following:

1. The number of provisions of Chapter 11 of this code the owner has been cited to comply with.
2. Any planned alterations within the building where work required to comply with the provisions of Chapter 11 of this code and the *International Existing Building Code* where work can be incorporated into the compliance path schedule.
3. Any disruption of business operations that occurs within the building during construction required to comply with Chapter 11 of this code that must be addressed that will lengthen time for completion or cause work to be performed outside of normal business operations.
4. The number of buildings under the *owner's* control that have to comply with provisions of Chapter 11 of this code.
5. The *owner's* availability to have funding available to complete the work.
6. Availability of necessary design professionals and contractors to design and conduct the work.

Revise as follows:

~~1101.4.1~~ 1101.4.3 Construction documents. *Construction documents* necessary to comply with this chapter shall be completed and ~~submitted within a time schedule~~ in accordance with systematic plan of correction *approved* by the *fire code official*.

~~1101.4.2~~ 1101.4.4 Completion of work. Work necessary to comply with this chapter shall be completed ~~within a time schedule~~ in accordance with the systematic plan of correction *approved* by the *fire code official*.

~~1101.4.3~~ 1101.4.5 Extension of time. The *fire code official* is authorized to grant necessary extensions of time where it can be shown that the specified time periods are not physically practical or pose an undue hardship and the owner has shown a good faith effort to comply with the approved systematic plan of correction. The granting of an extension of time for compliance shall be based on the showing of good cause and subject to the filing of ~~an~~ a revised acceptable systematic plan of correction that is approved by ~~with~~ the *fire code official*.

Reason: This code proposal is intended to address the lack of direction to fire code officials regarding seeking compliance with chapter 11 of the

IFC. The code has been silent in addressing the realities and difficulties that retrofitting requirement compliance place on building owners. Unlike new construction, change of use, or alterations where regulatory compliance can be factored into project budgets, retrofitting is not part of a building's maintenance and operations budget and can create a hardship. Building owners are often confronted with violation notices for compliance with Chapter 11 items from field inspectors who treat the requirements the same as a routine violation like exit light maintenance, replacing a noncompliant lock, or unblocking an exit. We can provide examples of where this has already occurred. The lack of realization that many of the items have significant cost associated with them, the lack of available designers and contractors needed to meet demand to do the work necessary to comply with a notice, and sometimes the inability to comply safely without disruption of business operations, is not recognized with short time period notices.
BOMA fully supported the 2021 code change that required a fire sprinkler retrofit for existing high-rise structures because it contained a very acceptable one year to submit a plan for compliance and a ten year from that point to complete the work. This allowed the process of applying the IEBC through alterations and change of use projects to comply with retrofit provisions over a period of time and then completing remaining areas.

Why this is important:

Building owners are normally considered cash cows that are sitting on massive reserves of funds. This is far from the truth. Even small ownership entities have business plans that have to take in staffing cost, overhead from taxes and utilities, disruptions of normal business activities such as what occurred with the Covid pandemic, and both budgeted and unbudgeted maintenance cost. They operate on a cash flow based on occupancy rates of space. Receiving a short compliance period for very expensive safety enhancements without funding from grants, tax deductions or credits can be financially difficult, many times requiring the diversion of intended preventative maintenance funds, reserves for unintended maintenance cost, or actually being required to take loans to accomplish the work. This, in turn adds cost to the end user in the form of higher rents and places the building owner in a very precarious situation of keeping rents in line with regional rental rates.

We need to understand that these buildings are not inherently unsafe. If they were, they would be subject the unsafe building provisions of both the fire and property maintenance codes. Many of the buildings were built under building codes in effect at the time of construction that have been enhanced over time. In no way should chapter 11 be applied as if an emergency, unsafe condition or event has occurred. To be palatable, chapter 11 should be applied as a partnership between the building owner and the fire official.

The proposed code change attempts to accomplish this. It brings forth the elements that need to be considered from the building owner's perspective when issued a notice of violation to comply with Chapter 11. In addition, it recognizes code changes to the brought into the 21' IEBC that makes specific reference to compliance with IFC Chapter 11.

We floated this to various entities that may have interest in this proposal. We received very good feedback and suggestions of methods to accomplish the intent. One proposed that the administrative portion of the code be modified to address the concern. This still is an option, but Chapter 11 is the only section of the code unique by requiring retrofitting and also containing its own administrative provisions for application. Others recommended establishing a chart with minimum compliance thresholds which has merit. However, no size fits all. For example, two years to change out non self-illuminating, back-up power emergency lighting and exit signs for a single five story building may be palatable. But having to do it in five, thirty story towers may be a strain.

We feel it best that the fire code official remains the ultimate decider, but by working with the building owner to understand their needs when developing a plan to make the building compliant. This takes time. Time to secure contractors and designers to develop plans, get cost estimates, and secure funding without disruption of cash flow. Especially during busy construction cycles when new buildings reduce the capabilities to access these professionals that are working on much larger projects.

Compliance sometimes requires the additional cost of having work performed when buildings are closed from daily operations. Drilling and sounds generated from construction, contractors needing access to occupied spaces, and the potential to create unsafe construction related issues (Blocked corridors and stairways, etc.) occurs when buildings are occupied. This adds expense to any project as contractors add to cost estimates the real cost of working outside of a normal day.

Some offered that we may need a companion code change to establish a definition of the term "systematic plan of correction". However, this term has already been used in section 1101.4.3 of Chapter 11 in previous codes. We note that this is the only place in the code where it occurs. This proposal only expands what appears to be a term understood by users in previous code cycles into other provisions of Chapter 11.

Building owners face uncertain times. Demand for office space is anticipated to decline at least for the short term as companies are reducing cost by shedding office space. Although this is anticipated to reverse in coming years, it may be the new norm as companies resistant to remote working were forced into it by the pandemic. Now that it has proven effective and remote meeting technology has improved, this could be more than a trend.

In addition, building owners are facing unprecedented pressure to shoulder the burden of energy efficiency beyond what they can expect as a return on investment. States and localities are moving legislation that will require retrofitting of existing HVAC equipment that currently use fossil fuels to higher efficiency electric or renewable energy equipment. The combination of energy compliance, IFC chapter 11 compliance, and the reduced need for office space has a potential to be disastrous to the office building and multi-family residential rental market. This code proposal allows for the continuous movement toward *safer* buildings while realizing the associate cost, hurdles, and disruption compliance can entail.

Cost Impact: The code change proposal will not increase or decrease the cost of construction

The proposal does not increase or decrease the cost of compliance. It will allow building owners to prepare for the cost.

F111-21

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: This proposal was disapproved with several concerns. Generally, it was felt that the focus was on economic impact versus safety. The approach lacks flexibility and does not recognize concepts such as a fire watch. The list of items addressed seems limiting and may reduce the authority of the fire code official. It was suggested that perhaps a reference back to Section 112 would be more appropriate and perhaps the conditions in Section 1101.4.2 should be eliminated. (Vote: 13-1)

F111-21

Individual Consideration Agenda

Public Comment 1:

IFC: CHAPTER 11, SECTION 1101, 1101.1, 1101.2, 1101.3, 1101.4, 1101.4.1 (New), 1101.4.2 (New), 1101.4.1, 1101.4.2, 1101.4.3

Proponents: John Catlett, representing BOMA International (catlettcodeconsulting@gmail.com) requests As Modified by Public Comment

Replace as follows:

2021 International Fire Code

CHAPTER 11
CONSTRUCTION REQUIREMENTS FOR EXISTING BUILDINGS

SECTION 1101
GENERAL

1101.1 Scope . The provisions of this chapter shall apply to existing buildings constructed prior to the adoption of this code.

1101.2 Intent . The intent of this chapter is to provide a minimum degree of fire and life safety to persons occupying existing buildings by providing minimum construction requirements where such existing buildings do not comply with the minimum requirements of the *International Building Code*.

1101.3 Permits . Permits shall be required as set forth in Sections 105.5 and 105.6 and the *International Building Code*.

1101.4 Owner notification . When a building is found to be in noncompliance with this chapter, the *fire code official* shall duly notify the *owner* of the building. Upon receipt of such notice, the *owner* shall, ~~subject to the following time limits, take necessary actions to comply with the provisions of this chapter.~~ <u>contact the fire code official within 30 days to establish a plan of correction.</u>

<u>**1101.4.1 Owner's responsibility**</u> **.**
<u>The building owner is required to provide a plan of correction and documentation to support a compliance path based on the provisions of section 1101.4.2 within a timeframe agreed to by the fire code official. The fire code official shall request documentation from the owner to support owner's proposed schedule.</u>

<u>**1101.4.2 Establishing a plan of correction**</u> **.**
<u>Upon receipt of such notice, the owner shall take necessary actions to establish a plan of correction noting designer and contractor availability, budget and financial considerations, the number of items to be complied with from Chapter 11, and the anticipated number of buildings under the owner's control that must be brought into compliance. The owner shall also include upcoming planned building alterations subject to the provisions of the *International Existing Building Code* that can incorporate the provisions of Chapter 11 that must be brought into compliance. Once the plan is approved by the fire code official, it shall be subject to the provisions of Section 110 of this code.</u>

~~**1101.4.1**~~ <u>**1101.4.3**</u> **Construction documents .** *Construction documents* necessary to comply with this chapter shall be completed and ~~submitted within a time schedule~~ <u>in accordance with the plan of correction</u> *approved* by the *fire code official*.

~~**1101.4.2**~~ <u>**1101.4.4**</u> **Completion of work .** Work necessary to comply with this chapter shall be completed ~~within a time schedule~~ <u>in accordance with</u>

the plan of correction *approved* by the *fire code official*.

~~**1101.4.3**~~ **1101.4.5 Extension of time .** The *fire code official* is authorized to grant necessary extensions of time where it can be shown that the specified time periods are not physically practical or pose an undue hardship, and the owner has shown a good faith effort to comply with the approved plan of correction. The granting of an extension of time for compliance shall be based on the showing of good cause and subject to the filing of ~~an~~ a revised~~acceptable systematic~~ plan of correction that is approved by ~~with~~ the *fire code official*.

Commenter's Reason: The Fire Code Committee was sympathetic to the original proposal and we received several offers to help craft this public comment from committee members and those who testified.
This code proposal is intended to address the lack of direction to fire code officials seeking compliance with chapter 11 of the IFC. Unlike new construction, change of use, or alterations where regulatory compliance can be factored into project budgets, retrofitting is not part of a building's maintenance and operations budget and can create a hardship both financially and practically with respect to building occupants and contractor availability.
Existing building owners are often confronted with violation notices for compliance with Chapter 11 items from field inspectors who treat the requirements similarly to a routine violation such as exit light maintenance, replacing a noncompliant lock, or unblocking an exit. Frequently, the following are not given adequate recognition: cost, availability of design professionals and contractors, disruption of business operations, possible need to perform the work during non-business hours, etc.
BOMA fully supported the 2021 code change that required a fire sprinkler retrofit for existing high-rise structures because we were able to negotiate a realistic one-year timeframe for plan submittal and a ten-year timeframe for implementation. In addition, several federal tax law changes were made that allowed building owners to amortize the cost over a fifteen-year period for tax relief.

Why this is important:

Building owners are normally considered cash cows that are sitting on massive reserves of funds. This is far from the truth. Even small ownership entities have business plans that have to take in staffing cost, overhead from taxes and utilities, snow and ice removal, disruptions of normal business activities such as what occurred with the Covid pandemic or long term disaster events, and both budgeted and unbudgeted maintenance cost. They operate on a cash flow based on occupancy rates of rented space.
Building owners have multiple considerations to take into account when establishing budgets: staffing costs, utilities, taxes, regular maintenance, and unplanned repairs to name a few. Receiving a short compliance period for very expensive safety enhancements without funding from grants, tax deductions or credits can be financially difficult, often requiring the diversion of intended preventative maintenance funds, reserves for unintended maintenance cost, or a need to take loans to accomplish the work. This, in turn adds cost to the end user in the form of higher rents and the building owner is faced with balancing increases to cover expenses with regional rental rates.

The ICC Government relations staff provided the Industry Advisory Committee an informal finding of survey of localities that enforce the provisions of Chapter 11. Many states and localities prohibit retrofitting provisions either entirely or they can only be applied as part of a planned building alteration or change of use subject to the International Existing Buildings Code. In fact, the country was split almost 50/50 percent on where these provisions are being enforced.

It is important to understand that these buildings are not inherently unsafe. If they were, they would be subject to the unsafe provisions of Section 111 of this code and property maintenance codes.

Many of the buildings were built under earlier building codes and have been enhanced over time. Chapter 11 should not be applied as if an emergency or unsafe condition has occurred. To be realistic and achievable, Chapter 11 should be applied as a partnership between the building owner and the fire official.

The proposed code change attempts to accomplish this. It brings forth the elements that need to be considered from the building owner's perspective when issued a notice of violation with respect to Chapter 11. In addition, it recognizes code changes brought into the 2021 IEBC that make specific reference to compliance with IFC Chapter 11.
Building owners face uncertain times. Demand for office space is anticipated to decline at least for the short term as companies are reducing cost by shedding office space and remote work is more widespread. In addition, building owners are facing unprecedented pressure to shoulder the burden of energy efficiency beyond what they can expect as a return on investment. States and localities are moving legislation that will require retrofitting of existing HVAC equipment that currently use fossil fuels to higher efficiency electric or renewable energy equipment. The combination of energy compliance, IFC chapter 11 compliance, and the reduced need for office space has a potential to be disastrous to the office building and multi-family residential rental market. The intent of Chapter 11 is to improve buildings to more recent improvements in building safety. It is not intended to make an unsafe building safe. As Chapter 111 provides. This code proposal allows for the continuous movement toward safer buildings while realizing the associate costs, practical challenges, and potential disruption that compliance can entail.

Cost Impact: The net effect of the public comment and code change proposal will not increase or decrease the cost of construction
This code change provides a clearer path to compliance with Chapter 11. Cost will not change. But planning for the cost of compliance can be budgeted and planned for.

Public Comment# 2985

F116-21

Proposed Change as Submitted

Proponents: Kris Hauschildt, representing self (krishauschildt@yahoo.com)

2021 International Fire Code

Revise as follows:

1103.9 Carbon monoxide detection. Carbon monoxide detection shall be installed in existing Group A, B, E, F, H, I, M ~~I-1, I-2, I-4~~ and R occupancies in accordance with Section 915. ~~and in classrooms in Group E occupancies where those units include any of the conditions identified in Sections 915.1.2 through 915.1.6. The carbon monoxide alarms shall be installed in the locations specified in Section 915.2 and the installation shall be in accordance with Section 915.4.~~

~~**Exceptions:**~~

1. ~~Carbon monoxide alarms are permitted to be solely battery operated where the code that was in effect at the time of construction did not require carbon monoxide detectors to be provided.~~
2. ~~Carbon monoxide alarms are permitted to be solely battery operated in *dwelling units* that are not served from a commercial power source.~~
3. ~~A carbon monoxide detection system in accordance with Section 915.5 shall be an acceptable alternative to carbon monoxide alarms.~~

Reason: This proposal seeks to establish uniform baseline requirements for CO detection in all occupancies with permanently installed fuel-burning appliances, fuel-burning fireplaces or attached garages. CO poisoning incidents resulting in deaths and injuries continue to happen with alarming regularity in occupancies not covered by the current IFC as well as those that are, demonstrating that current code requirements are not adequately inclusive and are not effectively targeting problem areas within specific occupancies.
The suggested revisions contained in this proposal are based on *"Development of a Technical Basis for CO Detector Siting," "Diffusion of CO Through Gypsum Wallboard,"* the New York State Fire Code which has required CO detection in all commercial occupancies since 2015, and data from individual case examples (see attachments and bibliography).

Requiring CO detection in all occupancies that contain known CO hazards will prevent an untold number of deaths and injuries.

Substantiation for Uniform Baseline Requirements for CO detection in All Occupancies

The lethality of CO is undisputed. The severity of poisoning injury depends not only on the level and duration of CO exposure, but also on the individual. Those most at risk from the effects of CO: infants and children, older people, pregnant women/unborn babies, and those with underlying health conditions. There is no formula that can accurately predict how CO will impact a particular person nor what level or duration of exposure can be tolerated without suffering prolonged harm, irreversible brain damage, or death. For many victims who survive a CO exposure, the effects do not end with the poisoning incident. They can be severe enough to cause death weeks to months later. They can also cause irreversible effects, including life-altering brain injury.

"In addition to the immediate onset effects of exposure, delayed-onset development of neuropsychiatric impairment typically occurs from several days to approximately 3–4 weeks after exposure, with symptoms including inappropriate euphoria, impaired judgment, poor concentration, memory loss, cognitive and personality changes, psychosis, and Parkinsonism. Symptoms of acute carbon monoxide poisoning in children are the same as those in adults. Acute carbon monoxide poisoning during pregnancy has been associated with spontaneous abortion and fetal death."

- Agency for Toxic Substances & Disease Registry, CDC

The lifesaving value of CO detection is undisputed. CO detection has been commercially available for at least 30 years and has proven reliability. There is no substitute for the early detection that these devices provide, alerting to danger before conditions escalate to a level of causing harm. In the absence of detection, it is the building occupants who are providing the alert to CO leaks, becoming ill or dying before building staff are even aware there is a problem. Some examples:

2013, North Carolina: My parents both died in a **hotel** room from a CO leak while they were on vacation. They lost consciousness and lay helpless all night, inhaling poison for over 14 hours until they died. No one in the building was even aware they were in danger. There was no CO detection onsite despite there being gas fireplaces in the guest rooms, a gas pool heater, gas dryers and gas water heaters. First responders (EMS, police, fire dept) suspected CO but thought it was more likely they both died of heart attacks so didn't bother to test the room, opting instead to wait weeks for autopsy toxicology results. The leak continued for another seven weeks, killing an 11-year-old boy and causing permanent injury to his mother in the same room before it was finally detected. Multiple people were ill at the hotel during those seven weeks, including guests and a repairman servicing the elevator which was located next to the leaking exhaust system.

2017, Michigan: A 13-year-old boy at a spring break swim party with his friends died on the deck of a **swimming pool** from CO leaking from a pool heater in an adjacent room. His friends suffered CO injury as well as head injuries when they lost consciousness and fell onto the concrete pool deck. An employee along with multiple firefighters suffered CO injuries responding to the incident.

** There is specific concern over the number of incidents in **indoor swimming pool areas** that have resulted in poisoning injuries to children. CO exposure in a pool also leads to an increased risk of drowning. These incidents are detailed on the attached spreadsheet.

2014, New York: A **restaurant** manager died from CO leaking from a fuel burning appliance in the room adjacent to his office. The assistant manager lost consciousness and suffered CO injury when she went looking for him. Multiple rescue personnel became injured as well when they rushed in to render aid, unaware they were entering a CO contaminated environment. 24 people were hospitalized including restaurant patrons. The manager had reportedly been ill for weeks prior, but neither he nor his doctors suspected it as being CO-related.

1995, California: A woman and her husband were poisoned in a **hotel** room, not found until 36 hours later – he died, she survived with permanent injury to her brain, so severe she was prevented from ever being able to work or live independently again. 25 years later, she lives in a specialized group home.

2006, Maryland: 20 **restaurant** workers suffered long term brain injury after being exposed to a CO leak that had gone unnoticed for weeks and progressed to a level of 700ppm in the dining area before problem was discovered.

2019, Ohio: CO leak at **correctional facility** caused poisoning injuries to 4 staff and 29 inmates

2019, Illinois: CO leak at a **dry cleaners**, 3 people taken to the hospital including a police officer

2019, Utah: 60 people were poisoned at a **church** from CO leaking from a boiler, having spent several hours breathing in CO levels measured at 200-500ppm. Many were projected to have long term health effects.

2021, Nebraska: 10 people poisoned at a **bowling alley**, 4 hospitalized.

According to NFIRS (National Fire Incident Reporting System) data, there were a total of 10,715 CO incidents in hotels/motels, churches, restaurants/cafeterias, bars/taverns, and K-12 schools between 1999 and 2018. This is a minimum number. Participation in the NFIRS system is voluntary and not all fire departments participate.

Further, deaths and injuries are occurring even in buildings equipped <u>with</u> CO detection, demonstrating the need for occupancy specific focus for future improvements beyond a baseline requirement:

2017, Texas: A couple was poisoned and found unconscious in their hotel room from CO leaking from a pool heater. The hotel was equipped with unmonitored CO detection. A couple staying a few doors down had removed the batteries from the CO alarm in their room after it had gone off multiple times during the night. The couple found unconscious later died of their CO related injuries.

2018, Tennessee: Several people were poisoned in a hotel exercise room, located on a floor with a pool but no guest rooms. The hotel reportedly had CO detection, but only on floors with guest rooms.

2019, Illinois: A couple was poisoned in their hotel room equipped with a CO alarm that was alarming, but a hotel maintenance worker told them to disregard the alarm. They ended up calling the fire department themselves and were treated at a hospital for CO poisoning.

As a homeowner it is a reasonable expectation to be aware of the hazards of CO and take responsibility to install CO detection to protect yourself. However, as an occupant of a building that is under someone else's charge, there is no way to know of equivalent hazards nor whether action has been taken to install safeguards. Combined with no human ability to detect CO, this leaves occupants critically vulnerable during any type of CO exposure incident. Their life safety is entirely at the mercy of circumstances they have no knowledge of and no control over, assuming a risk they did not choose to take.

Building and business owners rely on guidance from this code to provide basic life safety provisions for occupants. States rely on guidance from this code to pass safety legislation. People rely on this code to stay safe and keep their families safe from preventable death and harm. Emergency responders rely on this code to keep them safe from unnecessary risk in performing their already hazardous jobs.

Please act to protect people from unnecessary death and injury by approving this proposal to provide a baseline level of safety from carbon monoxide danger in all occupancies.

2021 IFC – Chapter 1 Scope and Administration

101.3 Intent.

The purpose of this code is to establish the minimum requirements consistent with nationally recognized good practice for providing a reasonable level of life safety and property protection from the hazards of fire, explosion, or dangerous conditions in new and existing buildings, structures and premises, and to provide a reasonable level of safety to fire fighters and emergency responders during emergency operations.

Bibliography: **SUPPORT DOCUMENTS FOUND AT THE FOLLOWING LINK**

- **https://thejenkinsfoundation.com/category/ifc-2024-proposal-support-do**cuments/

- Swimming Pool CO Incident Log
- Toxicological Profile for Carbon Monoxide - Agency for Toxic Substances & Disease Registry, CDC
- Development of a Technical Basis for Carbon Monoxide Detector Siting, NFPA Fire Protection Research Foundation, 2007
- 2020 Fire Code New York State
- Diffusion of Carbon Monoxide Through Gypsum Wallboard, Neil Hampson, MD
- Carbon Monoxide Poisoning, Lindell Weaver, MD, 2020
- Hotel/Motel CO Incident Log 1967-to date, Jenkins Foundation
- Commercial Building CO Incidents, Jenkins Foundation
- CO Detection and Alarm Requirements: Literature Review, NFPA Fire Protection Research Foundation, 2021
- Cost of Accidental Carbon Monoxide Poisoning: A Preventable Expense, Preventive Medicine Reports, 2016
- CO Incidents - NFIRS (National Fire Incident Reporting System) Data - REM Risk
- Carbon Monoxide Poisonings in Hotels and Motels: The Problem Silently Continues, Prev. Medicine Reports, 2019
- Carbon Monoxide Poisoning at Hotels, Motels and Resorts, Amer. Journal of Prev. Medicine, 2007
- NEMA - Life Fire Safety - Carbon Monoxide

Cost Impact: The code change proposal will increase the cost of construction
This code change proposal will increase the cost of construction, but it is crucial for life safety.

F116-21

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: This proposal was disapproved for the same reasons as expressed in F102-21. It was encouraged for some instances in existing buildings to look beyond allowing simply battery operated alarms and potentially to require connection to building power. Additionally the proponent is encouraged to bring this proposal and F102-21 back during the public comment phase. (Vote: 12-0)

F116-21

Individual Consideration Agenda

Public Comment 1:

IFC: 1103.9

Proponents: Michael O'Brian, representing FCAC (fcac@iccsafe.org) requests As Modified by Public Comment

Replace as follows:

2021 International Fire Code

1103.9 Carbon monoxide detection . Carbon monoxide detection shall be installed in existing buildings ~~Group I-1, I-2, I-4 and R occupancies and in classrooms in Group E occupancies~~ where ~~those units include~~ any of the conditions identified in ~~Sections 915.1.2 through 915.1.6~~ Section 915.1.1 exist. ~~The carbon~~ Carbon monoxide alarms shall be installed in the locations specified in Section 915.2 and the installation shall be in accordance with Section 915.4.

Exceptions:

1. Carbon monoxide alarms are permitted to be solely battery operated where the code that was in effect at the time of construction did not require carbon monoxide detectors to be provided.

2. Carbon monoxide alarms are permitted to be solely battery operated in *dwelling units* that are not served from a commercial power source.

3. A carbon monoxide detection system in accordance with Section 915.5 shall be an acceptable alternative to carbon monoxide alarms.

Commenter's Reason: This is the third code change for CO detection, and is a companion to F102-21.
The intent of this proposal is to require CO detection be retroactively installed in accordance with Chapter 9. This is arguably the most important change, as older buildings will be more likely to generate CO than a new occupancy with new appliances that have been recently installed.This proposal/public comment is intended to work hand in hand with the PC to F102-21 submitted by FCAC.

This Public Comment is submitted by the ICC Fire Code Action Committee (FCAC). The FCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance assigned International Codes with regard to fire and life safety in new and existing buildings and facilities as well as the protection of life and property in wildland urban interface areas. In 2020 and 2021 the Fire-CAC held multiple virtual meetings that were open to any interested party. In addition, there were numerous virtual specific working group meetings that were also open to any interested parties, to develop, discuss and debate the proposed changes. Related documentation and reports are posted on the FCAC website at: FCAC.

Cost Impact: The net effect of the public comment and code change proposal will increase the cost of construction
The overall proposal will increase the cost of construction but it is hoped that this PC will make it more clear where such protection is needed and may reduce the overall cost increase. The exact cost will vary by occupancy type. Occupancies already required to have these intallations will not be affected.

Public Comment# 2811

F117-21 Part I

Proposed Change as Submitted

Proponents: Cole Graveen, Structural Engineer, representing Self

THIS IS A TWO PART CODE CHANGE. PART 1 OF THIS PROPOSAL WILL BE HEARD BY THE FIRE CODE COMMITTEE AND PART II OF THIS PROPOSAL WILL BE HEARD BY THE PROPERTY MAINTENANCE & ZONING CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THESE COMMITTEES.

2021 International Fire Code

1104.6 Guards. Guards complying with this section shall be provided at the open sides of *means of egress* that are more than 30 inches (762 mm) above the floor or grade below.

Revise as follows:

1104.6.1 Height of guards. Guards shall form a protective barrier not less than 42 inches (1067 mm) high.

Exceptions:

1. Existing guards shall not be required to be higher than required by the adopted building code.
~~1.~~ 2. Existing guards on the open side of exit access and exit stairways and ramps shall be not less than 30 inches (760 mm) high.
~~2.~~ 3. Existing guards within dwelling units shall be not less than 36 inches (910 mm) high.
~~3.~~ 4. Existing guards in assembly seating areas.

Reason: This is the second of two proposals being submitted on the topic of existing guards. There are requirements for existing guards in both the IFC and the IPMC. The intent of these proposals is to A) Increase the coordination between the IFC and the IPMC on this topic, and B) Increase the coordination between the IFC and the IPMC with the IBC and the IRC.
In general, there are editorial differences between the IFC, IPMC, and the IBC which include the use of different terms and phrases as well as different organization, which can lead to confusion. There are also technical differences between the IFC and IPMC which creates a conflict when both codes are adopted by a jurisdiction.

This second proposal adds an exception to the required guard height in both the IFC and the IPMC. As a note to the ICC code committee reviewing this proposal, if both proposals are approved, the intent is for 307.1, Exception 2, to be placed as an exception to new section 307.2.1 as 307.2.1 addresses the guard height. This proposal adds a logical exception to the required existing guard height in both the IFC and the IPMC. Existing guards should not be retroactively required to be higher than the guard height permitted for new construction per the IBC or the IRC.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal clarifies the required height for existing guards. It may decrease costs in jurisdictions that retroactively require an increase in guard heights, but most likely it does not impact the cost of construction.

F117-21 Part I

Public Hearing Results

This proposal includes published errata

https://cdn-web.iccsafe.org/wp-content/uploads/2021-GROUP-A-CONSOLIDATED-MONOGRAPH-UPDATES-Updated-4-02-2021-complete.pdf

Committee Action: **Disapproved**

Committee Reason: This proposal was disapproved as it was consistent with the action on Part II of the proposal. In addition, the wording "adopted building code" is confusing and the scope of Section 1104.1 appears to address already. (Vote: 14-0)

F117-21 Part I

Individual Consideration Agenda

Public Comment 1:

IFC: 1104.6, 1104.6.1

Proponents: Cole Graveen, representing Self (cwgraveen@rrj.com) requests As Modified by Public Comment

Modify as follows:

2021 International Fire Code

1104.6 Guards . Guards complying with this section shall be provided at the open sides of *means of egress* that are more than 30 inches (762 mm) above the floor or grade below.

1104.6.1 Height of guards . Guards shall form a protective barrier not less than 42 inches (1067 mm) high.

Exceptions:

~~1.~~ ~~Existing guards shall not be required to be higher than required by the adopted building code.~~

~~2.~~ 1. Existing guards on the open side of exit access and exit stairways and ramps shall be not less than 30 inches (760 mm) high.

. ~~3.~~ 2. Existing guards within dwelling units shall be not less than 36 inches (910 mm) high.

. ~~4.~~ 3. The height of existing ~~Existing~~ guards in assembly seating areas shall be permitted to comply with the *International Building Code*.

Commenter's Reason: The code committee discussion and opposition testimony indicated that the language contained in the proposal was confusing. The modification contained in this public comment removes the proposed new exception and instead revises the text of an existing exception to more clearly indicate what is permitted by the IFC.
There are three exceptions to the minimum guard height of 42 inches. Two of the exceptions provide the lessor height that is permitted in specific locations, however Exception 3 for assembly seating areas does not provide the lessor height that is permitted. In addition, it does not give the user any idea where to find the minimum guard height that is intended by the exception. This can cause confusion as to what lessor height is acceptable per Exception 3.

The proposal revises the text of Exception 3 to specifically point to the IBC to obtain the minimum guard height. The IBC is where guard height requirements for assembly seating areas are contained.

A simple pointer to the IBC is the most straightforward way to clearly indicate what is intended and will not require modification if section numbers change in the future. In the IBC, Section 1015.3 contains the requirements for the height of guards. Exception 4 permits the guard height in assembly seating areas to comply with Section 1030.17. Section 1030.17, specifically Sections 1030.17.2 and 1030.17.3, permit guards in specific locations in assembly seating areas to be a minimum of 26 inches high.

Cost Impact: The net effect of the public comment and code change proposal will not increase or decrease the cost of construction
The modification in this public comment is a clarification of existing requirements and will not change the cost of construction.

Public Comment# 2217

F117-21 Part II

Proposed Change as Submitted

Proponents: Cole Graveen, Structural Engineer, representing Self

2021 International Property Maintenance Code

SECTION 307
HANDRAILS AND GUARDRAILS

Revise as follows:

307.1 General. Every exterior and interior flight of stairs having more than four risers shall have a handrail on one side of the stair and every open portion of a stair, landing, balcony, porch, deck, ramp or other walking surface that is more than 30 inches (762 mm) above the floor or grade below shall have *guards*. Handrails shall be not less than 30 inches (762 mm) in height or more than 42 inches (1067 mm) in height measured vertically above the nosing of the tread or above the finished floor of the landing or walking surfaces. *Guards* shall be not less than 30 inches (762 mm) in height above the floor of the landing, balcony, porch, deck, or ramp or other walking surface.

Exceptions:

1. *Guards* shall not be required where exempted by the adopted building code.

2. Existing *guards* shall not be required to be higher than required by the adopted building code.

Reason: This is the second of two proposals being submitted on the topic of existing guards. There are requirements for existing guards in both the IFC and the IPMC. The intent of these proposals is to A) Increase the coordination between the IFC and the IPMC on this topic, and B) Increase the coordination between the IFC and the IPMC with the IBC and the IRC.
In general, there are editorial differences between the IFC, IPMC, and the IBC which include the use of different terms and phrases as well as different organization, which can lead to confusion. There are also technical differences between the IFC and IPMC which creates a conflict when both codes are adopted by a jurisdiction.

This second proposal adds an exception to the required guard height in both the IFC and the IPMC. As a note to the ICC code committee reviewing this proposal, if both proposals are approved, the intent is for 307.1, Exception 2, to be placed as an exception to new section 307.2.1 as 307.2.1 addresses the guard height.This proposal adds a logical exception to the required existing guard height in both the IFC and the IPMC. Existing guards should not be retroactively required to be higher than the guard height permitted for new construction per the IBC or the IRC.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal clarifies the required height for existing guards. It may decrease costs in jurisdictions that retroactively require an increase in guard heights, but most likely it does not impact the cost of construction.

F117-21 Part II

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The committee disapproved this proposal as they felt the language did not match other I-codes (adopted building code vs. at the time of construction) and therefore caused confusion. Further, they felt the requirement should permit lower existing guard installations. Lastly, they felt that the new language seemed to require taller guards than previously allowed. (Vote: 10-1)

F117-21 Part II

Individual Consideration Agenda

Public Comment 1:

IPMC: SECTION 307, 307.1

Proponents: Cole Graveen, representing Self (cwgraveen@rrj.com) requests As Modified by Public Comment

Modify as follows:

2021 International Property Maintenance Code

SECTION 307
HANDRAILS AND GUARDRAILS

307.1 General . Every exterior and interior flight of stairs having more than four risers shall have a handrail on one side of the stair and every open portion of a stair, landing, balcony, porch, deck, ramp or other walking surface that is more than 30 inches (762 mm) above the floor or grade below shall have *guards*. Handrails shall be not less than 30 inches (762 mm) in height or more than 42 inches (1067 mm) in height measured vertically above the nosing of the tread or above the finished floor of the landing or walking surfaces. *Guards* shall be not less than 30 inches (762 mm) in height above the floor of the landing, balcony, porch, deck, or ramp or other walking surface.

Exceptions:

1. *Guards* shall not be required where exempted by the adopted building code.
2. ~~Existing *guards* shall not be required to be higher than required by the adopted building code.~~ The height of existing *guards* in assembly seating areas shall be permitted to comply with the *International Building Code.*

Commenter's Reason: The code committee discussion and opposition testimony indicated that the language contained in the proposal was confusing. The modification in this public comment revises the text of the new exception to be more clear as to what is permitted.
Currently the IPMC states that guards shall not be less than 30 inches in height. There are no exceptions permitted to the 30 inch minimum height. As such the IPMC conflicts with the IBC which allows guards to be not less than 26 inches in height for portions of assembly seating areas per Section 1030.17 Assembly Guards, specifically Sections 1030.17 .2 and 1030.17.3. Section 1030.17 is directly referenced by the guard height section, Section 1015.3 Height, in Exception 4. Therefore, while a 26 inch height guard in an assembly seating area can be built per the IBC, as soon as the building becomes an existing building, the guard is in violation of the IPMC.

This public comment places an exception to the minimum 30 inch guard height so that assembly seating areas legally built to a height of 26 inches are not in violation of the IPMC.

The original proposal attempted to generically reference the IBC by using the phrase "adopted building code" which is used elsewhere in the IPMC. This would have allowed for any future guard height exceptions to be automatically referenced by the IPMC. However as previously stated that approach was deemed to be confusing.

A simple pointer to the IBC is the most straightforward way to clearly indicate what is intended and will not require modification if section numbers change in the future. In the IBC, Section 1015.3 contains the requirements for the height of guards. Exception 4 permits the guard height in assembly seating areas to comply with Section 1030.17. Section 1030.17, specifically Sections 1030.17.2 and 1030.17.3, permit guards in specific locations in assembly seating areas to be a minimum of 26 high.

Cost Impact: The net effect of the public comment and code change proposal will not increase or decrease the cost of construction
This code change and public comment is essentially a clarification of the intent of the code with regard to the allowable guard height in assembly seating areas.

Public Comment# 2215

F118-21 Part I

<u>Proposed Change as Submitted</u>

Proponents: Cole Graveen, Structural Engineer, representing Self

THIS IS A TWO PART CODE CHANGE. PART 1 OF THIS PROPOSAL WILL BE HEARD BY THE FIRE CODE COMMITTEE AND PART 2 OF THIS PROPOSAL WILL BE HEARD BY THE PROPERTY MAINTENANCE & ZONING COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THESE COMMITTEES.

2021 International Fire Code

Revise as follows:

1104.6 Guards. ~~Guards~~ <u>*Guards*</u> ~~complying with this section~~ shall be provided <u>along open-sided walking surfaces</u> ~~at the open sides of *means of egress*~~ that are more than 30 inches (762 mm) above the floor or grade below.
<u>**Exception:** *Guards* shall not be required where exempted by the adopted building code.</u>

1104.6.1 Height of guards. ~~Guards~~ <u>*Guards*</u> shall <u>be</u> ~~form a protective barrier~~ not less than 42 inches (1067 mm) high.

Exceptions:

1. Existing ~~guards~~ <u>*guards*</u> on the open side of *exit access* and exit *stairways* and *ramps* shall be not less than 30 inches (760 mm) high.
2. Existing *guards* within *dwelling units* shall be not less than 36 inches (910 mm) high.
3. Existing *guards* in assembly seating areas.

Reason: This is the first of two proposals being submitted on the topic of existing guards. There are requirements for existing guards in both the IFC and the IPMC. The intent of these proposals is to A) Increase the coordination between the IFC and the IPMC on this topic, and B) Increase the coordination between teh IFC and the IPMC with the IBC and the IRC.
In general, there are editorial differences between the IFC, IPMC, and the IBC which include the use of different terms and phrases as well as different organization, which can lead to confusion. There are also technical differences between the IFC and IPMC which creates a conflict when both codes are adopted by a jurisdiction.

This first proposal primarily addresses the editorial differences, however it does address one technical difference.

<u>IFC Changes</u>

The text in 1104.6 is editorially changed to A) remove the “complying with this section” phrase as it is unnecessary and B) to use the phrase “along open-sided walking surfaces” to match the phrase used in the IBC, Section 1105.2, and the IRC, Section R312.1.

The text in 1104.6.1 is editorially changed to remove the phrase “form a protective barrier” as it is unnecessary and potentially confusing. Section 1104.6.1 addresses the required guard height, not the purpose of a guard. Guard is a defined term in the IFC and the definition includes its purpose. There is no need to rehash the purpose in this section. In addition, the phrase “form a protective barrier” is not part of the definition and could be interpreted by some as an additional requirement for guards in the IFC.

The technical change in this proposal is to add a new exception to Section 1104.6. Adding this exception coordinates the IFC with the IPMC, which already includes this exception. It also logically aligns the requirements for when an existing guard is required with the requirements for when a guard is required for new construction. The IBC has 7 exceptions to the requirement for when guards are to be installed. Locations that are not required to have guards for new construction per the IBC should not retroactively be required to have guards per the IFC (or the IPMC).

<u>IPMC Changes</u>

The requirements for handrails and guards are split into separate sections to match how the requirements are provided in the IFC, the IBC, and the IRC. Using separate sections more clearly indicates the requirements.

The handrail text is modified to delete reference to “exterior and interior” stairs as this text is not needed and is not used in the IFC. Simply using the term “stairs” is sufficient and will require all stairs covered by the code to comply.

The phrase “along open-sided walking surfaces” is added to the Guard section to coordinate with the IBC and the IRC. The list of items, balconies, etc., is left in place even though it is not necessary as it was considered that some may object to removing the list.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal is primarily editorial to reorganize and clarify the provisions. It is not expected to impact the cost of construction.

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: This proposal was disapproved based upon lack of clarity and concern that the building code may actually raise the height of the guard in some cases with the proposed exception. Generally, the exception seems confusing and what is trying to be accomplished is already addressed by the scoping statement in Section 1104.1. It was suggested that perhaps the section could simply be revised to require compliance with the building code at the time of construction. (Vote: 13-1)

F118-21 Part I

Individual Consideration Agenda

Public Comment 1:

IFC: 1104.6, 1104.6.1

Proponents: Cole Graveen, representing Self (cwgraveen@rrj.com) requests As Modified by Public Comment

Modify as follows:

2021 International Fire Code

1104.6 Guards . *Guards* shall be providedalong open-sided walking surfaces that are more than 30 inches (762 mm) above the floor or grade below.

~~**Exception:** *Guards* shall not be required where exempted by the adopted building code.~~

1104.6.1 Height of guards . *Guards* shall be not less than 42 inches (1067 mm) high.

Exceptions:

1. Existing *guards* on the open side of *exit access* and exit *stairways* and *ramps* shall be not less than 30 inches (760 mm) high.
2. Existing *guards* within *dwelling units* shall be not less than 36 inches (910 mm) high.
3. Existing *guards* in assembly seating areas.

Commenter's Reason: The code committee's reasons for recommending disapproval were based on the proposed new exception to IFC Section 1104.6. Section 1104.6 provides the requirements for where guards are required in existing buildings. The new exception was proposed because it matched the existing exception to the corresponding section in the International Property Maintenance Code. However due to the code committee's comments, I have removed the new exception from the proposal. The remaining changes are editorial changes which coordinate the text of the IFC with the text used for guards in the IBC, the IRC, and with the IPMC (due to F118-21 Part II which was recommended for approval).
The editorial changes contained in the proposal, which did not raise objections from the code committee, include:

A) The phrase "open-sided walking surfaces" replaces existing IFC text in order to be consistent with the text in the IBC and IRC.

B) The phrase "form a protective barrier" is removed for several reasons. First, this phrase does not appear in the IBC or the IRC. Second, the purpose of the guard is addressed in the definition contained in Section 202 and as such the purpose does not need to also be addressed in Section 1104.6.1 as this section addresses the height of the guard. and Third, the phrase is not used in the definition and therefore the use of the phrase in Section 1104.6.1 could be interpreted by some as an additional requirement for guards in the IFC that is not contained in the IBC, IRC, or the IPMC.

Cost Impact: The net effect of the public comment and code change proposal will not increase or decrease the cost of construction
The as modified proposal is editorial for coordination with other I-codes and will not effect the cost of construction.

Public Comment# 2205

NOTE: F118-21 PART II DID NOT RECEIVE A PUBLIC COMMENT AND IS REPRODUCED FOR INFORMATIONAL PURPOSES ONLY

F118-21 Part II

Proposed Change as Submitted

Proponents: Cole Graveen, Structural Engineer, representing Self

2021 International Property Maintenance Code

SECTION 307
HANDRAILS AND GUARDRAILS

Revise as follows:

307.1 ~~General~~ Handrails. ~~Every exterior and interior flight of stairs~~ Stairs having more than four risers shall have a handrail on one side of the stair . ~~and every open portion of a stair, landing, balcony, porch, deck, ramp or other walking surface that is more than 30 inches (762 mm) above the floor or grade below shall have *guards*. Handrails shall be not less than 30 inches (762 mm) in height or more than 42 inches (1067 mm) in height measured vertically above the nosing of the tread or above the finished floor of the landing or walking surfaces. *Guards* shall be not less than 30 inches (762 mm) in height above the floor of the landing, balcony, porch, deck, or ramp or other walking surface.~~

> ~~**Exception:** *Guards* shall not be required where exempted by the adopted building code.~~

Add new text as follows:

307.1.1 Height.
Handrails shall be not less than 30 inches (762 mm) in height or more than 42 inches (1067 mm) in height measured vertically above the nosing of the tread or above the finished floor of the landing or walking surfaces.

Revise as follows:

307.2 Guards. *Guards* shall be provided along open-sided walking surfaces, including balconies, porches, decks, stairs, ramps, and landings, that are more than 30 inches (762 mm) above the floor or grade below.

> **Exception:**
> Guards shall not be required where exempted by the adopted building code.

307.2.1 Height. *Guards* shall be not less than 30 inches (762 mm) high.

Reason: This is the first of two proposals being submitted on the topic of existing guards. There are requirements for existing guards in both the IFC and the IPMC. The intent of these proposals is to A) Increase the coordination between the IFC and the IPMC on this topic, and B) Increase the coordination between teh IFC and the IPMC with the IBC and the IRC.
In general, there are editorial differences between the IFC, IPMC, and the IBC which include the use of different terms and phrases as well as different organization, which can lead to confusion. There are also technical differences between the IFC and IPMC which creates a conflict when both codes are adopted by a jurisdiction.

This first proposal primarily addresses the editorial differences, however it does address one technical difference.

IFC Changes

The text in 1104.6 is editorially changed to A) remove the “complying with this section” phrase as it is unnecessary and B) to use the phrase “along open-sided walking surfaces” to match the phrase used in the IBC, Section 1105.2, and the IRC, Section R312.1.

The text in 1104.6.1 is editorially changed to remove the phrase “form a protective barrier” as it is unnecessary and potentially confusing. Section 1104.6.1 addresses the required guard height, not the purpose of a guard. Guard is a defined term in the IFC and the definition includes its purpose. There is no need to rehash the purpose in this section. In addition, the phrase “form a protective barrier” is not part of the definition and could be interpreted by some as an additional requirement for guards in the IFC.

The technical change in this proposal is to add a new exception to Section 1104.6. Adding this exception coordinates the IFC with the IPMC, which already includes this exception. It also logically aligns the requirements for when an existing guard is required with the requirements for when a guard is required for new construction. The IBC has 7 exceptions to the requirement for when guards are to be installed. Locations that are not required to have guards for new construction per the IBC should not retroactively be required to have guards per the IFC (or the IPMC).

IPMC Changes

The requirements for handrails and guards are split into separate sections to match how the requirements are provided in the IFC, the IBC, and the IRC. Using separate sections more clearly indicates the requirements.

The handrail text is modified to delete reference to “exterior and interior” stairs as this text is not needed and is not used in the IFC. Simply using the term “stairs” is sufficient and will require all stairs covered by the code to comply.

The phrase “along open-sided walking surfaces” is added to the Guard section to coordinate with the IBC and the IRC. The list of items, balconies, etc., is left in place even though it is not necessary as it was considered that some may object to removing the list.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal is primarily editorial to reorganize and clarify the provisions. It is not expected to impact the cost of construction.

F118-21 Part II

Public Hearing Results

Committee Action: **As Submitted**

Committee Reason: The committee agreed that this proposal aligns the guard and handrail requirements with other I-codes. Further, separating handrail requirements from guardrail requirements is appropriate.. (Vote: 11-0)

F118-21 Part II

F119-21 Part I

Proposed Change as Submitted

Proponents: John Williams, Chair, representing Healthcare Committee (ahc@iccsafe.org)

THIS IS A TWO PART CODE CHANGE. PART 1 WILL BE HEARD BY THE FIRE CODE COMMITTEE. PART 2 WILL BE HEARD BY THE BUILDING CODE GENERAL CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THESE COMMITTEES.

2021 International Fire Code

Add new text as follows:

1105.12 Group I-2 Electrical Systems.
Existing electrical systems shall comply with the requirements for existing electrical systems in NFPA 99.

Reason: In order to meet federal conditions of participation health care facilities must comply with system and equipment according to the requirements listed in NFPA 99, Health Care Facilities Code (K912). NFPA 99 is a risk based approach to system design and maintenance of key building systems. It is based upon risk to patients, visitor or staff in the healthcare facility regardless of occupancy classification. It does cover items such as routine testing of both normal and emergency power, testing of electrical systems, defining surgery operating rooms as wet locations unless approved risk assessment determines otherwise. Cover plates on life safety and critical branch receptacles are a distinct color. Requiring tamperproof receptacles in designated pediatric locations. These items are required in both new and existing healthcare facilities depending upon services and risk.These practices improve safety and reliability of electrical systems in locations at risk.
This proposal is submitted by the ICC Committee on Healthcare (CHC). The CHC was established by the ICC Board to evaluate and assess contemporary code issues relating to healthcare facilities. This is a joint effort between ICC and the American Society for Healthcare Engineering (ASHE), a subsidiary of the American Hospital Association, to eliminate duplication and conflicts in healthcare regulation. In 2020 the CHC held several virtual meeting, which included members of the committees as well as any interested parties, to discuss and debate the proposed changes. Information on the CHC, including: meeting agendas; minutes; reports; resource documents; presentations; and all other materials developed in conjunction with the CHC effort can be downloaded from the CHC website at CHC.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This change aligns with existing federal requirements for the healthcare industry.

F119-21 Part I

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The proposal was disapproved with a concern that it would be too difficult for existing electrical systems to comply. (Vote: 13-0)

F119-21 Part I

Individual Consideration Agenda

Public Comment 1:

IFC: 1105.12

Proponents: John Williams, representing Healthcare Committee (ahc@iccsafe.org) requests As Modified by Public Comment

Modify as follows:

2021 International Fire Code

1105.12 Group I-2 Electrical Systems. ~~Existing~~ In Group I-2 occupancies, existing electrical systems shall comply with the requirements for existing electrical systems in NFPA 99.

Commenter's Reason: The change is based upon concerns raise by the committee. There are only very small sections of Chapter 6 that are applicable to existing buildings. It does cover items such as routine testing of both normal and emergency power, testing of electrical systems, defining surgery operating rooms as wet locations unless approved risk assessment determines otherwise. Cover plates on life safety and critical branch receptacles are a distinct color. Requiring tamperproof receptacles in designated pediatric locations. This change is a part of a series of changes that assure the IFC, IBC and IEBC align with the requirements of CMS facilities regulations. The changes are designed to improve the safety of existing facilities regardless of year constructed.

Cost Impact: The net effect of the public comment and code change proposal will not increase or decrease the cost of construction
This change aligns with existing federal requirements for the healthcare industry.

Public Comment# 2611

F119-21 Part II

Proposed Change as Submitted

Proponents: John Williams, Chair, representing Healthcare Committee (ahc@iccsafe.org)

2021 International Building Code

Add new text as follows:

2701.1.1 Group I-2 Electrical Systems.
Electrical systems shall be installed in accordance with NFPA 99 and Article 517 of NFPA 70.

Reason: In order to meet federal conditions of participation health care facilities must comply with system and equipment according to the requirements listed in NFPA 99, Health Care Facilities Code (K912). NFPA 99 is a risk based approach to system design and maintenance of key building systems. It is based upon risk to patients, visitor or staff in the healthcare facility regardless of occupancy classification. It does cover items such as routine testing of both normal and emergency power, testing of electrical systems, defining surgery operating rooms as wet locations unless approved risk assessment determines otherwise. Cover plates on life safety and critical branch receptacles are a distinct color. Requiring tamperproof receptacles in designated pediatric locations. These items are required in both new and existing healthcare facilities depending upon services and risk.These practices improve safety and reliability of electrical systems in locations at risk.
This proposal is submitted by the ICC Committee on Healthcare (CHC). The CHC was established by the ICC Board to evaluate and assess contemporary code issues relating to healthcare facilities. This is a joint effort between ICC and the American Society for Healthcare Engineering (ASHE), a subsidiary of the American Hospital Association, to eliminate duplication and conflicts in healthcare regulation. In 2020 the CHC held several virtual meeting, which included members of the committees as well as any interested parties, to discuss and debate the proposed changes. Information on the CHC, including: meeting agendas; minutes; reports; resource documents; presentations; and all other materials developed in conjunction with the CHC effort can be downloaded from the CHC website at CHC.

Cost Impact:
This change aligns with existing federal requirements for the healthcare industry.

F119-21 Part II

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The proposal was disapproved. If this requirement is for just Group I-2, this needs to be in the text, not just in the title. The committee also asked if this was not sufficiently addressed in Section 2702.2.8 and 407.11 for Group I-2? (Vote: 8-6)

F119-21 Part II

Individual Consideration Agenda

Public Comment 1:

IBC: 2701.1.1

Proponents: John Williams, representing Healthcare Committee (ahc@iccsafe.org) requests As Modified by Public Comment

Modify as follows:

2021 International Building Code

2701.1.1 Group I-2 Electrical Systems . In Group I-2 occupancies, electrical ~~Electrical~~ systems shall be installed in accordance with NFPA 99 ~~and Article 517 of NFPA 70 70.~~ .

Commenter's Reason: One of the main points in the hearing was that the requirement was covered by 2702.2.8. (407.11). The scope of both 2702.2.8 and 407.11 is essential electric systems. The provisions in NFPA 99 extend beyond strictly essential electric system into all branches of the electric system. There are requirements for normal power such as tamperproof receptacles in pediatric areas which will include normal power and guidance on power in psychiatric locations in hospitals. This change is a part of a series of changes that assure the IFC, IBC and IEBC align with the requirements of CMS facilities' regulations. NFPA 70 is also applicable as it is required in 2701.1 and NFPA 99.

Cost Impact: The net effect of the public comment and code change proposal will not increase or decrease the cost of construction
This change aligns with existing federal requirements for the healthcare industry.

Public Comment# 2612

F122-21

Proposed Change as Submitted

Proponents: Michael O'Brian, representing FCAC (fcac@iccsafe.org)

2021 International Fire Code

Revise as follows:

1201.1 Scope. The provisions of this chapter shall apply to the installation, operation, maintenance, repair, retrofitting, testing, commissioning and decommissioning of energy systems used for generating or storing energy <u>including but not limited to energy storage systems under the exclusive control of an electric utility or lawfully designated agency.</u> It shall not apply to equipment associated with the generation, control, transformation, transmission, or distribution of energy installations that is under the exclusive control of an electric utility or lawfully designated agency.

Reason: This proposal clarifies that Chapter 12 applies to ESS at installations under the exclusive control of an electric utility, such as the ESS installation involved in an incident in Surprise, AZ. This is consistent with several requirements in Section 1207 that specifically reference ESS used at electric utility facilities.
This proposal is submitted by the ICC Fire Code Action Committee (FCAC). The FCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance assigned International Codes with regard to fire and life safety in new and existing buildings and facilities as well as the protection of life and property in wildland urban interface areas. In 2020 and 2021 the Fire-CAC held multiple virtual meetings that were open to any interested party. In addition, there were numerous virtual specific working group meetings that were also open to any interested parties, to develop, discuss and debate the proposed changes. Related documentation and reports are posted on the FCAC website at: https://www.iccsafe.org/products-and-services/i-codes/code-development/cs/fire-code-action-committee-fcac/

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal will not increase the cost of construction. It just clarifies that Chapter 12 does cover electric utility ESS installations.

F122-21

Public Hearing Results

Committee Action: **As Submitted**

Committee Reason: This proposal was approved to ensure that energy storage systems whether under the purview of utilities is regulated no differently than other ESS installations. The hazards remain the same and there is particular concern for emergency responder safety. It should be noted that this is both applicable to public and private utilities. (Vote: 10-4)

F122-21

Individual Consideration Agenda

Public Comment 1:

Proponents: Steven Rosenstock, representing Edison Electric Institute (srosenstock@eei.org) requests Disapprove

Commenter's Reason: As written, this language is not enforceable, for the following reasons:
-It is contradictory. The new sentence saying that the scope covers "energy storage systems under the exclusive control of an electric utility" is in direct conflict with the last sentence about <u>not</u> applying to equipment under the exclusive control of an electric utility.

-Utility controlled energy storage systems can or will act as energy generation systems. For example, a system that is rated at 100 kW and 400 kWh can replace a 100 kW fossil fuel "peaker" plant during a peak time of electric consumption or to help fill the gaps when the output of other generation is declining.

-Utility controlled energy storage systems can or will act to help control the electric grid, by providing ancillary services or voltage support or frequency control at the transmission level.

-Utility controlled energy storage systems can or will act to help control the electric grid, by providing ancillary services or voltage support or frequency control at the distribution system level.

Other proposals, such as F123, F124, and F125, provide much better language and do not contain such unenforceable language.

Cost Impact: The net effect of the public comment and code change proposal will not increase or decrease the cost of construction
No change to code.

Public Comment# 2580

F123-21

Proposed Change as Submitted

Proponents: sharon bonesteel, salt river project, representing salt river project (sharon.bonesteel@srpnet.com)

2021 International Fire Code

Revise as follows:

1201.1 Scope. The provisions of this chapter shall apply to the installation, operation, maintenance, repair, retrofitting, testing, commissioning and decommissioning of energy systems used for generating or storing energy. It shall not apply to equipment associated with the generation, control, transformation, transmission, or distribution of energy installations that is under the exclusive control of an electric utility or lawfully designated agency.

> **Exception:** ESS approved and installed in compliance with NFPA 855.

Add new standard(s) as follows:

NFPA

National Fire Protection Association
1 Batterymarch Park
Quincy, MA 02169-7471

855-2020	Standard for the Installation of Stationary Energy Storage Systems

Reason: The NFPA 855 Standard for the Installation of Stationary Energy Storage Systems is a comprehensive standard that provides the minimum requirements for mitigating the hazards associated with ESS. Due to the nature of the fast changing ESS market, the NFPA 855 Standard, which is under continual maintenance process, will be able to address new technologies promptly. It is an appropriate standard to use in lieu of the requirements of Ch.12 of the IFC.

Bibliography: NFPA® 855 Standard for the Installation of Stationary Energy Storage Systems, 2020 Edition, prepared by the Technical Committee on Energy Storage Systems and acted on by the NFPA at its Association Technical Meeting held June 17-20,2019, in San Antonio, TX. It was issued by the Standards Council on August 5, 2019, with an effective date of August25, 2019. This edition of NFPA 855 was approved as an American National Standard on August 25, 2019.
The next edition will be submitted as the reference standard upon completion.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The use of NFPA® 855 as an equivalent standard to Ch.12 of the IFC will not increase or decrease the cost of construction.

Staff Analysis: A review of the standard proposed for inclusion in the code, NFPA 855-2020: Standard for the Installation of Stationary Energy Storage Systems, with regard to some of the key ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before March 20, 2021.

F123-21

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The reference to NFPA 855 should more appropriately be located in Section 1207. Also, there was concern with the current lack of scope in NFPA 855 and the need for the fire code official to easily access the provisions within the IFC. (Vote: 14-0)

F123-21

Individual Consideration Agenda

Public Comment 1:

IFC: 1201.1

Proponents: Michael O'Brian, representing FCAC (fcac@iccsafe.org); Sharon Bonesteel, representing salt river project (sharon.bonesteel@srpnet.com) requests As Modified by Public Comment

Modify as follows:

2021 International Fire Code

1201.1 Scope . The provisions of this chapter shall apply to the installation, operation, maintenance, repair, retrofitting, testing, commissioning and decommissioning of energy systems used for generating or storing energy. It shall not apply to equipment associated with the generation, control, transformation, transmission, or distribution of energy installations that is under the exclusive control of an electric utility or lawfully designated agency. <u>Energy storage systems regulated by Section 1207 shall comply with this chapter as appropriate and NFPA 855.</u>

~~**Exception:** ESS approved and installed in compliance with NFPA 855.~~

Commenter's Reason: FCAC Reason: Reference to NFPA 855 is appropriate, it was a stated goal as both the IFC and NFPA language was being developed much as we have done with the IFC and NFPA 2. By referencing NFPA 855 the code user picks up details and annex note explanations that are not within the IFC.
Unfortunately the proposal does not provide the correct linkage to NFPA 855 and instead adds it as a separate parallel path. The format for referencing a standard in the IFC is to add that reference in addition to the language contained within the IFC. This modification adds the NFPA 855 reference in the form that is utilized for the other various standard the IFC refers to.Locating this linkage at the beginning of Chapter 12 is correct as other portions of Chapter 12 will apply to ESS based upon their intended use, (emergency or standby power), or form, (hydrogen fuel cell and storage usage as ESS).

This Public Comment is submitted by the ICC Fire Code Action Committee (FCAC). The FCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance assigned International Codes with regard to fire and life safety in new and existing buildings and facilities as well as the protection of life and property in wildland urban interface areas. In 2020 and 2021 the Fire-CAC held multiple virtual meetings that were open to any interested party. In addition, there were numerous virtual specific working group meetings that were also open to any interested parties, to develop, discuss and debate the proposed changes. Related documentation and reports are posted on the FCAC website at: FCAC.

Bonesteel Reason:

Reference to NFPA 855 is appropriate as it was a stated goal that it would eventually replace Section 1207. There are items in Section 1207 that are not fully covered in NFPA 855, so by combining the use of both documents during this rapidly changing industry time, maximum safety measures can be obtained. In edition, the code user will benefit from the annex note explanations in NFPA 855, and the opportunity to become familiar with its layout.

FCAC

Cost Impact: The net effect of the public comment and code change proposal will increase the cost of construction
The net effect might cause some increase in construction costs by applying additional requirements from NFPA 855. However, there is a chance for decreased costs because the location of this added language informs the user of the need to also comply with other provisions of Chapter 12 avoiding added costs when discovered late in the process. The Annexes of NFPA 855 provide additional guidance and understanding of intent and goals which could also help reduce costs.

Bonesteel

Cost Impact:

The net effect of the public comment and code change proposal will not increase or decrease the cost of construction.

Since the provisions in both documents are very similar in content and intent the cost of compliance will not change

Public Comment# 2457

F124-21

Proposed Change as Submitted

Proponents: Sharon Bonesteel, representing salt river project (sharon.bonesteel@srpnet.com)

2021 International Fire Code

Revise as follows:

1201.1 Scope. The provisions of this chapter shall apply to the installation, operation, maintenance, repair, retrofitting, testing, commissioning and decommissioning of energy systems used for generating or storing energy. It shall not apply to equipment associated with the generation, control, transformation, transmission, or distribution of energy installations that is under the exclusive control of an electric utility or lawfully designated agency.

Exception: Lead-acid and nickel-cadmium battery systems that are designed in accordance with IEEE C2 , used for dc power for control of substations and control or safe shutdown of generating stations under the exclusive control of the electric utility, and located outdoors or in building spaces used exclusively for such installations.

Add new standard(s) as follows:

IEEE

Institute of Electrical and Electronics Engineers Standards Association
445 Hoe Lane
Piscataway, NJ 08854
USA

IEEE Institute of Electrical and Electronics Engineers.
C2-2017 National Electrical Safety Code(R) (NESC(R))

Reason: These emergency back up systems should not be treated as energy storage systems. They have been functioning safely for years, providing back up in substations and other utility facilities. They are used for emergency power for pumps, for switch gear, and other equipment necessary for the safe operation and maintenance of utility facilities. Their installation and use has been safely governed by the IEEE C2 and the additional cost of conflicts in complying with Ch.12 will result in additional costs to the average utility customer, without additional safety being gained.

Cost Impact: The code change proposal will decrease the cost of construction
The additional requirements of Ch.12 for ESS are an additional expense for these systems that are emergency back up power for substations and other utility facilities.

Staff Analysis: A review of the standard proposed for inclusion in the code, IEEE C2-2017, National Electrical Safety Code(R) (NESC(R)), with regard to some of the key ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before March 20, 2021.

F124-21

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: This exception is too broad in scope and would remove all regulation. Such an exception needs to be more surgically made within Section 1207 as applicable to each issue. (Vote: 14-0)

F124-21

Individual Consideration Agenda

Public Comment 1:

Proponents: Steven Rosenstock, representing Edison Electric Institute (srosenstock@eei.org) requests As Submitted

Commenter's Reason: The exception is consistent with the language in the last sentence of Section 1201.1. The items listed are under the exclusive control of an electric utility and the equipment is directly associated with generation, control, transmission, or distribution of electric service.

Cost Impact: The net effect of the public comment and code change proposal will decrease the cost of construction
These systems will be excepted from the additional requirements in Chapter 12, and their costs will be reduced.

Public Comment# 2637

F127-21

Proposed Change as Submitted

Proponents: Marcelo Hirschler, GBH International, representing self (mmh@gbhint.com)

2021 International Fire Code

Revise as follows:

1204.5 Operating locations. Portable generators shall be operated only outdoors a minimum of 5 feet (1524 mm) from <u>any structure with a combustible wall or from</u> any building openings such as windows and doors or air intakes. Portable generators shall not be operated within buildings or enclosed areas. Additional separation shall be provided for tents, membrane structures and outdoor assembly events as specified in Chapter 31.

Add new text as follows:

<u>**1204.5.1 Generators located at less than 5 feet.**</u>
<u>Portable generators shall be permitted to be installed at a distance of less than 5 feet (1524 mm) from a combustible wall, as permitted by NFPA 37, where one of the following applies:</u>

1. <u>The generator has undergone a full scale fire test ,in accordance with NFPA 37, demonstrating that complete consumption of the combustibles in the generator, including its housing and fuel tank, will not ignite combustible structures.</u>
2. <u>The combustible wall exhibits a *fire-resistance rating* of at least one hour.</u>

Add new standard(s) as follows:

NFPA

National Fire Protection Association
1 Batterymarch Park
Quincy, MA 02169-7471

<u>NFPA 37-2021</u>	<u>Standard for the Installation and Use of Stationary Combustion Engines and Gas Turbines</u>

Reason: The IFC contains a requirement that generators should be placed no closer than 5 feet from openings. That is absolutely excellent. However, NFPA 37 (Standard for the Installation and Use of Stationary Combustion Engines and Gas Turbines) also requires that they be placed no closer than 5 feet from combustible walls, with some exceptions. NFPA 37 has now been revised so that the 2021 edition contains a full scale fire test which is used to demonstrate whether a generator can be safely installed at a distance of less than 5 feet, which is actually quite common, in practice, especially in urban environments and with the increased use of generators as backup power.
Experience has shown that fires starting at generators can cause severe destruction in buildings placed in the vicinity, which is why the required minimum distance of 5 feet is a good idea.

The changes to NFPA 37 reflect research that showed that it is possible to forecast whether a generator (which is called an engine in NFPA 37) placed closer than 5 feet can still be installed safely.

NFPA 37 provides three options for safe installation:

1. The nearby wall has a fire resistance rating of at least 1 hour.

2. The generator (engine) and its weatherproof housing (as well as any fuel tank) has undergone a full scale fire test that requires complete consumption of all the combustibles in the generator, and shows that any fire originating in the generator will not ignite the nearby building (with a margin of error added to the distance).

3. Calculations performed under engineering supervision demonstrate that a fire originating at the engine or within its weatherproof housing will not ignite combustible structures.

The annex of NFPA 37 provides guidance for the engineering calculation, using NFPA 555 as the basis for the engineering analysis.

NFPA 37 is already referenced in the IMC and the IFGC. It has been issued by a consensus standards organization (NFPA) and complies with CP 28.

The language in the present (2021) edition of NFPA 37 reads as follows (with the changes from the earlier edition shown in legislative format):

4.1.4 Engines Located Outdoors.

4.1.4.1 Engines and, if provided, their weatherproof housings that are installed outdoors shall be located at least 1.5 m (5 ft) from any openings in the walls of structures.

4.1.4.2 Engines and, if provided, their weatherproof housings that are installed outdoors shall be located at least 1.5 m (5 ft) from structures having combustible walls except as provided in 4.1.4.2.1~~or~~ through 4.1.4.2.4.

4.1.4.2.1 A clearance less than 1.5 m (5 ft) shall be permitted where all portions of structures that are closer than 1.5 m (5 ft) from the engine enclosure have a fire resistance rating of at least 1 hour.

4.1.4.2.2 A clearance less than 1.5 m (5 ft) shall be permitted where ~~it has been demonstrated through methods acceptable to the authority having jurisdiction that a fire within the enclosure~~ a fire test involving consumption of the available combustibles, within the engine or, if provided, its weatherproof housing demonstrates that a fire originating at the engine or its weatherproof housing will not ignite combustible structures.*

4.1.4.2.3 If an engine assembly includes a nonrated fuel tank, the testing in 4.1.4.2.2 shall include the fuel tank.

4.1.4.2.4 A clearance less than 1.5 m (5 ft) shall be permitted where calculations performed under engineering supervision demonstrate that a fire originating at the engine or within its weatherproof housing will not ignite combustible structures.

Cost Impact: The code change proposal will increase the cost of construction
The proposal adds a prohibition for generators to be placed near a combustible wall and adds, as an exception, a requirement that, if generators are placed close to a combustible wall they must be fire tested. The IFC has no requirements associated with generators and combustible walls.

Staff Analysis: A review of the standard proposed for inclusion in the code, NFPA 37-2021, Standard for the Installation and Use of Stationary Combustion Engines and Gas Turbines, with regard to some of the key ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before March 20, 2021.

F127-21

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The language in Section 1204.5 "any structure with a combustible wall or from" may cause confusion as it should simply refer to "a combustible wall or from." A structure could have some walls that are combustible and some that are non combustible. In addition there was concern that reference to a stationary generator standard for portable generators may cause confusion. (Vote: 13-1)

F127-21

Individual Consideration Agenda

Public Comment 1:

IFC: 1204.5, 1204.5.1 (New), 1204.5.1

Proponents: Marcelo Hirschler, representing self (mmh@gbhint.com) requests As Modified by Public Comment

Modify as follows:

2021 International Fire Code

1204.5 Operating locations . Portable generators shall be operated only outdoors a minimum of 5 feet (1524 mm) from any ~~structure with a~~ combustible wall or from any building openings such as windows and doors or air intakes. Portable generators shall not be operated within buildings or enclosed areas. Additional separation shall be provided for tents, membrane structures and outdoor assembly events as specified in Chapter 31.

1204.5.1 Portable generators in use for 7 days or more .
Portable generators in use for a period of at least 7 days shall be separated from combustible walls in accordance with Section 1204.5 or Section 1204.5.2.

~~1204.5.1~~ 1204.5.2 Generators located ~~at~~ less than 5 feet from combustible walls . Portable generators shall be permitted to be ~~installed~~ located and operated outdoors at a distance ~~of~~ less than 5 feet (1524 mm) from a combustible wall~~, as permitted by NFPA 37,~~ where one of the following applies:

1. The generator has undergone a ~~full scale~~ fire test ,in accordance with NFPA 37, demonstrating that complete consumption of the combustibles in the generator, including its housing and fuel tank, will not ignite combustible structures . There shall be no openings such as windows, doors or air intakes within 5 feet of the generator exhaust.
2. The combustible wall has ~~exhibits~~ a *fire-resistance rating* of at least one hour with no unprotected openings.

Commenter's Reason: This public comment addresses the concerns raised by the committee and the opponent.
1. The language has been changed to refer to combustible walls and not buildings with combustible walls.

2. The language has been changed to indicate that no generator shall be placed near any opening, for protection against carbon monoxide poisoning.

3. The scope of NFPA 37 explains that it applies to portable generators, as long as they are in use for a period of at least one week.

4. Since it is most common for walls to have openings, this prohibits operation of generators within 5 feet of unprotected openings on walls.

Cost Impact: The net effect of the public comment and code change proposal will increase the cost of construction
The proposal adds fire testing requirements for generators placed close to buildings.

Public Comment# 2361

F132-21

Proposed Change as Submitted

Proponents: Michael O'Brian, representing FCAC (fcac@iccsafe.org)

2021 International Fire Code

Add new text as follows:

1207.1.1 Utilities and Industrial applications.
This section shall not apply to capacitors and capacitor equipment for electric utilities and industrial facilities used in applications such as flexible ac transmission (FACTS) devices, filter capacitor banks, power factor correction, and standalone capacitor banks for voltage correction and stabilization.

1207.1.2 Mobile ESS.
Mobile ESS deployed at an electric utility substation or generation facility for 90 days or less shall not add to the threshold values in Table 1207.1 for the stationary ESS installation if both of the following conditions apply:

1. The mobile ESS complies with Section 1207.10.
2. The mobile ESS is only being used during periods in which the facility's stationary ESS is being tested, repaired, retrofitted or replaced.

Revise as follows:

TABLE 1207.1.1 ENERGY STORAGE SYSTEM (ESS) THRESHOLD QUANTITIES

TECHNOLOGY	**ENERGY CAPACITY[a]**
Capacitor ESS	3 kWh
Flow batteries[b]	20 kWh
ESS in one- and two-family dwellings and townhouse units	1 kWh
Lead-acid batteries, all types	70 kWh[c]
Lithium-ion batteries	20 kWh
Socium nickel chloride batteries ~~Nickel metal hydride (Ni-MH)~~	70 kWh
Nickel-cadmium batteries (Ni-Cd), Nickel Metal Hydride (Ni-MH), and Nickel Zinc (Ni-Zn) batteries	70 kWh
Non-electrochemical ESS[d]	70 kWh
Other battery technologies	10 kWh
Other electrochemical ESS technologies	3 kWh
Zinc manganese dioxide batteries (Zn-MnO2)	70 kWh

For SI: 1 kilowatt hour = 3.6 megajoules.

a. Energy capacity is the total energy capable of being stored (nameplate rating), not the usable energy rating. For units rated in amp-hours, kWh shall equal rated voltage times amp-hour rating divided by 1,000.

b. Shall include vanadium, zinc-bromine, polysulfide-bromide and other flowing electrolyte-type technologies.

c. Fifty gallons of lead-acid battery electrolyte shall be considered equivalent to 70 kWh.

d. ~~Section 1207 shall not apply to capacitors and capacitor equipment for electric utilities and industrial facilities used in applications such as flexible ac transmission (FACTS), filter capacitor banks, power factor correction, and stand-alone capacitor banks for voltage correction and stabilization.~~

d. Covers nonelectrochemical technologies such as flywheel and thermal ESS

Reason: The proposed new Section 1207.1.1 is consistent with NFPA 855 Section 10.1.4. The changes to Table 1207.1.1 are consistent with NFPA 855 Table 1.3. Data has been provided previously to address addition of nickel zinc (Ni-Zn), zinc manganese dioxide (Zn-MnO2) and sodium nickel chloride batteries to the table. The table now also covers non-electrochemical ESS, consistent with how it is treated in NFPA 855.

This proposal is submitted by the ICC Fire Code Action Committee (FCAC). The FCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance assigned International Codes with regard to fire and life safety in new and existing buildings and facilities as well as the protection of life and property in wildland urban interface areas. In 2020 and 2021 the Fire-CAC held multiple virtual meetings that were open to any interested party. In addition, there were numerous virtual specific working group meetings that were also open to any interested parties, to develop, discuss and debate the proposed changes. Related documentation and reports are posted on the FCAC website at: https://www.iccsafe.org/products-and-services/i-codes/code-development/cs/fire-code-action-committee-fcac/

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This has the potential to lower costs since it recognizes new electrochemical ESS technologies, which are no longer classified under the more stringent "other" technology provisions.

F132-21

Public Hearing Results

Committee Action: **As Modified**

Committee Modification:

1207.1.1Utilities and Industrial applications. This section shall not apply to capacitors and capacitor equipment for electric utilities and industrial facilities where such equipment complies with section 10.1.4 of the NFPA 855 ~~used in applications such as flexible ac transmission (FACTS) devices, filter capacitor banks, power factor correction, and standalone capacitor banks for voltage correction and stabilization.~~

1207.1.2 Mobile ESS. Mobile ESS deployed at an electric utility substation or generation facility for 90 days or less in accordance with section 1.3.3 of NFPA 855 shall not add to the threshold values in Table ~~1207.1~~ 1207.1.1 ~~for the stationary ESS installation if both of the following conditions apply:~~

1. ~~The mobile ESS complies with Section 1207.10.~~
2. ~~The mobile ESS is only being used during periods in which the facility's stationary ESS is being tested, repaired, retrofitted or replaced.~~

Add new standard(s) as follows:

NFPA 855-2020: Standard for the Installation of Stationary Energy Storage Systems

Committee Reason: This proposal was approved as it provides the necessary exceptions to capacitors associate with utilities and industrial facilities in certain applications and short term use of mobile ESS. The modification provide specific references to NFPA 855 to address duplicated language. There was some concern that the table was not consistent with NFPA 855. (Vote: 10-4)

F132-21

Individual Consideration Agenda

Public Comment 1:

IFC: 1207.1.1, 1207.1.2, TABLE 1207.1.1, 80 NFPA,

Proponents: Michael O'Brian, representing FCAC (fcac@iccsafe.org) requests As Modified by Public Comment

Further modify as follows:

2021 International Fire Code

1207.1.1 Utilities and Industrial applications . This section shall not apply to capacitors and capacitor equipment for electric utilities and industrial facilities ~~where such equipment complies with Section 10.1.4 of NFPA 855 855. equpment~~. used in applications such as flexible ac transmission (FACTS) devices, filter capacitor banks, power factor correction, and standalone capacitor banks for voltage correction and stabilization.

1207.1.2 Mobile ESS . Mobile ESS deployed at an electric utility substation or generation facility for 90 days or less ~~in accordance with Section 1.3.3 of NFPA 855~~ shall not add to the threshold values in Table 1207.1.1 . for the stationary ESS installation if both of the following conditions apply:

1. The mobile ESS complies with Section 1207.10.
2. The mobile ESS is only being used during periods in which the facility's stationary ESS is being tested, repaired, retrofitted or replaced.

TABLE 1207.1.1 ENERGY STORAGE SYSTEM (ESS) THRESHOLD QUANTITIES

TECHNOLOGY	ENERGY CAPACITY[a]
Capacitor ESS	3 kWh
Flow batteries[b]	20 kWh
~~ESS in one- and two-family dwellings and townhouse units~~	~~1 kWh~~
Lead-acid batteries, all types	70 kWh[c]
Lithium-ion batteries	20 kWh
~~Socium~~ Sodium nickel chloride batteries	70 kWh
Nickel-cadmium batteries (Ni-Cd), Nickel Metal Hydride (Ni-MH), and Nickel Zinc (Ni-Zn) batteries	70 kWh
Non-electrochemical ESS[d]	70 kWh
Other battery technologies	10 kWh
Other electrochemical ESS technologies	3 kWh
Zinc manganese dioxide batteries (Zn-MnO2)	70 kWh

For SI: 1 kilowatt hour = 3.6 megajoules.

a. Energy capacity is the total energy capable of being stored (nameplate rating), not the usable energy rating. For units rated in amp-hours, kWh shall equal rated voltage times amp-hour rating divided by 1,000.

b. Shall include vanadium, zinc-bromine, polysulfide-bromide and other flowing electrolyte-type technologies.

c. Fifty gallons of lead-acid battery electrolyte shall be considered equivalent to 70 kWh.

d. Covers nonelectrochemical technologies such as flywheel and thermal ESS

~~NFPA~~

~~National Fire Protection Association~~
~~1 Batterymarch Park~~
~~Quincy, MA 02169-7471~~

,

~~855-2020:~~ ~~Standard for the Installation of Stationary Energy Storage Systems~~

Commenter's Reason: This public comment is focused upon making this proposal along with F134-21 consistent with the following proposals

1. F138-21
2. F140-21
3. F141-21
4. F143-21
5. F144-21
6. F145-21
7. F146-21
8. F151-21
9. F152-21

A direct reference to NFPA 855 was not provided in the listed proposals. The revisions to this proposal through this PC will essentially revise the language back to how it was originally submitted In addition, the table is revised to remove one and two family dwellings as they are not a type of battery technology but a location where such technologies are used. It also corrects a spelling error.

Cost Impact: The net effect of the public comment and code change proposal will not increase or decrease the cost of construction
This does not change the outcome as the technical provisions will not change.

Public Comment# 2258

F133-21

Proposed Change as Submitted

Proponents: Emma Gonzalez-Laders, NYS DOS Division of Building Standards and Codes, representing NYS DOS Division of Building Standards and Codes (emma.gonzalez-laders@dos.ny.gov); Gregory Benton, representing NYS DOS Division of Building Standards and Codes (gregory.benton@dos.ny.gov); Chad Sievers, representing NYS Dept. of State (chad.sievers@dos.ny.gov); Jeffrey Hinderliter, City of Oswego, representing City of Oswego (jhinderliter@oswegony.org)

2021 International Fire Code

Revise as follows:

1207.1.3 Construction documents. The following information shall be provided with the permit application:

1. Location and layout diagram of the room or area in which the ESS is to be installed.
2. Details on the hourly *fire-resistance ratings* of assemblies enclosing the ESS.
3. The quantities and types of ESS to be installed.
4. Manufacturer's specifications, ratings and listings of each ESS.
5. Description of energy (battery) management systems and their operation.
6. Location and content of required signage.
7. Details on fire suppression, smoke or fire detection, thermal management, ventilation, exhaust and *deflagration* venting systems, if provided.
8. Support arrangement associated with the installation, including any required seismic restraint.
9. A commissioning plan complying with Section 1207.2.1.
10. A decommissioning plan complying with Section 1207.2.3.
11. <u>An emergency response plan, developed in conjunction with the *fire code official*, that includes adequate guidance for mitigating fire, thermal runaway, and explosion hazards.</u>

Reason: The actions taken in the initial minutes of an emergency are critical. A call for help to emergency services that provides full and accurate information helps the dispatcher send the right responders and equipment.[1] When it comes to energy storage systems (ESS), as a relatively new technology, emergency responders have limited knowledge and experience developing mitigation plans and anticipating the hazards they might encounter when responding to an emergency.
The document titled Energy Storage Safety Strategic Plan, prepared by the US Department of Energy in December of 2014, recognized that *"first responders must be included in the discussion to ensure that all areas of potential failure are identified and the best mitigation strategies are developed, spanning the chemistries and materials choices through components, module layouts and deployment."* The document emphasized the need for *"deliberate and concerted effort to engage the first responder community early in the design and siting of energy storage systems so that proper mitigation techniques can be developed and systems* [can be] *designed to improve the overall safety and ability to quickly and safely resolve the incident. This must include the development of techniques to extinguish any fires if they were to occur and respond to the variety of non-fire incidents that may require fire department response, developing site specific training for first responders, improved systems design, and the development of incident response plans. All of these must be based on the scientific understanding of the systems, materials and processes."* The report also highlighted the importance of ensuring that those mechanisms be included as part of the requirements "*in codes, standards and regulations."*[2]

In spite of this clear guidance issued by a reliable source, first responders arrive at the scene of an emergency without this critical information. In March of 2018, after first responders worked for hours to extinguish a deadly electric vehicle fire near Mountain View, California, the vehicle manufacturer dispatched a team of engineers to assist in the removal of the battery pack.[3] As it pertains to buildings, first responders should be able to reasonably anticipate the types of hazards to be encountered prior to being dispatched. Having to wait for a manufacturer or other facility personnel to arrive and provide critical information to successfully address the hazards could result in loss of life, injuries, and loss of property.A report from the UL Firefighter Safety Research Institute included similar recommendations. Prepared after the 2018 fire and explosion at an ESS facility in Sunrise, Arizona, that resulted in injuries to four firefighters, the investigative report was the first of its kind and was issued as part of the Study of Firefighter Line of Duty Injuries and Near Misses. The report included *"recommendations on how to improve codes, standards, and emergency response training to better protect first responders, maintenance personnel and nearby communities."* [4] The report indicated that an Emergency Response Plan was neither required, nor provided to fire service personnel prior to the incident and that the report provided on arrival did not include adequate guidance to mitigate the typical potential hazards to be found at an ESS facility: thermal runaway, fire, and explosion. The burden of preparing the emergency response plan during design and permitting and making it available to the fire code official prior to an incident is minor when compared to the potential to injuries to first responders.

Much of the work and information required for the preparation of an ERP is basically already required under in Item #7 on the same list and code section (*"details on fire suppression, smoke or fire detection, thermal management, ventilation, exhaust and deflagration venting systems, if provided"*). Many of the technical aspects required in Item #7 will inform the creation of the emergency response plan.

[1] https://www.ready.gov/business/implementation/emergency

[2] https://www.sandia.gov/ess-ssl/docs/other/DOE_OE_Safety_Strategic_Plan_Dec_2014_final.pdf

[3] https://www.cnet.com/roadshow/news/tesla-model-x-autopilot-crash-fire/ and https://electrek.co/2018/03/23/tesla-fire-battery-pack-model-x-crash/

[4] https://ulfirefightersafety.org/posts/four-firefighters-injured-in-lithium-ion-battery-energy-storage-system-explosion.html

Bibliography: *Emergency Response Plan.* Ready Campaign. FEMA. www.ready.gov/business/implementation/emergency. Accessed 12/2/2020.
Energy Storage Safety Strategic Plan. US Department of Energy. December, 2014. www.sandia.gov/ess-ssl/docs/other/DOE_OE_Safety_Strategic_Plan_Dec_2014_final.pdf. Accessed 12/2/2020.

Hyatt, Kyle. *Tesla Model X Fatal Crash and Fire Under Investigation.* CNET. 03/28/2018. www.cnet.com/roadshow/news/tesla-model-x-autopilot-crash-fire/. Accessed 12/2/2020.

Lambert, Fred. *Tesla Assists in Removing Partially Destroyed Battery Pack After Tragic Fatal Crash Resulted in a Fire. Electrek*. www.electrek.co/2018/03/23/tesla-fire-battery-pack-model-x-crash/Four Firefighters Injured in Lithium-Ion Battery. Accessed 12/2/2020.

McKinnon, Mark B., DeCrane, Sean, and Kerber, Stephen . *Energy Storage System Explosion - Arizona.* UL Firefighter Safety Research Institute. www.ulfirefightersafety.org/posts/four-firefighters-injured-in-lithium-ion-battery-energy-storage-system-explosion.html. Accessed 12/2/2020.

Emergency Response Planning Checklist. Akita Box. www.home.akitabox.com/emergency-response-planning-checklist-pdf. Accessed 12/2/2020.

Cost Impact: The code change proposal will increase the cost of construction
Any responsible development will likely include some level of hazard mitigation and incident pre-planing at some stage of the project process, regardless. This proposal simply would require that all that information be gathered into a standard Emergency Response Plan (ERP) during design and permitting and be subject to the approval of the fire code official.

Sample checklists for the development of a general Emergency Response Plan can be found online free of charge.[1] Completing the checklist and customizing a plan based on the presence of a lithium-ion battery ESS on the premises will likely require one to three hours depending on the preparer’s level of familiarity with and the complexities of the system being used. Where a battery type other than lithium-ion is being proposed, less information is readily available and likely more time will be required. As mentioned in the Reason Statement, some of the research and documentation needed to prepare an ERP will be readily available, since much of the technical information that is already required in Item #7 of the same list and section will form the basis for the creation of the ERP.

Once a plan is developed, the designer or the supplier of the system can use it as the basis for future projects, therefore, the time required to prepare it for subsequent projects will decrease. Likewise, a plan developed for another facility with the same technology and a similar scope can inform the development of a plan for a new facility, also reducing the time required to develop the new plan.

The cost of inaction, when considering the risks to first responders and property losses, far outweighs the cost of pre-planning.

[1] https://home.akitabox.com/emergency-response-planning-checklist-pdf

F133-21

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: This language would be more appropriate for Chapter 4 of the IFC as it relates to preplanning which is done after construction is complete. The proposal seems to be mixing preplanning with a hazardous mitigation analysis which is already required in Section 1207.1.4. It was suggested that perhaps the analysis in Section 1207.1.4 should be required in the construction documents or within the section addressing commissioning. (Vote: 13-0)

Individual Consideration Agenda

Public Comment 1:

IFC: 1207.1.3, 1207.2.2, 1207.2.2.1, 1207.2.2.2 (New), NFPA Chapter 80 (New)

Proponents: Robert Davidson, representing Self (rjd@davidsoncodeconcepts.com); Chad Sievers, representing NYS Dept. of State (chad.sievers@dos.ny.gov) requests As Modified by Public Comment

Modify as follows:

2021 International Fire Code

1207.1.3 Construction documents . The following information shall be provided with the permit application:

1. Location and layout diagram of the room or area in which the ESS is to be installed.
2. Details on the hourly *fire-resistance ratings* of assemblies enclosing the ESS.
3. The quantities and types of ESS to be installed.
4. Manufacturer's specifications, ratings and listings of each ESS.
5. Description of energy (battery) management systems and their operation.
6. Location and content of required signage.
7. Details on fire suppression, smoke or fire detection, thermal management, ventilation, exhaust and *deflagration* venting systems, if provided.
8. Support arrangement associated with the installation, including any required seismic restraint.
9. A commissioning plan complying with Section 1207.2.1.
10. A decommissioning plan complying with Section 1207.2.3.
11. ~~An emergency response plan, developed in conjunction with the *fire code official*, that includes adequate guidance for mitigating fire, thermal runaway, and explosion hazards.~~

1207.2.2 Operation and maintenance . An operation and maintenance manual shall be provided to both the ESS *owner* or their authorized agent and the ESS operator before the ESS is put into operation and shall include the following:

1. Manufacturer's operation manuals and maintenance manuals for the entire ESS, or for each component of the system requiring maintenance, that clearly identify the required routine maintenance actions.
2. Name, address and phone number of a service agency that has been contracted to service the ESS and its associated safety systems.
3. Maintenance and calibration information, including wiring diagrams, control drawings, schematics, system programming instructions and control sequence descriptions, for all energy storage control systems.
4. Desired or field-determined control set points that are permanently recorded on control drawings at control devices or, for digital control systems, in system programming instructions.
5. A schedule for inspecting and recalibrating all ESS controls.
6. A service record log form that lists the schedule for all required servicing and maintenance actions and space for logging such actions that are completed over time and retained on-site.

The ESS shall be operated and maintained in accordance with the manual and a copy of the manual shall be retained at an approved on-site location.

1207.2.2.1 Ongoing inspection and testing . Systems that monitor and protect the ESS installation shall be inspected and tested in accordance with the manufacturer's instructions and the operation and maintenance manual. Inspection and testing records shall be maintained in the operation and maintenance manual.

<u>**1207.2.2.2 Emergency planning and training** </u>**.**
<u>Emergency planning and training complying with Section 4.1.3.2 of NFPA 855 shall be provided. The emergency operations plan associated with the required emergency planning and training shall be submitted to the fire code official for review and approval.</u>

NFPA

National Fire Protection Association
1 Batterymarch Park

Quincy, MA 02169-7471

855-2020 INSTALLATION OF STATIONARY ENERGY STORAGE SYSTEMS

Commenter's Reason: Emergency planning and training is essential for sites with installed energy storage systems. Early, coordinated and effective response to potentially dangerous conditions involving the ESS is critical to keep an incident small through quick mitigation.
The committee's decision to disapprove the original submittal is correct from the standpoint as to location of the requirement. The topic is not related to construction submittals, it is directly related to operations and maintenance. This public comment relocates the requirement to a new subsection under Section 1207.2.2 Operation and maintenance. Detailed requirements for Emergency planning and training including an emergency operations plan is already provided for in NFPA 855 and this proposed language requires that the Emergency planning and training section of that document be complied with.4.1.3 Emergency Planning and Training.

NFPA 855-2020

4.1.3.1* General. Emergency planning and training shall be provided by the owner of the ESS or their authorized representative so that ESS facility operations and maintenance personnel and emergency responders can effectively address foreseeable hazards associated with the on-site systems.

4.1.3.2 Facility Staff Planning and Training. An emergency operations plan and associated training shall be established, maintained, and conducted by ESS facility operations and maintenance personnel.

4.1.3.2.1 Emergency Operations Plan.

4.1.3.2.1.1 An emergency operations plan shall be readily available for use by facility operations and maintenance personnel.

4.1.3.2.1.2 For normally occupied facilities, the emergency operations plan shall be on site.

4.1.3.2.1.3 The plan shall be updated when conditions that affect the response considerations and procedures change.

4.1.3.2.1.4 The emergency operations plan shall include the following:
(1) thru (8)...

To see the remaining details requirements NFPA 855 is publicly accessible at:
https://www.nfpa.org/Codes-and-Standards/All-Codes-and-Standards/List-of-Codes-and-Standards

Cost Impact: The net effect of the public comment and code change proposal will not increase or decrease the cost of construction
This requirement is not related to construction (installation) of the ESS, it is related to operations and maintenance. As a result it does not impact construction costs, though it will increase operational costs.

Public Comment# 2758

Public Comment 2:

IFC: 1207.1.3, 404.1

Proponents: Emma Gonzalez-Laders, representing NYS DOS Division of Building Standards and Codes (emma.gonzalez-laders@dos.ny.gov); Gregory Benton, representing NYS Department of State (gregory.benton@dos.ny.gov); Chad Sievers, representing NYS Department of State (chad.sievers@dos.ny.gov); Paul Rogers, representing International Association Firefighters (timjoepaul@yahoo.com) requests As Modified by Public Comment

Replace as follows:

2021 International Fire Code

1207.1.3 Construction documents . The following information shall be provided with the permit application:

1. Location and layout diagram of the room or area in which the ESS is to be installed.
2. Details on the hourly *fire-resistance ratings* of assemblies enclosing the ESS.
3. The quantities and types of ESS to be installed.
4. Manufacturer's specifications, ratings and listings of each ESS.
5. Description of energy (battery) management systems and their operation.

6. Location and content of required signage.
7. Details on fire suppression, smoke or fire detection, thermal management, ventilation, exhaust and *deflagration* venting systems, if provided.
8. Support arrangement associated with the installation, including any required seismic restraint.
9. A commissioning plan complying with Section 1207.2.1.
10. A decommissioning plan complying with Section 1207.2.3.
11. ~~An emergency response~~ A fire safety and evacuation plan in accordance with Section 404. ~~, developed in conjunction with the *fire code official*, that includes adequate guidance for mitigating fire, thermal runaway, and explosion hazards.~~

404.1 General . Where required by Section 403 or by other sections of this code, fire safety, evacuation and lockdown plans shall comply with Sections 404.2 through 404.4.1.

Commenter's Reason: As noted in the original proposal, the need to "*engage the first responder community early in the design and siting of energy storage systems"* was noted in the 2014 DOE Energy Storage Safety Strategic Plan.

Similar recommendations were included in a report from the UL Firefighter Safety Research Institute prepared after the 2018 fire and explosion at an ESS facility in Sunrise, Arizona.
In spite of that clear guidance, first responders continue to arrive at the scene of an emergency without critical information on the "major fire hazards associated with the normal use and occupancy" likely to be encountered in an ESS facility. A list of "major fire hazards associated with the normal use and occupancy" is required to be included as part of a fire safety and evacuation plan in item #5 of Section 404.2.2.

During the Spring hearings, the committee indicated that this pre-planning "language would be more appropriate for Chapter 4 of the IFC," therefore, we're proposing to revise our original proposal to simply include a reference to Section 404. However, since Section 404 only applies "where required by Section 403," we're also proposing to expand the scope of 404.1 to include other locations where the Fire Code so requires. This is consistent with the language used in Sections 508.1 and 5005.1.3.

The committee also suggested that "perhaps the [hazard mitigation] analysis in Section 1207.1.4 should be required in the construction documents." However, in accordance with Section 1207.1.4, a hazard mitigation analysis is only required for a few unusual instances and does not give the fire code official the opportunity to weigh in on the majority of installations. For this reason, we are not proposing any modifications based on that specific recommendation at this time.

Cost Impact: The net effect of the public comment and code change proposal will increase the cost of construction
Any responsible development will likely include some level of fire safety and evacuation pre-planing at some stage of the project process, regardless. This proposal simply would require that the information be gathered during design and permitting and be subject to the approval of the fire code official.

Completing the plan for a lithium-ion system using information readily available will likely require one to three hours depending on the preparer's level of familiarity with and the complexities of the system being used. Where a battery type other than lithium-ion is being proposed, less information is readily available and likely more time will be required. As mentioned in the Reason Statement for the original proposal, some of the research and documentation needed to prepare a plan will be readily available, since much of the technical information that is already required in Item #7 of the same list and section and in other sections of the code will form the basis for the creation of the plan.

Once a plan is developed, the designer or the supplier of the system can use it as the basis for future projects, therefore, the time required to prepare it for subsequent projects will decrease. Likewise, a plan developed for another facility with the same technology and a similar scope can inform the development of a plan for a new facility, also reducing the time required to develop the new plan.

The cost of inaction, when considering the risks to first responders and property losses, far outweighs the cost of pre-planning.

[1] https://home.akitabox.com/emergency-response-planning-checklist-pdf

Public Comment# 2385

F134-21

Proposed Change as Submitted

Proponents: Michael O'Brian, representing FCAC (fcac@iccsafe.org)

2021 International Fire Code

Add new text as follows:

1207.1.3.1 Utilities applicability.
Plans and specifications associated with ESS owned and operated by electric utilities as a component of the electric grid that are considered critical infrastructure documents in accordance with the provisions of the North American Electric Reliability Corporation and other applicable governmental laws and regulations shall be made available to the fire code official for viewing based on the requirements of the applicable governmental laws and regulations.

Reason: This proposed change is consistent with NFPA 855, Section 4.1.2.1.2 and recognizes that there are federally enforced NAERC restrictions that regulate distribution of certain sensitive electric utility plans and documents.
This proposal is submitted by the ICC Fire Code Action Committee (FCAC). The FCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance assigned International Codes with regard to fire and life safety in new and existing buildings and facilities as well as the protection of life and property in wildland urban interface areas. In 2020 and 2021 the Fire-CAC held multiple virtual meetings that were open to any interested party. In addition, there were numerous virtual specific working group meetings that were also open to any interested parties, to develop, discuss and debate the proposed changes. Related documentation and reports are posted on the FCAC website at: https://www.iccsafe.org/products-and-services/i-codes/code-development/cs/fire-code-action-committee-fcac/

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The proposal only addresses the manner in which documentation is provided to the code official.

F134-21

Public Hearing Results

Committee Action: **As Modified**

Committee Modification:

1207.1.3.1 Utilities applicability. Plans and specifications associated with ESS owned and operated by electric utilities shall comply with section 4.1.2.1.2 of NFPA 855 ~~as a component of the electric grid that are considered critical infrastructure documents in accordance with the provisions of the North American Electric Reliability Corporation and other applicable governmental laws and regulations shall be made available to the fire code official for viewing based on the requirements of the applicable governmental laws and regulations.~~

Add new standard(s) as follows:
NFPA 855-2020: Standard for the Installation of Stationary Energy Storage Systems

Committee Reason: This proposal both clarifies when the fire code official can review plans and specifications as permitted by applicable laws and regulations and coordinates with NFPA 855. The modification provide specific references to NFPA 855 to address duplicated language. (Vote 14-0)

F134-21

Individual Consideration Agenda

Public Comment 1:

Proponents: Michael O'Brian, representing FCAC (fcac@iccsafe.org) requests As Submitted

Commenter's Reason: This public comment is focused upon making this proposal along with F132-21 consistent with the following proposals

1. F138-21
2. F140-21
3. F141-21
4. F143-21
5. F144-21
6. F145-21
7. F146-21
8. F151-21
9. F152-21

A direct reference to NFPA 855 was not provided in those proposals.

Cost Impact: The net effect of the public comment and code change proposal will not increase or decrease the cost of construction
This does not change the outcome as the technical provisions will not change.

Public Comment# 2259

F138-21

Proposed Change as Submitted

Proponents: Michael O'Brian, representing FCAC (fcac@iccsafe.org)

2021 International Fire Code

Revise as follows:

1207.2.1 Commissioning. Commissioning of newly installed ESS and existing ESS that have been retrofitted, replaced or previously decommissioned and are returning to service shall be conducted prior to the ESS being placed in service in accordance with a commissioning plan that has been*approved* prior to initiating commissioning. The commissioning plan shall include the following:

1. A narrative description of the activities that will be accomplished during each phase of commissioning, including the personnel intended to accomplish each of the activities.
2. A listing of the specific ESS and associated components, controls and safety-related devices to be tested, a description of the tests to be performed and the functions to be tested.
3. Conditions under which all testing will be performed, which are representative of the conditions during normal operation of the system.
4. Documentation of the owner's project requirements and the basis of design necessary to understand the installation and operation of the ESS.
5. Verification that required equipment and systems are installed in accordance with the *approved* plans and specifications.
6. Integrated testing for all fire and safety systems.
7. Testing for any required thermal management, ventilation or exhaust systems associated with the ESS installation.
8. Preparation and delivery of operation and maintenance documentation.
9. Training of facility operating and maintenance staff.
10. Identification and documentation of the requirements for maintaining system performance to meet the original design intent during the operation phase.
11. Identification and documentation of personnel who are qualified to service, maintain and decommission the ESS, and respond to incidents involving the ESS, including documentation that such service has been contracted for.
12. A decommissioning plan for removing the ESS from service, and from the facility in which it is located. The plan shall include details on providing a safe, orderly shutdown of energy storage and safety systems with notification to the code officials prior to the actual decommissioning of the system. The decommissioning plan shall include contingencies for removing an intact operational ESS from service, and for removing an ESS from service that has been damaged by a fire or other event.

~~Exception~~ Exceptions: Commissioning shall not be required for lead-acid and nickel-cadmium battery systems at facilities under the exclusive control of communications utilities that comply with NFPA 76 and operate at less than 50 VAC and 60 VDC. A decommissioning plan shall be provided and maintained where required by the fire code official.

1. Lead-acid and nickel-cadmium battery systems less than 50 V ac, 60 V dc that are in telecommunications facilities for installations of communications equipment under the exclusive control of communications utilities and located outdoors or in building spaces or walk-in units used exclusively for such installations that are in compliance with NFPA 76 shall be permitted to have a commissioning plan in compliance with recognized industry practices in lieu of complying with Section 1207.2.1.
2. Lead-acid and nickel-cadmium battery systems that are designed in accordance with IEEE C2, used for dc power for control of substations and control or safe shutdown of generating stations under the exclusive control of the electric utilities, and located in building spaces or walk-in units used exclusively for such installations shall be permitted to have a commissioning plan in compliance with applicable governmental laws and regulations in lieu of developing a commissioning plan in accordance with Section 1207.2.1.

Add new standard(s) as follows:

IEEE

Institute of Electrical and Electronics Engineers Standards Association
445 Hoes Lane
Piscataway, NJ 08854
USA

IEEE Institute of Electrical and Electronics Engineers.
National Electrical Safety Code(R) (NESC(R))

Reason: This proposed change is consistent with NFPA 855, Sections 8.1.1, 6.1.1.2, and 8.1.2 and allows options for lead acid and Ni-cad battery system ESS commissioning for telecommunications and electric utility installations.
This proposal is submitted by the ICC Fire Code Action Committee (FCAC). The FCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance assigned International Codes with regard to fire and life safety in new and existing buildings and facilities as well as the protection of life and property in wildland urban interface areas. In 2020 and 2021 the Fire-CAC held multiple virtual meetings that were open to any interested party. In addition, there were numerous virtual specific working group meetings that were also open to any interested parties, to develop, discuss and debate the proposed changes. Related documentation and reports are posted on the FCAC website at: https://www.iccsafe.org/products-and-services/i-codes/code-development/cs/fire-code-action-committee-fcac/

Cost Impact: The code change proposal will not increase or decrease the cost of construction
It merely provides industry options for commissioning ESS.

Staff Analysis: A review of the standard proposed for inclusion in the code, IEEE C2-2017, National Electrical Safety Code(R) (NESC(R)), with regard to some of the key ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before March 20, 2021.

F138-21

Public Hearing Results

Committee Action: **As Modified**

Committee Modification:

1207.2.1 Commissioning. Commissioning of newly installed ESS and existing ESS that have been retrofitted, replaced or previously decommissioned and are returning to service shall be conducted prior to the ESS being placed in service in accordance with a commissioning plan that has been approved prior to initiating commissioning. The commissioning plan shall include the following:

1. A narrative description of the activities that will be accomplished during each phase of commissioning, including the personnel intended to accomplish each of the activities.
2. A listing of the specific ESS and associated components, controls and safety-related devices to be tested, a description of the tests to be performed and the functions to be tested.
3. Conditions under which all testing will be performed, which are representative of the conditions during normal operation of the system.
4. Documentation of the owner's project requirements and the basis of design necessary to understand the installation and operation of the ESS.
5. Verification that required equipment and systems are installed in accordance with the approved plans and specifications.
6. Integrated testing for all fire and safety systems.
7. Testing for any required thermal management, ventilation or exhaust systems associated with the ESS installation.
8. Preparation and delivery of operation and maintenance documentation.
9. Training of facility operating and maintenance staff.
10. Identification and documentation of the requirements for maintaining system performance to meet the original design intent during the operation phase.
11. Identification and documentation of personnel who are qualified to service, maintain and decommission the ESS, and respond to incidents involving the ESS, including documentation that such service has been contracted for.
12. A decommissioning plan for removing the ESS from service, and from the facility in which it is located. The plan shall include details on providing a safe, orderly shutdown of energy storage and safety systems with notification to the code officials prior to the actual decommissioning of the system. The decommissioning plan shall include contingencies for removing an intact operational ESS from service, and for removing an ESS from service that has been damaged by a fire or other event.

Exceptions: Commissioning shall not be required for lead-acid and nickel-cadmium battery systems at facilities under the exclusive control of communications utilities that comply with NFPA 76 and operate at less than 50 VAC and 60 VDC. A decommissioning plan shall be provided and maintained where required by the fire code official.

1. Lead-acid and nickel-cadmium battery systems less than 50 V ac, 60 V dc that are in telecommunications facilities for installations of communications equipment under the exclusive control of communications utilities and located outdoors or in building spaces or walk-in units used exclusively for such installations that are in compliance with NFPA 76 shall be permitted to have a commissioning plan in

compliance with recognized industry practices in lieu of complying with Section 1207.2.1.

2. Lead-acid and nickel-cadmium battery systems that are ~~designed in accordance with IEEE C2,~~ used for dc power for control of substations and control or safe shutdown of generating stations under the exclusive control of the electric utilities, and located in building spaces or walk-in units used exclusively for such installations shall be permitted to have a commissioning plan in compliance with applicable governmental laws and regulations in lieu of developing a commissioning plan in accordance with Section 1207.2.1.

~~IEEEC2-2017 National Electrical Safety Code(R) (NESC(R))~~

Committee Reason: Provides the necessary exceptions to commissioning for lead-acid and nickel-cadmium battery systems in certain applications and provides consistency with NFPA 855. The modification removes an unnecessary standard reference to IEEE C2. (Vote: 12-2)

F138-21

Individual Consideration Agenda

Public Comment 1:

IFC: 1207.2.1, IEEE (New)

Proponents: Steven Rosenstock, representing Edison Electric Institute (srosenstock@eei.org) requests As Modified by Public Comment

Further modify as follows:

2021 International Fire Code

1207.2.1 Commissioning . Commissioning of newly installed ESS and existing ESS that have been retrofitted, replaced or previously decommissioned and are returning to service shall be conducted prior to the ESS being placed in service in accordance with a commissioning plan that has been*approved* prior to initiating commissioning. The commissioning plan shall include the following:

1. A narrative description of the activities that will be accomplished during each phase of commissioning, including the personnel intended to accomplish each of the activities.
2. A listing of the specific ESS and associated components, controls and safety-related devices to be tested, a description of the tests to be performed and the functions to be tested.
3. Conditions under which all testing will be performed, which are representative of the conditions during normal operation of the system.
4. Documentation of the owner's project requirements and the basis of design necessary to understand the installation and operation of the ESS.
5. Verification that required equipment and systems are installed in accordance with the *approved* plans and specifications.
6. Integrated testing for all fire and safety systems.
7. Testing for any required thermal management, ventilation or exhaust systems associated with the ESS installation.
8. Preparation and delivery of operation and maintenance documentation.
9. Training of facility operating and maintenance staff.
10. Identification and documentation of the requirements for maintaining system performance to meet the original design intent during the operation phase.
11. Identification and documentation of personnel who are qualified to service, maintain and decommission the ESS, and respond to incidents involving the ESS, including documentation that such service has been contracted for.
12. A decommissioning plan for removing the ESS from service, and from the facility in which it is located. The plan shall include details on providing a safe, orderly shutdown of energy storage and safety systems with notification to the code officials prior to the actual decommissioning of the system. The decommissioning plan shall include contingencies for removing an intact operational ESS from service, and for removing an ESS from service that has been damaged by a fire or other event.

Exceptions: Commissioning shall not be required for lead-acid and nickel-cadmium battery systems at facilities under the exclusive control of communications utilities that comply with NFPA 76 and operate at less than 50 VAC and 60 VDC. A decommissioning plan shall be provided and maintained where required by the fire code official.

1. Lead-acid and nickel-cadmium battery systems less than 50 V ac, 60 V dc that are in telecommunications facilities for installations of communications equipment under the exclusive control of communications utilities and located outdoors or in building spaces or walk-in

units used exclusively for such installations that are in compliance with NFPA 76 shall be permitted to have a commissioning plan in compliance with recognized industry practices in lieu of complying with Section 1207.2.1.

2. Lead-acid and nickel-cadmium battery systems that are designed in accordance with IEEE C2, used for dc power for control of substations and control or safe shutdown of generating stations under the exclusive control of the electric utilities, and located in building spaces or walk-in units used exclusively for such installations shall be permitted to have a commissioning plan in compliance with applicable governmental laws and regulations in lieu of developing a commissioning plan in accordance with Section 1207.2.1.

IEEE

Institute of Electrical and Electronics Engineers Standards Association
445 Hoes Lane
Piscataway , NJ 08854

IEEE Institute of Electrical and Electronics Engineers .
National Electrical Safety Code(R) (NESC(R))

Commenter's Reason: This is the language that was vetted and approved by the FCAC.
IEEE C2 is a published and available standard. It will also be updated by next year.

Bibliography: IEEE C2-2017 - *2017 National Electrical Safety Code(R) (NESC(R))*, 2016, Institute of Electrical and Electronics Engineers, New York, NY

https://ieeexplore.ieee.org/document/7526279

Cost Impact: The net effect of the public comment and code change proposal will not increase or decrease the cost of construction
It provides another option for the design and installation of such systems at utility facilities.

Public Comment# 2651

F140-21

Proposed Change as Submitted

Proponents: Michael O'Brian, representing FCAC (fcac@iccsafe.org)

2021 International Fire Code

Revise as follows:

1207.3.1 Energy storage system listings. ESS shall be *listed* in accordance with UL 9540.

~~**Exception**~~ **Exceptions:** ~~Lead-acid and nickel-cadmium battery systems installed in facilities under the exclusive control of communications utilities, and operating at less than 50 VAC and 60 VDC in accordance with NFPA 76, are not required to be *listed*.~~

1. Lead-acid and nickel-cadmium battery systems less than 50 V ac, 60 V dc in telecommunications facilities for installations of communications equipment under the exclusive control of communications utilities located outdoors or in building spaces used exclusively for such installations that are in compliance with NFPA 76.
2. Lead-acid and nickel-cadmium battery systems that are designed in accordance with IEEE C2, used for dc power for control of substations and control or safe shutdown of generating stations under the exclusive control of the electric utility, and located outdoors or in building spaces used exclusively for such installations.
3. Lead-acid battery systems in uninterruptable power supplies listed and labeled in accordance with UL 1778 and utilized for standby power applications.

Add new standard(s) as follows:

IEEE

Institute of Electrical and Electronics Engineers Standards Association
445 Hoes Lane
Piscataway, NJ 08854
USA

IEEE Institute of Electrical and Electronics Engineers.
C2-2017 National Electrical Safety Code(R) (NESC(R))

UL

Underwriters Laboratories LLC
333 Pfingsten Road
Northbrook, IL 60062

1778-2014 - with revisions through October 2017 Uninterruptible Power Systems

Reason: This proposed change is consistent with NFPA 855, Sections 4.2.1.1 through 4.2.1.3 and allows certain battery systems in telecommunication, electric utility and UPS applications to not be listed to UL 9540.
This proposal is submitted by the ICC Fire Code Action Committee (FCAC). The FCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance assigned International Codes with regard to fire and life safety in new and existing buildings and facilities as well as the protection of life and property in wildland urban interface areas. In 2020 and 2021 the Fire-CAC held multiple virtual meetings that were open to any interested party. In addition, there were numerous virtual specific working group meetings that were also open to any interested parties, to develop, discuss and debate the proposed changes. Related documentation and reports are posted on the FCAC website at: https://www.iccsafe.org/products-and-services/i-codes/code-development/cs/fire-code-action-committee-fcac/

Cost Impact: The code change proposal will not increase or decrease the cost of construction
It introduces applications in which certain ESS technologies are not required to be listed.

Staff Analysis: A review of the following standards proposed for inclusion in the code, with regard to some of the key ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before March 20, 2021.

- IEEE C2-2017, National Electrical Safety Code(R) (NESC(R))
- UL 1778-2014 - Uninterruptible Power Systems with revisions through October 2017

F140-21

Public Hearing Results

Committee Action: **As Modified**

Committee Modification:

1207.3.1 Energy storage system listings. ESS shall be *listed* in accordance with UL 9540.

Exceptions:

1. Lead-acid and nickel-cadmium battery systems less than 50 V ac, 60 V dc in telecommunications facilities for installations of communications equipment under the exclusive control of communications utilities located outdoors or in building spaces used exclusively for such installations that are in compliance with NFPA 76.
2. Lead-acid and nickel-cadmium battery systems that are ~~designed in accordance with IEEE C2,~~ used for dc power for control of substations and control or safe shutdown of generating stations under the exclusive control of the electric utility, and located outdoors or in building spaces used exclusively for such installations.
3. Lead-acid battery systems in uninterruptable power supplies listed and labeled in accordance with UL 1778 and utilized for standby power applications.

~~**IEEEC2-2017 National Electrical Safety Code(R) (NESC(R))**~~

Committee Reason: The proposal was approved to be consistent with the previous action on F138-21. This includes both the need to address exceptions for certain battery technologies and also the removal of IEEE C2 as the modification addresses. There is concern that fire code officials should not have to familiar with IEEE C2. (Vote: 12-1)

F140-21

Individual Consideration Agenda

Public Comment 1:

IFC: 1207.3.1, IEEE (New)

Proponents: Steven Rosenstock, representing Edison Electric Institute (srosenstock@eei.org) requests As Modified by Public Comment

Further modify as follows:

2021 International Fire Code

1207.3.1 Energy storage system listings . ESS shall be *listed* in accordance with UL 9540.

Exceptions:

1. Lead-acid and nickel-cadmium battery systems less than 50 V ac, 60 V dc in telecommunications facilities for installations of communications equipment under the exclusive control of communications utilities located outdoors or in building spaces used exclusively for such installations that are in compliance with NFPA 76.
2. Lead-acid and nickel-cadmium battery systems that are designed in accordance with IEEE C2, used for dc power for control of substations and control or safe shutdown of generating stations under the exclusive control of the electric utility, and located outdoors or in building spaces used exclusively for such installations.
3. Lead-acid battery systems in uninterruptable power supplies listed and labeled in accordance with UL 1778 and utilized for standby power applications.

IEEE

Institute of Electrical and Electronics Engineers Standards Association
445 Hoes Lane
Piscataway , NJ 08854

IEEE Institute of Electrical and Electronics Engineers .
National Electrical Safety Code(R) (NESC(R))

Commenter's Reason: This was the original language approved by the FCAC.
IEEE C2 is available for use. It will also be updated by next year.

Bibliography: IEEE C2-2017 - *2017 National Electrical Safety Code(R) (NESC(R))*, 2016, Institute of Electrical and Electronics Engineers, New York, NY
https://ieeexplore.ieee.org/document/7526279

Cost Impact: The net effect of the public comment and code change proposal will not increase or decrease the cost of construction
This provides another option with no impact on construction costs.

Public Comment# 2653

F143-21

Proposed Change as Submitted

Proponents: Michael O'Brian, representing FCAC (fcac@iccsafe.org)

2021 International Fire Code

Revise as follows:

1207.5.1 Size and separation. Electrochemical ESS shall be segregated into groups not exceeding 50 kWh (180 megajoules). Each group shall be separated a minimum of 3 feet (914 mm) from other groups and from walls in the storage room or area. The storage arrangements shall comply with Chapter 10.

1. Lead-acid and nickel-cadmium battery systems in facilities under the exclusive control of communications utilities and operating at less than 50 VAC and 60 VDC in accordance with NFPA 76.
2. Lead-acid and nickel cadmium systems that are designed in accordance with IEEE C2, used for dc power for control of substations and control or safe shutdown of generating stations under the exclusive control of the electric utility, and located outdoors or in building spaces used exclusively for such installations.
3. Lead-acid battery systems in uninterruptable power supplies listed and labeled in accordance with UL 1778, utilized for standby power applications, and limited to not more than 10% of the floor area on the floor on which the ESS is located.

~~2.~~ 4. The *fire code official* is authorized to approve larger capacities or smaller separation distances based on large-scale fire testing complying with Section 1207.1.5.

Add new standard(s) as follows:

IEEE

Institute of Electrical and Electronics Engineers Standards Association
445 Hoes Lane
Piscataway, NJ 08854
USA

IEEE Institute of Electrical and Electronics Engineers.
C2-2017 National Electrical Safety Code(R) (NESC(R))

UL

Underwriters Laboratories LLC
333 Pfingsten Road
Northbrook, IL 60062

1778-2014: Uninterruptible Power Systems with revisions through October 2017

Reason: This proposed change is consistent with NFPA 855, Sections 4.6.6 and 4.6.7 and includes exceptions for certain battery technologies in electric utility and UPS applications .
This proposal is submitted by the ICC Fire Code Action Committee (FCAC). The FCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance assigned International Codes with regard to fire and life safety in new and existing buildings and facilities as well as the protection of life and property in wildland urban interface areas. In 2020 and 2021 the Fire-CAC held multiple virtual meetings that were open to any interested party. In addition, there were numerous virtual specific working group meetings that were also open to any interested parties, to develop, discuss and debate the proposed changes. Related documentation and reports are posted on the FCAC website at: https://www.iccsafe.org/products-and-services/i-codes/code-development/cs/fire-code-action-committee-fcac/

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal will not increase the cost of construction. It introduces applications in which certain ESS technologies are not required to meet size and separation requirements.

Staff Analysis: A review of the following standards proposed for inclusion in the code, with regard to some of the key ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before March 20, 2021.

- IEEE C2-2017, National Electrical Safety Code(R) (NESC(R))
- UL 1778-2014 - Uninterruptible Power Systems with revisions through October 2017

F143-21

Public Hearing Results

Committee Action: **As Modified**

Committee Modification:

1207.5.1 Size and separation. Electrochemical ESS shall be segregated into groups not exceeding 50 kWh (180 megajoules). Each group shall be separated a minimum of 3 feet (914 mm) from other groups and from walls in the storage room or area. The storage arrangements shall comply with Chapter 10.

Exceptions:

1. Lead-acid and nickel-cadmium battery systems in facilities under the exclusive control of communications utilities and operating at less than 50 VAC and 60 VDC in accordance with NFPA 76.
2. Lead-acid and nickel cadmium systems that are ~~designed in accordance with IEEE C2,~~ used for dc power for control of substations and control or safe shutdown of generating stations under the exclusive control of the electric utility, and located outdoors or in building spaces used exclusively for such installations.
3. Lead-acid battery systems in uninterruptable power supplies listed and labeled in accordance with UL 1778, utilized for standby power applications, and limited to not more than 10% of the floor area on the floor on which the ESS is located.
4. The *fire code official* is authorized to approve larger capacities or smaller separation distances based on large-scale fire testing complying with Section 1207.1.5.

~~IEEE C2-2017 National Electrical Safety Code(R) (NESC(R))~~

Committee Reason: The proposal was approved based upon the need for consistency with NFPA 855 and providing appropriate technology specific exceptions. The modifications clarify that the list is actually a list of exceptions and also to remove IEEE C2 consistent with modifications made to F138-21, F140-21 and F141-21. (Vote: 14-0)

F143-21

Individual Consideration Agenda

Public Comment 1:

IFC: 1207.5.1, IEEE (New)

Proponents: Steven Rosenstock, representing Edison Electric Institute (srosenstock@eei.org) requests As Modified by Public Comment

Further modify as follows:

2021 International Fire Code

1207.5.1 Size and separation . Electrochemical ESS shall be segregated into groups not exceeding 50 kWh (180 megajoules). Each group shall be separated a minimum of 3 feet (914 mm) from other groups and from walls in the storage room or area. The storage arrangements shall comply with Chapter 10.

Exceptions:

1. Lead-acid and nickel-cadmium battery systems in facilities under the exclusive control of communications utilities and operating at less than 50 VAC and 60 VDC in accordance with NFPA 76.
2. Lead-acid and nickel cadmium systems that are designed in accordance with IEEE C2, used for dc power for control of substations and control or safe shutdown of generating stations under the exclusive control of the electric utility, and located outdoors or in building spaces used exclusively for such installations.
3. Lead-acid battery systems in uninterruptable power supplies listed and labeled in accordance with UL 1778, utilized for standby power applications, and limited to not more than 10% of the floor area on the floor on which the ESS is located.
4. The *fire code official* is authorized to approve larger capacities or smaller separation distances based on large-scale fire testing complying with Section 1207.1.5.

IEEE

Institute of Electrical and Electronics Engineers Standards Association
445 Hoes Lane
Piscataway , NJ 08854

IEEE Institute of Electrical and Electronics Engineers .

National Electrical Safety Code(R) (NESC(R))

Commenter's Reason: This is the original proposal approved by FCAC.
IEEE C2 is available for use and will be updated by next year.

Bibliography: IEEE C2-2017 - *2017 National Electrical Safety Code(R) (NESC(R))*, 2016, Institute of Electrical and Electronics Engineers, New York, NY
https://ieeexplore.ieee.org/document/7526279

Cost Impact: The net effect of the public comment and code change proposal will not increase or decrease the cost of construction
This provides another option for utility installations.

Public Comment# 2655

F144-21

Proposed Change as Submitted

Proponents: Michael O'Brian, representing FCAC (fcac@iccsafe.org)

2021 International Fire Code

Revise as follows:

1207.5.3 Elevation. Electrochemical ESS shall not be located in the following areas:

1. Where the floor is located more than 75 feet (22 860 mm) above the lowest level of fire department vehicle access.
2. Where the floor is located below the lowest *level of exit discharge*.

Exceptions:

1. Lead-acid and nickel-cadmium battery systems less than 50 VAC and 60 VDC installed in facilities under the exclusive control of communications utilities in accordance with NFPA 76.
2. Lead-acid and nickel cadmium systems that are designed in accordance with IEEE C2, used for dc power for control of substations and control and safe shutdown of generating stations under the exclusive control of the electric utility, and located outdoors or in building spaces used exclusively for such installations.
3. Lead-acid battery systems in uninterruptable power supplies listed and labeled in accordance with UL 1778, utilized for standby power applications, which is limited to not more than 10% of the floor area on the floor on which the ESS is located.

~~2.~~ 4. Where *approved*, installations shall be permitted in underground vaults complying with NFPA 70, Article 450, Part III.

~~3.~~ 5. Where *approved* by the *fire code official,* installations shall be permitted on higher and lower floors.

Add new standard(s) as follows:

IEEE

Institute of Electrical and Electronics Engineers Standards Association
445 Hoes Lane
Piscataway, NJ 08854
USA

IEEE Institute of Electrical and Electronics Engineers.
C2-2017 National Electrical Safety Code(R) (NESC(R))

UL

Underwriters Laboratories LLC
333 Pfingsten Road
Northbrook, IL 60062

1778-2014 Uninterruptible Power Systems

Reason: This proposed change is consistent with NFPA 855, Section 4.3.9.3 and allows exceptions to elevation requirements for certain battery technologies in electric utility and UPS systems.
This proposal is submitted by the ICC Fire Code Action Committee (FCAC). The FCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance assigned International Codes with regard to fire and life safety in new and existing buildings and facilities as well as the protection of life and property in wildland urban interface areas. In 2020 and 2021 the Fire-CAC held multiple virtual meetings that were open to any interested party. In addition, there were numerous virtual specific working group meetings that were also open to any interested parties, to develop, discuss and debate the proposed changes. Related documentation and reports are posted on the FCAC website at: https://www.iccsafe.org/products-and-services/i-codes/code-development/cs/fire-code-action-committee-fcac/

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal will not increase the cost of construction. It is actually a relaxation of requirements.

Staff Analysis: A review of the following standards proposed for inclusion in the code, with regard to some of the key ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before March 20, 2021.

- IEEE C2-2017, National Electrical Safety Code(R) (NESC(R))
- UL 1778-2014 - Uninterruptible Power Systems with revisions through October 2017

F144-21

Public Hearing Results

Committee Action: **As Modified**

Committee Modification:

1207.5.3 Elevation. Electrochemical ESS shall not be located in the following areas:

1. Where the floor is located more than 75 feet (22 860 mm) above the lowest level of fire department vehicle access.
2. Where the floor is located below the lowest *level of exit discharge*.

Exceptions:

1. Lead-acid and nickel-cadmium battery systems less than 50 VAC and 60 VDC installed in facilities under the exclusive control of communications utilities in accordance with NFPA 76.
2. Lead-acid and nickel cadmium systems that are ~~designed in accordance with IEEE C2,~~ used for dc power for control of substations and control and safe shutdown of generating stations under the exclusive control of the electric utility, and located outdoors or in building spaces used exclusively for such installations.
3. Lead-acid battery systems in uninterruptable power supplies listed and labeled in accordance with UL 1778, utilized for standby power applications, which is limited to not more than 10% of the floor area on the floor on which the ESS is located.
4. Where *approved*, installations shall be permitted in underground vaults complying with NFPA 70, Article 450, Part III.
5. Where *approved* by the *fire code official,* installations shall be permitted on higher and lower floors.

~~IEEE C2-2017 National Electrical Safety Code(R) (NESC(R))~~

Committee Reason: This proposal was approved based upon consistency with NFPA 855 and recognizing battery technology specific exceptions. The modification removes the reference to IEEE C2 consistent with the actions on F138-21, F140-21, F141-21 and F143-21. (Vote: 13-0)

F144-21

Individual Consideration Agenda

Public Comment 1:

IFC: 1207.5.3, IEEE (New)

Proponents: Steven Rosenstock, representing Edison Electric Institute (srosenstock@eei.org) requests As Modified by Public Comment

Further modify as follows:

2021 International Fire Code

1207.5.3 Elevation . Electrochemical ESS shall not be located in the following areas:

1. Where the floor is located more than 75 feet (22 860 mm) above the lowest level of fire department vehicle access.
2. Where the floor is located below the lowest *level of exit discharge*.

Exceptions:

1. Lead-acid and nickel-cadmium battery systems less than 50 VAC and 60 VDC installed in facilities under the exclusive control of communications utilities in accordance with NFPA 76.
2. Lead-acid and nickel cadmium systems that are <u>designed in accordance with IEEE C2,</u>used for dc power for control of substations and control and safe shutdown of generating stations under the exclusive control of the electric utility, and located outdoors or in building spaces used exclusively for such installations.
3. Lead-acid battery systems in uninterruptable power supplies listed and labeled in accordance with UL 1778, utilized for standby power

applications, which is limited to not more than 10% of the floor area on the floor on which the ESS is located.

4. Where *approved*, installations shall be permitted in underground vaults complying with NFPA 70, Article 450, Part III.
5. Where *approved* by the *fire code official,* installations shall be permitted on higher and lower floors.

IEEE

Institute of Electrical and Electronics Engineers Standards Association
445 Hoes Lane
Piscataway , NJ 08854

IEEE Institute of Electrical and Electronics Engineers .
National Electrical Safety Code(R) (NESC(R))

Commenter's Reason: This was the language that was approved by the FCAC.
IEEE C2 is available for use, and it is being updated by next year to provide even more safety improvements.

Bibliography: IEEE C2-2017 - *2017 National Electrical Safety Code(R) (NESC(R))*, 2016, Institute of Electrical and Electronics Engineers, New York, NY
https://ieeexplore.ieee.org/document/7526279

Cost Impact: The net effect of the public comment and code change proposal will not increase or decrease the cost of construction
This provides an exception for utility systems that comply with IEEE C2.

Public Comment# 2681

F145-21

Proposed Change as Submitted

Proponents: Michael O'Brian, representing FCAC (fcac@iccsafe.org)

2021 International Fire Code

Revise as follows:

1207.5.4 Fire detection. An *approved* automatic smoke detection system or radiant energy-sensing fire detection system complying with Section 907.2 shall be installed in rooms, indoor areas and walk-in units containing electrochemical ESS. An *approved* radiant energy-sensing fire detection system shall be installed to protect open parking garage and rooftop installations. Alarm signals from detection systems shall be transmitted to a central station, proprietary or remote station service in accordance with NFPA 72, or where *approved* to a constantly attended location.

Exception: Normally unoccupied, remote stand-alone telecommunications structures with a gross floor area of less than 1500 ft^2 (139 m^2) utilizing lead-acid or nickel cadmium batteries shall not be required to have a fire detection system installed.

1207.5.4.1 System status. Lead-acid and nickel-cadmium battery systems that are designed in accordance with IEEE C2, used for dc power for control of substations and control or safe shutdown of generating stations under the exclusive control of the electric utility, and located outdoors or in building spaces used exclusively for such installations shall be allowed to use the process control system to monitor the smoke or radiant energy–sensing fire detectors required in Section 1207.5.4.

~~Where required by the *fire code official*, visible annunciation shall be provided on cabinet exteriors or in other *approved* locations to indicate that potentially hazardous conditions associated with the ESS exist.~~

Add new standard(s) as follows:

IEEE

Institute of Electrical and Electronics Engineers Standards Association
445 Hoe Lane
Piscataway, NJ 08854
USA

IEEE Institute of Electrical and Electronics Engineers.
C2-2017 National Electrical Safety Code(R) (NESC(R))

Reason: This proposed change is consistent with NFPA 855, Sections 4.10.2 and 4.10.3. It allows small remote telecommunication facilities, such as mountaintop repeaters, to not require a fire detection system. It also revises the fire detection system requirements for certain electric utility installations to use process control systems to monitor the smoke or fire detectors.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
It is actually a relaxation of requirements.

Staff Analysis: A review of the standard proposed for inclusion in the code, IEEE C2-2017, National Electrical Safety Code(R) (NESC(R)), with regard to some of the key ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before March 20, 2021.

F145-21

Public Hearing Results

Committee Action: **As Modified**

Committee Modification:

1207.5.4.1 System status. Lead-acid and nickel-cadmium battery systems that are ~~designed in accordance with IEEE C2,~~ used for dc power for control of substations and control or safe shutdown of generating stations under the exclusive control of the electric utility, and located outdoors or in building spaces used exclusively for such installations shall be allowed to use the process control system to monitor the smoke or radiant energy–sensing fire detectors required in Section 1207.5.4.

~~IEEEC2-2017National Electrical Safety Code(R) (NESC(R))~~

Committee Reason: This proposal was approved and modified based upon past actions on F138-21, F140-21, F141-21, F143-21 and F144-21. (Vote: 14-0)

F145-21

Individual Consideration Agenda

Public Comment 1:

IFC: 1207.5.4.1, IEEE (New)

Proponents: Steven Rosenstock, representing Edison Electric Institute (srosenstock@eei.org) requests As Modified by Public Comment

Further modify as follows:

2021 International Fire Code

1207.5.4.1 System status . Lead-acid and nickel-cadmium battery systems that are designed in accordance with IEEE C2,used for dc power for control of substations and control or safe shutdown of generating stations under the exclusive control of the electric utility, and located outdoors or in building spaces used exclusively for such installations shall be allowed to use the process control system to monitor the smoke or radiant energy–sensing fire detectors required in Section 1207.5.4.

IEEE

Institute of Electrical and Electronics Engineers Standards Association
445 Hoes Lane
Piscataway , NJ 08854

IEEE Institute of Electrical and Electronics Engineers .
National Electrical Safety Code(R) (NESC(R))

Commenter's Reason: The exception should apply to small and remote utility buildings as well as telecommunication buildings.
The language regarding IEEE C2 was in the original proposal that was vetted and approved by the FCAC.

IEEE C2 is available for use and will be updated next year.

Bibliography: IEEE C2-2017 - *2017 National Electrical Safety Code(R) (NESC(R))*, 2016, Institute of Electrical and Electronics Engineers, New York, NY
https://ieeexplore.ieee.org/document/7526279

Cost Impact: The net effect of the public comment and code change proposal will decrease the cost of construction
This will decrease costs for small and remote utility facilities.

Public Comment# 2699

F146-21

Proposed Change as Submitted

Proponents: Michael O'Brian, representing FCAC (fcac@iccsafe.org)

2021 International Fire Code

Revise as follows:

1207.5.5 Fire suppression systems. Rooms and areas within buildings and walk-in units containing electrochemical ESS shall be protected by an automatic fire suppression system designed and installed in accordance with one of the following:

1. ~~An~~Automatic sprinkler systems ~~system designed and installed in accordance with Section 903.3.1.1~~ for ESS units (groups) with a maximum stored energy capacity of 50 kWh, as described in Section 1207.5.1, shall be designed with a minimum density of 0.3 gpm/ft^2 (1.1 l/min) based ~~on the fire area~~ over the area of the room or 2500 ft^2 (232 m^2) design area, whichever is smaller, unless a lower density is approved based upon large-scale fire testing in accordance with Section 1207.1.5.
2. ~~Where *approved*, an *automatic sprinkler system* designed and installed in accordance with Section 903.3.1.1 with a sprinkler hazard classification~~ Automatic sprinkler systems for ESS units (groups) exceeding 50 kWh shall use a density based on large-scale fire testing complying with Section 1207.1.5.
3. The following alternative automatic fire-extinguishing systems designed and installed in accordance with Section 904, provided that the installation is *approved* by the *fire code official* based on large-scale fire testing complying with Section 1207.1.5:

   3.1. NFPA 12, *Standard on Carbon Dioxide Extinguishing Systems*.

   3.2. NFPA 15, *Standard for Water Spray Fixed Systems for Fire Protection*.

   3.3. NFPA 750, *Standard on Water Mist Fire Protection Systems*.

   3.4. NFPA 2001, *Standard on Clean Agent Fire-Extinguishing Systems*.

   3.5. NFPA 2010, *Standard for Fixed Aerosol Fire-Extinguishing Systems*.

~~Exception~~ Exceptions:

1. Fire suppression systems for lead-acid and nickel-cadmium battery systems at facilities under the exclusive control of communications utilities that operate at less than 50 VAC and 60 VDC shall be provided where required by NFPA 76.
2. Lead-acid and nickel cadmium systems that are designed in accordance with IEEE C2, used for dc power for control of substations and control or safe shutdown of generating stations under the exclusive control of the electric utility, and located outdoors or in building spaces used exclusively for such installations shall not be required to have a fire suppression system installed.
3. Lead-acid battery systems in uninterruptable power supplies listed and labeled in accordance with UL 1778, utilized for standby power applications, which is limited to not more than 10% of the floor area on the floor on which the ESS is located shall not be required to have a fire suppression system.

Add new standard(s) as follows:

IEEE

Institute of Electrical and Electronics Engineers Standards Association
445 Hoe Lane
Piscataway, NJ 08854
USA

IEEE Institute of Electrical and Electronics Engineers.
C2-2017 National Electrical Safety Code(R) (NESC(R))

UL

Underwriters Laboratories LLC
333 Pfingsten Road
Northbrook, IL 60062

1778-2014: Uninterruptible Power Systems with revisions through October 2017

Reason: This proposed change is consistent with NFPA 855, TIA Log #1486, and Sections 4.11.6 and 4.11.5. The new sprinkler density requirements were based, in part, on testing conducted by FM. The two exemptions for not requiring fire suppression for certain lead-acid and Ni-Cad battery systems used in electric utility and UPS applications were consistent with requirements in place prior to the 2018 IFC.
This proposal is submitted by the ICC Fire Code Action Committee (FCAC). The FCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance assigned International Codes with regard to fire and life safety in new and existing buildings and facilities as

well as the protection of life and property in wildland urban interface areas. In 2020 and 2021 the Fire-CAC held multiple virtual meetings that were open to any interested party. In addition, there were numerous virtual specific working group meetings that were also open to any interested parties, to develop, discuss and debate the proposed changes. Related documentation and reports are posted on the FCAC website at: https://www.iccsafe.org/products-and-services/i-codes/code-development/cs/fire-code-action-committee-fcac/

Cost Impact: The code change proposal will increase the cost of construction
This proposal may result in an increase in the cost of construction. Large scale UL 9540A fire testing may dictate larger sprinkler densities be provided. However, the two exceptions have the potential to reduce the cost of construction.

Staff Analysis: A review of the following standards proposed for inclusion in the code, with regard to some of the key ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before March 20, 2021.

- IEEE C2-2017, National Electrical Safety Code(R) (NESC(R))
- UL 1778-2014 - Uninterruptible Power Systems with revisions through October 2017

F146-21

Public Hearing Results

Committee Action: As Modified

Committee Modification:

1207.5.5 Fire suppression systems. Rooms and areas within buildings and walk-in units containing electrochemical ESS shall be protected by an automatic fire suppression system designed and installed in accordance with one of the following:

1. Automatic sprinkler systems for ESS units (groups) with a maximum stored energy capacity of 50 kWh, as described in Section 1207.5.1, shall be designed with a minimum density of 0.3 gpm/ft^2 (1.1 l/min) based over the area of the room or 2500 ft^2 (232 m^2) design area, whichever is smaller, unless a lower density is approved based upon large-scale fire testing in accordance with Section 1207.1.5.
2. Automatic sprinkler systems for ESS units (groups) exceeding 50 kWh shall use a density based on large-scale fire testing complying with Section 1207.1.5.
3. The following alternative automatic fire-extinguishing systems designed and installed in accordance with Section 904, provided that the installation is *approved* by the *fire code official* based on large-scale fire testing complying with Section 1207.1.5:

   3.1. NFPA 12, *Standard on Carbon Dioxide Extinguishing Systems*.

   3.2. NFPA 15, *Standard for Water Spray Fixed Systems for Fire Protection*.

   3.3. NFPA 750, *Standard on Water Mist Fire Protection Systems*.

   3.4. NFPA 2001, *Standard on Clean Agent Fire-Extinguishing Systems*.

   3.5. NFPA 2010, *Standard for Fixed Aerosol Fire-Extinguishing Systems*.

Exceptions:

1. Fire suppression systems for lead-acid and nickel-cadmium battery systems at facilities under the exclusive control of communications utilities that operate at less than 50 VAC and 60 VDC shall be provided where required by NFPA 76.
2. Lead-acid and nickel cadmium systems that are ~~designed in accordance with IEEE C2,~~ used for dc power for control of substations and control or safe shutdown of generating stations under the exclusive control of the electric utility, and located outdoors or in building spaces used exclusively for such installations shall not be required to have a fire suppression system installed.
3. Lead-acid battery systems in uninterruptable power supplies listed and labeled in accordance with UL 1778, utilized for standby power applications, which is limited to not more than 10% of the floor area on the floor on which the ESS is located shall not be required to have a fire suppression system.

Delete without substitution:
~~IEEEC2-2017 National Electrical Safety Code(R) (NESC(R))~~

Committee Reason: This proposal was approved and modified based upon past actions on F138-21, F140-21, F141-21, F143-21, F144-21 and F145-21. In addition, it provides the scoping of the criteria for automatic sprinkler protection and focuses on the specific room or area versus fire area. (Vote: 14-0)

Individual Consideration Agenda

Public Comment 1:

IFC: 1207.5.5

Proponents: Andrew Bevis, representing National Fire Sprinkler Association requests As Modified by Public Comment

Modify as follows:

2021 International Fire Code

1207.5.5 Fire suppression systems . Rooms and areas within buildings and walk-in units containing electrochemical ESS shall be protected by an automatic fire suppression system designed and installed in accordance with one of the following:

1. Automatic sprinkler systems, designed and installed in accordance with Section 903.3.1.1, for ESS units (groups) with a maximum stored energy capacity of 50 kWh, as described in Section 1207.5.1, shall be designed with a minimum density of 0.3 gpm/ft^2 (1.1 l/min) based over the area of the room or 2500 ft^2 (232 m^2) design area, whichever is smaller, unless a lower density is approved based upon large-scale fire testing in accordance with Section 1207.1.5.
2. Automatic sprinkler systems~~for~~ , designed and installed in accordance with Section 903.3.1.1, for ESS units (groups) exceeding 50 kWh shall use a density based on large-scale fire testing complying with Section 1207.1.5.
3. The following alternative automatic fire-extinguishing systems designed and installed in accordance with Section 904, provided that the installation is *approved* by the *fire code official* based on large-scale fire testing complying with Section 1207.1.5:

   3.1. NFPA 12, *Standard on Carbon Dioxide Extinguishing Systems*.

   3.2. NFPA 15, *Standard for Water Spray Fixed Systems for Fire Protection*.

   3.3. NFPA 750, *Standard on Water Mist Fire Protection Systems*.

   3.4. NFPA 2001, *Standard on Clean Agent Fire-Extinguishing Systems*.

   3.5. NFPA 2010, *Standard for Fixed Aerosol Fire-Extinguishing Systems*.

Exceptions:

1. Fire suppression systems for lead-acid and nickel-cadmium battery systems at facilities under the exclusive control of communications utilities that operate at less than 50 VAC and 60 VDC shall be provided where required by NFPA 76.
2. Lead-acid and nickel cadmium systems that are used for dc power for control of substations and control or safe shutdown of generating stations under the exclusive control of the electric utility, and located outdoors or in building spaces used exclusively for such installations shall not be required to have a fire suppression system installed.
3. Lead-acid battery systems in uninterruptable power supplies listed and labeled in accordance with UL 1778, utilized for standby power applications, which is limited to not more than 10% of the floor area on the floor on which the ESS is located shall not be required to have a fire suppression system.

Commenter's Reason: This pointer to NFPA 13 needs to be included into this proposal. This proposal leaves the user with the possibility to incorrectly interpret that remaining requirements of NPFA 13 would not apply and only the design densities are applicable. This mod was supported by the FCAC.

Cost Impact: The net effect of the public comment and code change proposal will not increase or decrease the cost of construction
This is simply a pointer to the remaining NFPA 13 requirements that are already required by the standard.

Public Comment# 2380

Public Comment 2:

IFC: 1207.5.5, IEEE (New)

Proponents: Steven Rosenstock, representing Edison Electric Institute (srosenstock@eei.org) requests As Modified by Public Comment

Further modify as follows:

2021 International Fire Code

1207.5.5 Fire suppression systems . Rooms and areas within buildings and walk-in units containing electrochemical ESS shall be protected by an automatic fire suppression system designed and installed in accordance with one of the following:

1. Automatic sprinkler systems for ESS units (groups) with a maximum stored energy capacity of 50 kWh, as described in Section 1207.5.1, shall be designed with a minimum density of 0.3 gpm/ft^2 (1.1 l/min) based over the area of the room or 2500 ft^2 (232 m^2) design area, whichever is smaller, unless a lower density is approved based upon large-scale fire testing in accordance with Section 1207.1.5.
2. Automatic sprinkler systems for ESS units (groups) exceeding 50 kWh shall use a density based on large-scale fire testing complying with Section 1207.1.5.
3. The following alternative automatic fire-extinguishing systems designed and installed in accordance with Section 904, provided that the installation is *approved* by the *fire code official* based on large-scale fire testing complying with Section 1207.1.5:

   3.1. NFPA 12, *Standard on Carbon Dioxide Extinguishing Systems*.

   3.2. NFPA 15, *Standard for Water Spray Fixed Systems for Fire Protection*.

   3.3. NFPA 750, *Standard on Water Mist Fire Protection Systems*.

   3.4. NFPA 2001, *Standard on Clean Agent Fire-Extinguishing Systems*.

   3.5. NFPA 2010, *Standard for Fixed Aerosol Fire-Extinguishing Systems*.

Exceptions:

1. Fire suppression systems for lead-acid and nickel-cadmium battery systems at facilities under the exclusive control of communications utilities that operate at less than 50 VAC and 60 VDC shall be provided where required by NFPA 76.
2. Lead-acid and nickel cadmium systems that are designed in accordance with IEEE C2, used for dc power for control of substations and control or safe shutdown of generating stations under the exclusive control of the electric utility, and located outdoors or in building spaces used exclusively for such installations shall not be required to have a fire suppression system installed.
3. Lead-acid battery systems in uninterruptable power supplies listed and labeled in accordance with UL 1778, utilized for standby power applications, which is limited to not more than 10% of the floor area on the floor on which the ESS is located shall not be required to have a fire suppression system.

IEEE

Institute of Electrical and Electronics Engineers Standards Association
445 Hoes Lane
Piscataway , NJ 08854

IEEE Institute of Electrical and Electronics Engineers .
National Electrical Safety Code(R) (NESC(R))

Commenter's Reason: This is the original language that was vetted and approved by the Fire Code Action Committee.
IEEE C2 is available for use, and will be updated again by next year.

Bibliography: IEEE C2-2017 - *2017 National Electrical Safety Code(R) (NESC(R))*, 2016, Institute of Electrical and Electronics Engineers, New York, NY
https://ieeexplore.ieee.org/document/7526279

Cost Impact: The net effect of the public comment and code change proposal will not increase or decrease the cost of construction
This provides another option for utility systems and does not impact the overall costs.

Public Comment# 2696

F150-21

Proposed Change as Submitted

Proponents: Richard Kluge, Ericsson Inc., representing Alliance for Telecommunications Industry Solutions (ATIS) (richard.kluge@ericsson.com)

2021 International Fire Code

Revise as follows:

1207.6.1.2.3 Supervision. Required mechanical exhaust ventilation systems shall be supervised ~~by an *approved* central station, proprietary or remote station service in accordance with NFPA 72, or~~ and shall initiate an audible and visible signal at an *approved* constantly attended ~~on-site~~ location.

1207.6.1.2.4 Gas detection system. Where required by Section 1207.6.1.2, rooms, areas and walk-in units containing ESS shall be protected by an *approved* continuous gas detection system that complies with Section 916 and with the following:

1. The gas detection system shall be designed to activate the mechanical ventilation system when the level of flammable gas in the room, area or walk-in unit exceeds 25 percent of the LFL.
2. The mechanical ventilation system shall remain on until the flammable gas detected is less than 25 percent of the LFL.
3. The gas detection system shall be provided with a minimum of 2 hours of standby power in accordance with Section 1203.2.5.
4. Failure of the gas detection system shall ~~annunciate a trouble signal at an *approved* central station, proprietary or remote station service in accordance with NFPA 72, or shall~~ initiate an audible and visible trouble signal at an *approved* constantly attended ~~on-site~~ location.

Reason: The requirements to “supervise mechanical exhaust ventilation and gas detection system operation at an approved central station, proprietary or remote station service in accordance with NFPA 72” is incongruent with other parts of the code and is not warranted by the safety record of traditional battery systems to which these code sections apply.

Compare these supervision requirements to those of *IFC Chapter 6: Building Services and Systems, Section 608 Mechanical Refrigeration, subsection 608.18.1 Ventilation system activation* which requires:

1. The detectors shall activate at or below a refrigerant concentration of 25 percent of the LFL.
2. Upon activation, the detection system shall activate the emergency ventilation system in Section 608.18.2.
3. The detection, signaling and control circuits shall be supervised.

While items 1 and 2 are consistent with the section on battery system ventilation and gas detection, item 3 is much more flexible as there is no requirement that operations be supervised by an approved central station, proprietary or remote station service.

Furthermore, *IFC Chapter 6004: Highly Toxic and Toxic Compressed Gases, Section 6004.2.2.10.1 Gas detection system alarms* specifies:

> The gas detection system shall initiate a local alarm and transmit a signal to a constantly attended control station when a short-term hazard condition is detected. The alarm shall be both audible and visible and shall provide warning both inside and outside the area where gas is detected. The audible alarm shall be distinct from all other alarms.

Once again, it is required the alarm be transmitted to a constantly attended location, but it is left to the user to decide if central station, proprietary or remote station service is warranted.

Meanwhile, *IFC Chapter 9: Fire Protection and Life Safety Systems* comes close to discouraging the use of fire alarm systems to monitor gas sensors and detectors. *Section 916 Gas Detection Systems, subsection 916.10 Fire alarm system connections* states:

> Gas sensors and gas detection systems shall not be connected to fire alarm systems unless approved and connected in accordance with the fire alarm equipment manufacturer’s instructions.

Section 1207.6.1.2 on ventilation of batteries used for energy storage is the only location in the code that dictates monitoring of mechanical ventilation and gas detection systems via central station, proprietary or remote station service. While the option for monitoring at a constantly attended on-site location is available in the current text, installations of many telecommunications network batteries are at normally unattended locations, so this option is not available.

A better approach is to permit a failure of the ventilation or gas detection system to initiate an audible and visible signal at any approved constantly attended location as proposed by the code change submittal. This would, as an example, allow for alarms from telecommunications facilities to be monitored and detected at a Network Operations Center or other proprietary alarm center, consistent with how similar alarms for refrigerant gases and toxic gases are treated in the code.

Also note that in the 100-year experience with the use of batteries as standby power within the telecommunications industry there is no history of explosions resulting from gas evolution within buildings as a result of failed ventilation or monitoring. Even on large battery plants, the generation rate of hydrogen gas is maintained well below the LFL by normal room ventilation specified for human occupancy. It is neither consistent with the code treatment of these types of systems nor justified by the scant loss record to mandate monitoring of these systems by any third-party.

Cost Impact: The code change proposal will decrease the cost of construction
Allowing for other alternatives for monitoring of mechanical ventilation and gas detection system operation will reduce the cost of code compliance.

F150-21

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The proposal is based upon a misunderstanding of the application of NFPA 72. Proprietary monitoring is allowed which would permit either onsite or off site supervision by the utilities or telecommunication companies. It was suggested that perhaps the reference to on-site location should be deleted based upon the confusion it adds with those terms. (Vote: 14-0)

F150-21

Individual Consideration Agenda

Public Comment 1:

IFC: 1207.6.1.2.3, 1207.6.1.2.4

Proponents: Richard Kluge, representing Alliance for Telecommunications Industry Solutions (ATIS) (richard.kluge@ericsson.com) requests As Modified by Public Comment

Replace as follows:

2021 International Fire Code

1207.6.1.2.3 Supervision . Required mechanical exhaust ventilation systems shall be supervised by an *approved* central station, proprietary or remote station service in accordance with NFPA 72, or shall initiate an audible and visible signal at an *approved* constantly attended ~~on-site~~ location.

1207.6.1.2.4 Gas detection system . Where required by Section 1207.6.1.2, rooms, areas and walk-in units containing ESS shall be protected by an *approved* continuous gas detection system that complies with Section 916 and with the following:

1. The gas detection system shall be designed to activate the mechanical ventilation system when the level of flammable gas in the room, area or walk-in unit exceeds 25 percent of the LFL.
2. The mechanical ventilation system shall remain on until the flammable gas detected is less than 25 percent of the LFL.
3. The gas detection system shall be provided with a minimum of 2 hours of standby power in accordance with Section 1203.2.5.
4. Failure of the gas detection system shall annunciate a trouble signal at an *approved* central station, proprietary or remote station service in accordance with NFPA 72, or shall initiate an audible and visible trouble signal at an *approved* constantly attended ~~on-site~~ location.

Commenter's Reason: It was suggested during discussion among the IFC Committee in CAH that the "on-site" limitation be removed as it adds confusion, potentially conflicting with the earlier designation that the alarm be monitored by an approved central station, proprietary or remote station service in accordance with NFPA 72.

There is no need for the ventilation or gas detection alarm to be monitored on-site. It may be safer to monitor off-site. The revised wording is more consistent with how similar alarms for refrigerant gases and toxic gases are currently treated in the IFC and is identical to the requirements of NFPA 855, Standard for the Installation of Stationary Energy Storage Systems. The AHJ should be able to approve any constantly attended monitoring location for these types of alarm, either on-site or off-site.

Cost Impact: The net effect of the public comment and code change proposal will not increase or decrease the cost of construction
No cost impact, only more options for the AHJ to approve monitoring.

Public Comment# 2776

F151-21

Proposed Change as Submitted

Proponents: Michael O'Brian, representing FCAC (fcac@iccsafe.org)

2021 International Fire Code

Revise as follows:

1207.6.3 Explosion control. Where required by Table 1207.6 or elsewhere in this code, explosion control complying with Section 911 shall be provided for rooms, areas, ESS cabinets or ESS walk-in units containing electrochemical ESS technologies.

Exceptions:

1. Where *approved*, explosion control is permitted to be waived by the *fire code official* based on large-scale fire testing complying with Section 1207.1.5 that demonstrates that flammable gases are not liberated from electrochemical ESS cells or modules ~~where tested in accordance with UL 9540A~~.
2. Where *approved*, explosion control is permitted to be waived by the *fire code official* based on documentation provided in accordance with Section 104.7 that demonstrates that the electrochemical ESS technology to be used does not have the potential to release flammable gas concentrations in excess of 25 percent of the LFL anywhere in the room, area, walk-in unit or structure under thermal runaway or other fault conditions.
3. Where approved, ESS cabinets that have no debris, shrapnel, or enclosure pieces ejected during large scale fire testing complying with Section 1207.1.5 shall be permitted in lieu of providing explosion control complying with Section 911.
4. Explosion control is not required for lead-acid and nickel cadmium battery systems less than 50 V ac, 60 V dc in telecommunication facilities under the exclusive control of communications utilities located in building spaces or walk-in units used exclusively for such installations.
5. Explosion control is not required for lead-acid and nickel cadmium systems designed in accordance with IEEE C2, used for dc power for control of substations and control or safe shutdown of generating stations under the exclusive control of the electric utility located in building spaces or walk-in units used exclusively for such installations.
6. Explosion control is not required for lead-acid battery systems in uninterruptable power supplies listed and labeled in accordance with UL 1778, utilized for standby power applications, and housed in a single cabinet in a single fire area in buildings or walk-in units.

Add new standard(s) as follows:

IEEE

Institute of Electrical and Electronics Engineers Standards Association
445 Hoe Lane
Piscataway, NJ 08854
USA

IEEE Institute of Electrical and Electronics Engineers.
C2-2017 National Electrical Safety Code

UL

Underwriters Laboratories LLC
333 Pfingsten Road
Northbrook, IL 60062

1778-2014 Uninterruptible Power Supply Systems with revisions through October 2017

Reason: This proposal accomplishes the following:
1. ESS Cabinets - Several large ESS cabinets containing lithium ion batteries are now being manufactured. This corrects an oversight for these units not requiring explosion control. In lieu of providing explosion control in accordance with Section 911 (e.g. NFPA 68 or 69) these ESS cabinets can be designed so that “no debris, shrapnel, or enclosure pieces are ejected” during large scale fire testing complying, which is terminology used in the unit level test acceptance criteria in UL 9540A. See item (3)

2. The reference to UL 9540A is being removed from exception 1 since it is covered by the reference to 1207.5.1.

3. Allows exemptions (4), (5), and (6) for lead-acid and Ni-Cad ESS at telecom, electric utility and UPS installations that are consistent with NFPA 855.

This proposal is submitted by the ICC Fire Code Action Committee (FCAC). The FCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance assigned International Codes with regard to fire and life safety in new and existing buildings and facilities as well as the protection of life and property in wildland urban interface areas. In 2020 and 2021 the Fire-CAC held multiple virtual meetings that were open to any interested party. In addition, there were numerous virtual specific working group meetings that were also open to any interested parties, to develop, discuss and debate the proposed changes. Related documentation and reports are posted on the FCAC website at: https://www.iccsafe.org/products-and-services/i-codes/code-development/cs/fire-code-action-committee-fcac/

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The proposal has the potential to increase the cost of construction It requires explosion control in ESS cabinets which was overlooked during the last code cycle. It can decrease the cost of construction for installations covered by (4), (5) and (6).

Staff Analysis: A review of the following standards proposed for inclusion in the code, with regard to some of the key ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before March 20, 2021.

- IEEE C2-2017, National Electrical Safety Code(R) (NESC(R))
- UL 1778-2014 - Uninterruptible Power Systems with revisions through October 2017

F151-21

Public Hearing Results

Committee Action: **As Modified**

Committee Modification:

1207.6.3 Explosion control. Where required by Table 1207.6 or elsewhere in this code, explosion control complying with Section 911 shall be provided for rooms, areas ,ESS cabinets or ESS walk-in units containing electrochemical ESS technologies.

Exceptions:

1. Where *approved*, explosion control is permitted to be waived by the *fire code official* based on large-scale fire testing complying with Section 1207.1.5 that demonstrates that flammable gases are not liberated from electrochemical ESS cells or modules .
2. Where *approved*, explosion control is permitted to be waived by the *fire code official* based on documentation provided in accordance with Section 104.7 that demonstrates that the electrochemical ESS technology to be used does not have the potential to release flammable gas concentrations in excess of 25 percent of the LFL anywhere in the room, area, walk-in unit or structure under thermal runaway or other fault conditions.
3. Where approved, ESS cabinets that have no debris, shrapnel, or enclosure pieces ejected during large scale fire testing complying with Section 1207.1.5 shall be permitted in lieu of providing explosion control complying with Section 911.
4. Explosion control is not required for lead-acid and nickel cadmium battery systems less than 50 V ac, 60 V dc in telecommunication facilities under the exclusive control of communications utilities located in building spaces or walk-in units used exclusively for such installations.
5. Explosion control is not required for lead-acid and nickel cadmium systems ~~designed in accordance with IEEE C2,~~ used for dc power for control of substations and control or safe shutdown of generating stations under the exclusive control of the electric utility located in building spaces or walk-in units used exclusively for such installations.
6. Explosion control is not required for lead-acid battery systems in uninterruptable power supplies listed and labeled in accordance with UL 1778, utilized for standby power applications, and housed in a single cabinet in a single fire area in buildings or walk-in units.

~~IEEEC2-2017 National Electrical Safety Code~~

Committee Reason: This proposal was approved and modified based upon past actions on F138-21, F140-21, F141-21, F143-21, F144-21, F145-21 and F146-21. (Vote: 14-0)

F151-21

Individual Consideration Agenda

Public Comment 1:

IFC: 1207.6.3, IEEE (New)

Proponents: Steven Rosenstock, representing Edison Electric Institute (srosenstock@eei.org) requests As Modified by Public Comment

Further modify as follows:

2021 International Fire Code

1207.6.3 Explosion control . Where required by Table 1207.6 or elsewhere in this code, explosion control complying with Section 911 shall be provided for rooms, areas, ESS cabinets or ESS walk-in units containing electrochemical ESS technologies.

Exceptions:

1. Where *approved*, explosion control is permitted to be waived by the *fire code official* based on large-scale fire testing complying with Section 1207.1.5 that demonstrates that flammable gases are not liberated from electrochemical ESS cells or modules.
2. Where *approved*, explosion control is permitted to be waived by the *fire code official* based on documentation provided in accordance with Section 104.7 that demonstrates that the electrochemical ESS technology to be used does not have the potential to release flammable gas concentrations in excess of 25 percent of the LFL anywhere in the room, area, walk-in unit or structure under thermal runaway or other fault conditions.
3. Where approved, ESS cabinets that have no debris, shrapnel, or enclosure pieces ejected during large scale fire testing complying with Section 1207.1.5 shall be permitted in lieu of providing explosion control complying with Section 911.
4. Explosion control is not required for lead-acid and nickel cadmium battery systems less than 50 V ac, 60 V dc in telecommunication facilities under the exclusive control of communications utilities located in building spaces or walk-in units used exclusively for such installations.
5. Explosion control is not required for lead-acid and nickel cadmium systems <u>designed in accordance with IEEE C2,</u>used for dc power for control of substations and control or safe shutdown of generating stations under the exclusive control of the electric utility located in building spaces or walk-in units used exclusively for such installations.
6. Explosion control is not required for lead-acid battery systems in uninterruptable power supplies listed and labeled in accordance with UL 1778, utilized for standby power applications, and housed in a single cabinet in a single fire area in buildings or walk-in units.

<u>IEEE</u>

<u>Institute of Electrical and Electronics Engineers Standards Association</u>
<u>445 Hoes Lane</u>
<u>Piscataway</u> , <u>NJ 08854</u>

<u>IEEE Institute of Electrical and Electronics Engineers</u> .
<u>National Electrical Safety Code(R) (NESC(R))</u>

Commenter's Reason: This was the original proposal vetted and approved by the FCAC.
IEEE C2 is available for use and will be updated next year.

Bibliography: IEEE C2-2017 - *2017 National Electrical Safety Code(R) (NESC(R))*, 2016, Institute of Electrical and Electronics Engineers, New York, NY
https://ieeexplore.ieee.org/document/7526279

Cost Impact: The net effect of the public comment and code change proposal will not increase or decrease the cost of construction
This will provide another option for utility applications.

Public Comment# 2743

F153-21

Proposed Change as Submitted

Proponents: Michael O'Brian, representing FCAC (fcac@iccsafe.org)

2021 International Fire Code

Revise as follows:

1207.1 General. The provisions in this section are applicable to stationary and mobile electrical energy storage systems (ESS).

Exception: ESS in Group R-3 and R-4 occupancies shall only be required to comply with Section 1207.11 except where Section 1207.11.4 requires compliance with Sections 1207.1 through 1207.9.

1207.11 ESS in Group R-3 and R-4 occupancies. ESS in Group R-3 and R-4 occupancies shall be~~installed and maintained~~ in accordance with Sections 1207.11.1 through 1207.11.9. ~~The temporary use of an *owner* or occupant's electric-powered vehicle as an ESS shall be in accordance with Section 1207.11.10.~~

Exceptions:

1. ESS listed and labeled in accordance with UL 9540 and marked “For use in residential dwelling units”, where installed in accordance with the manufacturer’s instructions and NFPA 70.
2. ESS rated less than 1 kWh (3.6 megajoules).

1207.11.1 Equipment listings. ESS shall be*listed* and *labeled* in accordance with UL 9540. ~~ESS *listed* and *labeled* solely for utility or commercial use shall not be used for residential applications.~~

~~**Exceptions:**~~

1. ~~Where *approved*, repurposed unlisted battery systems from electric vehicles are allowed to be installed outdoors or in detached dedicated cabinets located not less than 5 feet (1524 mm) from exterior walls, property lines and public ways.~~
2. ~~ESS less than 1 kWh (3.6 megajoules).~~

1207.11.2 Installation. ESS shall be installed in accordance with the manufacturer's instructions and their listing.

1207.11.2.1 Spacing. Individual ESS units shall be separated from each other by at least 3 feet (914 mm) ~~of spacing unless~~ except where smaller separation distances are documented to be adequate based on large-scale fire testing complying with Section 1207.1.5.

1207.11.3 Location. ESS shall be installed only in the following locations:

1. Detached garages and detached accessory structures.
2. Attached garages separated from the *dwelling unit* living space and *sleeping units* in accordance with Section 406.3.2 of the *International Building Code*.
3. Outdoors or on the exterior side of exterior walls located a minimum of 3 feet (914 mm) from doors and windows directly entering the dwelling unit.
4. Enclosed Utility closets, basements, ~~and~~ storage or utility spaces within *dwelling units* and *sleeping units* with finished or noncombustible walls and ceilings. Walls and ceilings of unfinished wood-framed construction shall be provided with not less than 5/8 in. Type X gypsum wallboard.

ESS shall not be installed in sleeping rooms, or closets or spaces opening directly into sleeping rooms.

1207.11.4 Energy ratings. Individual ESS units shall have a maximum rating of 20 kWh. The aggregate rating of the ESS ~~structure~~ shall not exceed:

1. 40 kWh within utility closets, basements, and storage or utility spaces.
2. 80 kWh in attached or detached garages and detached accessory structures.
3. 80 kWh on exterior walls.
4. 80 kWh outdoors on the ground.

ESS installations exceeding the permitted individual or aggregate ratings shall be installed in accordance with Section 1207.1 through 1207.9.

1207.11.5 Electrical installation. ESS shall be installed in accordance with NFPA 70. Inverters shall be *listed* and *labeled* in accordance with UL

1741 or provided as part of the UL 9540 listing. Systems connected to the utility grid shall use inverters *listed* for utility interaction.

1207.11.6 Fire detection. Rooms and areas within *dwellings units*, *sleeping units, basements* and attached garages in which ESS are installed shall be protected by smoke alarms in accordance with Section 907.2.11. A *heat detector listed* and interconnected to the smoke alarms shall be installed in locations within *dwelling units*, *sleeping units* and attached garages where smoke alarms cannot be installed based on their listing.

1207.11.7 Protection from impact. ~~Stationary storage battery systems~~ ESS installed in a location subject to vehicle damage shall be protected by *approved* barriers. ~~Appliances in garages shall also be installed in accordance with Section 304.3 of the *International Mechanical Code*.~~

1207.11.8 Ventilation. Indoor installations of ESS that include batteries that produce hydrogen or other flammable gases during charging shall be provided with exhaust ventilation in accordance with Section 304.5 of the *International Mechanical Code* ~~1207.6.1~~.

Delete without substitution:

~~**1207.11.9 Toxic and highly toxic gas.** ESS that have the potential to release toxic or highly toxic gas during charging, discharging and normal use conditions shall not be installed within Group R-3 or R-4 occupancies.~~

Revise as follows:

~~**1207.11.10**~~ **1207.11.9 Electric vehicle use.** The temporary use of an *owner* or occupant's electric-powered vehicle to power a *dwelling unit* or *sleeping unit* while parked in an attached or detached garage or outdoors ~~outside~~ shall comply with the vehicle manufacturer's instructions and NFPA 70.

Reason: Significant changes were made when the ESS requirements were updated in the 2021 International Residential Code. Those changes are also being introduced into the next edition of the NFPA 855 Stationary Energy Storage system standard. This update includes requirements that are essentially identical to the 2021 IRC, with the following two exceptions.

1. In section 1207.11.1 an exception was removed that allowed, where approved, repurposed unlisted battery systems from electric vehicles are allowed to be installed outdoors or in detached dedicated cabinets located not less than 5 feet (1524 mm) from exterior walls, property lines and public ways. This type of installation is not common, and there are concerns with the overall safety of these unlisted systems. This was also not allowed in NFPA 855.
2. There has been considerable discussion about whether ESS should be allowed in certain rooms and spaces within the dwelling unit. Item 4 to Section 1207.11.3 provides more requirements for protection of walls and ceilings where located in utility closets, basements and storage or utility spaces.

The footnote to 1207.1 was revised to clarify that ESS in Group R-3 and R-4 occupancies only have to comply with section 1207.11, except when larger systems that exceed the energy capacity limits of Section 1207.11.4. Those larger system must comply with the requirements that apply to commercial ESS installations, which is also in the 2021 IRC.

This proposal is submitted by the ICC Fire Code Action Committee (FCAC). The FCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance assigned International Codes with regard to fire and life safety in new and existing buildings and facilities as well as the protection of life and property in wildland urban interface areas. In 2020 and 2021 the Fire-CAC held multiple virtual meetings that were open to any interested party. In addition, there were numerous virtual specific working group meetings that were also open to any interested parties, to develop, discuss and debate the proposed changes. Related documentation and reports are posted on the FCAC website at: https://www.iccsafe.org/products-and-services/i-codes/code-development/cs/fire-code-action-committee-fcac/

Cost Impact: The code change proposal will increase the cost of construction
This proposal has the potential to increase the cost of construction due to the eliminations of exceptions and possible limitations on locations of ESS.

F153-21

Public Hearing Results

Committee Action: **As Submitted**

Committee Reason: This proposal was approved as it aligns with the IRC provisions. There was some concern on Item 4 of Section 1207.11.3 regarding the need for approval from the Fire Code Official. However that was not seen as necessary by the committee and had been heavily discussed with a collaborative effort between enforcement officials and industry. (Vote: 13-0)

F153-21

Individual Consideration Agenda

Public Comment 1:

IFC: 1207.11.3

Proponents: Joshua Costello, representing County of Los Angeles Fire Department (joshua.costello@fire.lacounty.gov) requests As Modified by Public Comment

Modify as follows:

2021 International Fire Code

1207.11.3 Location. ESS shall be installed only in the following locations:

1. Detached garages and detached accessory structures.
2. Attached garages separated from the *dwelling unit* living space and *sleeping units* in accordance with Section 406.3.2 of the *International Building Code*.
3. Outdoors or on the exterior side of exterior walls located a minimum of 3 feet (914 mm) from doors and windows directly entering the dwelling unit.
4. Enclosed Utility closets, basements, storage or utility spaces within *dwelling units* and *sleeping units* with finished or noncombustible walls and ceilings <u>where the UL 9540A test data establishes that the concentration of flammable gas does not exceed 25% LFL in air for the applicable compartment installation size</u>. Walls and ceilings of unfinished wood-framed construction shall be provided with not less than 5/8 in. Type X gypsum wallboard.

ESS shall not be installed in sleeping rooms, or closets or spaces opening directly into sleeping rooms.

Commenter's Reason: The **language being added by this public comment** (which is only to Section 1207.11.3 of F153-21) **is to <u>alert the code official of what is already required to be reviewed</u> for the locations in option #4**.
It is <u>extremely misleading</u> <u>to the code official</u> **<u>to omit the condition that</u> the code official must first investigate/confirm that the UL 9540A test data (for the *specific* ESS model being considered for *indoor residential* installation)** establishes that the concentration of flammable gas does not exceed 25% LFL in air for the applicable compartment installation size.

Without doing so sets the occupants and first responders up for explosion and asphyxiation hazards. **<u>Not all ESS are created equally, even listed ESS</u>**. These performance criteria (see excerpts from **UL 9540, UL 9540A, and NFPA**, below) are in place for a reason, but if those responsible for enforcing them are misled into ignoring them, then they serve no purpose. **In our review of <u>manufacturers' installation manuals and other materials</u> readily available for indoor residential ESS, <u>we find no mention of minimum installation compartment size data</u>, despite the fact that UL 9540/UL 9540A requires it as a condition of installation/approval**. Each specific ESS model needs to be considered separately based upon its individual test data on the gas it produces during the performance tests that the IFC currently requires.

<u>An ESS that is capable of significant thermal runaway (as shown by the gas-generation data of its UL 9540A tests) should not be allowed to be bolted within a residential dwelling/sleeping unit, for the following reasons</u>:

• It is **<u>well documented</u> that ESS chemistries (which vary from manufacturer to manufacturer) have the <u>potential for thermal runaway</u>, which is largely <u>the very reason for the code-referenced performance standards</u>.** <u>Causes of thermal runaway</u> can include internal fault (such as from poor quality control during manufacture, overcharging, over-discharging, battery management software/firmware error, or simply **<u>degradation due to age</u>**) or damage from an external impact, exposure to fire, etc. <u>Land, air, and marine transport</u> of lithium-ion batteries of all types are extremely regulated and restricted for these very reasons, even for brand-new batteries (see references below).

• **Residential ESS will age, will not always be maintained,** contain an exponentially larger amount of potential energy than batteries we carry on ourselves, and **are bolted within a structure, and in the case of location option #4, immediately adjacent to sleeping rooms/areas**. This is not only an explosion and asphyxiation hazard, as presented above, but **<u>also a problem for fire fighters attempting to control any incident involving thermal runaway of an ESS</u>**:

- **The chemical reaction of lithium-ion thermal runaway within a cell or cells cannot be stopped, only slowed, such as by cooling.** The reaction continues until all fuel (lithium salts in this case) is consumed, even if it was temporarily slowed below the level of detection.
- **The cells are not accessible to fire fighters who are trying to cool them:**
  - The involved cells are located behind the outer skin of the ESS unit
  - In this case, the ESS units are bolted within an enclosed space in the interior of a residential dwelling.
  - **Hose stream application will be greatly encumbered** by the above, causing the need for **greater amounts of water** to be poured into the structure, and over **an extended period of time causing more and more damage** to the structure.
  - **Fire fighters are not equipped with the ability to remove an involved ESS from a structure:** it is an electrocution hazard as it stores electricity, and even more so because it is damaged. Disconnecting wires to/from the ESS changes neither the thermal runaway

chemical reaction that has already begun, nor the electricity it already stores. **The electrocution hazard of a damaged ESS remains even after the damaged cells have finished their thermal runaway.** How does a fire department ensure that it is safe to relinquish control of an R-3 or R-4 structure back to the responsible party, or walk away at all, when a residence contains a damaged ESS that had shown signs of thermal runaway? **Cooling measures will temporarily slow the thermal runaway process to below the level of detection. Reignitions** have been documented of lithium-ion batteries, even in cars, **weeks later. Definitive action requires sustained submersion within a water bath**, preferably salt water.

We plan to submit a code change proposal in the Group B session in order to accomplish a **correlating change to the IRC**.

• UL and NFPA standards provide the basis for this public comment:

A) **Excerpts from UL 9540 (2020 Edition) – Energy Storage Systems and Equipment:**

***Accessed from: https://www.shopulstandards.com/ProductDetail.aspx?productId=UL9540**

23.2 Large scale fire testing23.2.1 **Electrochemical type ESS, including but not limited to capacitor and battery ESS, shall be subjected to large scale fire testing in accordance with UL 9540A as follows in (a) – (g).** See Appendix E for guidance on code limits related to separation distances and energy capacity.

a) Systems with increased energy capacities as required in codes and standards;

b) Indoor systems with decreased separation distances to adjacent ESS units, doors and windows, or to combustibles, non-combustibles, or limited combustibles. This includes building construction components (e.g. wall and ceilings) or any materials in the vicinity of the ESS. See 42.2;

c) Outdoor systems with decreased separation distances to adjacent units and to exposures. See 42.4;

d) Outdoor wall mounted systems with reduced separation distances;

e) Indoor wall mounted systems;

f) **Systems for installation in residential dwellings (where permitted)**; and

g) When an explosion analysis is required to confirm the installations location is safe.

B) **Excerpts from UL 9540A *(2019 Edition) - ANSI/CAN/UL Standard for Test Method for Evaluating Thermal Runaway Fire Propagation in Battery Energy Storage Systems:**
***Accessed from: https://www.shopulstandards.com/ProductDetail.aspx?productId=UL9540A**

4 Glossary

. . .

4.17 THERMAL RUNAWAY – The incident when an electrochemical cell increases its temperature through self-heating in an uncontrollable fashion. The thermal runaway progresses when the cell's generation of heat is at a higher rate than the heat it can dissipate. This may lead to fire, explosion and gas evolution.

. . .

1 Scope

1.1 The test methodology in this standard **determines the capability of a battery to undergo thermal runaway and then evaluates the fire and explosion hazard characteristics of those battery energy storage systems that have demonstrated a capability to undergo thermal runaway.**

1.2 The data generated will be used **to determine the fire and explosion protection required for an installation of a battery energy storage system** intended for installation, operation and maintenance in accordance with ICC IFC, NFPA 1, NFPA 70, IEEE C2, CAN/CSA C22.2 No. 0, and other codes affecting energy storage systems, and the manufacturer's installation instructions.

. . .

9 Unit Level

. . .

9.2 Test method – Indoor floor mounted BESS units

. . .

9.2.27 For residential use systems, **the gas collection data gathered in 9.2 shall be compared to the smallest room installation specified by the manufacturer to determine if the flammable gas collected exceeds 25% LFL in air.**

. . .

9.4 Test Method – Indoor wall mounted units

. . .

9.4.6 The gas collection methods shall be in accordance with Section 9.2. For residential use systems, **the gas collection data gathered in 9.2 shall be compared to the smallest room installation specified by the manufacturer to determine if the flammable gas collected exceeds 25% LFL in air.**

. . .

Table 9.1 - Unit Level Performance Criteria

[Excerpt of **residential** **indoor** **requirements** pertaining to **concentrations of flammable gas relative to the "smallest intended room installation size"**]

Table 9.1

Unit Level Performance Criteria

InstallationPerformance CriteriaNon-Residential Installations. . .. . .**Residential Installations**Indoor Floor Mounted. . .
e) The concentration of flammable gas does not exceed 25% LFL in air for the smallest specified room installation size.

. . .

Indoor Wall Mounted

. . .

e) The concentration of flammable gas does not exceed 25% LFL in air for the smallest specified room installation size.

. . .

C) **NFPA 855 (1st Draft Report Revision to the 2020 Edition; creates the 2023 Edition.) – Standard for the Installation of Energy Storage Systems:**

Chapter 15 One- and Two-Family Dwellings and Townhouse Units

15.1* General.

ESS installations with a rating of 1 kWh (3.6 MJ) or greater and associated with one- or two-family dwellings or townhouse units shall comply with the requirements of this chapter.

15.2 Equipment Listings.

15.2.1

ESS ~~1 kWh or greater in maximum stored energy~~ shall be listed and labeled in accordance with UL 9540.

. . .

~~15.6~~ 4 ~~Location~~ Locations.

15.~~6~~ 4.1

ESS shall only be installed in the following locations:

(1) In attached garages separated from the dwelling unit living area and sleeping units in accordance with the local building code

(2) In detached garages and detached accessory structures

(3) Outdoors on exterior walls or on the ground located a minimum of 3 ft (914 mm) from doors and windows directly entering the dwelling unit

(4) In enclosed utility closets and storage or utility spaces where approved by the AHJ

~~15.6.1.1~~15.4.2

If the room or space where the ESS is to be installed is not finished, the walls and ceiling of the room or space shall be protected with not less than $^5/_8$ in. Type X gypsum board.

~~15.6.2~~15.4.3

ESS shall not be installed in ~~living area of dwelling units~~ sleeping rooms, or in ~~sleeping units other than within utility~~ closets ~~and storage~~ or ~~utility~~ spaces opening directly into sleeping rooms.

Bibliography: Industries and standards (largely based upon 49 CFR 175.10(a)(18), for those involving transportation) recognize the risks that remain inherent in these technologies and heavily restrict their transportation.:

A) **Transportation:**

1) **Airlines:**

(a) https://www.faa.gov/hazmat/resources/lithium_batteries/media/Battery_incident_chart.pdf

(b) https://www.skybrary.aero/index.php/Lithium-Ion_Aircraft_Batteries_as_a_Smoke/Fire_Risk

(c) https://www.faa.gov/hazmat/packsafe/more_info/?hazmat=7

(d) https://www.faa.gov/news/fact_sheets/news_story.cfm?newsId=23054

(e) https://www.tsa.gov/travel/security-screening/whatcanibring/items/lithium-batteries-more-100-watt-hours

(f) https://www.alaskaair.com/content/travel-info/baggage/prohibited-items/spare-batteries-electronic-devices

(g) https://www.cnbc.com/2019/02/27/us-bars-lithium-batteries-as-cargo-on-passenger-aircraft.html

2) **Shipping/Freight:**

(a) The International Air Transport Association (IATA) 2021 Lithium Battery Guidance Document – Transport of Lithium Metal and Lithium Ion Batteries Revised for the 2021 Regulations (https://www.iata.org/contentassets/05e6d8742b0047259bf3a700bc9d42b9/lithium-battery-guidance-document-2021.pdf)

(b) https://www.maritime-executive.com/article/fire-aboard-cosco-boxship-caused-by-container-load-of-batteries

(c) https://www.maritimeprofessional.com/news/lithium-battery-fires-threat-container-360275

(d) https://www.ups.com/assets/resources/media/en_US/pack_ship_batteries.pdf

(i) “Other types of batteries, including lithium ion and lithium metal types, may be fully regulated as hazardous materials (also known as dangerous goods) for transportation, so that in addition to those basic safety precautions they require use of specialized packaging, specific hazard labeling, and specific documents certifying compliance with the applicable regulations.”

(ii) “Research has demonstrated that for lithium ion batteries, reduced SoC may provide an additional level of safety during transport and reduce the likelihood of a thermal event. In accordance with IATA, all lithium ion batteries (without equipment) shipped by air must not exceed 30% SoC.”

B) **Other:**

1) https://ulfirefightersafety.org/posts/four-firefighters-injured-in-lithium-ion-battery-energy-storage-system-explosion.html

2) https://www.aps.com/en/About/Our-Company/Newsroom/Articles/Equipment-failure-at-McMicken-Battery-Facility

3) https://docket.images.azcc.gov/E000007939.pdf

4) Pacific Northwest National Laboratory: https://www.pnnl.gov/news-media/pnnl-invention-reduces-risk-battery-explosions

5) https://www.nfpa.org/News-and-Research/Publications-and-media/NFPA-Journal/2020/January-February-2020/Features/EV-Stranded-Energy

Cost Impact: The net effect of the public comment and code change proposal will increase the cost of construction
The change by this public comment will not increase the cost of construction because it is merely alerting the code official of something that is already required: a condition on the approval of installation that is already required by what is already a referenced standard.

Public Comment# 2440

F154-21

Proposed Change as Submitted

Proponents: Larry Sherwood, on behalf of Sustainable Energy Action Committee, representing Interstate Renewable Energy Council (Larry@irecusa.org); Kevin Reinertson, Riverside County Fire Dept., representing California Fire Chiefs Association FPO (kevin.reinertson@fire.ca.gov); Benjamin Davis, CA Solar & Storage Association, representing CA Solar & Storage Association (ben@calssa.org); Joseph H. Cain, P.E., Solar Energy Industries Association (SEIA), representing SEIA (JoeCainPE@gmail.com)

2021 International Fire Code

Revise as follows:

1207.11.6 Fire detection. ESS installed in group R-3 and R-4 occupancies shall comply with the following:

1. Rooms and areas within *dwellings units*, *sleeping units* and attached garages in which ESS are installed shall be protected by smoke alarms in accordance with Section 907.2.11 ~~907.2.10~~.
2. A listed heat alarm ~~heat detector listed and interconnected to the smoke alarms~~ shall be installed in locations ~~within *dwelling units*, *sleeping units* and attached garages~~ where smoke alarms cannot be installed based on their listing.

Reason: The purpose of this proposal is to:

1. Divide the single paragraph into distinct parts for clarity, separating the charging language from the provisions to provide single-station or multi-station smoke alarms per the code.
2. Correct the section pointer to section 907.2.10 to the revised location in the 2021 IFC, 907.2.11.
3. Clarify the intent is to provide both heat detection and alarm annunciation in the ESS location through the use of listed heat alarms.

The term heat detector was replaced because the heat detectors do not include a local annunciator. A heat detector is only required to detect a heat event, and safety officials want an audible alarm.

The term interconnected is removed from this section as the requirements for interconnection are provided in section 907.2.11 of the code.

This proposal was prepared by the Sustainable Energy Action Committee (SEAC), a forum for all stakeholders (including, but not limited to, AHJs, designers, engineers, contractors, first responders, manufacturers, suppliers, utilities, and testing labs) to collaboratively identify and find solutions for issues that affect the installation and use of solar energy systems, energy storage systems, demand response, and energy efficiency. The purpose is to facilitate the deployment and use of affordable, clean and renewable energy in a safe, efficient, and sustainable manner.

All recommendations from SEAC are approved by diverse stakeholders through a consensus process.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal clarifies existing code language.

Staff Analysis: Note that the reference to Section 907.2.10 has been corrected by errata to Section 907.2.11 for the first printing of the 2021 IFC.

F154-21

Public Hearing Results

Committee Action: **As Submitted**

Committee Reason: This proposal was approved based upon the revision from "detector" to "alarm" which is more technically correct. The proponent is encouraged to address the issue of interconnection during public comment. (Vote: 11-3)

F154-21

Individual Consideration Agenda

Public Comment 1:

IFC: 1207.11.6

Proponents: Brad Fox, representing Santa Clara County Fire Department (brad.fox@sccfd.org) requests As Modified by Public Comment

Modify as follows:

2021 International Fire Code

1207.11.6 Fire detection . ESS installed in group R-3 and R-4 occupancies shall comply with the following:

1. Rooms and areas within *dwellings units*, *sleeping units* and attached garages in which ESS are installed shall be protected by smoke alarms in accordance with Section 907.2.11 .
2. A listed heat alarm or heat detector with annunciation shall be installed ~~in locations~~ and interconnected to dwelling unit smoke alarms where smoke alarms cannot be installed based on their listing.

Commenter's Reason: Heat alarms cannot be used in all applications. Current available heat alarms are ordinary temperature which activate at 135F, but their UL listing only allows ambient temperatures up to 100F or 115F. In many parts of the country unconditioned garage temperatures easily exceed these ratings during warmer months. Intermediate temperature heat detectors can be successfully installed with 120V power, interconnected to home smoke alarms, and provided with a local annunciator through a relay. I recommend giving manufacturers and installers more options, and ensuring an appropriately listed device is available for all installations.
The original reason provided to remove the term interconnected was a reference to interconnection provisions of 907.2.11. However 907.2.11 only references smoke alarms, and does not state interconnection requirements for a heat alarm/detector to smoke alarms. It will not be obvious to code users to make the connection between 1207.11.6 and smoke alarm requirements of 907.2.11. Stating the interconnection requirement to dwelling unit smoke alarms provides clarity of intent to code users.

Cost Impact: The net effect of the public comment and code change proposal will not increase or decrease the cost of construction
This public comment clarifies existing code language.

Public Comment# 2798

Public Comment 2:

IFC: 1207.11.6

Proponents: Kevin Scott, representing KH Scott & Associates LLC (khscottassoc@gmail.com) requests As Modified by Public Comment

Modify as follows:

2021 International Fire Code

1207.11.6 Fire detection . ESS installed in group R-3 and R-4 occupancies shall comply with the following:

1. Rooms and areas within *dwellings units*, *sleeping units* and attached garages in which ESS are installed shall be protected by smoke alarms in accordance with Section 907.2.11 .
2. A listed heat alarm shall be installed in locations where smoke alarms cannot be installed based on their listing. Heat alarms shall be interconnected to the smoke alarms in the structure.

Commenter's Reason: This Public Comment is designed to retain the language requiring interconnection of the heat alarms to the smoke alarms. This original proposal deleted this requirement with the reasoning that it was duplicative language since interconnection is already required in Section 907.2.11. However, Section 907.2.11 does not require heat alarms to be interconnected. Section 907.2.11.5 requires interconnection, but does apply to heat alarms; it is limited to smoke alarms. In fact, heat alarms are not even included in Section 907.2.11. Therefore, the basis for removing this requirement is not found in the code.

This Public Comment replaces the requirement for interconnection and ensures that interconnection of heat alarms to smoke alarms currently in the 2021 IFC is retained.

Cost Impact: The net effect of the public comment and code change proposal will not increase or decrease the cost of construction
This Public Comment does not impact the cost of construction, because the requirement is already in the 2021 IFC.

Public Comment# 2534

F155-21

Proposed Change as Submitted

Proponents: Larry Sherwood, on behalf of Sustainable Energy Action Committee, representing Interstate Renewable Energy Council (Larry@irecusa.org); Kevin Reinertson, Riverside County Fire Dept., representing California Fire Chiefs Association FPO (kevin.reinertson@fire.ca.gov); Benjamin Davis, CA Solar & Storage Association, representing CA Solar & Storage Association (ben@calssa.org); Joseph H. Cain, P.E., Solar Energy Industries Association (SEIA), representing SEIA (JoeCainPE@gmail.com)

2021 International Fire Code

Revise as follows:

1207.11.7 Protection from impact. ~~Stationary storage battery systems~~ ESS installed in a location subject to vehicle damage in accordance with ~~shall~~ Section 1207.11.7.1 or 1207.11.7.2 shall be provided with impact protection in accordance with Section 1207.11.7.3. ~~be protected by *approved* barriers. Appliances in garages shall also be installed in accordance with Section 304.3 of the *International Mechanical Code*.~~

Add new text as follows:

1207.11.7.1 Garages.
Where an ESS is installed in the normal driving path of vehicle travel within a garage, impact protection complying with Section 1207.11.3 shall be installed. The normal driving path is a line perpendicular to the garage vehicle opening to the back wall, extending 3 ft. (914 mm) to either side along the back wall and to a height of 48 in. (1219 mm), (See Figure 1207.11.7.1)

> **Exception:** Where the clear height of the vehicle garage opening is 7 ft 6 in, (2286 mm) or less, ESS installed not less than 36 inches (914 mm) above finished floor are not subject to vehicle impact protection requirements.

1207.11.7.2 Other locations subject to vehicle impact.
Where an ESS is installed in a location other than as defined in Section 1207.11.7.1, and is subject to vehicle damage, impact protection shall be provided in accordance with Section 1207.11.7.3.

1207.11.7.3 Impact Protection Options.
Where ESS is required to be protected from impact in accordance with Section 1207.11.7.1 or 1207.11.7.2 such protection shall comply with one of the following:

1. Bollards constructed in accordance with one of the following:
   - 1.1 48 inches (1219 mm) in length by 3 inches (76mm) in diameter schedule. 80 steel pipe embedded in a concrete pier 12 inches (304 mm) deep and 6 inches (152 mm) in diameter, with 36 inches (914 mm) of pipe exposed, filled with concrete, and spaced at a maximum interval of 5 feet (1524 mm). Each bollard shall be located not less than 6 inches (152 mm) from an ESS.
   - 1.2 36 inches (914 mm) in height by 3 inches (76 mm) in diameter schedule 80 steel pipe fully welded to an 8 inches (203 mm) by 8 inches (203 mm) by ¼ inch (6.4 mm) thick steel plate and bolted to a concrete floor by means of 4 - ½ inch (13 mm) concrete anchors with 3 inch (76 mm) minimum embedment. Spacing shall be not greater than 60 inches. (1524 mm), and each bollard shall be located not less than 6 inches (152 mm) from the ESS.
   - 1.3 Pre-manufactured steel pipe bollards shall be filled with concrete and anchored in accordance with the manufacturer's installation instructions, with spacing not greater than a 60 inches. (1524 mm). Located not less than 6 inches (152mm) from the ESS.
2. Wheel barriers constructed in accordance with one of the following:
   - 2.1. 6 inches (152 mm) in height by 6 inches (152 mm) in width wheel barrier made of concrete or polymer, anchored to the concrete floor not less than every 36 inches (914 mm) and located not less than 54 inches (1372 mm) from the ESS.. Minimum 2 - ½ inch (13 mm) diameter concrete anchors with 3 inch (76 mm) embedment per barrier shall be used. Spacing between barriers shall be no greater than 36 inches. (914 mm).
   - 2.2. Pre-manufactured wheel barriers shall be anchored in accordance with the manufacturers installation instructions.
3. Approved method designed to resist a 2000 lbf (8899 Newtons) impact in the direction of travel at 24 inches (608 mm) above grade.

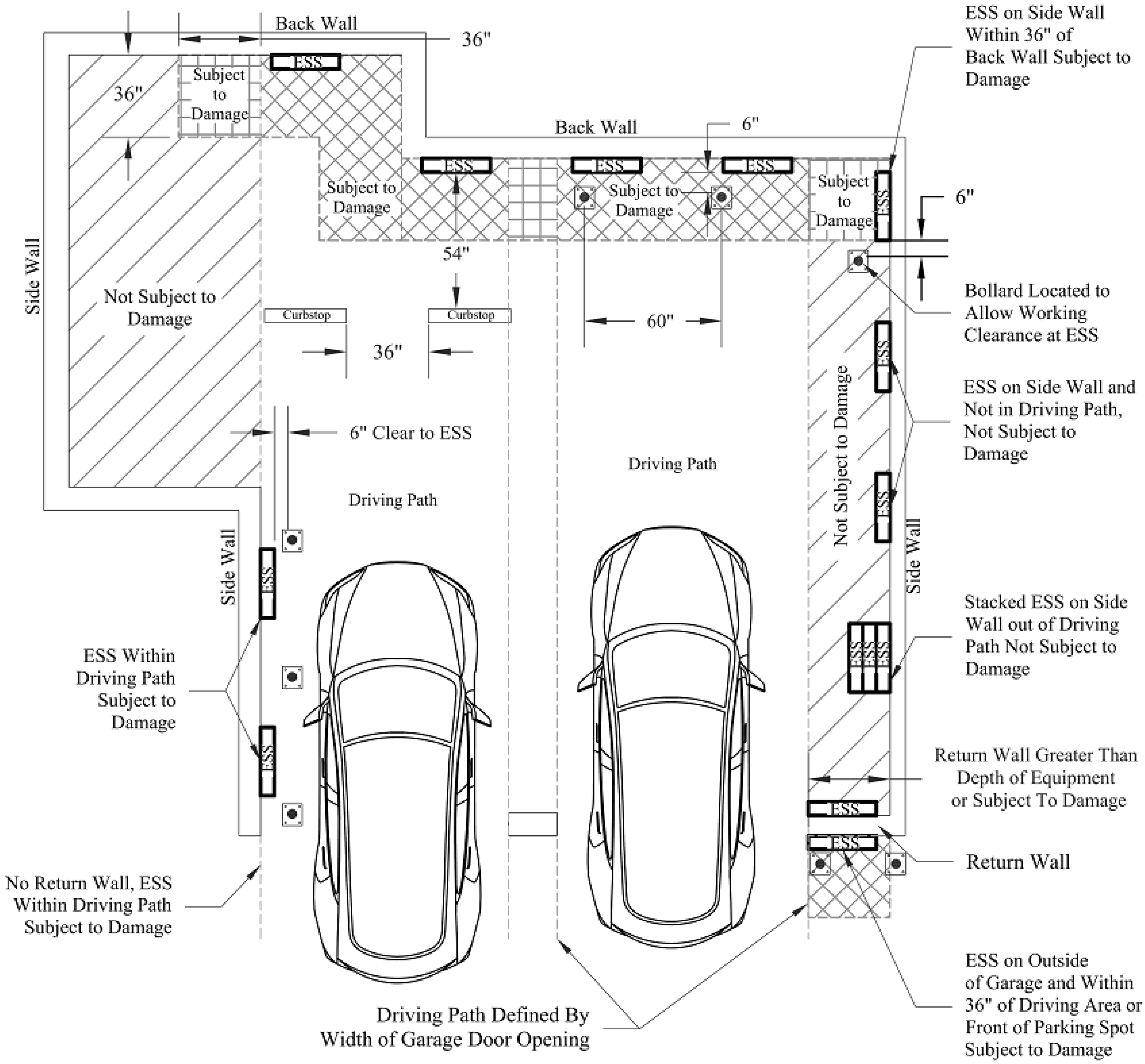


FIGURE 1207.11.7.1 ESS VEHICLE IMPACT PROTECTION

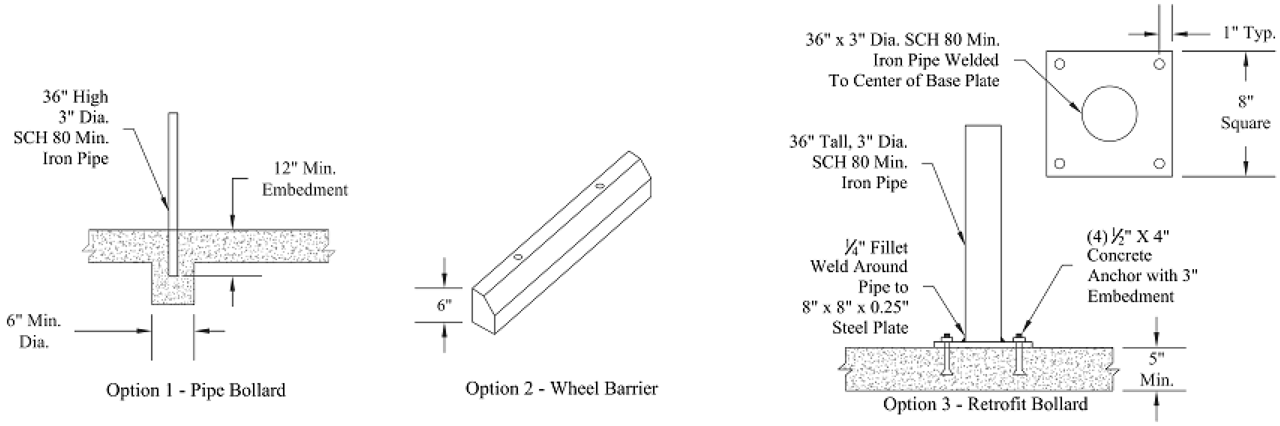


FIGURE 1207.11.7.3 IMPACT PROTECTION OPTIONS

Reason: Summary
First, a minor editorial change is needed to replace stationary storage battery system with ESS . This should have been part of a global change last cycle.

Second, the last sentence referring to appliances has been removed. Section 304.3 is related to the elevation of ignition sources not vehicle impact protection. The concern about raising ignition sources has historically been applied to fuel-fired appliances such as water heaters. These types of appliances are the only equipment able to be listed as flammable vapor ignition resistant. Even when a water heater has not been evaluated to ANSI Z21.10, only the actual ignition source needs to be elevated above 18", not the entire water heater. It's important to note that NFPA 70 does not consider the area below 18" a classified location in above-grade residential garages.

The third and most substantial change addresses the need for a clearly defined area in which a residential garage ESS installation would trigger the "Subject to Vehicle Damage" requirement found in 1207.11.7. The existing language has led to widely varying interpretations and enforcement of impact protection.

- **N**ew language (1207.11.1) has been added to define this area and set the expectation that the barriers are intended to deflect, resist, or visually deter an impact. This language mirrors the existing Section 312.3 in the IFC.
- A minimum installation height of 48" within the likely impact area has been added to allow elevation of the ESS as a permissible mitigation option. An exception to this 48" minimum has been included to recognize that a reduced garage opening height would thereby limit vehicle height and allow a lower placement of equipment before additional protection is needed. This exception is inspired by existing IMC Commentary:

"The height of the vehicle entry opening of the garage or carport can be used as a guide in determining how tall of a vehicle could be driven into the garage or carport"

- A new Figure 1207.11.7.1 has been added to illustrate the zones in which a typical residential garage ESS installation would trigger the need for impact protection. This figure is based on existing IMC commentary related to the installation of fuel-fired appliances that may pose a fire hazard when damaged. The IMC commentary Figure 304.6 (2) has been modified to reflect common ESS installation locations and takes a similar approach to mitigating the risk of impact.
- New language (1207.11.7.2) has been added to address other than garage locations that may also have vehicle access such as residential driveways, and also allows some flexibility to the AHJ and installer for larger, non-typical, or custom residential garages where the normal path of vehicle travel falls outside of the area defined in 1207.11.7.1.

Finally, the prescriptive barrier and post designs per IBC 1607.10 or IFC 312.2 may be appropriate for an energy storage system in a public access parking lot, garage, or other throughway. We are therefore not proposing any changes to 1207.4.5. However, the forces assumed in these sections are not representative of the impact scenarios expected in a private residential garage reserved for permanent occupants.
For example, the calculation in IBC 1607.8.3 results in approx. 12K lb-force applied to the anchorage, which causes readily available bollard to concrete connections to fail. This effectively eliminates the possibility of retrofitting a floor mounted bollard as a solution. Additionally, the posts described in IFC 312.2 can not be reasonably installed in an existing residential garage, and although uncommon especially those with tensioned concrete slabs. This leaves AHJs and installers with no guidelines for a retrofit bollard designed to deter vehicle operators from carelessly striking the ESS units. While IFC Section 312.3 does allow an alternative approach, designers, installers, and code officials will benefit from more explicit guidance within Section 1207.11. In new construction posts designed in accordance with Section 312 may be feasible, however it is unlikely that a homebuilder would be able to anticipate the installation of an ESS in a specific location in a garage. The proposed options for impact protection were inspired by existing IMC commentary figure 304.6(2). These options have been modified to provide a consistent amount of force resistance across the available choices, something teh IMC commentary does not do. These options more reasonably reflect the expected impact scenario described in the commentary text:

“The barriers shown in the commentary figure will not eliminate all possibility of a motor vehicle contacting the appliances but will offer a reasonable warning to a driver who is slowly navigating near the appliances”

And:

“Although this section does not specifically require the impact protection provided to stop any type of vehicle at any speed, the intent is for the impact protection to cause the driver to want to stop vehicle movement out of concern for damage that could be occurring. The choice of the type, structural capacity and the location of barriers is the responsibility of the designer.”

Between limiting the locations that ESS Batteries can be installed, and defining the requirements when impact protection is required, the result will be an improved level of protection from the risk of vehicle impacts, and damage mitigation if incidents do occur.

Technical Justification

An engineering review of the impact protection guidance found across the I-Codes and ASCE 7-16 was completed. Specifically Section 312 of both the prior and existing IFC, Section 4.5.3 of ASCE 7-16, and commentary language and figures associated with Section 304.6 of the IMC.

It is important to recognize that the prescription of the IFC Section 312 for bollards in public driving areas does not lead to a bollard that will resist 12k lbs. as prior editions of the code suggested.. In actual testing ((Harrison (SwRI), Evaluation of collision protection provided by vehicle impact bollards and propane cylinder exchange cabinets 2013)) the static resistance was between 900 lbs. at 36” (2.7k lbs. reaction) and 11k lbs. at 36” (33k lbs. reaction).

ASCE 7-16 specifies vehicle barrier systems must resist 6k lbs. load at between 18” and 27” (9k to 13.5k lbs. reaction) There are no commonly available retrofittable bollards that can do this in an average residential garage without adding thickness to the concrete.

The IMC commentary figure when back calculated sets a bar of physical resistance which seems more appropriate to this risk and allows for solutions that are more practical to apply. For example, the bollard shown in IMC commentary Figure 304.6(2) will take an impact of about 625 lbs. load applied at 24", resulting in a 1250 lb reaction force at the post to base plate connection. Likely outcomes based on this force include:

- No damage at 0.5 mph impact from an average passenger car.
- Bollard would deflect permanently a few inches at a 2 mph collision speed
- Anchor bolts would shear off or blowout at a 5 mph collision speed.

The limitation is mostly the concrete to base plate connection. The IRC requires a 2500-3000 psi mix for garages, and garages are often of stronger mix, especially in freeze prone areas. The average garage concrete slab will fall within these specifications: 2500 - 4000 psi concrete with 5" min thickness. Using 1/2" epoxy anchors this equates to roughly a 2mph impact that could be sustained without significant damage to the bollard. This is aligned with a standard Uline 4.5" bollard with 1/8" wall thickness and a 8x8x3/8" base plate. More strength requires a larger base plate, as the limitation is the connection to the concrete.

The bolt down bollard specified in this proposal will take a 2000 lb impact, 24" off the ground with no damage, given 3000 psi concrete. More than 6" of permanent deflection would require a very significant force, and then only touching the face of the ESS. This seems a reasonable level of protection, and clearance distance.

This proposal was prepared by the Sustainable Energy Action Committee (SEAC), a forum for all stakeholders (including, but not limited to, AHJs, designers, engineers, contractors, first responders, manufacturers, suppliers, utilities, and testing labs) to collaboratively identify and find solutions for issues that affect the installation and use of solar energy systems, energy storage systems, demand response, and energy efficiency. The purpose is to facilitate the deployment and use of affordable, clean and renewable energy in a safe, efficient, and sustainable manner.

All recommendations from SEAC are approved by diverse stakeholders through a consensus process.

Bibliography:
Harrison, O. (2013). Evaluation of Collision Protection provided by vehicle impact bollards and propane cylinder exchange cabinets (Rep. No. 18.19083.01.107.FR1). Southwest Research Institute.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal clarifies and gives more technical rigor to the requirements.

Public Hearing Results

Committee Action: **As Submitted**

Committee Reason: This proposal provides much needed options for impact protection. There was some concern that the solutions provided are still too costly. (Vote: 12-2)

Individual Consideration Agenda

Public Comment 1:

IFC: 1207.11.7.1, FIGURE 1207.11.7.1, 1207.11.7.3, FIGURE 1207.11.7.3

Proponents: Larry Sherwood, representing Interstate Renewable Energy Council (larry@irecusa.org); Kevin Reinertson, representing California Fire Chiefs Association FPO (kevin.reinertson@fire.ca.gov) requests As Modified by Public Comment

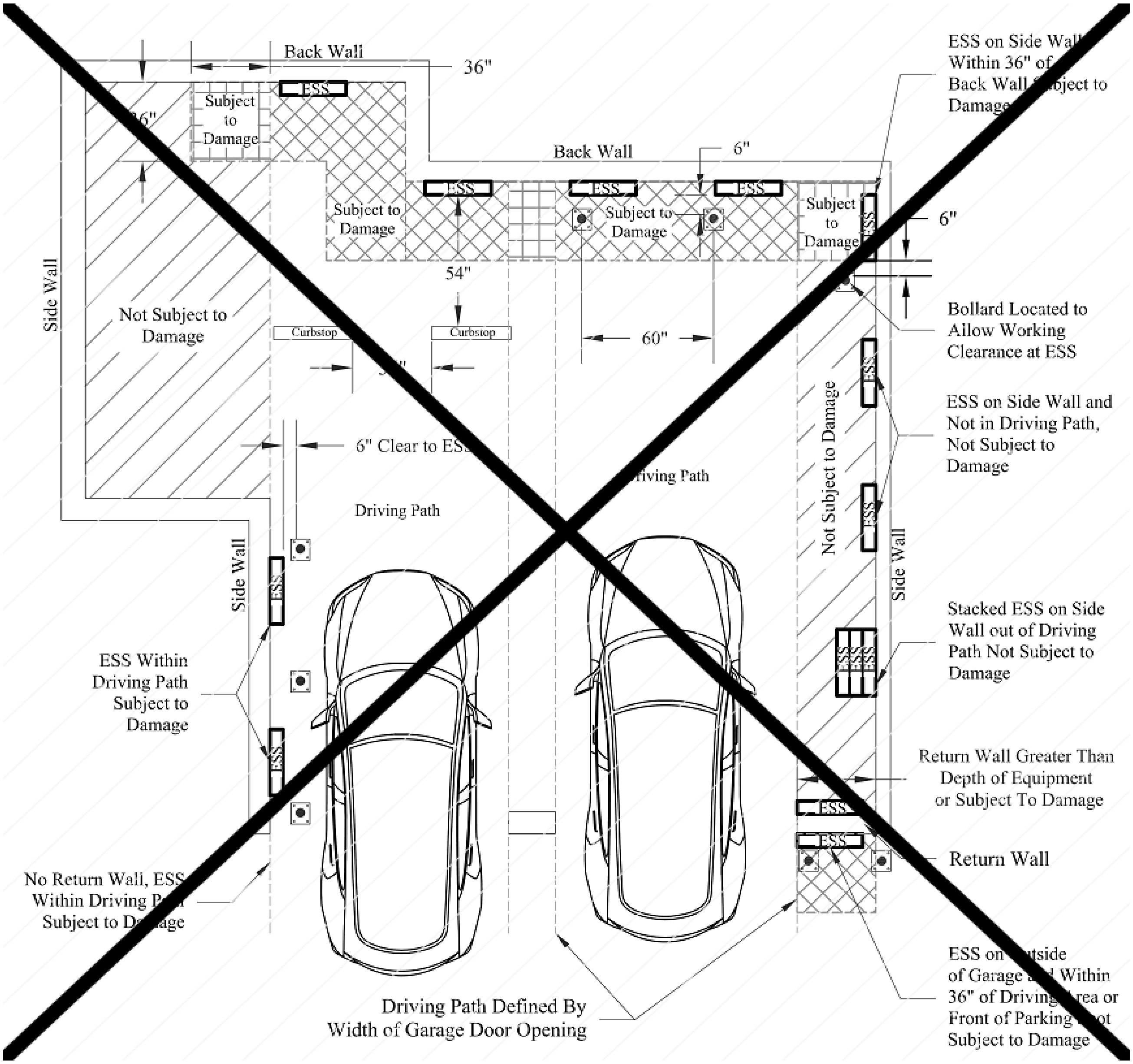
Modify as follows:

2021 International Fire Code

1207.11.7.1 Garages . Where an ESS is installed in the normal driving path of vehicle travel within a garage, impact protection complying with Section 1207.11.3 shall be provided ~~installed~~. The normal driving path is a space ~~line perpendicular to~~ between the garage vehicle opening ~~to~~ and the interior face of the back wall~~, extending 3 ft. (914 mm) to either side along the back wall and~~ to a height of 48 in. (1219 mm) above the finished floor. The width of the normal driving path shall be equal to the width of the garage door opening. Impact protection shall also be provided for an ESS installed at either of the following locations (See Figure 1207.11.7.1):

1. On the interior face of the back wall and located within 36” to the left or to the right of the normal driving path.
2. On the interior face of a side wall and located within 24 inches from the back wall and 36 inches of the normal driving path.

Exception: Where the clear height of the vehicle garage opening is 7 ft 6 in, (2286 mm) or less, ESS installed not less than 36 inches (914 mm) above finished floor are not subject to vehicle impact protection requirements.



~~**FIGURE 1207.11.7.1 ESS VEHICLE IMPACT PROTECTION**~~

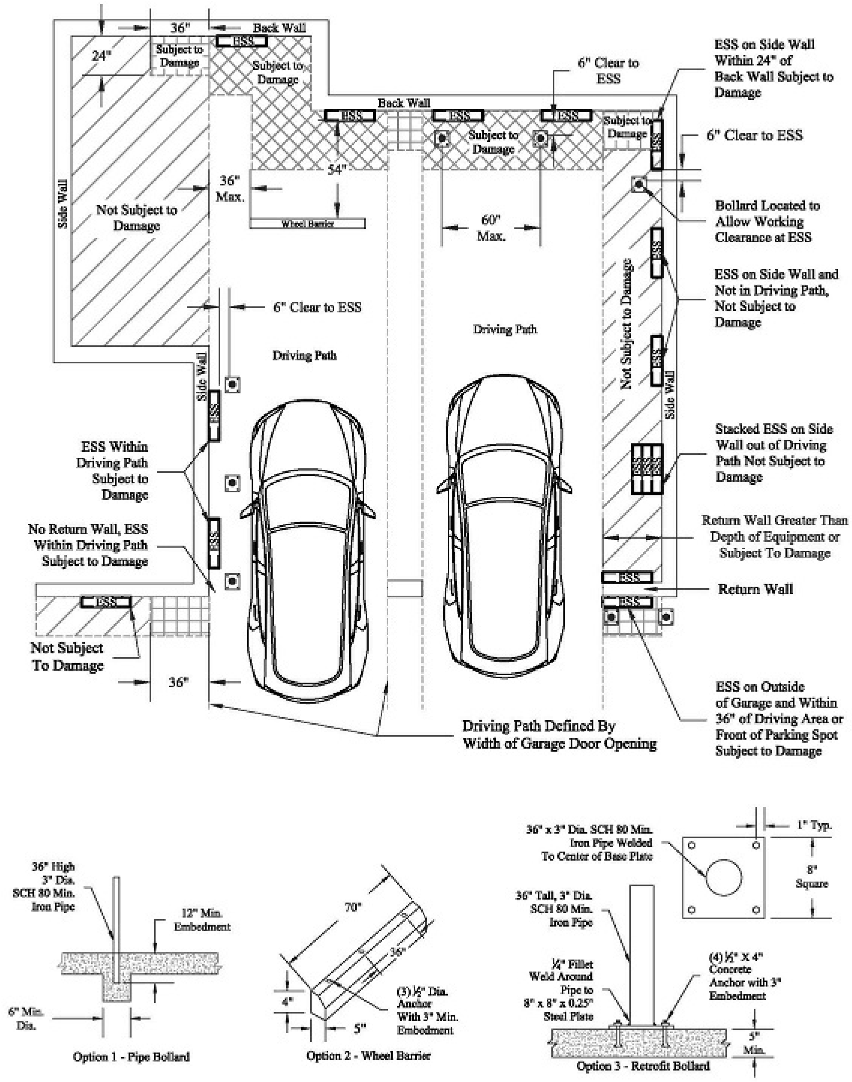


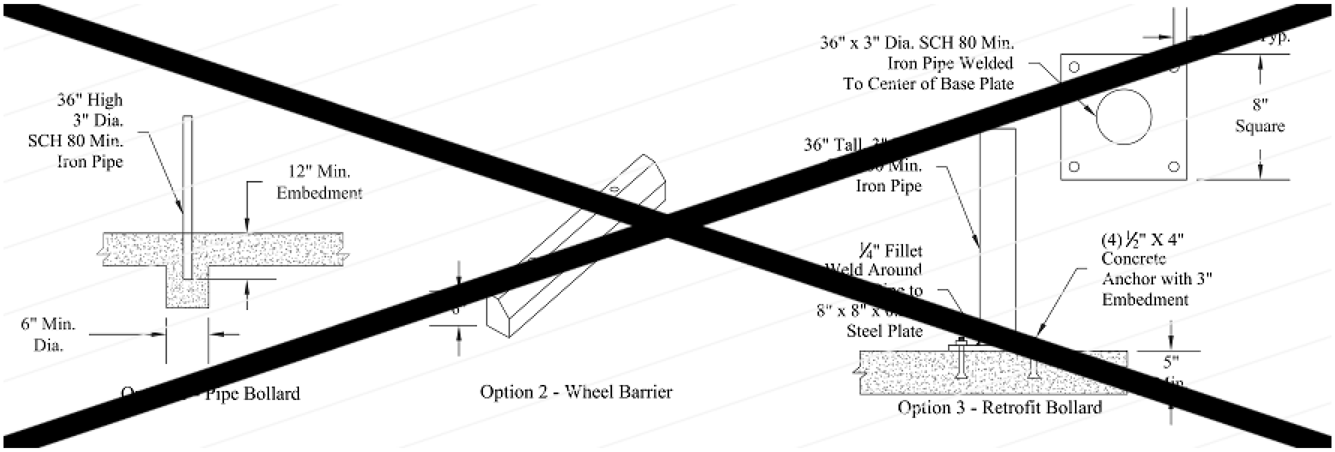
FIGURE 1207.11.7.1 ESS VEHICLE IMPACT PROTECTION

1207.11.7.3 Impact Protection Options . Where ESS is required to be protected from impact in accordance with Section 1207.11.7.1 or 1207.11.7.2 such protection shall comply with one of the following:

1. Bollards constructed in accordance with one of the following:
   - 1.1 Minimum 48 inches (1219 mm) in length by 3 inches (76mm) in diameter schedule 80 steel pipe embedded in a concrete pier not less than 12 inches (304 mm) deep and 6 inches (152 mm) in diameter, with at least 36 inches (914 mm) of pipe exposed, filled with concrete, and spaced at a maximum interval of 5 feet (1524 mm). Each bollard shall be located not less than 6 inches (152 mm) from an ESS.
   - 1.2 Minimum 36 inches (914 mm) in height by 3 inches (76 mm) in diameter schedule 80 steel pipe fully welded to ~~an~~ a minimum 8 inches (203 mm) by ¼ inch (6.4 mm) thick steel plate and bolted to a concrete floor by means of 4 - ½ inch (13 mm) concrete anchors with 3 inch (76 mm) minimum embedment. Spacing shall be not greater than 60 inches. (1524 mm), and each bollard shall be located not less than 6 inches (152 mm) from the ESS.
   - 1.3 Pre-manufactured steel pipe bollards shall be filled with concrete and anchored in accordance with the manufacturer's installation instructions, with spacing not greater than a 60 inches. (1524 mm). Each bollard shall be located ~~Located~~ not less than 6 inches (152mm) from the ESS.
2. Wheel barriers constructed in accordance with one of the following:
   - 2.1. ~~6 inches (152 mm) in height by 6 inches (152 mm) in width~~ 4 inches (102 mm) in height by 5 inches (127 mm) in width by 70 inches (1778 mm) in length wheel barrier made of concrete or polymer, anchored to the concrete floor not less than every 36 inches (914 mm) and located not less than 54 inches (1372 mm) from the ESS.. Minimum ~~2 2(~~ 3) - ½ inch (13 mm) diameter concrete anchors with 3 inch (76 mm) embedment per barrier shall be used. Spacing between barriers shall be no greater than 36 inches. (914 mm).

2.2. Pre-manufactured wheel barriers shall be anchored in accordance with the manufacturers installation instructions.

3. Approved method designed to resist a 2000 lbf (8899 Newtons) impact in the direction of travel at 24 inches (608 mm) above grade.



~~FIGURE 1207.11.7.3 IMPACT PROTECTION OPTIONS~~

Commenter's Reason: This public comment is intended to address the following improvements, developed in collaboration between a SEAC working group and NAHB:

1. Improve language in 1207.11.7 to make it more accurately align with the associated Figure. The intent was to describe an area or space, not simply a “line”.
2. Incorporate a suggestion to reduce the “corner” area condition to 36” x 24” based on the geometry of a vehicle approaching at an angle. Important to note that an ESS that is wider than 24” inches when considering any required clearances would trigger the need for a barrier.
3. Clarify which dimensions are minimums and which are maximums; the language as previously approved may be confusing.
4. Further refine the guidance on wheel barriers:
1. Add a length measurement - this was omitted in error. 70” was determined to be commonly available and wide enough to protect against the wheel track of an average passenger vehicle.
2. This 70” length necessitated an additional fastener so the minimum of (2) was increased to (3).
3. Reduce the minimum size based on commonly available pre-made wheel barriers
5. Further refine Figure 1207.11.7.1:
1. Add an ESS on an exterior wall not subject to damage as an example
2. Align terminology - replace “curb stop” with “wheel barrier”
3. Edit corner area dimensions

This public comment was prepared by the Sustainable Energy Action Committee (SEAC), a forum for all stakeholders (including, but not limited to, AHJs, designers, engineers, contractors, first responders, manufacturers, suppliers, utilities, and testing labs) to collaboratively identify and find solutions for issues that affect the installation and use of solar energy systems, energy storage systems, demand response, and energy efficiency. The purpose is to facilitate the deployment and use of affordable, clean and renewable energy in a safe, efficient, and sustainable manner.
All recommendations from SEAC are approved by diverse stakeholders through a consensus process.

Cost Impact: The net effect of the public comment and code change proposal will not increase or decrease the cost of construction
The public comment clarifies and gives more technical rigor to the requirements.

Public Comment# 2792

F157-21

Proposed Change as Submitted

Proponents: Kevin Duerr-Clark, representing New York State Department of State (kevin.duerr-clark@dos.ny.gov); Chad Sievers, representing NYS Dept. of State (chad.sievers@dos.ny.gov)

2021 International Fire Code

Revise as follows:

2310.4 Fueling of marine vehicles at other than approved marine motor fuel-dispensing facilities. Fueling of floating marine craft at other than a marine motor fuel-dispensing facility shall comply with Sections 2310.4.1 and 2310.4.2, <u>and where applicable, Section 5706.5.4</u>.

Reason: This proposal is to tie the two sections pertaining to marine craft fueling together. As the code currently is written, 2310.4 has requirements for fueling marine vehicles at other than approved dispensing facilities, which would include fueling from a tank vehicle, tank car, or mobile fueling vehicle. However, there is no tie to the other sections such as 5706.5.4. Without this tie, 2310.4.1 specifically does not permit Class I fuels at other than a marine motor fuel dispensing facility, but 5706.5.4.1 is not that specific and would appear to allow any liquid fuel, which is likely not the intent. Providing the tie eliminates this discrepancy.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
There is no anticipated cost of construction increase. This is intended to simply tie two related code sections together.

F157-21

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: This proposal was disapproved as Section 2310.4 is intended for transfer activities not for fueling and was not intended as on-demand mobile fueling. (Vote: 13-0)

F157-21

Individual Consideration Agenda

Public Comment 1:

Proponents: Chad Sievers, representing NYS Dept. of State (chad.sievers@dos.ny.gov); Kevin Duerr-Clark, representing New York State Department of State (kevin.duerr-clark@dos.ny.gov) requests As Submitted

Commenter's Reason: The committee recommendation listed on this proposal indicates that Section 2310.4 is intended for transfer activities and not for fueling. However, the title of Section 2310.4 is "Fueling of marine vehicles at other than approved marine motor fuel-dispensing facilities." The Section goes further to state that "Fueling of floating marine craft at other than a marine motor fuel-dispensing facility shall comply with Sections 2310.4.1 and 2310.4.2."
Lastly, the provisions of Section 2310.4.2 describes, among other things, the requirements for the tank vehicle used to fuel floating marine craft, which includes the vehicle and fueling operations to be in compliance with 5706.6. Although Section 5706.5 is titled "Bulk transfer and process transfer operations," the general Section 5706.5.1 indicates that Sections 5706.5.4 through 5706.5.4.5 shall apply to dispensing from tank vehicles and tank cars, and subsequently, Section 5706.5.4 is dispensing from tank vehicles and tank cars into the fuel tanks of motor vehicles.

Section 5706.5.4.1 then deals directly with liquids intended for use as motor fuels that are transferred from tank vehicles into the fuel tanks of marine craft. This is the same process that is addressed by Section 2310.4.

Other sections of the code link together mobile fueling operations and Section 5706.5.4. For example, the commentary to the definition of "Mobile Fueling" indicates "This definition pertains to the fueling process regulated by Section 5706.5.4.5, wherein fuel is dispensed from the tank vehicle directly to the fuel tank of a vehicle. Also note the requirements in Section 5707 for on-demand mobile fueling (see commentaries, Section 5706.5.4.5 and 5707).

This proposal simply aligns Section 2310.4 and Section 5706.5.4. It does not impose any additional requirements.

Cost Impact: The net effect of the public comment and code change proposal will not increase or decrease the cost of construction
There is no anticipated cost of construction increase. This is intended to simply tie two related code sections together.

Public Comment# 2841

F158-21

Proposed Change as Submitted

Proponents: Michael O'Brian, representing FCAC (fcac@iccsafe.org)

2021 International Fire Code

Add new text as follows:

2404.2 Prohibited enclosures for spray application operations.
Inflatable or portable enclosures shall not be used for spray application of flammable finishes.

> **Exception:** Enclosures for the spray application of flammable finishes in marinas, dry docking areas or construction areas shall comply with 2404.3.

2404.3 Membrane enclosures.
The design, construction, protection, operation and maintenance of membrane Enclosures shall be in accordance with NFPA 33.

Reason: Inflatable or portable enclosures for spray application operations are prohibited as they do not meet the minimum codes set forth for spray booths. Examples of such noncompliance are as follows:

1. Location of spray-finishing operations

2. Construction type not that of noncombustible material

3. Omission of fire protection systems - not protected by an approved automatic fire-extinguishing system

4. Ventilation and filtration requirements

5. Air supported structure collapse with any significant fire incident.Additionally, if an inflatable or portable enclosure is able to meet the intent of the codes applicable to IFC Section 2404 Spray Finishing, a local fire official would have the ability to allow such use as an equivalent alternative.

This proposal is submitted by the ICC Fire Code Action Committee (FCAC). The FCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance assigned International Codes with regard to fire and life safety in new and existing buildings and facilities as well as the protection of life and property in wildland urban interface areas. In 2020 and 2021 the Fire-CAC held multiple virtual meetings that were open to any interested party. In addition, there were numerous virtual specific working group meetings that were also open to any interested parties, to develop, discuss and debate the proposed changes. Related documentation and reports are posted on the FCAC website at: https://www.iccsafe.org/products-and-services/i-codes/code-development/cs/fire-code-action-committee-fcac/

Cost Impact: The code change proposal will not increase or decrease the cost of construction
There is not a cost associated with this proposal as current code does not specifically permit temporary and inflatable spray application operations of flammable finishes and this proposal does not change the allowable conditions associated with marinas, dry docking or construction areas.

F158-21

Public Hearing Results

Committee Action: **As Submitted**

Committee Reason: The proposal was approved as currently the code is silent and enforcement of portable spray booths operations is difficult. The use of portable spray booths is becoming quite prevent and fire code officials need a tool to address. Note that the provisions for limited spray space would allow many smaller operations without further regulation. The key is not allowing portable spray booths to replace permanent code compliant spray booths. NFPA 33 task group is still reviewing this issue as well. (Vote: 14-0)

F158-21

Individual Consideration Agenda

Public Comment 1:

IFC: 2404.2, 2404.3

Proponents: Paul Armstrong, representing IFAI (paul@7arms.com) requests As Modified by Public Comment

Modify as follows:

2021 International Fire Code

~~**2404.2 Prohibited enclosures for spray application operations**~~**.**
~~Inflatable or portable enclosures shall not be used for spray application of flammable finishes.~~

> ~~**Exception:** Enclosures for the spray application of flammable finishes in marinas, dry docking areas or construction areas shall comply with 2404.3.~~

~~**2404.3**~~ <u>**2404.2**</u> **Membrane enclosures .** The design, construction, protection, operation and maintenance of membrane ~~Enclosures~~ <u>enclosures used for spray application of flammable finishes</u> shall be in accordance with NFPA 33.

Commenter's Reason: During testimony at the CAH, it was noted that the point of this initial proposal is for inflatable, portable or permanently installed membrane enclosures to comply with the provisions of NFPA 33. NFPA 33 provides the necessary protection for the spray application of flammable finishes and is referenced for other types of installations. In this case, if any membrane enclosure that doesn't comply is proposed for installation and use, it should be not allowed. It was also noted that there is a submittal to the NFPA 33 committee to address inflatable and portable membrane enclosures, this makes the first new section and exception unnecessary and a general reference to compliance for all such membrane enclosures with NFPA 33 much more clean and to the point.

Cost Impact: The net effect of the public comment and code change proposal will not increase or decrease the cost of construction
This will recognize the application of NFPA 33 for these membrane structures.

Public Comment# 2880

F165-21

Proposed Change as Submitted

Proponents: Michael O'Brian, representing FCAC (fcac@iccsafe.org)

2021 International Fire Code

Add new text as follows:

3103.9.1 Water Filled Vessels.
Water filled vessels shall not be used to anchor a tent or membrane structure unless approved and in accordance with the tent or membrane structure manufacturer's instructions.

Revise as follows:

3103.6 Construction documents. A detailed site and floor plan for*tents* or *membrane structures* with an *occupant load* of 50 or more shall be provided with each application for approval. The *tent* or *membrane structure* floor plan shall indicate details of the *means of egress* facilities, seating capacity, arrangement of the seating and location and type of heating and electrical equipment. The *construction documents* shall include an analysis of structural stability. Water filled vessels used to anchor a tent or membrane structure shall be in accordance with Section 3103.9.1.

Reason: The use of water filled barrels as anchors has long been problematic. With a great deal of variance in how water filled barrels react based on connections, fill amounts, and connection of straps to the barrel itself, it is the intent of this code proposal to ensure that manufacturers of tents and membrane structures dictate how water barrels may be used to anchor their products, taking a local entity out of the equation.
Tent safety as performed by the tent installer is a very complicated issue and has an enormous number of variables. Many different factors go into proper anchoring of tents and many of those have scientific bases; but because each factor has an influence on the other factors the science can get very confusing.

To give an example of the variables involved, here is a short list

Surface (concrete, dirt, asphalt, grass, other)

Size of tent

Type of stake

Distance from tent of stake

Geometry of staking pattern

Angle of stake/strap

Number of stakes/straps

Stake/Strap connection method

Type of soil

Moisture level in soil

Construction of strapping or rope

Quite often tents are set up on concrete. The ideal method would of installation on concrete are concrete anchors. These anchors are very strong. Depending on the condition and age of the concrete the failure pressure of this type anchor is anywhere from 2000 to 3000 lbs. or more. This is as close to ideal as you are going to get in the tent business.

Unfortunately for several reasons the property owner will not allow drilling and placement of concrete anchors.

"Water Barrels" are commonly used to secure tents. This is the method most often misused.

A typical water barrel holds 50 gallons of water. Water weighs about 8.34 lbs. per gallon. So, the actual weight of a water barrel is about 420 lbs. Not nearly sufficient weight for holding down a large tent. A water barrel has a plastic bottom that tends to slide if pressure is applied. Water barrels are tied at the top, leaving your pressure point about 40" up (should be at absolute ground level). Water barrels also tend to tip over and spill their contents, effectively causing you to lose ballast.

If we have a 40x40 frame tent we will need a minimum of 16,000 lbs. of holding capacity to safely secure this tent in normal conditions. That means in the best of conditions we would need over 60 water barrels to secure one single 40x40 tent.

We can conclude that water barrels are not a good alternative for securing tents. And many municipalities have recognized that and no longer allow the use of water barrels. Safety and liability are the key factors. Most tent and membrane manufactures do not recommend water barrels do to the following reasons: Water barrels have a low coefficient of friction, reduce weight effectiveness to other methods, have a larger quantities of water barrels to other methods, the tie off location affect the amount to uplift that the barrel may withstand.

For those manufacturers who would allow the use of water barrels for anchoring of their tents, a provision has been made to allow for the tent manufacturer to provide the documentation on their use.

For more information and videos please see the link below https://www.gettent.com/content/water-barrels-deadweights.asp

This proposal is submitted by the ICC Fire Code Action Committee (FCAC). The FCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance assigned International Codes with regard to fire and life safety in new and existing buildings and facilities as well as the protection of life and property in wildland urban interface areas. In 2020 and 2021 the Fire-CAC held multiple virtual meetings that were open to any interested party. In addition, there were numerous virtual specific working group meetings that were also open to any interested parties, to develop, discuss and debate the proposed changes. Related documentation and reports are posted on the FCAC website at: https://www.iccsafe.org/products-and-services/i-codes/code-development/cs/fire-code-action-committee-fcac/

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The cost of construction will not change since the option to use the water filled vessel is still allowed if approved by the manufacturer.

F165-21

Public Hearing Results

Committee Action: **As Submitted**

Committee Reason: The committee stated that the reasons for approval were that this will improve the anchorage of tents and membrane structures and as a code official, calling out the water barrels as being prohibited really is necessary otherwise the presumption is you know that it's equivalent in terms of its anchoring capacity. Additionally, it was noted that in reviewing some of the manufacturers specifications, they don't necessarily say exactly how to anchor them, they just say they shall be anchored and this addresses specifically how we don't want them to be anchored. (Vote: 14-0)

F165-21

Individual Consideration Agenda

Public Comment 1:

IFC: 3103.9.1

Proponents: Paul Armstrong, representing IFAI (paul@7arms.com) requests As Modified by Public Comment

Modify as follows:

2021 International Fire Code

3103.9.1 Water Filled Vessels. Water filled vessels shall be permitted to be used when ~~not be used to anchor a tent or membrane structure unless~~ approved and in accordance with the tent or membrane structure manufacturer's ~~instructions~~ load specifications.

Commenter's Reason: This simple revision clarifies that Tent manufacturer's information only provides the staking or ballasting load since they do not know the soil or surface conditions where the tent is intended to be installed. It is the responsibility of the installer to determine the appropriate method and to obtain the approval of the local authority having jurisdiction. This also changes the tone from what shall not be used to what is permitted.

Cost Impact: The net effect of the public comment and code change proposal will not increase or decrease the cost of construction
The effect of this revision is to clarify the tent manufacturer's information to be used.

Public Comment# 2876

F170-21

Proposed Change as Submitted

Proponents: Elley Klausbruckner, Klausbruckner & Associates, Inc., representing Klausbruckner & Associates, Inc.

2021 International Fire Code

Revise as follows:

3206.7 Fire department access doors. Where fire department access doors are required by Table 3206.2, fire department access doors shall be provided in accordance Sections 3206.7.1 through ~~3206.7.8.~~ 3206.7.7.

3206.7.1 ~~Exterior walls without fire department access doors~~ Where Located. ~~Fire department access doors are not required in an exterior wall that does not face a fire apparatus access road provided that all of the following conditions occur:~~
Where exterior walls surrounding high-piled storage areas face fire apparatus access roads, such walls shall be provided with fire department access doors. Fire department access doors are not required in an exterior wall that does not face a fire apparatus access road.

> **Exception:** Fire department access doors are not required in an exterior wall that faces a fire apparatus access road provided that all of the following conditions exist:
>
> 1. The opposite exterior wall faces a fire apparatus access road.
> 2. The opposite exterior wall is provided with fire department access doors.
> 3. The entire interior surface of the exterior wall is less than 150 feet (45 720 mm) away from a fire department access door.
> 4. The building is equipped throughout with an *automatic sprinkler system* in accordance with Section 903.3.1.1.

~~**3206.7.2 Where located.** Where exterior walls surrounding *high-piled storage areas* face fire apparatus access roads, such walls shall be provided with fire department access doors.~~

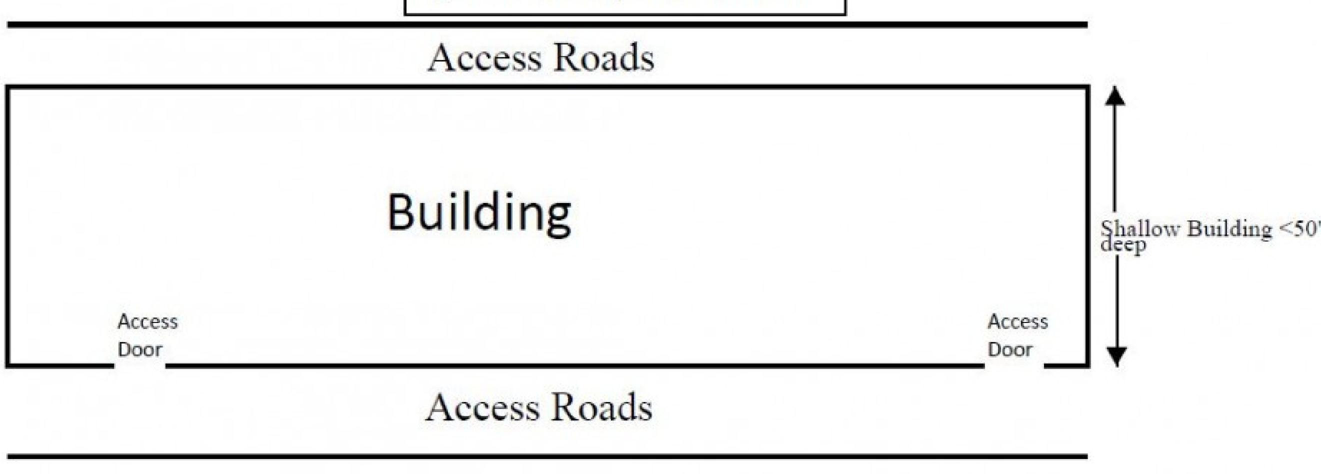
Reason: Please see Figure 1 below as an example of what the intent of this code change is. The language as it's currently written is impractical for the following reasons:
1. Section 3206.7.1 (access doors are required where exterior walls do NOT face an access road unless conditions 1-4 are met) is in conflict with Section 3206.7.2 (access doors are only required where exterior walls face an access road).

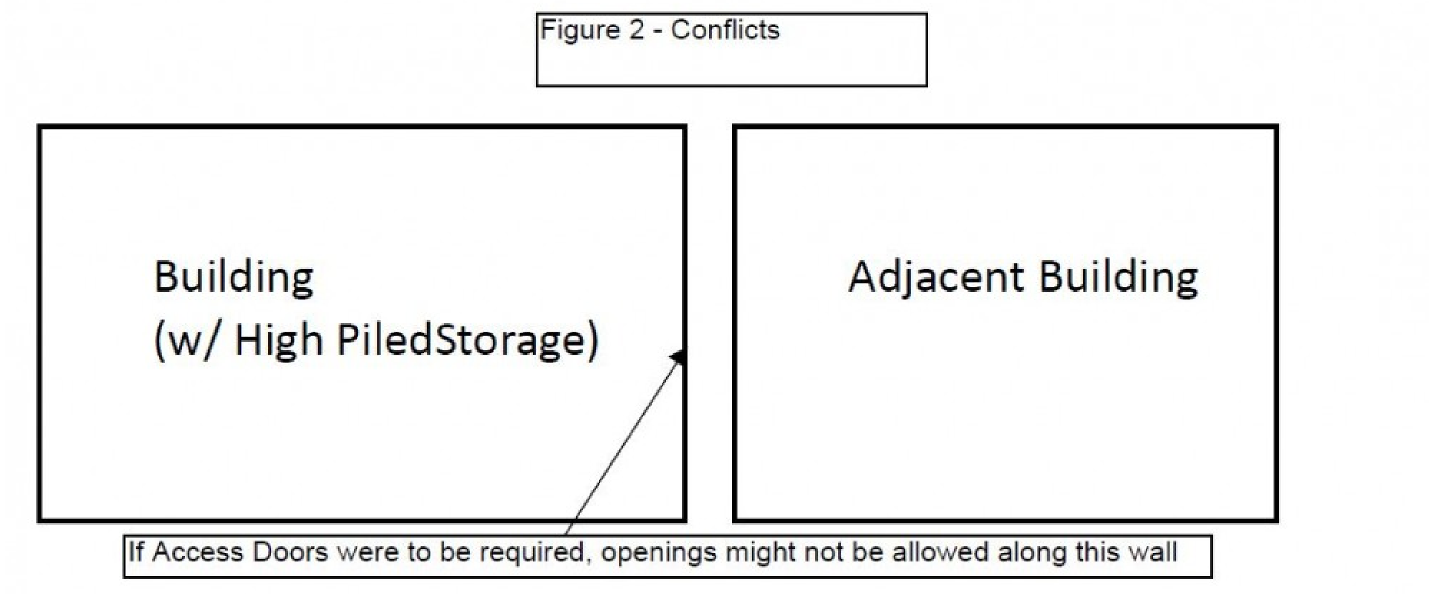
2. Access from a side of a building that does not have an access road is impractical. The building in most cases is small enough not to require access roads along one side of the building, thereby allowing access from other sides due to the size of the building.

3. This will create a problem in existing buildings when one business moves out and another moves in, thereby forcing the new tenant to cut holes in exterior building walls.

4. If the side of the building that does not require access roads abuts another building, then in many cases openings are not allowed along that side of the building, thereby creating a conflict in the code. Please see Figure 2 below as an example.

Figure 1 - Example of the Intent





Cost Impact: The code change proposal will decrease the cost of construction
The revisions clarify the code and eliminate conflicts in the requirements to provide access doors in an exterior wall that does not face a fire apparatus access road or abuts another building.

F170-21

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The committee stated that the reason for disapproval was that if you have a wall that does not face an access road, but the opposite of it does, then you don't have to put the doors in. It is taking something out that is going to make it much more difficult and it doesn't seem like there's a conflict in the current language. Additionally, it was noted that the original code language says where it does not face an access road and the concern is that code officials who are going to look at these buildings and then say you do have to put in access roads. (Vote: 10-4)

F170-21

Individual Consideration Agenda

Public Comment 1:

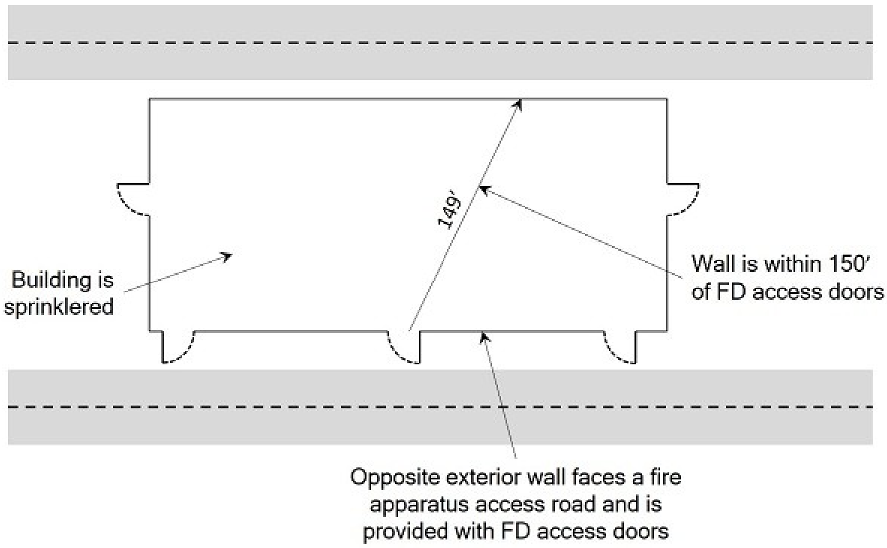
Proponents: Kevin Scott, representing KH Scott & Associates LLC (khscottassoc@gmail.com) requests As Submitted

Commenter's Reason: It is unfortunate that the recent rewrite to Chapter 32 created an unintentional conflict for the requirements for fire department access doors. The original proposal was designed to remedy this conflict, however, it is such a subtle conflict that the Code Development Committee did not recognize that the conflict exists. This Public Comment urges Approval as Submitted.
IFC Sections 3206.7.1 and 3206.7.2 each work fine as stand alone sections. It is when you attempt to apply them together that the conflict occurs. Current text in IFC Section 3206.7.2 only requires FD access doors in exterior walls facing a fire apparatus access road. This means that if an exterior wall does not face an access road, then FD access doors are not required. This section is very clear, however, Section 3206.7.1 states that the FD access doors can only be eliminated if a list of criteria is met in addition to the fact that it does not face an access road. So one section says FD access doors are not needed and the other section says the FD access doors are not needed if you meet certain criteria. The list of criteria is actually intended to be an exception allowing an exterior wall of a narrow building to be without FD access doors.

The original code change reformatted these requirements into a logical and correlated order.

IFC Section 3206.6 requires that all portions of the exterior wall of the building must be within 150’ of a FD access road. This distance to an access road is not relaxed with the installation of fire sprinkler system as it is in other buildings. So all portions of the exterior wall need to be within 150' of an access road, but when the building is small enough, FD access doors are not required on all sides of the building when adequate access is provided from the other FD access doors.

If all portions of one exterior wall are within 150' of FD access doors, additional FD access doors are not required in that one wall. See diagram below.



Cost Impact: The net effect of the public comment and code change proposal will not increase or decrease the cost of construction
This Public Comment clarifies the requirements currently in the code.

Public Comment# 2556

F174-21

Proposed Change as Submitted

Proponents: David Tyree, representing AWC (dtyree@awc.org); Raymond O'Brocki, AWC, representing AWC (robrocki@awc.org)

2021 International Fire Code

Revise as follows:

3303.5 Fire safety requirements for buildings of Types IV-A, IV-B and IV-C construction. Buildings of Types IV-A, IV-B and IV-C construction designed to be greater than six stories above*grade plane* shall comply with the following requirements during construction unless otherwise *approved* by the *fire code official*:

1. Standpipes shall be provided in accordance with Section 3313.
2. A water supply for fire department operations, as *approved* by the *fire code official* and the *fire chief*.
3. Where building construction exceeds six stories above *grade plane* and noncombustible protection is required by Section 602.4 of the *International Building Code*, at least one layer of noncombustible protection shall be installed on all building elements on floor levels, including mezzanines, more than four levels below active mass timber construction before additional floor levels can be erected.

    ~~Exception~~ Exceptions:

    1. Shafts and vertical exit enclosures shall not be considered part of the active mass timber construction.
    2. Noncombustible material on the top of mass timber floor assemblies shall not be required before erecting additional floor levels.

4. Where building construction exceeds six stories above *grade plane*, required exterior wall coverings shall be installed on floor levels, including mezzanines, more than four levels below active mass timber construction before additional floor levels can be erected.

    Exception: Shafts and vertical exit enclosures shall not be considered part of the active mass timber construction.

Reason: Applying at least one layer of the required noncombustible protection to mass timber walls and ceilings as construction progresses in height is an important component of fire safety during construction. This code requirement was informed by the experience at Brock Commons, the 18-story tall mass timber building in Vancouver, British Columbia. Less critical, and more problematic for builders, is applying the noncombustible topping on CLT floors during construction. The fire service in Vancouver did not require the CLT floors to be covered with gypcrete as the building progressed in height. They believed that it would add little fire protection and that the protection of the walls and ceilings were much more critical to the fire safety of the building than the floors.
The requirement to place the noncombustible protection over the mass timber floor panels per IFC 3303.5 before construction proceeds more than four stories above is impracticable. Enacting the 4-story trigger creates undue hardships and constructability nightmares. Some projects are looking to place up to 2" of non-structural topping on the floor panels and placing conduit within the topping to run "under the finished floor" but above the exposed mass timber underside. To place conduit in this area while the mass timber superstructure is going vertical creates many challenges. The weight of loaded drywall carts needed later in construction to finish out the required protection for other surfaces may cause damage to the conduit and gypcrete. In addition, gypcrete does not wear well in inclement weather. In most, if not all cases, the building will not be watertight as the building goes higher while placing gypcrete underneath. Damaged gypcrete affects sound ratings and could cause adhesion problems for flooring above the cracked gypcrete. Perhaps most important, requiring the gypcrete topping to be installed earlier than the normal construction sequencing calls for effectively requiring the metal stud framing, drywalling, and mechanicals/electrical/plumbing rough-ins to be completed before the gypcrete can be permanently installed. This significantly affects the critical path of construction scheduling and greatly diminishes normal scheduling savings.

The 4-story trigger for floor protection creates significant additional costs by adversely affecting the speed of construction. Compared to the obvious safety benefits of protecting walls and ceilings during construction, the benefits of protecting floors is much less critical. Therefore, the inordinate difficulty and cost associated with the current requirement justifies this proposed exception.

Cost Impact: The code change proposal will decrease the cost of construction
This proposal will reduce the construction cost by increased efficiencies and reduced construction times.

F174-21

Public Hearing Results

Committee Action: **As Submitted**

Committee Reason: The proposal was approved as it addresses the concern that the risk from exposed floors during construction was low and provides a more practical approach. There was some concern that the term "floor levels" may be confusing in this application. Additionally, the exception, as written, may go further than anticipated in terms of scope of application. (Vote: 9-4)

F174-21

Individual Consideration Agenda

Public Comment 1:

Proponents: Shamim Rashid-Sumar, representing National Ready Mixed Concrete Association (ssumar@nrmca.org) requests Disapprove

Commenter's Reason: F174-21 is recommended for disapproval based on several technical concerns regarding the proposed exception to combustible protection for floors in Type IV buildings under construction.
The proponents of the code change have argued that heat stress in a compartment fire on the floor is minimal, and that the fire hazard and combustibility presented by the horizontal floor surface does not warrant the need for a noncombustible material during the construction phase. However, this argument neglects re-radiation between adjacent surfaces including between ceilings and floors which occurs during a fire. Hence the code requires flooring to be subject to an incident heat flux from a flooring radiant panel to confirm compliance. Additionally, noncombustible protection is clearly required by Section 602.4 for floors and undersides of floors in Type IV construction.

The reference to “floor levels” in the proposed code change is problematic in that it is confusing in application, and as written, may be expanded beyond what is intended in terms of scope of application. Finally, the removal of safety provisions from Type IV buildings under construction is premature based on the relatively recent addition of the tall wood building provisions to the code and the lack of building history for CLT structures in jurisdictions where the IBC has been adopted.

Recommend DISAPPROVAL for F174-21.

Cost Impact: The net effect of the public comment and code change proposal will not increase or decrease the cost of construction
No change to code.

Public Comment# 2834

F175-21

Proposed Change as Submitted

Proponents: Jeff O'Neill, representing American Society of Health Care Engineers (ASHE) (jeff.oneill@uphs.upenn.edu); Andrew W.J. Kollar, Self / Fused Studios P.C., representing Self (akollar@fusedstudios.org); Wayne Jewell, Green Oak Charter Township, representing Self (wayne.jewell@greenoaktwp.com)

2021 International Fire Code

Add new definition as follows:

HEALTH CARE LABORATORY. . Laboratories used for to support the health care facilities through testing, analysis, research or developmental activities on a nonproduction basis including diagnostic, clinical and hospital laboratories.

HIGHER EDUCATION LABORATORY. Laboratories in Group B occupancies used for educational purposes above the 12th grade. Storage, use and handling of chemicals in such laboratories shall be limited to purposes related to testing, analysis, teaching, research or developmental activities on a nonproduction basis.

Revise as follows:

LABORATORY SUITE. A fire-rated enclosed laboratory area that will provide one or more laboratory spaces, within a ~~Group B educational occupancy~~ *higher education* or *health care laboratory*, that are permitted to include ancillary uses such as offices, bathrooms and corridors that are contiguous with the laboratory area, and are constructed in accordance with Chapter 38.

CHAPTER 38
HIGHER EDUCATION AND HEALTH CARE LABORATORIES

3801.1 Scope. *Higher education* and *health care laboratories* complying with the requirements of this chapter shall be permitted to exceed the maximum allowable quantities of hazardous materials in *control areas* set forth in Chapter 50 without requiring classification as a Group H occupancy. Except as specified in this chapter, such laboratories shall comply with all applicable provisions of this code and the *International Building Code*.

3802.1 Definitions. The following terms are defined in Chapter 2:
CHEMICAL FUME HOOD.

GLOVE BOX.

HEALTH CARE LABORATORY.

HIGHER EDUCTION LABORATORY.

LABORATORY SUITE.

SPECIAL EXPERT.

3804.1.1.6 Standby or emergency power. *Higher education* and *health care laboratory suites* shall be provided with emergency or standby power in accordance with Section 1203.2.14.

5003.8.3 Control areas. *Control areas* shall comply with Sections 5003.8.3.1 through 5003.8.3.5.3.

> **Exception:** *Higher education* and *health care laboratories* in accordance with Chapter 38 of this code and Section 428 of the International Building Code.

2021 International Building Code

Add new definition as follows:

HEALTH CARE LABORATORY. . Laboratories used for to support the health care facilities through testing, analysis, research or developmental activities on a nonproduction basis including diagnostic, clinical and hospital laboratories.

Revise as follows:

[F] HIGHER EDUCATION LABORATORY. Laboratories in Group B occupancies used for educational purposes above the 12th grade. Storage, use and handling of chemicals in such laboratories shall be limited to purposes related to testing, analysis, teaching, research or developmental activities on a nonproduction basis.

[F] LABORATORY SUITE. A fire-rated, enclosed laboratory area providing one or more laboratory spaces within a a higher education laboratory or a health care laboratory ~~Group B educational occupancy~~ that includes ancillary uses such as offices, bathrooms and corridors that are contiguous with the laboratory area, and are constructed in accordance with Section 428.

[F] 307.1.1 Uses other than Group H. An occupancy that stores, uses or handles *hazardous materials* as described in one or more of the following items shall not be classified as Group H, but shall be classified as the occupancy that it most nearly resembles.

1. Buildings and structures occupied for the application of flammable finishes, provided that such buildings or areas conform to the requirements of Section 416 and the *International Fire Code*.
2. Wholesale and retail sales and storage of flammable and combustible liquids in mercantile occupancies conforming to the *International Fire Code*.
3. Closed piping system containing *flammable or combustible liquids* or gases utilized for the operation of machinery or equipment.
4. Cleaning establishments that utilize *combustible liquid* solvents having a *flash point* of 140°F (60°C) or higher in closed systems employing equipment *listed* by an *approved* testing agency, provided that this occupancy is separated from all other areas of the building by 1-hour *fire barriers* constructed in accordance with Section 707 or 1-hour *horizontal assemblies* constructed in accordance with Section 711, or both.
5. Cleaning establishments that utilize a liquid solvent having a *flash point* at or above 200°F (93°C).
6. Liquor stores and distributors without bulk storage.
7. Refrigeration systems.
8. The storage or utilization of materials for agricultural purposes on the premises.
9. Stationary storage battery systems installed in accordance with the *International Fire Code*.
10. *Corrosive* personal or household products in their original packaging used in retail display.
11. Commonly used *corrosive* building materials.
12. Buildings and structures occupied for *aerosol product* storage, aerosol cooking spray products or plastic aerosol 3 products shall be classified as Group S-1, provided that such buildings conform to the requirements of the *International Fire Code*.
13. Display and storage of nonflammable solid and nonflammable or noncombustible liquid *hazardous materials* in quantities not exceeding the maximum allowable quantity per *control area* in Group M or S occupancies complying with Section 414.2.5.
14. The storage of black powder, smokeless propellant and small arms primers in Groups M and R-3 and special industrial *explosive* devices in Groups B, F, M and S, provided such storage conforms to the quantity limits and requirements prescribed in the *International Fire Code*.
15. Stationary fuel cell power systems installed in accordance with the *International Fire Code*.
16. Capacitor energy storage systems in accordance with the *International Fire Code*.
17. ~~Group B *higher*~~ Higher *education* and *health care laboratories* ~~*laboratory* occupancies~~ complying with Section 428 and Chapter 38 of the International Fire Code.
18. Distilling or brewing of beverages conforming to the requirements of the *International Fire Code.*
19. The storage of beer, distilled spirits and wines in barrels and casks conforming to the requirements of the *International Fire Code.*

[F] 414.2 Control areas. *Control areas* shall comply with Sections 414.2.1 through 414.2.5 and the *International Fire Code*.

Exception: *Higher education* and *health care laboratories* in accordance with Section 428 and Chapter 38 of the International Fire Code.

SECTION 428
HIGHER EDUCATION AND HEALTH CARE LABORATORIES

[F] 428.1 Scope. *Higher education* and *health care laboratories* complying with the requirements of Sections 428.1 through 428.4 shall be permitted to exceed the maximum allowable quantities of *hazardous materials* in *control areas* set forth in Tables 307.1(1) and 307.1(2) without requiring classification as a Group H occupancy. Except as specified in Section 428, such laboratories shall comply with all applicable provisions of this code and the *International Fire Code*.

Reason: First, we wish to acknowledge the efforts put forth by the Fire Code Action Committee (FCAC) and the people who worked to put together the original code change that introduced “higher education laboratories” in F340-16. That effect successfully put in place much needed regulations to address the use of hazardous materials in what are highly monitored conditions without production – laboratories in higher education institutions, by providing enhanced safety requirements.
But as was the situation prior to the approval of F340-16 and the introduction of regulations for higher education laboratories in what is now Chapter 38 in the IFC and Section 428 in the IBC, the I-Codes still do not do not specifically provide or address how to regulate those laboratories that by all accounts operate the same as a “higher education laboratory” but cannot be classified as a “higher education laboratories” because they are

not used for educational purposes above the 12th grade." Because of this, users must try to apply general hazardous materials provisions, which oftentimes are not appropriate for clinical, diagnostic or research laboratory settings.

After being in the 2018 and 2021 codes, users have had a chance to really review and come to understand the provisions that are found in Chapter 38 of the IFC and Section 428 in the IBC. And although we do not disagree with any of the logic that the FCAC gave in the Reason statement for F340-16 for the key parameters that must be present, we do not see any technical reasons for why those provisions are should be limited to only higher education laboratories. This code change seeks to expand the application of the provisions in Chapter 38 of the IFC and Section 428 in the IBC to not just higher education laboratories but to any clinical, diagnostic or research laboratory that meets the criteria contained in those sections – what we are proposing be categorized as "health care laboratories

As was stated in the Reason statement to F340-16 "The advance of technologies, science, medicine and our knowledge of the world often relies on having vibrant and successful academic institutions." But the laboratory settings in which those advances occur are NOT limited to only those that come out of an academic institutions (high-learning institution) – they come out of laboratories found in the private sector and the nationally-funded sectors also. The perfect example is the research that is happening right now with the race to solve the COVID-19 crisis. Most of the work involved is coming out of laboratories in that are not in a higher education sector.

In their Reason statement for F340-15 the FCAC put forth what they saw as the "conditions typically present in academic laboratories that make them unique," but which when looked at on their own merits are conditions or characteristics also found in non-academic, non-production laboratories in other occupancies including hospitals, clinical, research and diagnostic areas. The FCAC included:

1. Lower chemical density in individual research laboratories.

"…there are often many small laboratories within a building that are using small quantities of hazardous materials in each location. Individually, they do not store or use a large quantity of hazardous materials, but together, they may often exceed the maximum allowable quantities for the control area. This lower chemical density often mitigates the overall risk, but the IFC currently has no provisions to recognize this condition."

1. Ongoing staff oversight from "Special Experts" in laboratory safety.

"…"have a full cadre of faculty and staff with chemical expertise. These "Special Experts" often include, but are not limited to: Fire Marshals, Industrial Hygienists, Radiation Safety Officers, Biological Safety Officers, Chemical Hygiene Officers and Environmental Health and Safety Officers. These individuals are an integral part of the preparation/review of laboratory safety documentations, as well as regularly scheduled safety audits."

1. Mixed-use occupancies.

"…building will house laboratories, office space, storerooms, classrooms and lecture halls. The current limits on hazardous materials are so restrictive on upper floors that many universities are forced to locate classrooms and lecture halls on the upper floors so that they can take full advantage of the hazardous materials quantities allowed on the lower floors. This results in moving large numbers of students through hallways, past laboratories to get to the upper floors. They will also have to exit back down the same routes in the event of an emergency."

All of these are valid conditions and important principles to use when deciding which the types of laboratories should be allowed to use the provisions in IFC Chapter 38 and IBC Section 428. But these conditions and logic are not limited to only those laboratories found in higher education institutions – rather a laboratory found in an institution of higher learner is only one of many types of laboratories that meets the conditions and principles. When each of the "conditions" is reviewed it really becomes obvious that they are not unique to academic (higher education) laboratories.

This proposal is based on the fundamental concept that it should not be the laboratory "setting" which drives the scope of IFC Chapter 38 (IBC Section 428), i.e., higher education vs private clinical, but rather it should be the characteristics and design of the laboratory. The same philosophy the I-Codes uses to engage the requirements for the hazardous materials provisions in general should be used to engage the requirements for use of IFC Chapter 38. The distribution and density of materials, the physical constraints and the qualification of on-site personal are all "conditions" that are also found in non-academic laboratories which do not support production or processing.

Many non-academic laboratories (think diagnostic and clinical) are designed in the same way higher learning laboratories are, and are made up of [to quote F340-16] "…many small laboratories within a building that are using small quantities of hazardous materials in each location. Individually, they do not store or use a large quantity of hazardous materials, but together, they may often exceed the maximum allowable quantities for the control area." If so, then it is logical that they should be able to use the provisions in IFC Chapter 38?

Regarding the topic of "oversight" from special experts, the logic FCAC present is not unique to higher education laboratories. It is also very true for most non-academic laboratories (such as hospitals and testing organizations) because they are mandated through state and federal agencies.

Regarding the topic of "mixed occupancy," while most post-secondary academic laboratory do occur in what are deemed to be "mixed occupancy," so are most non-academic laboratories. A perfect example is that of a hospital – while the primary occupancy is Group I-2, almost every hospital also contains other occupancies such as storage/utility areas, kitchens, dining facilities, office space, and clinical laboratories.

The one condition FCAC included in their Reason statement that when closely examined was a double-edged sword was:

1. Limited, or "directed", funding streams. Also unique to academic institutions are the funding sources for research. In a "non-profit" teaching and research environment, the majority of research is funded through grants and endowments. Unfortunately, many grants only support the costs of research personnel and equipment, not structural upgrades to accommodate newer research processes.

While a limited funding stream is portrayed as a justification for implementing new regulations for laboratories associated with academic institutions, a good funding stream is actually a benefit because it allows a non-academic laboratory to be equipped with the newest equipment – both for laboratory experiments and for the protection of the occupants. Logic says that because of good funding non-academic laboratories may operate in a safer environment.

We also assert that there is a fifth condition that was present in the development of the code language in F340-16, and should be acknowledged, one that is fundamental:

1. The activities in a laboratory are not part of a production process, nor in any way simulate a production process.

Without the code change contained herein, jurisdictions will still have to do the same thing for non-academic laboratories as they have been – making state or local amendments to allow for greater numbers of control areas and larger percentages of MAQs in non-production laboratories. Code Change F340-16 bought higher education laboratories into the codes and provides the AHJ with rules but there still are no unique rules for non-academic laboratories. This proposal seeks to build on the work the FCAC did in F340-16 and provide standardized model code language to address this topic for both academic (higher education) and non-academic laboratories.

To allow non-academic laboratories to use these regulations the following revisions are proposed:

- Replace the definition of “higher learning laboratories” with “non-production laboratories;”
- Revise IFC Chapter 38 to use the new designation of “non-production laboratories”
- Revise IBC Section 428 to use the new designation of “non-production laboratories”
- Coordinate the various sections in the IFC and IBC to use the new designation of “non-production laboratories”

For those interested in the history of this topic and Code change F340-16, please visit the ICC Code Development Archives at https://www.iccsafe.org/products-and-services/i-codes/code-development/2015-2017-code-development-cycle/

Cost Impact: The code change proposal will decrease the cost of construction
By complying with the provisions in IFC Chapter 39 small non-academic, non-production laboratories will be classified as a Group B occupancies rather than a Group H occupancy. However, many of the non-production labs that this change would cover would seek variances to be in B-occupancies, thus avoiding the impacts of being classified as H-occupancies. Therefore, savings are in reality very slight for those areas (ie: hospital labs, commercial diagnostic labs such as Qwest or LabCorp).

Staff Analysis: This proposal addresses requirements in a different or contradicting manner to those found in Code Change 7075. The committee is urged to make their intentions clear with their actions on these proposals.

F175-21

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: This proposal was disapproved as the increase in scope was viewed not within the original intent of the provisions. There was a concern that the increased scope would allow this concept in buildings containing non ambulatory patients. This proposal as written would not limit health care laboratories to Group I-2 occupancies. In addition, it was felt that clinical laboratories need to be defined. Finally, it was noted that the broadening of this scope was turned down in 2018. (Vote: 13-1)

Staff Analysis: This proposal addresses requirements in a different or contradicting manner to those found in Code Change F176-21. The committee
is urged to make their intentions clear with their actions on these proposals.

F175-21

Individual Consideration Agenda

Public Comment 1:

Proponents: John Williams, representing Healthcare Committee (ahc@iccsafe.org) requests As Submitted

Commenter's Reason: The intention of this code change is to utilize the same lab space requirements already approved, in a similar occupancy setting. This proposal does not contradict requirements approved for Higher Educational Labs, but simple expands them to clinical labs. The same requirements are routinely sought, and approved, for hospital labs. This concept is already utilized in the California Building Standards Code, Laboratories group “L” occupancy; Chapter 4, Special Detail Requirements, Section 453.”
Operationally, it was mentioned in committee debate that a lab and inpatient beds would somehow occupy the same space. This notion is false. The Incidental Use Table already requires a one-hour separation between clinical labs and all other spaces of the facility, regardless of sprinklering status. Usually, clinical labs occur in lower levels of the hospital, reserving spaces with windows for patient care, especially on bed units where an outside window is required. Labs routinely are adjacent to other support areas, and are multiple floors away from patient care.

The distinction between production labs and clinical labs is profound. The best way to paint this picture is using the COVID-19 pandemic as an example. Rapid testing, based on nasal swabs, are processed in clinical labs using non-hazardous reagents. These clinical labs are common in hospitals, and the main concern is with wasting the tissue and bodily fluid samples, and not hazardous waste. Millions of doses of vaccines, at pharmaceutical plants, are generated from production labs, where hazardous waste is the main concern.

Regulation around clinical labs is at least equal, to even greater, than Higher Educational Labs. Quantities of any hazardous chemical inventory is required to be reported to a hospital Environment of Care Committee, normally chaired by the hospital Safety Officer. The quantities regularly reported in this setting is appropriate for the conditions of this code change. This regulatory structure at a hospital is required as a Condition of Participation with the Centers for Medicare and Medicaid Services (CMS). Any clinical lab receiving reimbursement from the federal government (which is most) are subject to these regulatory conditions, without exception.

For these reasons, there is no reason that Higher Education Laboratory functions are a unique carve-out that can be subject to sound reasoning around the handling of hazardous materials in a laboratory setting.

This public comment is submitted by the Committee on Healthcare (CHC).

The CHC was established by the ICC Board to evaluate and assess contemporary code issues relating to healthcare facilities. This is a joint effort between ICC and the American Society for Healthcare Engineering (ASHE), a subsidiary of the American Hospital Association, to eliminate duplication and conflicts in healthcare regulation. In 2020 and 2021 the CHC held several virtual meeting, which included members of the committees as well as any interested parties, to discuss and debate the proposed changes. Information on the CHC, including: meeting agendas; minutes; reports; resource documents; presentations; and all other materials developed in conjunction with the CHC effort can be downloaded from the CHC website at CHC.

Cost Impact: The net effect of the public comment and code change proposal will decrease the cost of construction
By complying with the provisions in IFC Chapter 39 small non-academic, non-production laboratories will be classified as a Group B occupancies rather than a Group H occupancy. However, many of the non-production labs that this change would cover would seek variances to be in B-occupancies, thus avoiding the impacts of being classified as H-occupancies. Therefore, savings are in reality very slight for those areas (ie: hospital labs, commercial diagnostic labs such as Qwest or LabCorp).

Public Comment# 2590

F183-21

Proposed Change as Submitted

Proponents: Michael O'Brian, representing FCAC (fcac@iccsafe.org)

2021 International Fire Code

Revise as follows:

3903.5 Use of flammable and combustible liquids. Where ~~The use of~~ *flammable* ~~and~~ or *combustible* ~~*liquids*~~ solvents are used for ~~liquid~~ extraction processes , such processes ~~where the liquid is boiled, distilled or evaporated~~ shall be located within a chemical ~~hazardous exhaust~~ fume hood, listed or approved ~~rated~~ for exhausting flammable vapors. Electrical equipment used within the ~~hazardous exhaust~~ chemical fume hood or enclosure shall be listed ~~rated~~ for use in flammable atmospheres and installed in accordance with NFPA 70. ~~Heating of *flammable* or *combustible liquids* over an open flame is prohibited.~~

> ~~**Exception:** The use of a heating element not rated for flammable atmospheres, where documentation from the manufacture, or *approved* testing laboratory indicates the element is rated for heating of *flammable liquids*.~~

Reason: The proposed change is to clarify that the use of either flammable or combustible solvents shall be within a listed or approved fume hood or enclosure. Currently many such processes occur in a room not specifically designed for potentially flammable atmospheres. Clarification of electrical requirements within these spaces is also provided.
This proposal is submitted by the ICC Fire Code Action Committee (FCAC). The FCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance assigned International Codes with regard to fire and life safety in new and existing buildings and facilities as well as the protection of life and property in wildland urban interface areas. In 2020 and 2021 the Fire-CAC held multiple virtual meetings that were open to any interested party. In addition, there were numerous virtual specific working group meetings that were also open to any interested parties, to develop, discuss and debate the proposed changes. Related documentation and reports are posted on the FCAC website at: https://www.iccsafe.org/products-and-services/i-codes/code-development/cs/fire-code-action-committee-fcac/

Cost Impact: The code change proposal will not increase or decrease the cost of construction
No cost increase is expected as appropriate fume hoods or enclosures should already be provided with appropriate electrical per NFPA 70.

F183-21

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: Although the proposal is heading right direction the proposal as written does not currently address the the intent clearly. It was preferred that the provisions simply point to other portions of the code such as Chapter 57 as Chapter 39 was generally already structured that way. (Vote 14-0)

F183-21

Individual Consideration Agenda

Public Comment 1:

IFC: 3903.5

Proponents: Michael O'Brian, representing FCAC (fcac@iccsafe.org) requests As Modified by Public Comment

Replace as follows:

2021 International Fire Code

3903.5 Use of flammable and combustible ~~liquids~~ solvents . The use of *flammable* and *combustible liquids* for ~~liquid~~ extraction processes where the liquid is boiled, distilled or evaporated shall be located within ~~a hazardous~~ an exhaust fume hood or other area provided with exhaust ventilation in accordance with Section 5005.1.9.~~, rated for exhausting flammable vapors~~. Electrical equipment shall be in accordance with Section

603 ~~used within the hazardous exhaust fume hood shall be rated for use in flammable atmospheres. Heating of *flammable* or *combustible liquids* over an open flame is prohibited~~.

> ~~**Exception:** The use of a heating element not rated for flammable atmospheres, where documentation from the manufacture, or *approved* testing laboratory indicates the element is rated for heating of *flammable liquids*.~~

Commenter's Reason: In response to committee comments the language was revised to clarify the intent for exhaust ventilation where flammable vapors might be present and provides pointers to relevant sections related to exhaust requirements within the fire code. This is a replacement proposal working directly from the 2021 IFC language.

Cost Impact: The net effect of the public comment and code change proposal will not increase or decrease the cost of construction
This allow options beyond exhaust fume hoods so should not increase costs.

Public Comment# 2507

F184-21

Proposed Change as Submitted

Proponents: Michael O'Brian, representing FCAC (fcac@iccsafe.org)

2021 International Fire Code

Add new text as follows:

<u>3903.7</u> <u>Means of Egress</u>.
<u>Means of egress from rooms or areas used for extraction shall swing in the direction of egress travel.</u>

<u>3903.7.1</u> <u>Illumination</u>.
<u>Means of egress illumination within extraction rooms or areas shall be provided with emergency power in accordance with Section 1008.3.</u>

Reason: This section is added based on incidents in the industry, which have demonstrated the need for a quick and unimpeded exit access from extraction rooms. Incidents with flammable gas fires develop rapidly and broadly, which requires immediate action and movement from personnel impacted.In the event of a power outage a clear egress path is critical as these rooms have equipment and chemicals that could create a secondary risk to the occupant.
This proposal is submitted by the ICC Fire Code Action Committee (FCAC). The FCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance assigned International Codes with regard to fire and life safety in new and existing buildings and facilities as well as the protection of life and property in wildland urban interface areas. In 2020 and 2021 the Fire-CAC held multiple virtual meetings that were open to any interested party. In addition, there were numerous virtual specific working group meetings that were also open to any interested parties, to develop, discuss and debate the proposed changes. Related documentation and reports are posted on the FCAC website at: https://www.iccsafe.org/products-and-services/i-codes/code-development/cs/fire-code-action-committee-fcac/

Cost Impact: The code change proposal will increase the cost of construction
Door swing will not impact construction costs and is an easy life safety improvement. The addition of a standard emergency light would be a negligible cost impact (typical light fixture $300-400) along with an additional electrical connection when constructing the room.

F184-21

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The proposal was disapproved as there is concern that there is too much focus on some issues and not others in Chapter 39. This can give the impression that other code requirements, that are still applicable, are not required since they are not discussed in Chapter 39. There was some concern that the egress component of this proposal should remain as it is a specific need not addressed currently by Chapter 10. (Vote: 8-6)

F184-21

Individual Consideration Agenda

Public Comment 1:

IFC: 3903.7, 3903.7.1

Proponents: Kevin Scott, representing KH Scott & Associates LLC (khscottassoc@gmail.com) requests As Modified by Public Comment

Modify as follows:

2021 International Fire Code

3903.7 Means of Egress . ~~Means of egressegress from~~ <u>Exit and exit access doors from</u> rooms or areas used for extraction shall swing in the direction of egress travel.

~~**3903.7.1 Illumination** .~~ ~~Means of egress illumination within extraction rooms or areas shall be provided with emergency power in accordance with~~

~~Section 1008.3.~~

Commenter's Reason: This Public Comment modifies the proposal and retains only the requirement for means of egress from extraction rooms. Extraction rooms present a higher hazard than the remainder of the facility, especially where flammable gases are used as the extraction medium. The requirement to swing the door in the direction of travel is a logical provision based on this increased hazard.

The proposal has been modified to specifically address the exit door or exit access door in the extraction room, rather than the means of egress in general. So this Public Comment only affects the doors in the extraction room, not the entire means of egress path from the extraction room. Once the occupant is out of the extraction room, the remaining path of egress travel will be based on the requirements for the facility as a whole.

Cost Impact: The net effect of the public comment and code change proposal will not increase or decrease the cost of construction
The cost of construction should not be affected by this change. The exit door or exit access door is already provided for the extraction room and this proposal simply changes the direction of swing for that door.

Public Comment# 2560

F186-21 Part I

Proposed Change as Submitted

Proponents: Michael O'Brian, representing FCAC (fcac@iccsafe.org); Mike Nugent, Chair, representing ICC Building Code Action Committee (bcac@iccsafe.org)

THIS IS A TWO PART CODE CHANGE. PART 1 OF THIS PROPOSAL WILL BE HEARD BY THE FIRE CODE COMMITTEE AND PART 2 OF THIS PROPOSAL WILL BE HEARD BY THE BUILDING CODE GENERAL COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THAT COMMITTEE.

2021 International Fire Code

SECTION 4005
FIRE PROTECTION

Delete without substitution:

~~**4005.1 Automatic sprinkler system.** The storage of distilled spirits and wines shall be protected by an *approved automatic sprinkler system* as required by Chapter 9.~~

Add new text as follows:

4005.1 Palletized storage of distilled spirits in wooden barrels.
The palletized storage of distilled spirits shall be protected by an *approved automatic sprinkler system* installed throughout the building in accordance with Section 903.3.1.1 as modified in this section.

4005.1.1 Storage height.
Palletized storage arrays of barrels stored on-end shall be limited to a maximum of 7 pallets high.

4005.1.2 Flue spaces.
Flue spaces with a minimum width of 6 inches (152 mm) shall be maintained between adjacent pallets.

4005.1.3 Loading aisles.
Palletized storage that is provided with a defined loading aisle between pallet storage areas shall be arranged using one of the following:

1. Draft curtains, installed in accordance with Section 4005.1.3.1, shall be provided along the side of palletized storage facing the loading aisle to separate the quick response sprinklers and standard response sprinklers.
2. A trench drain shall be provided on each side of the loading aisle, arranged to capture any spilled distilled spirits in the aisle space and remove them from the building to prevent spills from spreading into the barrel storage area.
3. Barrels shall be banded on each pallet to prevent barrels from falling off pallets during transportation and loading into the storage racks.

4005.1.3.1 Draft curtains.
Where installed in accordance with Section 4005.1.3, Item 1, draft curtains shall be designed and construction in accordance with Sections 4005.1.3.1.1 through 4005.1.3.1.3.

4005.1.3.1.1 Construction.
Draft curtains shall be constructed of sheet metal, lath and plaster, gypsum board or other approved noncombustible materials that provide equivalent performance to resist the passage of smoke. Joints and connections shall be designed to resist the passage of smoke.

4005.1.3.1.2 Location.
Draft curtains shall be located along loading aisles serving storage areas.

4005.1.3.1.3 Depth.
Draft curtains shall extend vertically downward from the ceiling for a minimum distance of 20 percent of the ceiling height measured from the floor, with a minimum depth of 6 feet (1829 mm).

4005.1.4 Automatic sprinkler system design.
Storage heights and automatic sprinkler densities for palletized on-end barrels shall in accordance with Table 4005.1.4 and Sections 4005.1.4.1 through 4005.1.4.6.

TABLE 4005.1.4 Palletized Storage of Distilled Spirits with up to 75% Alcohol by Volume in Wooden Barrels

Protection Area	**Sprinkler System Type**	**Maximum Ceiling Height (feet)**	**Maximum Storage Height**	**Ceiling Sprinkler Protection: Response / Nominal Temperature Rating / Orientation**	**K-factor gpm/psi$^{1/2}$**	**Design[a], # of Sprinklers @ Pressure (psi)**
Barrel Storage	Wet-pipe	30	24 feet or 7 barrels	QR / 165ºF / Pendent	14.0	12 @ 18
	Dry-pipe			SR / 286ºF / Upright	16.8	24 @ 13
	Wet-pipe	30	1 barrel	Any / 165ºF / Any	11.2	30 @ 7
	Dry-pipe			SR / 286ºF / Upright	11.2	50 @ 7
	Wet-pipe	30	2 barrels	SR / 286ºF / Any	11.2	50 @ 29
Loading Aisle w/ Draft Curtain	Wet-pipe or Dry-pipe	30	NA	SR / 286ºF / Any	5.6	100 @ 13
					> 8.0	100 @ 7
Loading Aisle w/ Trench Drains or Banded Barrels or No Permanent Loading Aisle	Provide the barrel storage design across the entire roof area (i.e., storage area and loading aisle)					

For SI: 1 foot = 304.8 mm; 1 pound per square inch (psi) = 6.895 kPa; K-Factor of 1 gpm/psi0.5 = 14.395 L/min/bar0.5; °C = [(°F)-32]/1.8.

Notes: QR = quick response sprinkler; SR = standard response sprinkler.

a. Sprinklers shall have a maximum coverage area of 100 square feet (9.3 m²).

4005.1.4.1 Protected product.
The storage and automatic sprinkler requirements in Table 4005.1.4 apply to alcohol-water mixtures greater than 20 percent and up to 75 percent alcohol by volume in wooden barrel sizes not exceeding 130 gallons (492 L).

4005.1.4.2 Hose stream allowance.
The automatic sprinkler design shall include a 500 gallons per minute (1900 L/min) hose stream allowance.

4005.1.4.3 Water supply duration.
The automatic sprinkler system water supply duration, including hose stream demand, shall be a minimum of one hour.

4005.1.4.4 Automatic sprinkler system balancing.
Where a permanent loading aisle is provided with a separate automatic sprinkler system on the ceiling, the barrel storage automatic sprinkler design and the loading aisle automatic sprinkler design are not required to be balanced at the point of connection.

4005.1.4.5 Dry pipe sprinkler systems.
Where dry-pipe sprinkler systems are installed, the sprinkler system shall be designed to deliver water to the most remote 4 sprinklers within 40 seconds.

4005.1.4.6 Small distilled spirits facilities.
Fire protection for palletized storage of distilled spirits in small distilled spirits facilities not greater than 7,500 square feet (697 m²) is permitted to be in accordance with Sections 4005.1.4.6.1 through 4005.1.4.6.3.

4005.1.4.6.1 Ceiling clearance.
The clearance from the top of storage to the deflector of the automatic sprinklers at the ceiling shall be a minimum of 18 inches (457 mm) and a maximum of 10 feet (3048 mm).

4005.1.4.6.2 Automatic sprinkler coverage area.
The automatic sprinkler coverage area shall not exceed 80 square feet (7.4 m2) per sprinkler.

4005.1.4.6.3 Fire protection scheme.
The storage arrangement and automatic sprinkler system design shall be in accordance with Table 4005.1.4.6.3.

TABLE 4005.1.4.6.3 PALLETIZED STORAGE OF DISTILLED SPIRITS IN WOODEN BARRELS IN SMALL DISTILLED SPIRITS FACILITIES

Protection Area	**Sprinkler System Type**	**Maximum Ceiling Height (feet)**	**Maximum Storage Height (feet)**	**Ceiling Sprinkler Protection**			
				Response / Temperature Rating / Orientation	**K-factor ($gpm/psi^{1/2}$)**	**Sprinkler Density (gpm/ft^2)**	**Area (square feet)**
Barrel Storage	Wet-pipe	24	12	SR / 286ºF / Any	≥ 11.2	0.35	4000
				SR / 165ºF / Any	≥ 11.2	0.35	7500

For SI: 1 foot = 304.8 mm; 1 pound per square inch (psi) = 6.895 kPa; K-Factor of 1 gpm/psi0.5 = 14.395 L/min/bar0.5; °C = [(°F)-32]/1.8; 1 gallon per minute per square foot = 40.75 L/min/m².

Notes: SR = standard response sprinkler.

4005.2 Rack storage in wooden barrels.
The rack storage of distilled spirits and wine greater than 20 percent alcohol shall be protected by an approved automatic sprinkler system installed throughout in accordance with Section 903.3.1.1 and Sections 4005.2.1 through 4005.2.3.5.2.

4005.2.1 Flues spaces for on-side wooden barrels.
Rack storage for on-side wooden barrels shall be provided with a minimum width of 8 inches (203 mm) between adjacent rows of barrels.

4005.2.1.1 Elevated walkways.
Where provided, elevated walkways between barrels shall be constructed in accordance with one of the following:

1. Noncombustible materials that are 50 percent open.
2. Noncombustible materials that are open less than 50 percent provided the walkway has a maximum width of 1 foot (0.3 m) and a minimum gap of 3 inches (76 mm) is provided between the walkway and the barrel storage.
3. Combustible materials and provided with a row of automatic sprinklers directly beneath each walkway.

4005.2.2 Flues spaces for on-end wooden barrels.
Rack storage arrangements with on-end wooden barrels shall be provided with transverse and longitudinal flue spaces with a minimum width of 6 inches (15 cm).

4005.2.3 Fire protection for rack storage.
Rack storage arrangements of alcohol-water mixtures up to 75 percent alcohol in wooden barrel with sizes not exceeding 130 gallons (492 L) shall be protected in accordance with Sections 4005.2.3.1 through 4005.2.3.5.2.

4005.2.3.1 Hose stream allowance.
The automatic sprinkler system design shall include a 500 gallons per minute (1900 L/min) hose stream allowance.

4005.2.3.2 Water supply duration.
The automatic sprinkler system water supply duration, including hose stream demand, shall be a minimum of one hour.

4005.2.3.3 Dry-pipe automatic sprinkler system.
Where dry-pipe automatic sprinkler systems are installed, the automatic sprinkler system shall be designed to deliver water to the most remote 4 sprinklers within 40 seconds.

4005.2.3.4 Ceiling automatic sprinkler systems.
The automatic sprinkler systems installed at the ceiling shall be designed with a minimum density of 0.2 gallons per minute per square foot (0.8 L/min) with an operating area of 2,000 square feet (186 m2).

4005.2.3.5 Automatic sprinkler system balancing.
The automatic sprinkler system installed at the ceiling and the in-rack sprinkler system shall be balanced at the point of connection.

4005.2.3.6 Automatic sprinkler system design.
The design of the automatic sprinkler system at the ceiling and the in-rack sprinkler system shall be in accordance with Table 4005.2.3.6.

TABLE 4005.2.3.6 RACK STORAGE OF DISTILLED SPIRITS IN WOODEN BARRELS

Barrel Arrangement	Sprinkler System Type	Maximum Ceiling Height (feet)	Maximum Storage Height	Minimum Aisle Width (feet)	Ceiling Sprinkler Protection			In-Rack Sprinkler Protection			
					Response / Nominal Temperature Rating / Orientation	K-factor (gpm/psi$^{1/2}$)	Design, # of Sprinklers @ Pressure (psi)	Layout	Response / Nominal Temperature Rating	K-factor (gpm/psi$^{1/2}$)	Design [a], # of Sprinklers @ Pressure (psi)
On-Side	Wet	40	33 feet / 9 barrels	NA	QR / 165°F / Pendent	14.0	12 @ 37	None			
					SR / 286°F / Any	≥ 11.2	20 @ 7	Figures 4005.2.3.6(1) and 4005.2.3.6(2)	QR / 165°F / Any	8.0 (115)	6 @ 45 [one level of in racks] or 12 @ 45 [more than one level of in-racks]
	Dry	40	33 feet / 9 barrels	NA	SR / 286°F / Upright	16.8	24 @ 25	None			
					SR / 286°F / Upright	≥ 11.2	20 @ 7	Figures 4005.2.3.6(1) and 4005.2.3.6(2)	QR / 165°F / Upright	8.0 (115)	6 @ 45 [one level of in racks] Or 12 @ 45 [more than one level of in-racks]
On-End	Wet	30	25 feet / 5 barrels	8	SR / 286°F / Any	≥ 11.2	50 @ 7	Figures 4005.2.3.6(3), 4005.2.3.6(4), 4005.2.3.6(5) and 4005.2.3.6(6)	QR / 165°F / Any	≥ 8.0 (115)	6 @ 25 [one level] or 12 @ 25 [more than one level of in-racks]

For SI: 1 foot = 304.8 mm; 1 pound per square inch (psi) = 6.895 kPa; K-Factor of 1 gpm/psi0.5 = 14.395 L/min/bar0.5; °C = [(°F)-32]/1.8; 1 gallon per minute per square foot = 40.75 L/min/m².

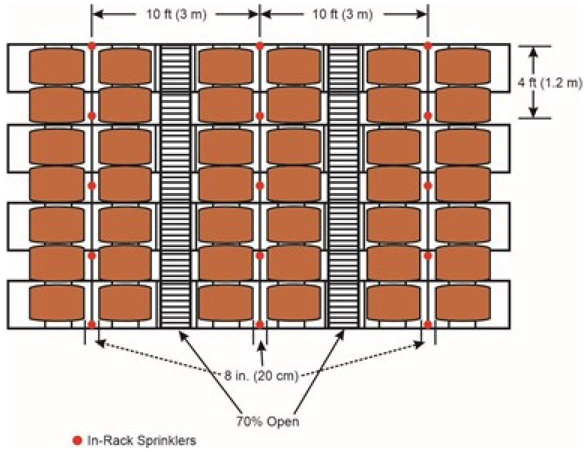
Notes: QR – quick response sprinkler; SR – standard response sprinkler.

a. Sprinklers shall have a maximum coverage area of 100 square feet (9.3 m²).

For SI: 1 foot = 304.8 mm; 1 pound per square inch (psi) = 6.895 kPa; K-Factor of 1 gpm/psi0.5 = 14.395 L/min/bar0.5; ° C = [(° F)-32]/1.8; 1 gallon per minute per square foot = 40.75 L/min/m².

Notes: QR – quick response sprinkler; SR – standard response sprinkler.

a. Sprinklers shall have a maximum coverage area of 100 square feet (9.3 m²).



<u>Figure 4005.2.3.6(1) In-rack sprinkler layout for wooden barrels on their sides (plan view)</u>

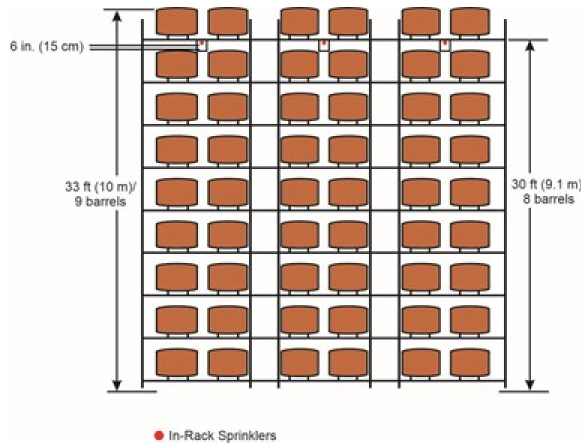
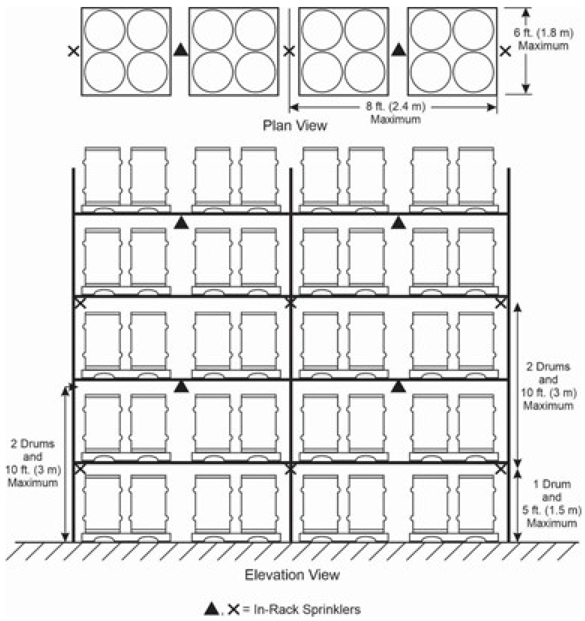


FIGURE 4005.2.3.6(2)
IN-RACK SPRINKLER LAYOUT FOR WOODEN BARRELS ON THEIR SIDES (ELEVATION VIEW)



<u>FIGURE 4005.2.3.6(3)</u> <u>IN-RACK SPRINKLER LAYOUT FOR SINGLE ROW RACK OF ON-END WOODEN BARRELS</u>

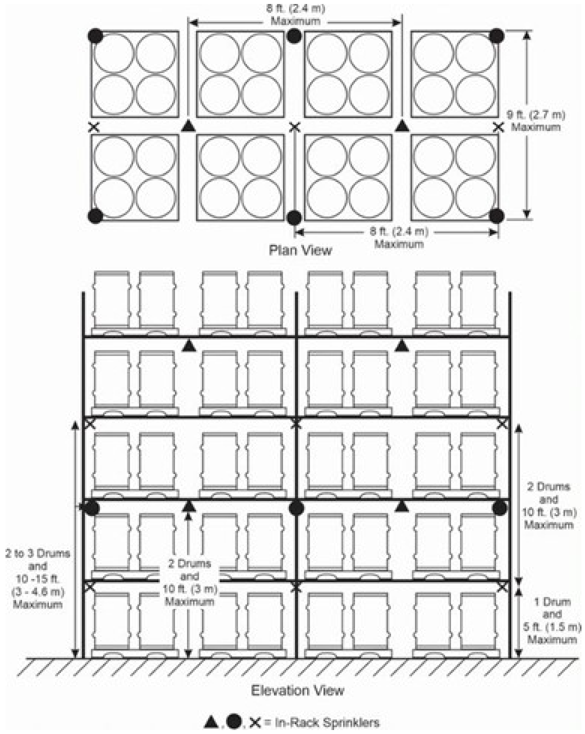


FIGURE 4005.2.3.6(4) IN-RACK SPRINKLER LAYOUT FOR DOUBLE ROW RACK OF ON-END WOODEN BARRELS

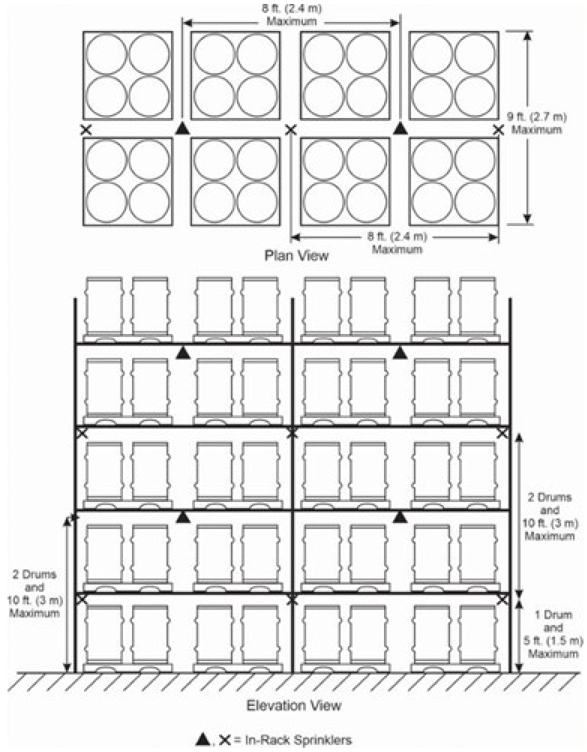
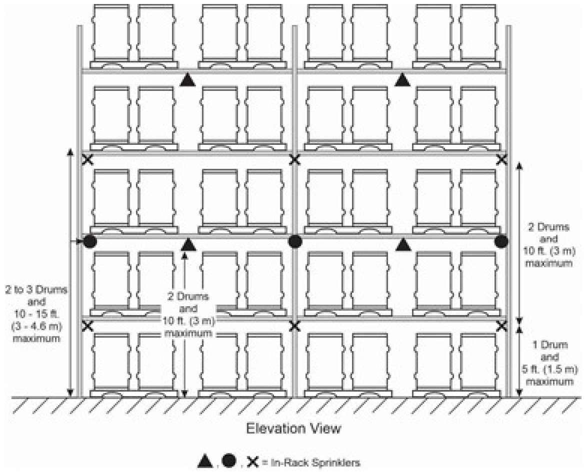


FIGURE 4005.2.3.6(5) IN-RACK SPRINKLER LAYOUT FOR DOUBLE ROW RACK OF ON-END WOODEN BARRELS



<u>FIGURE 4005.2.3.6(6)</u> <u>IN-RACK SPRINKLER LAYOUT FOR MULTIPLE ROW RACK OF ON-END WOODEN BARRELS</u>

<u>4005.3</u> <u>Wine 20 percent or less alcohol content</u>.
<u>The storage of wine in barrels with an alcohol content of 20 percent or less shall be protected by an approved automatic sprinkler system installed throughout in accordance with Section 903.3.1.1.</u>

Revise as follows:

~~4005.2~~ <u>4005.4</u> Portable fire extinguishers. *Approved* portable fire extinguishers shall be provided in accordance with Section 906.

Reason: This proposal provides guidance for storage and associated fire protection of alcoholic beverages both in warehouse and in small distillery facilities.
One of the conceptual changes is the threshold at which the percentage of alcohol results in a higher classification of hazard. Traditionally, beverages with an alcohol content greater than 16% were considered to present a higher level of hazard and were therefore placed into Group F-1 for manufacturing and packaging and Group S-1 for storage. Recent testing by FM Global demonstrates that the 16% threshold was too conservative and the threshold is being revised to 20%. Even recent revisions to Ch 32 list beverages in glass or ceramic containers with up to 20% alcohol content as a Class I commodity. The alcohol content does not raise the flammability of the liquid to an extent where additional levels of protection are necessary, and for the most part can be considered nonflammable or noncombustible. As a result, the manufacturing, packaging and storage of beverages with an alcohol content up to 20% will be classified as Group F-2 or S-2 as appropriate. This results in revisions to IBC Chapter 3 and the IFC occupancy definitions in Chapter 2.

The fire protection section provides specific sprinkler system design criteria. The requirements are based on the storage configuration:

- Palletized storage in Section 4005.1
- Rack storage in Section 4005.2

Palletized storage is then provided with design options in Section 4005.1.3:

- Provide draft curtains along the loading aisles
- Provide trench drains along each side of the loading aisles
- Provide straps to secure the barrels to the pallet
- There is a 4th option, which is to not provide a loading aisle at all. As stated in the charging sentence “palletized storage provided with a defined loading aisle...” In other words, the building or room is solid storage; it will have walkways to access the barrels but will not have a forklift loading aisle.

Each of these three designs provides a method of mitigating the spread of liquid or fire during a fire incident. These three protection features are again reference in Table 4005.1.4, and have an impact on the fire sprinkler system design.

The fire sprinkler design criteria is core of this code change. Table 4005.1.4 provides criteria for sprinkler system densities, storage heights and sprinkler selection. This design criteria is based on full-scale fire testing conducted by FM Global and presented in FM Data Sheet 7-29.

Section 4005.1.4 provides for a reduced level of sprinkler protection. Because of reduced level of protection, this section is limited to facilities no greater than 7,500 square feet and with a ceiling height of no more than 24 feet. The intent of this reduction is to allow the small distilleries with a reasonable level of protection based on the reduced fire load per square foot and limited size.

Rack storage is covered in Section 4005.2. This section contains specific requirements again based on storage method:

- Barrels stored on their side
- Barrels stored on-end

The difference in configuration results in different sprinkler design criteria in Table 4005.2.3.6. Rack storage is allowed up to 33 feet in height. Figures have been included to depict the in-rack sprinkler locations.

This proposal is submitted by the ICC Fire Code Action Committee (FCAC) and the ICC Building Code Action Committee (BCAC).

BCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2020 the BCAC has held several virtual meetings open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the BCAC website at BCAC.

The FCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance assigned International Codes with regard to fire and life safety in new and existing buildings and facilities as well as the protection of life and property in wildland urban interface areas. In 2020 and 2021 the Fire-CAC held multiple virtual meetings that were open to any interested party. In addition, there were numerous virtual specific working group meetings that were also open to any interested parties, to develop, discuss and debate the proposed changes. Related documentation and reports are posted on the FCAC website at: FCAC.

Bibliography: FM Global Property Loss Prevention Data Sheet 7-29, Ignitable Liquid Storage in Portable Containers, October 2020
Factory Mutual Insurance Company, Johnson, RI

Cost Impact: The code change proposal will not increase or decrease the cost of construction
Chapter 40 of the Fire Code already requires an approved fire sprinkler system for new distilleries and storage facilities for distilled spirits. This code change does not increase that requirement but will provide guidance and consistency in how jurisdictions apply the fire sprinkler requirement.

F186-21 Part I

Public Hearing Results

This proposal includes published errata

https://cdn-web.iccsafe.org/wp-content/uploads/2021-GROUP-A-CONSOLIDATED-MONOGRAPH-UPDATES-Updated-4-02-2021-complete.pdf

Committee Action: **As Submitted**

Committee Reason: The committee stated that the reason for approval was that the basis of this new prescriptive code section is data. As noted, it is not a one size fits all issue. The section addresses both the small and large distilleries and more importantly, the different configurations of storage based on the full-scale fire test data. Additionally, since there is a lot of these distilleries, it is necessary to make sure that they have a reasonable type of sprinkler system to provide appropriate mitigation for the hazards that are known to be possible with alcoholic beverages, which are now up to 20%. (Vote: 12-2)

F186-21 Part I

Individual Consideration Agenda

Public Comment 1:

IFC: 4005.1

Proponents: Michael O'Brian, representing FCAC (fcac@iccsafe.org) requests As Modified by Public Comment

Modify as follows:

2021 International Fire Code

4005.1 Palletized storage of distilled spirits in wooden barrels . The palletized storage of distilled spirits in wooden barrels shall be protected by an *approved automatic sprinkler system* installed throughout the building in accordance with Section 903.3.1.1 as modified in this section. The palletized storage of metal containers of distilled spirits shall be protected by an *approved automatic sprinkler system that complies with* Chapter 57.

Commenter's Reason: This public comment clarifies that the specific storage heights and associated sprinkler densities are addressed in Chapter 57 for metal containers. The provisions found with Section 4005.1.4 are based upon testing with wooden barrels.

Cost Impact: The net effect of the public comment and code change proposal will not increase or decrease the cost of construction
This simply clarifies the applicability of the automatic sprinkler system requirements based upon type of container.

Public Comment# 2325

Public Comment 2:

IFC: TABLE 4005.2.3.6, FIGURE 4005.2.3.6(4), FIGURE 4005.2.3.6(5), FIGURE 4005.2.3.6(6), 4005.2.3.6(5) (New)

Proponents: Michael O'Brian, representing FCAC (fcac@iccsafe.org) requests As Modified by Public Comment

Modify as follows:

2021 International Fire Code

TABLE 4005.2.3.6 RACK STORAGE OF DISTILLED SPIRITS IN WOODEN BARRELS

Portions of table not shown remain unchanged.

					Ceiling Sprinkler Protection			In-Rack Sprinkler Protection			
Barrel Arrangement	Sprinkler System Type	Maximum Ceiling Height (feet)	Maximum Storage Height	Minimum Aisle Width (feet)	Response / Nominal Temperature Rating / Orientation	K-factor (gpm/psi$^{1/2}$)	Design, # of Sprinklers @ Pressure (psi)	Layout	Response / Nominal Temperature Rating	K-factor (gpm/psi$^{1/2}$)	Design [a], # of Sprinklers @ Pressure (psi)
On-End	Wet	30	25 feet / 5 barrels	8	SR / 286°F / Any	≥ 11.2	50 @ 7	Figures 4005.2.3.6(3), 4005.2.3.6(4) and, 4005.2.3.6(5) ~~and~~ ~~4005.2.3.6(6)~~	QR / 165°F / Any	≥ 8.0 (115)	6 @ 25 [one level] or 12 @ 25 [more than one level of in-racks]

For SI: 1 foot = 304.8 mm; 1 pound per square inch (psi) = 6.895 kPa; K-Factor of 1 gpm/psi0.5 = 14.395 L/min/bar0.5; °C = [(°F)-32]/1.8; 1 gallon per minute per square foot = 40.75 L/min/m².

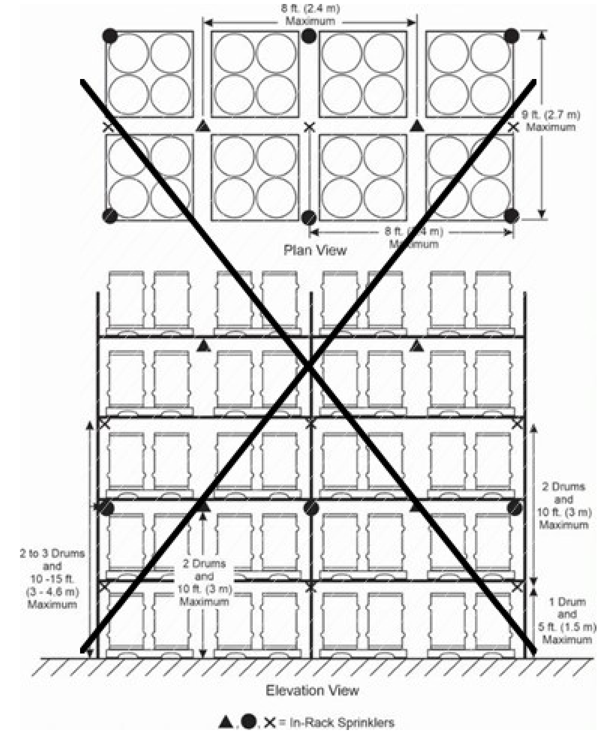
Notes: QR – quick response sprinkler; SR – standard response sprinkler.

a. Sprinklers shall have a maximum coverage area of 100 square feet (9.3 m²).

For SI: 1 foot = 304.8 mm; 1 pound per square inch (psi) = 6.895 kPa; K-Factor of 1 gpm/psi0.5 = 14.395 L/min/bar0.5; °C = [(°F)-32]/1.8; 1 gallon per minute per square foot = 40.75 L/min/m².

Notes: QR – quick response sprinkler; SR – standard response sprinkler.

a. Sprinklers shall have a maximum coverage area of 100 square feet (9.3 m²).



~~FIGURE 4005.2.3.6(4) IN-RACK SPRINKLER LAYOUT FOR DOUBLE ROW RACK OF ON-END WOODEN BARRELS~~

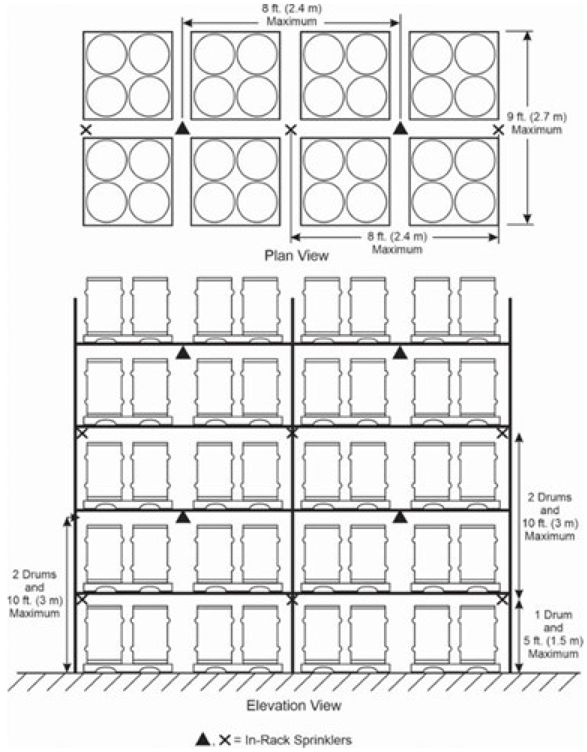


FIGURE ~~4005.2.3.6(5)~~ 4005.2.3.6(4) IN-RACK SPRINKLER LAYOUT FOR DOUBLE ROW RACK OF ON-END WOODEN BARRELS

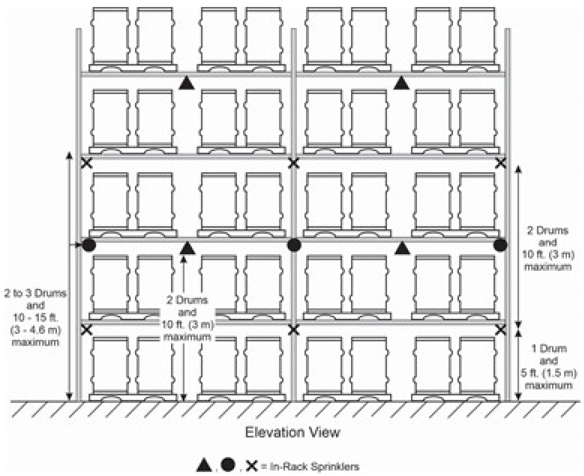
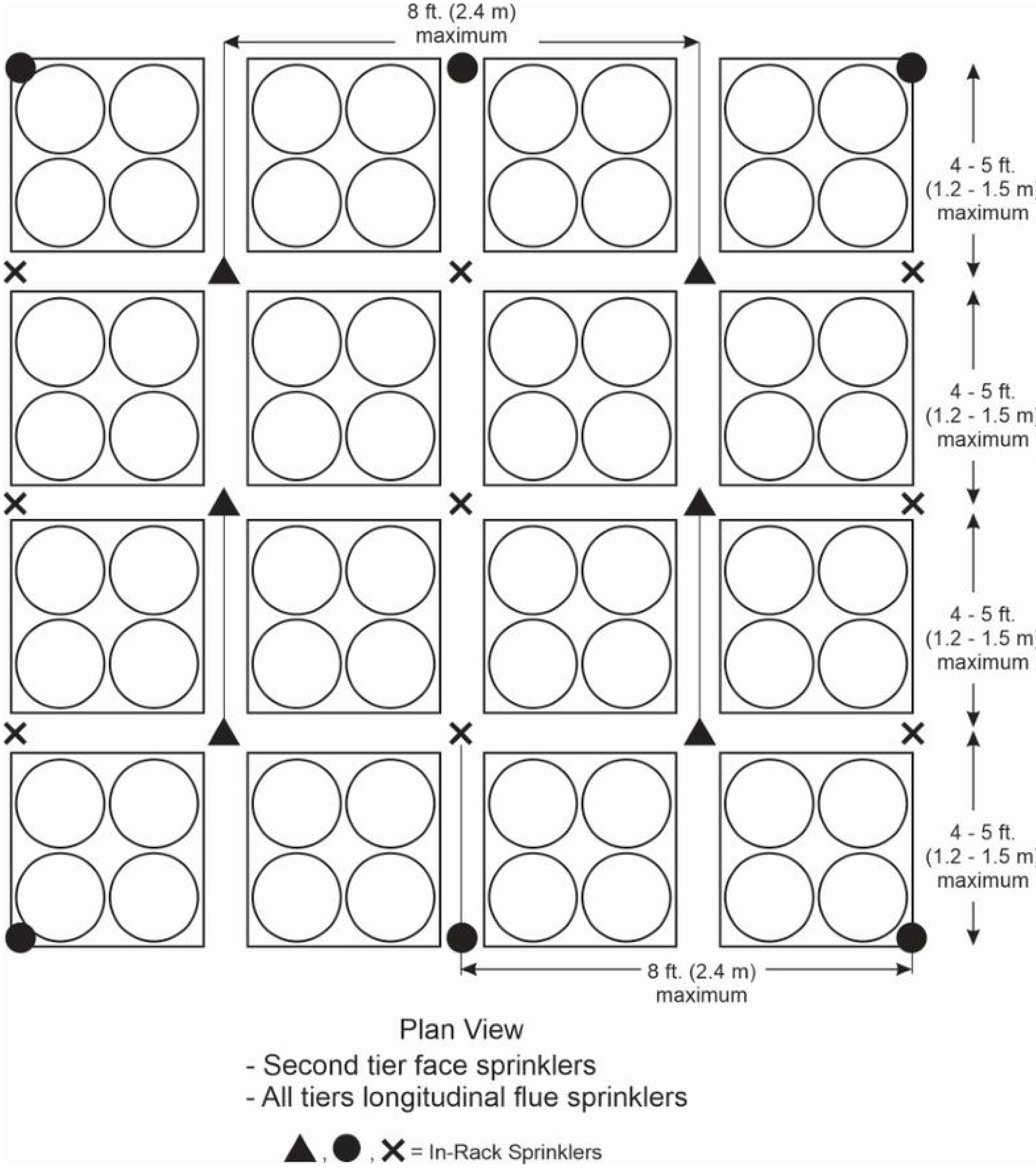


FIGURE ~~4005.2.3.6(6)~~ 4006.5.3.6(5) IN-RACK SPRINKLER LAYOUT FOR MULTIPLE ROW RACK OF ON-END WOODEN BARRELS



4005.2.3.6(5) IN-RACK SPRINKLER LAYOUT FOR MULTIPLE ROW RACK OF ON-END WOODEN BARRELS

Commenter's Reason: The purpose of this PC is simply editorial. First it removes an unnecessary Figure from the table and the proposal. Additionally, the plan view of what is now numbered as Figure 4005.2.3.6(5) was omitted in the original proposal and has been added by this PC.

Cost Impact: The net effect of the public comment and code change proposal will not increase or decrease the cost of construction
Provides an editorial fix to correct figures. The cost impact is unchanged from the original proposal.

Public Comment# 2326

Public Comment 3:

Proponents: Jeffrey Hugo, representing NFSA (hugo@nfsa.org) requests Disapprove

Commenter's Reason: The design criteria contained in this proposal is not ready for the IFC. It comes from FM Data Sheet 7-29 and the Distilled Spirits Council of the United States (DISCUS) *Recommended Fire Protection Practices for Distilled Spirits Beverage Facilities.* Both documents are

developed for clients, not by consensus This means the development of both above documents are not ANSI-based; open to the public for input, the ability for the public to comment, decided upon by a balanced committee, or voted upon by a membership.
By disapproving this change, the current Section 4005.1 (2021 edition) would remain and continue to require automatic sprinkler systems using Chapter 9. NFPA 13 (903.3.1.1) is the correct installation standard for Chapter 40, wherein it would reference to NFPA 30, the appropriate place for the design criteria for distilled spirits. NFPA standards, used extensively by the ICC, are ANSI-based open consensus-based standards that this information, such as the test reports, modeling, and data are evaluated and reviewed by fire protection experts in a full development cycle.

Public Inputs based on FM 7-29 are submitted in the 2024 NFPA 30 cycle and if approved could be referenced in the next or 2027 edition of the IFC, While there is a need for design criteria for these types of facilities, it is prudent to wait for NFPA 30 to complete its consensus-based process.

Cost Impact: The net effect of the public comment and code change proposal will not increase or decrease the cost of construction
No change to code.

Public Comment# 2867

F186-21 Part II

Proposed Change as Submitted

Proponents: Michael O'Brian, representing FCAC (fcac@iccsafe.org); Mike Nugent, Chair, representing ICC Building Code Action Committee (bcac@iccsafe.org)

2021 International Building Code

SECTION 306
FACTORY GROUP F

Revise as follows:

306.2 Moderate-hazard factory industrial, Group F-1. Factory industrial uses that are not classified as Factory Industrial F-2 Low Hazard shall be classified as F-1 Moderate Hazard and shall include, but not be limited to, the following:

- Aircraft (manufacturing, not to include repair)
- Appliances
- Athletic equipment
- Automobiles and other motor vehicles
- Bakeries
- Beverages: over ~~16 percent~~ 20 percent alcohol content
- Bicycles
- Boats
- Brooms or brushes
- Business machines
- Cameras and photo equipment
- Canvas or similar fabric
- Carpets and rugs (includes cleaning)
- Clothing
- Construction and agricultural machinery
- Disinfectants
- Dry cleaning and dyeing
- Electric generation plants
- Electronics
- Energy storage systems (ESS) in dedicated use buildings
- Engines (including rebuilding)
- Food processing establishments and commercial kitchens not associated with restaurants, cafeterias and similar dining facilities more than 2,500 square feet (232 m^2) in area
- Furniture
- Hemp products
- Jute products
- Laundries
- Leather products
- Machinery
- Metals
- Millwork (sash and door)
- Motion pictures and television filming (without spectators)
- Musical instruments
- Optical goods
- Paper mills or products
- Photographic film
- Plastic products
- Printing or publishing
- Recreational vehicles
- Refuse incineration
- Shoes
- Soaps and detergents
- Textiles
- Tobacco
- Trailers

- Upholstering
- Water/sewer treatment facilities
- Wood; distillation
- Woodworking (cabinet)

306.3 Low-hazard factory industrial, Group F-2. Factory industrial uses that involve the fabrication or manufacturing of noncombustible materials that during finishing, packing or processing do not involve a significant fire hazard shall be classified as F-2 occupancies and shall include, but not be limited to, the following:

- Beverages: up to and including ~~16 percent~~ <u>20 percent</u> alcohol content
- *Brick* and masonry
- Ceramic products
- Foundries
- Glass products
- Gypsum
- Ice
- Metal products (fabrication and assembly)

SECTION 311
STORAGE GROUP S

Revise as follows:

311.2 Moderate-hazard storage, Group S-1. Storage Group S-1 occupancies are buildings occupied for storage uses that are not classified as Group S-2, including, but not limited to, storage of the following:

- *Aerosol products*, Levels 2 and 3
- Aircraft hangar (storage and repair)
- Bags: cloth, burlap and paper
- Bamboos and rattan
- Baskets
- Belting: canvas and leather
- Beverages over ~~16 percent~~ <u>20 percent</u> alcohol content
- Books and paper in rolls or packs
- Boots and shoes
- Buttons, including cloth covered, pearl or bone
- Cardboard and cardboard boxes
- Clothing, woolen wearing apparel
- Cordage
- Dry boat storage (indoor)
- Furniture
- Furs
- Glues, mucilage, pastes and size
- Grains
- Horns and combs, other than celluloid
- Leather
- Linoleum
- Lumber
- Motor vehicle *repair garages* complying with the maximum allowable quantities of *hazardous materials* specified in Table 307.1(1) (see Section 406.8)
- Photo engravings
- Resilient flooring
- *Self-service storage facility* (mini-storage)
- Silks
- Soaps
- Sugar
- Tires, bulk storage of
- Tobacco, cigars, cigarettes and snuff
- Upholstery and mattresses
- Wax candles

311.3 Low-hazard storage, Group S-2. Storage Group S-2 occupancies include, among others, buildings used for the storage of noncombustible materials such as products on wood pallets or in paper cartons with or without single thickness divisions; or in paper wrappings. Such products are permitted to have a negligible amount of plastic *trim*, such as knobs, handles or film wrapping. Group S-2 storage uses shall include, but not be limited to, storage of the following:

- Asbestos
- Beverages up to and including ~~16 percent~~ 20 percent alcohol
- Cement in bags
- Chalk and crayons
- Dairy products in nonwaxed coated paper containers
- Dry cell batteries
- Electrical coils
- Electrical motors
- Empty cans
- Food products
- Foods in noncombustible containers
- Fresh fruits and vegetables in nonplastic trays or containers
- Frozen foods
- Glass
- Glass bottles, empty or filled with noncombustible liquids
- *Gypsum board*
- Inert pigments
- Ivory
- Meats
- Metal cabinets
- Metal desks with plastic tops and *trim*
- Metal parts
- Metals
- Mirrors
- Oil-filled and other types of distribution transformers
- Public parking garages, open or enclosed
- Porcelain and pottery
- Stoves
- Talc and soapstones
- Washers and dryers

Reason: This proposal provides guidance for storage and associated fire protection of alcoholic beverages both in warehouse and in small distillery facilities.
One of the conceptual changes is the threshold at which the percentage of alcohol results in a higher classification of hazard. Traditionally, beverages with an alcohol content greater than 16% were considered to present a higher level of hazard and were therefore placed into Group F-1 for manufacturing and packaging and Group S-1 for storage. Recent testing by FM Global demonstrates that the 16% threshold was too conservative and the threshold is being revised to 20%. Even recent revisions to Ch 32 list beverages in glass or ceramic containers with up to 20% alcohol content as a Class I commodity. The alcohol content does not raise the flammability of the liquid to an extent where additional levels of protection are necessary, and for the most part can be considered nonflammable or noncombustible. As a result, the manufacturing, packaging and storage of beverages with an alcohol content up to 20% will be classified as Group F-2 or S-2 as appropriate. This results in revisions to IBC Chapter 3 and the IFC occupancy definitions in Chapter 2.

The fire protection section provides specific sprinkler system design criteria. The requirements are based on the storage configuration:

- Palletized storage in Section 4005.1
- Rack storage in Section 4005.2

Palletized storage is then provided with design options in Section 4005.1.3:

- Provide draft curtains along the loading aisles
- Provide trench drains along each side of the loading aisles
- Provide straps to secure the barrels to the pallet
- There is a 4th option, which is to not provide a loading aisle at all. As stated in the charging sentence “palletized storage provided with a defined loading aisle...” In other words, the building or room is solid storage; it will have walkways to access the barrels but will not have a forklift loading aisle.

Each of these three designs provides a method of mitigating the spread of liquid or fire during a fire incident. These three protection features are again reference in Table 4005.1.4, and have an impact on the fire sprinkler system design.

The fire sprinkler design criteria is core of this code change. Table 4005.1.4 provides criteria for sprinkler system densities, storage heights and sprinkler selection. This design criteria is based on full-scale fire testing conducted by FM Global and presented in FM Data Sheet 7-29.

Section 4005.1.4 provides for a reduced level of sprinkler protection. Because of reduced level of protection, this section is limited to facilities no greater than 7,500 square feet and with a ceiling height of no more than 24 feet. The intent of this reduction is to allow the small distilleries with a reasonable level of protection based on the reduced fire load per square foot and limited size.

Rack storage is covered in Section 4005.2. This section contains specific requirements again based on storage method:

- Barrels stored on their side
- Barrels stored on-end

The difference in configuration results in different sprinkler design criteria in Table 4005.2.3.6. Rack storage is allowed up to 33 feet in height. Figures have been included to depict the in-rack sprinkler locations.

This proposal is submitted by the ICC Fire Code Action Committee (FCAC) and the ICC Building Code Action Committee (BCAC).

BCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2020 the BCAC has held several virtual meetings open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the BCAC website at BCAC.

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Factory Mutual Insurance Company, Johnson, RI

Cost Impact: The code change proposal will not increase or decrease the cost of construction
Chapter 40 of the Fire Code already requires an approved fire sprinkler system for new distilleries and storage facilities for distilled spirits. This code change does not increase that requirement but will provide guidance and consistency in how jurisdictions apply the fire sprinkler requirement.

F186-21 Part II

Public Hearing Results

Committee Action: **As Submitted**

Committee Reason: This proposal was approved for S-1 and F-1 occupancies and the alcohol content of beverages as providing consistency with other provisions in the IBC and IFC, including IFC Table 3203.8. (Vote: 14-0)

F186-21 Part II

Individual Consideration Agenda

Public Comment 1:

IBC: SECTION 306, 306.2, 306.3, SECTION 311, 311.2, 311.3

Proponents: Brad Emerick, representing Myself requests As Modified by Public Comment

Modify as follows:

SECTION 306
FACTORY GROUP F

306.2 Moderate-hazard factory industrial, Group F-1 . Factory industrial uses that are not classified as Factory Industrial F-2 Low Hazard shall be classified as F-1 Moderate Hazard and shall include, but not be limited to, the following:

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- Athletic equipment
- Automobiles and other motor vehicles
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- Beverages: over ~~20~~ 17.7 percent alcohol content
- Bicycles
- Boats
- Brooms or brushes
- Business machines
- Cameras and photo equipment
- Canvas or similar fabric
- Carpets and rugs (includes cleaning)
- Clothing
- Construction and agricultural machinery
- Disinfectants
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- Electric generation plants
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- Engines (including rebuilding)
- Food processing establishments and commercial kitchens not associated with restaurants, cafeterias and similar dining facilities more than 2,500 square feet (232 m^2) in area
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- Hemp products
- Jute products
- Laundries
- Leather products
- Machinery
- Metals
- Millwork (sash and door)
- Motion pictures and television filming (without spectators)
- Musical instruments
- Optical goods
- Paper mills or products
- Photographic film
- Plastic products
- Printing or publishing
- Recreational vehicles
- Refuse incineration
- Shoes
- Soaps and detergents
- Textiles
- Tobacco
- Trailers
- Upholstering
- Water/sewer treatment facilities
- Wood; distillation
- Woodworking (cabinet)

306.3 Low-hazard factory industrial, Group F-2 . Factory industrial uses that involve the fabrication or manufacturing of noncombustible materials that during finishing, packing or processing do not involve a significant fire hazard shall be classified as F-2 occupancies and shall include, but not be limited to, the following:

- Beverages: up to and including ~~20~~ 17.7 percent alcohol content
- *Brick* and masonry
- Ceramic products
- Foundries
- Glass products
- Gypsum
- Ice
- Metal products (fabrication and assembly)

SECTION 311
STORAGE GROUP S

311.2 Moderate-hazard storage, Group S-1 . Storage Group S-1 occupancies are buildings occupied for storage uses that are not classified as Group S-2, including, but not limited to, storage of the following:

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- Bamboos and rattan
- Baskets
- Belting: canvas and leather
- Beverages over ~~20~~ 17.7 percent alcohol content
- Books and paper in rolls or packs
- Boots and shoes
- Buttons, including cloth covered, pearl or bone
- Cardboard and cardboard boxes
- Clothing, woolen wearing apparel
- Cordage
- Dry boat storage (indoor)
- Furniture
- Furs
- Glues, mucilage, pastes and size
- Grains
- Horns and combs, other than celluloid
- Leather
- Linoleum
- Lumber
- Motor vehicle *repair garages* complying with the maximum allowable quantities of *hazardous materials* specified in Table 307.1(1) (see Section 406.8)
- Photo engravings
- Resilient flooring
- *Self-service storage facility* (mini-storage)
- Silks
- Soaps
- Sugar
- Tires, bulk storage of
- Tobacco, cigars, cigarettes and snuff
- Upholstery and mattresses
- Wax candles

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- Asbestos
- Beverages up to and including ~~20~~ 17.7 percent alcohol
- Cement in bags
- Chalk and crayons
- Dairy products in nonwaxed coated paper containers
- Dry cell batteries
- Electrical coils
- Electrical motors

- Empty cans
- Food products
- Foods in noncombustible containers
- Fresh fruits and vegetables in nonplastic trays or containers
- Frozen foods
- Glass
- Glass bottles, empty or filled with noncombustible liquids
- *Gypsum board*
- Inert pigments
- Ivory
- Meats
- Metal cabinets
- Metal desks with plastic tops and *trim*
- Metal parts
- Metals
- Mirrors
- Oil-filled and other types of distribution transformers
- Public parking garages, open or enclosed
- Porcelain and pottery
- Stoves
- Talc and soapstones
- Washers and dryers

Commenter's Reason: This proposed modification is simply to accurately correlate the threshold between *Moderate-* and *Low-Hazard Occupancies* that produce, handle and store alcohol beverages with the definitions of *Flammable* and *Combustible Liquids*.
Facilities that produce, handle and store alcohol beverages (less than the Maximum Allowable Quantities or MAQs) are classified as **Moderate-Hazard** (e.g., distilleries) and **Low-Hazard** (e.g., breweries and wineries).

The definitions of ***Flammable*** *Liquids* and ***Combustible*** *Liquids* are international standards. DOT, TTB, ICC, OSHA, NFPA, etc., etc., all recognize the definition of ***Flammable Liquid*** as "A liquid having a Closed Cup Flash Point **below 100°F (38°C)**" and the definition of "***Combustible Liquid*** as "A liquid having a Closed Cup Flash Point **at or above 100°F (38°C)**" in their codes and standards.

The concentration of alcohol in an alcohol beverage with a Closed Cup Flash Point of **100°F** is 17.74%.

The table below lists concentrations of alcohol in water from 0% to 100% and the corresponding Closed Cup Flash Point temperatures.

Alcohol by Volume (ABV)	Closed Cup Flash Point	Reference
0%		
5%	144 °F	(1)
10%	120 °F	(1)
17.7%	100 °F	(3)
20%	97 °F	(1)
30%	85 °F	(1)
40%	79 °F	(1)
50%	75 °F	(1)
60%	72 °F	(1)
70%	70 °F	(1)
80%	68 °F	(1)
90%	65 °F	(1)
95%	63 °F	(1)
100%	55 °F	(2)

Bibliography: Reference

(1) Fire Protection Guide to Hazardous Materials 14ed; NFPA

(2) An Introduction to Fire Dynamics 2ed; Drysdale

(3) 6th Order Polynomial Regression with R^2=0.9994

Cost Impact: The net effect of the public comment and code change proposal will not increase or decrease the cost of construction
Increasing the previous threshold of 16% to 17.7% allows more wineries and breweries to be classified to a lower-hazard threshold.

Public Comment# 2737

F204-21

Proposed Change as Submitted

Proponents: Kevin Duerr-Clark, representing New York State Department of State (kevin.duerr-clark@dos.ny.gov); Chad Sievers, representing NYS Dept. of State (chad.sievers@dos.ny.gov)

2021 International Fire Code

Revise as follows:

5704.2.13.1.4 Tanks abandoned in place. Tanks abandoned in place shall be as follows:

1. ~~*Flammable* and *combustible liquids* shall be removed from the tank and connected piping.~~ The entire contents of the tank and related piping shall be emptied, cleaned, and purged of all vapor. The contents of the storage tank and related piping shall be removed from the premises or property and disposed of in accordance with applicable local, state, or federal rules and regulations.
2. The suction, inlet, gauge, vapor return and vapor lines shall be disconnected and either be permanently removed, capped, plugged, or filled with concrete.
3. Underground tanks shall be filled completely with an *approved* inert solid material. Above-ground tanks may either be filled with an approved inert solid material or if not filled with an *approved* inert solid material then the vent line shall remain open and intact.
~~The tank shall be filled completely with an *approved* inert solid material.~~
4. Remaining underground piping shall be capped or plugged.

   Exception: Piping that is reused for the installation of a new tank and meets the applicable requirements for the new installation shall be allowed to remain where approved by the fire code official.
5. A record of tank size, location and date of abandonment shall be retained.
6. All exterior above-grade fill piping shall be permanently removed when tanks are abandoned or removed, or the oil fill pipe shall be filled with concrete.
7. Tanks with automatic delivery shall have the supplier or suppliers notified in writing a minimum of 24 hours prior to the abandonment, instructing them to discontinue deliveries.

5704.2.14 Removal and disposal of tanks. Removal and disposal of tanks shall comply with Sections 5704.2.14.1 and 5704.2.14.2.

Revise as follows:

5704.2.14.1 Removal. Removal of above-ground and underground tanks shall be in accordance with all of the following:

1. ~~*Flammable* and *combustible liquids* shall be removed from the tank and connected piping.~~ The entire contents of the tank and related piping shall be emptied, cleaned, purged of all vapor, and inerted.
2. Piping at tank openings that is not to be used further shall be disconnected.
3. Piping shall be removed from the ground.

   ~~Exception~~ Exceptions:

   1. Piping is allowed to be abandoned in place where the *fire code official* determines that removal is not practical. Abandoned piping shall be capped and safeguarded as required by the *fire code official*.
   2. Piping that is reused for the installation of a new tank and meets the applicable requirements for the new installation shall be allowed to remain where *approved* by the *fire code official*.

4. Tank openings shall be capped or plugged, leaving a $^{1}/_{8}$-inch to $^{1}/_{4}$-inch-diameter (3.2 mm to 6.4 mm) opening for pressure equalization.
5. Tanks shall be purged of vapor and inerted prior to removal.
6. All exterior above-grade fill and vent piping shall either be permanently removed or filled with concrete.

   Exception: Piping associated with bulk plants, terminal facilities and refineries.
7. Tanks with automatic delivery shall have the supplier or suppliers notified in writing a minimum of 24 hours prior to the removal, instructing them to discontinue deliveries.

5704.2.14.2 Disposal. ~~Tanks shall be disposed of in accordance with federal, state and local regulations.~~ The tank and related piping, and the contents of the tank and related piping shall be removed from the premises and disposed of in accordance with applicable local, state, or federal rules and regulations

Reason: This change provides some additional clarity on proper removal and disposal of the materials within tanks that are abandoned in place and those removed and disposed of. It is also attempting to clarify scenarios where either reuse of existing piping is necessary for replacement tank installations, or for when removal of all piping would be unnecessarily onerous. Lastly, it requires property owner notification to supplies when the tank is abandoned or removed. This was done to help minimize the chances of a supplier attempting to fill a tank that has been abandoned or removed, resulting in a spill and costly remediation.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
These changes provide some more flexibility in the abandonment and removal of tanks while clarifying what would already be required by local, state, and federal laws. The only potential small cost, which is not a construction cost, would be the cost to the property owner to notify the suppliers. Depending on the method of notification (electronic such as email, or a mailed letter), the cost would be marginal.

F204-21

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: This proposal was disapproved as the details are not complete with the proposal such as how a fill pipe is addressed to avoid accidental filling. It allows the fill pipe to remain in place if filled with concrete. Also, it was pointed out that as written the contents of the tank need to be cleaned versus the tank itself. (Vote 13-0)

F204-21

Individual Consideration Agenda

Public Comment 1:

IFC: 5704.2.13.1.4, 5704.2.14.1

Proponents: Chad Sievers, representing NYS Dept. of State (chad.sievers@dos.ny.gov); Kevin Duerr-Clark, representing New York State Department of State (kevin.duerr-clark@dos.ny.gov) requests As Modified by Public Comment

Modify as follows:

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5704.2.13.1.4 Tanks abandoned in place . Tanks abandoned in place shall be as follows:

1. The entire contents of the tank and related piping shall be emptied, ~~cleaned,~~ and the tank purged of all vapor. The contents of the storage tank and related piping shall be removed from the premises or property and disposed of in accordance with applicable local, state, or federal rules and regulations.
2. The suction, inlet, gauge, vapor return and vapor lines shall be disconnected and either be permanently removed, capped, plugged, or filled ~~with concrete.~~ completely with an *approved* inert solid material.
3. ~~Underground tanks~~ Tanks shall be filled completely with an *approved* inert solid material. ~~Above-ground tanks may either be filled with an approved inert solid material or if not filled with an *approved* inert solid material then the vent line shall remain open and intact.~~
4. Remaining underground piping shall be capped or plugged.

   Exception: Piping that is reused for the installation of a new tank and meets the applicable requirements for the new installation shall be allowed to remain where approved by the fire code official.

5. A record of tank size, location and date of abandonment shall be retained.
6. All exterior above-grade fill piping shall be permanently removed when tanks are abandoned or removed, or the oil fill pipe shall be filled ~~with concrete~~ completely with an *approved* inert solid material.
7. ~~Tanks~~ owner of tanks with automatic delivery shall notify ~~have~~ the supplier or suppliers ~~notified~~ in writing a minimum of 24 hours prior to the

abandonment, instructing them to discontinue deliveries.

5704.2.14.1 Removal . Removal of above-ground and underground tanks shall be in accordance with all of the following:

1. The entire contents of the tank and related piping shall be emptied, ~~cleaned,~~ the tank and piping purged of all vapor, and inerted.
2. Piping at tank openings that is not to be used further shall be disconnected.
3. Piping shall be removed from the ground.

Exceptions:

1. Piping is allowed to be abandoned in place where the *fire code official* determines that removal is not practical. Abandoned piping shall be capped and safeguarded as required by the *fire code official*.
2. Piping that is reused for the installation of a new tank and meets the applicable requirements for the new installation shall be allowed to remain where *approved* by the *fire code official*.

4. Tank openings shall be capped or plugged, leaving a $^1/_8$-inch to $^1/_4$-inch-diameter (3.2 mm to 6.4 mm) opening for pressure equalization.
5. Tanks shall be purged of vapor and inerted prior to removal.
6. All exterior above-grade fill and vent piping shall either be permanently removed or filled ~~with~~ with an approved inert solid material.

~~concrete.~~

Exception: Piping associated with bulk plants, terminal facilities and refineries.

7. The owner of tanks ~~Tanks~~ with automatic delivery shall notify~~have~~ the supplier or suppliers ~~notified~~ in writing a minimum of 24 hours prior to the removal, instructing them to discontinue deliveries.

Commenter's Reason:
The additional modifications were made to:

1) The additional modifications increase clarity.
2) Eliminates the requirement for the tank to be cleaned, as
   a. There is no practical method to clean a tank.
   b. A clean tank will provide a minimal environmental benefit as most of the residual material will become bound with the fill material.
   c. Cleaning the tank will increase the amount of hazardous waste
   d. A clean tank may be subjective as there is no standard to define when a tank is clean.
   e. Cleaning a tank may require a person to enter the tank which is a dangerous activity.
3) Allows the pipe and tank to be filled with other materials besides just concrete such as foam, grout, or other acceptable material.

Cost Impact: The net effect of the public comment and code change proposal will not increase or decrease the cost of construction
These changes provide some more flexibility in the abandonment and removal of tanks while clarifying what would already be required by local, state, and federal laws. The only potential small cost, which is not a construction cost, would be the cost to the property owner to notify the suppliers. Depending on the method of notification (electronic such as email, or a mailed letter), the cost would be marginal.

Public Comment# 2571

F205-21

Proposed Change as Submitted

Proponents: Jonathan Roberts, representing UL LLC (jonathan.roberts@ul.com)

2021 International Fire Code

Revise as follows:

5705.5 Alcohol-based hand rubs classified as Class I or II liquids. The use of ~~wall-mounted~~ dispensers containing alcohol-based hand rubs classified as Class I or II liquids shall be in accordance with all of the following:

1. The maximum capacity of each dispenser shall be 68 ounces (2 L).
2. The minimum separation between dispensers shall be 48 inches (1219 mm).
3. ~~The d~~ Dispensers shall not be ~~installed~~ located above, below, or closer than 1 inch (25 mm) to an electrical receptacle, switch, appliance, device or other ignition source. The wall space between the dispenser and the floor or intervening counter top shall be free of electrical receptacles, switches, appliances, devices or other ignition sources.
4. Dispensers shall be ~~mounted~~ located so that the bottom of the dispenser is not less than 42 inches (1067 mm) and not more than 48 inches (1219 mm) above the finished floor.
5. Dispensers shall not obstruct required means of egress or be placed within 3 feet (914 mm) of an open flame, heating device or other ignition source.

~~5.~~ 6. Dispensers shall not release their contents except when the dispenser is manually activated. Facilities shall be permitted to install and use automatically activated "touch free" alcohol-based hand-rub dispensing devices with the following requirements:

- ~~5.1~~ 6.1. The facility or persons responsible for the dispensers shall test the dispensers each time a new refill is installed in accordance with the manufacturer's care and use instructions.
- ~~5.2~~ 6.2. Dispensers shall be designed and must operate in a manner that ensures accidental or malicious activations of the dispensing device are minimized. At a minimum, all devices subject to or used in accordance with this section shall have the following safety features:
  - ~~5.2.1~~ 6.2.1. Any activations of the dispenser shall only occur when an object is placed within 4 inches (98 mm) of the sensing device.
  - ~~5.2.2~~ 6.2.2. The dispenser shall not dispense more than the amount required for hand hygiene consistent with label instructions as regulated by the United States Food and Drug Administration (USFDA).
  - ~~5.2.3~~ 6.2.3. An object placed within the activation zone and left in place will cause only one activation.

~~6.~~ 7. Storage and use of alcohol-based hand rubs shall be in accordance with the applicable provisions of Sections 5704 and 5705.

~~7.~~ 8. Dispensers installed in occupancies with carpeted floors shall only be allowed in *smoke compartments* or *fire areas* equipped throughout with an *approved automatic sprinkler system* in accordance with Section 903.3.1.1 or 903.3.1.2.

5705.5.1 Corridor installations. In addition to the provisions of Section 5705.5, where ~~wall-mounted~~ dispensers containing alcohol-based hand rubs are ~~installed~~ located in *corridors* or rooms and areas open to the *corridor*, they shall be in accordance with all of the following:

1. Level 2 and 3 aerosol containers shall not be allowed in *corridors*.
2. The maximum capacity of each Class I or II liquid dispenser shall be 41 ounces (1.21 L) and the maximum capacity of each Level 1 aerosol dispenser shall be 18 ounces (0.51 kg).
3. The maximum quantity allowed in a *corridor* within a *control area* shall be 10 gallons (37.85 L) of Class I or II liquids or 1135 ounces (32.2 kg) of Level 1 aerosols, or a combination of Class I or II liquids and Level 1 aerosols not to exceed, in total, the equivalent of 10 gallons (37.85 L) or 1,135 ounces (32.2 kg) such that the sum of the ratios of the liquid and aerosol quantities divided by the allowable quantity of liquids and aerosols, respectively, shall not exceed one.
4. The minimum *corridor* width shall be 72 inches (1829 mm).
5. Projections into a *corridor* shall be in accordance with Section 1003.3.3.

Reason: Pandemics such as the Covid-19 virus have led to an increased need to provide hand sanitizer dispensers. This proposal removes the term "wall-mounted" in the scope of this section in order to cover all dispensers, including wall mounted and floor supported dispensers. It is not intended to apply to individual personal use hand sanitizers.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
It introduces an option for floor supported hand sanitizers to be used.

F205-21

Public Hearing Results

Committee Action: **As Modified**

Committee Modification:

5001.1 Scope. Prevention, control and mitigation of dangerous conditions related to storage, dispensing, use and handling of hazardous materials shall be in accordance with this chapter. This chapter shall apply to all hazardous materials, including those materials regulated elsewhere in this code, except that where specific requirements are provided in other chapters, those specific requirements shall apply in accordance with the applicable chapter. Where a material has multiple hazards, all hazards shall be addressed.

Exceptions:

1. In retail or wholesale sales occupancies, medicines, foodstuff, cosmetics and commercial or institutional products containing not more than 50 percent by volume of water-miscible liquids and with the remainder of the solutions not being flammable, provided that such materials are packaged in individual containers not exceeding 1.3 gallons (5 L).
2. Alcoholic beverages in retail or wholesale sales occupancies, provided that the liquids are packaged in individual containers not exceeding 1.3 gallons (5 L).
3. Application and release of pesticide and agricultural products and materials intended for use in weed abatement, erosion control, soil amendment or similar applications where applied in accordance with the manufacturer's instructions and label directions.
4. The off-site transportation of hazardous materials where in accordance with Department of Transportation (DOTn) regulations.
5. Building materials not otherwise regulated by this code.
6. Refrigeration systems (see Section 608).
7. Stationary storage battery systems regulated by Section 1207.
8. The display, storage, sale or use of fireworks and *explosives* in accordance with Chapter 56.
9. *Corrosives* utilized in personal and household products in the manufacturer's original consumer packaging in Group M occupancies.
10. The storage of beer, distilled spirits and wines in barrels and casks.
11. The use of ~~wall-mounted~~ dispensers containing alcohol-based hand rubs classified as Class I or II liquids where in accordance with Section 5705.5.
12. Specific provisions for flammable liquids in motor fuel-dispensing facilities, repair garages, airports and marinas in Chapter 23.
13. Storage and use of fuel oil in tanks and containers connected to oil-burning equipment. Such storage and use shall be in accordance with Section 605. For abandonment of fuel oil tanks, Chapter 57 applies.
14. Storage and display of aerosol products complying with Chapter 51.
15. Storage and use of *flammable* or *combustible liquids* that do not have a fire point when tested in accordance with ASTM D92, not otherwise regulated by this code.
16. *Flammable* or *combustible liquids* with a *flash point* greater than 95°F (35°C) in a water-miscible solution or dispersion with a water and inert (noncombustible) solids content of more than 80 percent by weight, which do not sustain combustion, not otherwise regulated by this code.
17. Commercial cooking oil storage tank systems located within a building and designed and installed in accordance with Section 607 and NFPA 30.

5705.5.1 Corridor installations. In addition to the provisions of Section 5705.5, where dispensers containing alcohol-based hand rubs are located in *corridors* or rooms and areas open to the *corridor*, they shall be in accordance with all of the following:

1. Level 2 and 3 aerosol containers shall not be allowed in *corridors*.
2. The maximum capacity of each Class I or II liquid dispenser shall be 41 ounces (1.21 L) and the maximum capacity of each Level 1 aerosol dispenser shall be 18 ounces (0.51 kg).

3. The maximum quantity allowed in a *corridor* within a *control area* shall be 10 gallons (37.85 L) of Class I or II liquids or 1135 ounces (32.2 kg) of Level 1 aerosols, or a combination of Class I or II liquids and Level 1 aerosols not to exceed, in total, the equivalent of 10 gallons (37.85 L) or 1,135 ounces (32.2 kg) such that the sum of the ratios of the liquid and aerosol quantities divided by the allowable quantity of liquids and aerosols, respectively, shall not exceed one.

~~4. The minimum *corridor* width shall be 72 inches (1829 mm).~~

~~5.~~ <u>4.</u> Projections into a *corridor* shall be in accordance with Section 1003.3.3.

Committee Reason: This proposal was approved as it provides the most enforceable language than found in the other proposals. Means of egress concerns are addressed. This proposal also better deals with practical issues such as ignition sources and controls how the dispensers operate. A key element is removing the limitation of enforcing only for wall mounted dispensers. This provides the basic tools for enforcement of all dispenser types. It is encouraged that all F190-21, F205-21, F206-21 and F207-21 be reviewed together and to come back with a coordinated public comment to address additional concerns with issues such as corridor width and enforcement. The modifications remove an additional occurrence of "wall-mounted" that was missed and removes the corridor width limitation that is not appropriate beyond healthcare facilities. (Vote: 9-4)

F205-21

Individual Consideration Agenda

Public Comment 1:

IFC: 5705.5

Proponents: Michael O'Brian, representing FCAC (fcac@iccsafe.org); John Williams, representing Healthcare Committee (ahc@iccsafe.org) requests As Modified by Public Comment

Further modify as follows:

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5705.5 Alcohol-based hand rubs classified as Class I or II liquids . The use of dispensers containing alcohol-based hand rubs classified as Class I or II liquids shall be in accordance with all of the following:

1. The maximum capacity of each dispenser shall be 68 ounces (2 L).
2. The minimum separation between dispensers shall be 48 inches (1219 mm).
3. Dispensers shall not be located above, below, or closer than 1 inch (25 mm) to an electrical receptacle, switch, appliance, device or other ignition source. The wall space between the dispenser and the floor or intervening counter top shall be free of electrical receptacles, switches, appliances, devices or other ignition sources.
4. Dispensers shall be located so that the bottom of the dispenser is not less than 42 inches (1067 mm) and not more than 48 inches (1219 mm) above the finished floor.
5. Dispensers shall not obstruct required means of egress or be placed within 3 feet (914 mm) of an open flame, heating device or other ignition source.
6. Dispensers shall not release their contents except when the dispenser is manually activated. Facilities shall be permitted to install and use automatically activated “touch free” alcohol-based hand-rub dispensing devices with the following requirements:

    6.1. The facility or persons responsible for the dispensers shall test the dispensers each time a new refill is installed in accordance with the manufacturer’s care and use instructions.

    6.2. Dispensers shall be designed and must operate in a manner that ensures accidental or malicious activations of the dispensing device are minimized. At a minimum, all devices subject to or used in accordance with this section shall have the following safety features:

        6.2.1. Any activations of the dispenser shall only occur when an object is placed within 4 inches (98 mm) of the sensing device.

        6.2.2. The dispenser shall not dispense more than the amount required for hand hygiene consistent with label instructions as regulated by the United States Food and Drug Administration (USFDA).

        6.2.3. An object placed within the activation zone and left in place will cause only one activation.

7. Storage and use of alcohol-based hand rubs shall be in accordance with the applicable provisions of Sections 5704 and 5705.

8. ~~Dispensers installed in occupancies with carpeted floors shall only be allowed in *smoke compartments* or *fire areas* equipped throughout with an *approved automatic sprinkler system* in accordance with Section 903.3.1.1 or 903.3.1.2.~~

Commenter's Reason: This Public Comment is submitted by the ICC Fire Code Action Committee (FCAC) and the Committee on Health Care (CHC).

Removes the requirement for the use of dispensers in carpeted occupancies to only be permitted where the smoke compartment of fire area is protected with a NFPA 13 or NFPA 13R automatic fire sprinkler system. Carpets in buildings are regulated by the IFC have interior finish requirements for floor carpeting. There has been no documented data showing a higher fire risk for dispensers in carpeted areas or buildings when compared to non-carpeted areas.

It is the intention of this Public Comment to delete Item 8 in Section 5705.5 that addresses requirements for Dispensers installed in areas containing carpeted floors. This Item is also addressed by a separate Public Comment that would modify the current requirements for Dispensers in areas with carpeted floors. If the ICC membership approves this Public Comment, the intention would be to delete all specific requirements pertaining to Dispensers in areas with carpeted floors (Item 8 from Section 5705.5) as this item is not necessary.

The FCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance assigned International Codes with regard to fire and life safety in new and existing buildings and facilities as well as the protection of life and property in wildland urban interface areas. In 2020 and 2021 the Fire-CAC held multiple virtual meetings that were open to any interested party. In addition, there were numerous virtual specific working group meetings that were also open to any interested parties, to develop, discuss and debate the proposed changes. Related documentation and reports are posted on the FCAC website at: https://www.iccsafe.org/products-and-services/i-codes/code-development/cs/fire-code-action-committee-fcac/
The CHC was established by the ICC Board to evaluate and assess contemporary code issues relating to healthcare facilities. This is a joint effort between ICC and the American Society for Healthcare Engineering (ASHE), a subsidiary of the American Hospital Association, to eliminate duplication and conflicts in healthcare regulation. In 2020 and 2021 the CHC held several virtual meetings, which included members of the committees as well as any interested parties, to discuss and debate the proposed changes. Information on the CHC, including: meeting agendas; minutes; reports; resource documents; presentations; and all other materials developed in conjunction with the CHC effort can be downloaded from the CHC website at:

https://www.iccsafe.org/products-and-services/i-codes/code-development/cs/icc-committee-on-healthcare/

Cost Impact: The net effect of the public comment and code change proposal will not increase or decrease the cost of construction
It introduces an option for hand sanitizers to be used.

Public Comment# 2237

Public Comment 2:

IFC: 5001.1, 5705.5, 5705.5.1, 5705.5.2 (New), TABLE 5705.5.2 (New), TABLE 5003.1.1(1); IBC: TABLE 307.1(1)

Proponents: Michael O'Brian, representing FCAC (fcac@iccsafe.org); John Williams, representing Healthcare Committee (ahc@iccsafe.org) requests As Modified by Public Comment

Further modify as follows:

2021 International Fire Code

5001.1 Scope . Prevention, control and mitigation of dangerous conditions related to storage, dispensing, use and handling of hazardous materials shall be in accordance with this chapter.
This chapter shall apply to all hazardous materials, including those materials regulated elsewhere in this code, except that where specific requirements are provided in other chapters, those specific requirements shall apply in accordance with the applicable chapter. Where a material has multiple hazards, all hazards shall be addressed.

Exceptions:

1. In retail or wholesale sales occupancies, medicines, foodstuff, cosmetics and commercial or institutional products containing not more than 50 percent by volume of water-miscible liquids and with the remainder of the solutions not being flammable, provided that such materials are packaged in individual containers not exceeding 1.3 gallons (5 L).
2. Alcoholic beverages in retail or wholesale sales occupancies, provided that the liquids are packaged in individual containers not exceeding 1.3 gallons (5 L).

3. Application and release of pesticide and agricultural products and materials intended for use in weed abatement, erosion control, soil amendment or similar applications where applied in accordance with the manufacturer's instructions and label directions.

4. The off-site transportation of hazardous materials where in accordance with Department of Transportation (DOTn) regulations.

5. Building materials not otherwise regulated by this code.

6. Refrigeration systems (see Section 608).

7. Stationary storage battery systems regulated by Section 1207.

8. The display, storage, sale or use of fireworks and *explosives* in accordance with Chapter 56.

9. *Corrosives* utilized in personal and household products in the manufacturer's original consumer packaging in Group M occupancies.

10. The storage of beer, distilled spirits and wines in barrels and casks.

11. The installation and use of dispensers containing alcohol-based hand rubs , replacement alcohol-based hand rub solution and dispensers in storage classified as Class I or II liquids where in accordance with Section 5705.5.

12. Alcohol-based hand rub dispensers in use by individuals and containing not more than 16 oz (474 ml).

~~12.~~ 13. Specific provisions for flammble liquids in motor fuel-dispensing facilities, repair garages, airports and marinas in Chapter 23.

~~13.~~ 14. Storage and use of fuel oil in tanks and containers connected to oil-burning equipment. Such storage and use shall be in accordance with Section 605. For abandonment of fuel oil tanks, Chapter 57 applies.

~~14.~~ 15. Storage and display of aerosol products complying with Chapter 51.

~~15.~~ 16. Storage and use of *flammable* or *combustible liquids* that do not have a fire point when tested in accordance with ASTM D92, not otherwise regulated by this code.

~~16.~~ 17. *Flammable* or *combustible liquids* with a *flash point* greater than 95°F (35°C) in a water-miscible solution or dispersion with a water and inert (noncombustible) solids content of more than 80 percent by weight, which do not sustain combustion, not otherwise regulated by this code.

~~17.~~ 18. Commercial cooking oil storage tank systems located within a building and designed and installed in accordance with Section 607 and NFPA 30.

5705.5 Alcohol-based hand rubs classified as Class I or II liquids . The use of dispensers containing alcohol-based hand rubs classified as Class I or II liquids shall be in accordance with all of the following:

1. The maximum capacity of each wall mounted dispenser shall be 68 ounces (2 ~~L).~~ L) and any other dispenser shall be 1 gallon (4 L) .

2. The maximum quantity within a control area shall be 30 gallons (37.85 L) of Class I or II liquids or 1135 ounces (32.2 Kg) of Level 1 aerosols, or a combination of Class 1 or II liquids and Level 1 aerosols not to exceed, in total, the equivalent of 30 gallons (37.85 L) or 1135 ounces (32.2 Kg). The combination of liquids and aerosols shall be limited such that the sum of the ratios of the liquid and aerosol quantities divided by the allowable quantity of liquids and aerosols, respectively, shall not exceed one.

~~2~~ 3 . The minimum separation between dispensers shall be 48 inches (1219 mm).

~~3.~~ 4. Dispensers shall not be located above, below, or closer than 1 inch (25 mm) to an electrical receptacle, switch, appliance~~,~~ or device ~~or other ignition source.~~ The wall space between the dispenser and the floor or intervening counter top shall be free of electrical receptacles, switches, appliances, devices or other ignition sources.

~~4.~~ 5. Wall-mounted Dispensers shall be located so that the bottom of the dispenser is not less than 42 inches (1067 mm) and not more than 48 inches (1219 mm) above the finished floor.

~~5.~~ 6. Dispensers shall not obstruct required means of egress or be placed within 3 feet (914 mm) of an open flame, heating device or other ignition source.

~~6.~~ 7. Dispensers shall not release their contents except when the dispenser is manually activated. Facilities shall be permitted to install and use automatically activated “touch free” alcohol-based hand-rub dispensing devices with the following requirements:

~~6.1.~~ 7.1 The facility or persons responsible for the dispensers shall test the dispensers each time a new refill is installed in accordance with the manufacturer’s care and use instructions.

~~6.2.~~ 7.2 Dispensers shall be designed and must operate in a manner that ensures accidental or malicious activations of the dispensing device are minimized. At a minimum, all devices subject to or used in accordance with this section shall have the following safety features:

~~6.2.1.~~ 7.2.1 Any activations of the dispenser shall only occur when an object is placed within 4 inches (98 mm) of the sensing device.

~~6.2.2.~~ 7.2.2 The dispenser shall not dispense more than the amount required for hand hygiene consistent with label instructions as regulated by the United States Food and Drug Administration (USFDA).

~~6.2.3.~~ ~~6.2.3~~ . 7.2.3

An object placed within the activation zone and left in place will cause only one activation.

~~7.~~ 8. Storage ~~and use~~ of alcohol-based hand ~~rubs~~ rubs solution not in useshall be in accordance with the ~~applicable~~ provisions of ~~Sections~~ Section~~s 5704 and~~ ~~5705.~~ 5705 5.2 .

~~8.~~ 9. Dispensers ~~installed~~ locatedin ~~occupancieswith~~ areas with carpeted floors shall only be allowed in *smoke compartments* or *fire areas* equipped throughout with an *approved automatic sprinkler system* in accordance with Section 903.3.1.1 or 903.3.1.2.

5705.5.1 Corridor installations . In addition to the provisions of Section 5705.5, where dispensers containing alcohol-based hand rubs are located in *corridors* or ~~rooms and~~ areas open to the *corridor*, they shall be in accordance with all of the following:

1. Level 2 and 3 aerosol containers shall not be allowed in *corridors*.
2. The maximum capacity of each ~~Class I or II liquid dispenser shall be 41 ounces (1.21 L) and the maximum capacity of each~~ Level 1 aerosol dispenser shall be 18 ounces (0.51 kg).
3. ~~The maximum quantity allowed in a *corridor* within a *control area* shall be 10 gallons (37.85 L) of Class I or II liquids or 1135 ounces (32.2 kg) of Level 1 aerosols, or a combination of Class I or II liquids and Level 1 aerosols not to exceed, in total, the equivalent of 10 gallons (37.85 L) or 1,135 ounces (32.2 kg) such that the sum of the ratios of the liquid and aerosol quantities divided by the allowable quantity of liquids and aerosols, respectively, shall not exceed one.~~

~~4.~~ 3 Projections into a *corridor* shall be in accordance with Section 1003.3.3.

5705.5.2 Storage of alcohol;-based hand rub solutions classified as Class 1 or Class II liquids. . The indoor storage of alcohol-based hand rub solution in liquid or gel form, classified as Class I or Class II liquids, shall be in accordance with all of the following:

1. The maximum quantity of individual alcohol-based hand rub solution storage container shall be 1 gallon (4 L) or less and the container shall be constructed of a material compatible with the alcohol-based solution.

2. Storage of alcohol-based hand rub solution in basements or below grade shall be in basements protected throughout with an *automatic sprinkler system* in accordance with Section 903.3.1.1.

3. Storage of alcohol-based hand rub solution shall be less than or equal to the amounts in Table 5705.5.2.

TABLE 5705.5.2 ALLOWABLE QUANTITY OF ALCOHOL_BASED HAND RUB SOLUTION IN STORAGE

STORAGE LOCATIONS	SPRINKLERED (gal)[d,f]	NONSPRINKLERED (gal) [e]
Open storage areas[c]	120	5
Non-dedicated storage room[a]	240	120
Non-dedicated storage room; 1-HR fire separation [a,g]	360	240
Non-dedicated storage room; 2-HR fire separation[a,g]	480	360
Dedicated storage room[b]	360	240
Dedicated storage room; 1-HR fire separation[b,g]	600	360
Dedicated storage room; 2-HR fire separation[b,g]	720	480

NP = Not permitted

a. Non-dedicated storage room is an enclosed storage area complying with the applicable storage requirements of this code.

b. Dedicated storage room is an enclosed storage area complying with the applicable storage requirements of this code used only for the storage of alcohol-based hand rub solution.

c. The number of open storage areas is limited to 1 per story or fire area with a maximum of four per building.

d. The number of non-dedicated storage rooms is limited to 2 per story, the number of dedicated storage rooms is limited to 4 per story.

e. The number of non-dedicated storage rooms is limited to 1 per story, the number of dedicated storage rooms is limited to 2 per story.

f. Automatic sprinkler design density for a minimum of Ordinary Hazard Group 2

g. Fire separation with a fire wall, fire barrier or fire partition and a fire resistance-rated horizontal barrier.

TABLE 5003.1.1(1) MAXIMUM ALLOWABLE QUANTITY PER CONTROL AREA OF HAZARDOUS MATERIALS POSING A PHYSICAL HAZARD[a, j, m, n, p]

Portions of table not shown remain unchanged.

For SI: 1 cubic foot = 0.02832 m^3, 1 pound = 0.454 kg, 1 gallon = 3.785 L.

NA = Not Applicable, NL = Not Limited, UD = Unclassified Detonable.

p. The following shall not be included in determining the maximum allowable quantities:

1. Liquid or gaseous fuel in fuel tanks on vehicles.
2. Liquid or gaseous fuel in fuel tanks on motorized equipment operated in accordance with this code.
3. Gaseous fuels in piping systems and fixed appliances regulated by the *International Fuel Gas Code*.
4. Liquid fuels in piping systems and fixed appliances regulated by the *International Mechanical Code*.
5. Alcohol-based hand rubs classified as Class I or II liquids in dispensers that are installed in accordance with Sections 5705.5 and 5705.5.1. ~~The location of the alcohol-based hand rub (ABHR) dispensers shall be provided in the construction documents.~~
6. Alcohol-based hand rub solutions classified as Class I or II liquids in storage in accordance with Section 5705.5.2

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TABLE 307.1(1) MAXIMUM ALLOWABLE QUANTITY PER CONTROL AREA OF HAZARDOUS MATERIALS POSING A PHYSICAL HAZARD[a, j, m, n, p]

Portions of table not shown remain unchanged.

p. The following shall not be included in determining the maximum allowable quantities:

1. Liquid or gaseous fuel in fuel tanks on vehicles.
2. Liquid or gaseous fuel in fuel tanks on motorized equipment operated in accordance with the *International Fire Code*.
3. Gaseous fuels in piping systems and fixed appliances regulated by the *International Fuel Gas Code*.
4. Liquid fuels in piping systems and fixed appliances regulated by the *International Mechanical Code*.
5. Alcohol-based hand rubs classified as Class I or II liquids in dispensers that are installed in accordance with Sections 5705.5 and 5705.5.1 of the International Fire Code. ~~The location of the alcohol-based hand rub (ABHR) dispensers shall be provided in the construction documents.~~
6. Alcohol-based hand rub solutions classified as Class I or II liquids in storage in accordance with Section 5705.5.2 of the International Fire Code.

Commenter's Reason: This Public Comment is submitted by the ICC Fire Code Action Committee (FCAC) and the Committee on Health Care (CHC).
1. The addition of “storage” in Exception 11 of Section 5001.1 (Scope) is consistent with the IFC Committee Action on proposal F190-21; This modification simply ensures that the intention of the exception is for both the alcohol-based hand rub dispensers and the storage of alcohol-based sanitizer solutions awaiting use.2. This Public Comments add an exception from IFC requirements for personal use hand sanitizer in quantities of 16 oz or less. It is not the intention of this section to impose any requirements on individual use hand sanitizers carried for personal sanitizing.

3. The higher quantity of allowable alcohol-based hand rub solution in dispensers is increased from 10 Gallons to 30 Gallons per control area. This is a reasonable increase in MAQ and is supported by the increased quantities that have been safely utilized in all public buildings during the pandemic.

4. Provides “clean-up” of requirements to differentiate permanent wall-mounted dispenser requirements which have been in the IFC for many cycles from other types of dispensers such as floor-supported, desktop or counter located that are currently being used.

5. Eliminating the additional quantity restrictions for dispensers used in corridors as unnecessary and overly restrictive

6. Adding a new Section (5705.5.2) for storage requirements and quantity limitations.

This new section adds reasonable storage quantities limits and requirements based on experience over the past 1 ½ years of the pandemic.

The proposal addresses storage of alcohol-based sanitizer solutions in a maximum individual container size of 1 gallon; provides maximum storage qualities for sprinklered and nonsprinklered buildings and incorporates allowances for higher storage quantities based on whether the storage room is for only alcohol-based sanitizer solutions and whether the storage room has 1 or 2 hour fire resistance rated construction for compartmentation of the hazard.

The current MAQs for Class IB flammable liquids (typical classification for an alcohol-based hand sanitizer solution) is 120 gallons with 100% increase for sprinklers and approved storage cabinets) . The quantities in Table 5705.5.2 are modeled after these MAQ allowances recognizing: the storage challenges created during the pandemic and the experience of storage inn these amounts without unreasonable fire risk or notable fire incidents; the benefit of fire sprinkler protection and fire separations for hazard mitigation for sanitizer solution in storage.

7. To correct Footnote “p” in the IBC and IFC MAQ table.

It is the intention of this Public Comment to modify Item 7 in Section 5705.5 that addresses requirements for Dispensers installed in areas containing carpeted floors. This Item is also addressed by a separate Public Comment that would completely remove any requirements for Dispensers in areas with carpeted floors. If the ICC membership approves the separate Public Comment, the intention would be to delete Item 7 from Section 5705.5.

The FCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance assigned International Codes with regard to fire and life safety in new and existing buildings and facilities as well as the protection of life and property in wildland urban interface areas. In 2020 and 2021 the Fire-CAC held multiple virtual meetings that were open to any interested party. In addition, there were numerous virtual specific working group meetings that were also open to any interested parties, to develop, discuss and debate the proposed changes. Related documentation and reports are posted on the FCAC website at:

https://www.iccsafe.org/products-and-services/i-codes/code-development/cs/fire-code-action-committee-fcac/

The CHC was established by the ICC Board to evaluate and assess contemporary code issues relating to healthcare facilities. This is a joint effort between ICC and the American Society for Healthcare Engineering (ASHE), a subsidiary of the American Hospital Association, to eliminate duplication and conflicts in healthcare regulation. In 2020 and 2021 the CHC held several virtual meetings, which included members of the committees as well as any interested parties, to discuss and debate the proposed changes. Information on the CHC, including: meeting agendas; minutes; reports; resource documents; presentations; and all other materials developed in conjunction with the CHC effort can be downloaded from the CHC website at:

https://www.iccsafe.org/products-and-services/i-codes/code-development/cs/icc-committee-on-healthcare/

Cost Impact: The net effect of the public comment and code change proposal will not increase or decrease the cost of construction
It introduces an option for hand sanitizers to be used and stored within buildings.

Public Comment# 2512

Public Comment 3:

IFC: 5705.5, 5705.5.1

Proponents: Kevin Scott, representing KH Scott & Associates LLC (khscottassoc@gmail.com) requests As Modified by Public Comment

Modify as follows:

2021 International Fire Code

5705.5 Alcohol-based hand rubs classified as Class I or II liquids . The use of dispensers containing alcohol-based hand rubs classified as Class I or II liquids shall be in accordance with all of the following:

1. The maximum capacity of each dispenser shall be 68 ounces (2 L).
2. The minimum separation between dispensers shall be 48 inches (1219 mm).
3. Dispensers shall not be located above, below, or closer than 1 inch (25 mm) to an electrical receptacle, switch, appliance, device or other ignition source. The wall space between the dispenser and the floor or intervening counter top shall be free of electrical receptacles, switches, appliances, devices or other ignition sources.
4. Dispensers shall be ~~located~~ located so that the bottom of the dispenser is not less than 42 inches (1067 mm) and not more than 48 inches (1219 mm) above the finished floor.

5. Dispensers shall be located a minimum of 6 feet (1829 mm) apart.

~~5.~~ 6. Dispensers shall not obstruct required means of egress or be placed within 3 feet (914 mm) of an open flame, heating device or other ignition source.

~~6.~~ 7. Dispensers shall not release their contents except when the dispenser is manually activated. Facilities shall be permitted to install and use automatically activated “touch free” alcohol-based hand-rub dispensing devices with the following requirements:

~~6.1.~~ 7.1. The facility or persons responsible for the dispensers shall test the dispensers each time a new refill is installed in accordance with the manufacturer’s care and use instructions.

~~6.2.~~ 7.2. Dispensers shall be designed and must operate in a manner that ensures accidental or malicious activations of the dispensing device are minimized. At a minimum, all devices subject to or used in accordance with this section shall have the following safety features:

~~6.2.1.~~ 7.2.1 Any activations of the dispenser shall only occur when an object is placed within 4 inches (98 mm) of the sensing device.

~~6.2.2.~~ 7.2.2 The dispenser shall not dispense more than the amount required for hand hygiene consistent with label instructions as regulated by the United States Food and Drug Administration (USFDA).

~~6.2.3.~~ 7.2.3 An object placed within the activation zone and left in place will cause only one activation.

~~7.~~ 8. Storage and use of alcohol-based hand rubs shall be in accordance with the applicable provisions of Sections 5704 and 5705.

~~8.~~ 9. Dispensers installed in occupancies with carpeted floors shall only be allowed in *smoke compartments* or *fire areas* equipped throughout with an *approved automatic sprinkler system* in accordance with Section 903.3.1.1 or 903.3.1.2.

5705.5.1 Corridor installations . In addition to the provisions of Section 5705.5, where dispensers containing alcohol-based hand rubs are located in *corridors* or rooms and areas open to the *corridor*, they shall be in accordance with all of the following:

1. Level 2 and 3 aerosol containers shall not be allowed in *corridors*.
2. The maximum capacity of each Class I or II liquid dispenser shall be 41 ounces (1.21 L) and the maximum capacity of each Level 1 aerosol dispenser shall be 18 ounces (0.51 kg).
3. The maximum quantity allowed in a *corridor* within a *control area* shall be 10 gallons (37.85 L) of Class I or II liquids or 1135 ounces (32.2 kg) of Level 1 aerosols, or a combination of Class I or II liquids and Level 1 aerosols not to exceed, in total, the equivalent of 10 gallons (37.85 L) or 1,135 ounces (32.2 kg) such that the sum of the ratios of the liquid and aerosol quantities divided by the allowable quantity of liquids and aerosols, respectively, shall not exceed one. ~~4.~~
4. Dispensers shall be located a minimum of 6 feet (1829 mm) apart.

~~4.~~ 5. Projections into a *corridor* shall be in accordance with Section 1003.3.3.

Commenter's Reason: This Public Comment inserts a requirement for separation of ABHR dispensers.
Section 5705.5.1 Item 4 was deleted by the committee based on the reason that 72" wide corridors are only required in health care. While this statement is true, the 72" wide corridor actually went into the code based on fire modeling. The fire modeling showed that when the dispensers are place 72" apart, a fire from one unit will not spread to an adjacent unit. The concept of 72" separation was based on corridor widths in health care, but the fire spread modeling still holds true whether the units are in health care facilities or not.

F233-04/05 introduced ABHR dispensers into the IFC, and referenced the fire modeling performed to justify the 72" separation. The fire modeling demonstrated that separation of 72" kept the fire contained to one unit and it did not involve adjacent dispensers. ABHR dispensers are appearing in all types of occupancies, but the separation between devices needs to be maintained.

Cost Impact: The net effect of the public comment and code change proposal will not increase or decrease the cost of construction
There will be no cost impact by this Public Comment. The requirement is already in the code and is an operational requirement, not a construction requirement.

Public Comment# 2850

F210-21

Proposed Change as Submitted

Proponents: Kevin Duerr-Clark, representing New York State Department of State (kevin.duerr-clark@dos.ny.gov); Chad Sievers, representing NYS Dept. of State (chad.sievers@dos.ny.gov)

2021 International Fire Code

Revise as follows:

5706.5.4 Dispensing from tank vehicles and tank cars. Dispensing from tank vehicles and tank cars into the fuel tanks of motor vehicles shall be prohibited unless allowed by and conducted in accordance with Sections 5706.5.4.1 through 5706.5.4.5 or where permitted and *approved* in accordance with Section 5707 of this code.

Reason: Section 5707 specifically addresses on-demand mobile fueling operations, while 5706.5.4 is more generally dispensing from tank vehicles or tank cars into motor vehicles. However, with no clear distinction between the two types of operations or a tank vehicle vs a mobile fueling vehicle, these two sections could appear to have conflicting allowances. This proposal simply eliminates that potential conflict by providing a pointer from 5706.5.4 to 5707.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This code change proposal is an editorial code change and is only meant to clarify the code and eliminate contradictions in the code.

F210-21

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: This proposal was disapproved based upon the action on F209-21 and the fact this section is unique from on-demand mobile fueling. (Vote: 13-0)

F210-21

Individual Consideration Agenda

Public Comment 1:

Proponents: Chad Sievers, representing NYS Dept. of State (chad.sievers@dos.ny.gov); Kevin Duerr-Clark, representing New York State Department of State (kevin.duerr-clark@dos.ny.gov) requests As Submitted

Commenter's Reason: The PC was provided as the link to Section 5707 was important. Mobile fuel vehicles are a form of Tank Vehicle(See Section 5707.2.1) therefore, Section 5706.5.4 deals with dispensing fuel from tank vehicles into the fuel tanks of motor vehicles. Without the connection provided by this proposed change, Section 5706.5.4 could be interpreted to be more restrictive and limit what a mobile fueling vehicle is permitted to do. The connection allows Section 5707 to dictate the requirements for on-demand mobile fueling operations and does not change and provisions.

To clear up any confusion about how the approved proposal F209 would blend with this proposal, below we show how the language of both proposals would work together, showing they do not conflict with each other.

5706.5.4 Dispensing from tank vehicles and tank cars. Dispensing from tank cars into the fuel tanks of motor vehicles shall be prohibited. Dispensing from tank vehicles ~~and tank cars~~ into the fuel tanks of motor vehicles shall be prohibited unless allowed by and conducted in accordance with Sections 5706.5.4.1 through 5706.5.4.5 or where permitted and *approved* in accordance with Section 5707 of this code.

Cost Impact: The net effect of the public comment and code change proposal will not increase or decrease the cost of construction
This code change proposal is an editorial code change and is only meant to clarify the code and eliminate contradictions in the code.

Public Comment# 2998

F211-21

Proposed Change as Submitted

Proponents: Kevin Duerr-Clark, representing New York State Department of State (kevin.duerr-clark@dos.ny.gov); Chad Sievers, representing NYS Dept. of State (chad.sievers@dos.ny.gov)

2021 International Fire Code

Revise as follows:

5706.5.4.1 Marine craft and special equipment. Liquids intended for use as motor fuels are allowed to be transferred from tank vehicles into the fuel tanks of marine craft and special equipment where *approved* by the *fire code official*, and where:

1. The tank vehicle's specific function is that of supplying fuel to fuel tanks.
2. The operation is not performed where the public has access or where there is unusual exposure to life and property.
3. The dispensing line does not exceed 50 feet (15 240 mm) in length.
4. The dispensing nozzle is *approved*.
5. <u>The operation shall be in accordance with Sections 2310.4.1 and 2310.4.2 except where *approved* in accordance with Section 5707.</u>

Reason: This proposal ties together Section 2310.4, Section 5706.5.4, and Section 5707 for fueling marine craft from tank vehicles or mobile fueling vehicles. Without this tie, there is the appearance of conflicting provisions where a Class I would not be permitted under 2310.4, but potentially permitted under 5707, and silent in 5706.5.4.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
There is no anticipated cost of construction increase. This is simply a coordination of related code sections.

F211-21

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: Although the correlation with Section 2310.4 may be appropriate the reference to Section 5707 confuses the issue. Section 5707 if dealing with on-demand mobile fueling which is a different concept. The proponent is encouraged to revise this proposal through public comment to make the correlation back to Section 2310.4. (Vote: 13-0)

F211-21

Individual Consideration Agenda

Public Comment 1:

IFC: 5706.5.4.1

Proponents: Chad Sievers, representing NYS Dept. of State (chad.sievers@dos.ny.gov); Kevin Duerr-Clark, representing New York State Department of State (kevin.duerr-clark@dos.ny.gov) requests As Modified by Public Comment

Modify as follows:

2021 International Fire Code

5706.5.4.1 Marine craft and special equipment . Liquids intended for use as motor fuels are allowed to be transferred from tank vehicles into the fuel tanks of marine craft and special equipment where *approved* by the *fire code official*, and where:

1. The tank vehicle's specific function is that of supplying fuel to fuel tanks.
2. The operation is not performed where the public has access or where there is unusual exposure to life and property.

3. The dispensing line does not exceed 50 feet (15 240 mm) in length.

4. The dispensing nozzle is *approved*.

5. The operation shall be in accordance with Sections 2310.4.1 and 2310.4.2. ~~except where *approved* in accordance with Section 5707.~~

Commenter's Reason: In accordance with the committee action hearing the reference to section 5707 has been removed and the references to 2310.4 have been maintained.

Cost Impact: The net effect of the public comment and code change proposal will not increase or decrease the cost of construction
There is no anticipated cost of construction increase. This is simply a coordination of related code sections

Public Comment# 2753

F212-21

Proposed Change as Submitted

Proponents: Michael O'Brian, representing FCAC (fcac@iccsafe.org)

2021 International Fire Code

Revise as follows:

5706.5.4.5 Commercial, industrial, governmental or manufacturing. Dispensing of Class I, II and III motor vehicle fuel from tank vehicles into the fuel tanks of motor vehicles located at commercial, industrial, governmental or manufacturing establishments is allowed where approved ~~permitted~~, provided that such dispensing operations are conducted in accordance with the following:

1. Dispensing shall occur only at sites that have been issued a permit to conduct mobile fueling.
2. The *owner* of a mobile fueling operation shall provide to the jurisdiction a written response plan that demonstrates readiness to respond to a fuel spill and carry out appropriate mitigation measures, and describes the process to dispose properly of contaminated materials.
3. A detailed site plan shall be submitted with each application for a permit. The site plan shall indicate: all buildings, structures and appurtenances on site and their use or function; all uses adjacent to the *lot lines* of the site; the locations of all storm drain openings, adjacent waterways or wetlands; information regarding slope, natural drainage, curbing, impounding and how a spill will be retained on the site property; and the scale of the site plan.

   Provisions shall be made to prevent liquids spilled during dispensing operations from flowing into buildings or off-site. Acceptable methods include, but shall not be limited to, grading driveways, raising doorsills or other *approved* means.
4. The *fire code official* is allowed to impose limits on the times and days during which mobile fueling operations is allowed to take place, and specific locations on a site where fueling is permitted.
5. Mobile fueling operations shall be conducted in areas not open to the public or shall be limited to times when the public is not present.
6. Mobile fueling shall not take place within 15 feet (4572 mm) of buildings, property lines, combustible storage or storm drains.

   Exceptions:

   1. The distance to storm drains shall not apply where an *approved* storm drain cover or an *approved* equivalent that will prevent any fuel from reaching the drain is in place prior to fueling or a fueling hose being placed within 15 feet (4572 mm) of the drain. Where placement of a storm drain cover will cause the accumulation of excessive water or difficulty in conducting the fueling, such cover shall not be used and the fueling shall not take place within 15 feet (4572 mm) of a drain.
   2. The distance to storm drains shall not apply for drains that direct influent to *approved* oil interceptors.

7. The tank vehicle shall comply with the requirements of NFPA 385 and local, state and federal requirements. The tank vehicle's specific functions shall include that of supplying fuel to motor vehicle fuel tanks. The vehicle and all its equipment shall be maintained in good repair.
8. Signs prohibiting smoking or open flames within 25 feet (7620 mm) of the tank vehicle or the point of fueling shall be prominently posted on three sides of the vehicle including the back and both sides.
9. A portable fire extinguisher with a minimum rating of 40:BC shall be provided on the vehicle with signage clearly indicating its location.
10. The dispensing nozzles and hoses shall be of an *approved* and *listed* type.
11. The dispensing hose shall not be extended from the reel more than 100 feet (30 480 mm) in length.
12. Absorbent materials, nonwater-absorbent pads, a 10-foot-long (3048 mm) containment boom, an *approved* container with lid and a nonmetallic shovel shall be provided to mitigate a minimum 5-gallon (19 L) fuel spill.
13. Tank vehicles shall be equipped with a "fuel limit" switch such as a count-back switch, to limit the amount of a single fueling operation to not more than 500 gallons (1893 L) before resetting the limit switch.

    Exception: Tank vehicles where the operator carries and can utilize a remote emergency shutoff device that, when activated, immediately causes flow of fuel from the tank vehicle to cease.
14. Persons responsible for dispensing operations shall be trained in the appropriate mitigating actions in the event of a fire, leak or spill. Training records shall be maintained by the dispensing company.
15. Operators of tank vehicles used for mobile fueling operations shall have in their possession at all times an emergency communications device to notify the proper authorities in the event of an emergency.
16. The tank vehicle dispensing equipment shall be constantly attended and operated only by designated personnel who are trained to handle

and dispense motor fuels.

17. Fuel dispensing shall be prohibited within 25 feet (7620 mm) of any source of ignition.
18. The engines of vehicles being fueled shall be shut off during dispensing operations.
19. Nighttime fueling operations shall only take place in adequately lighted areas.
20. The tank vehicle shall be positioned with respect to vehicles being fueled to prevent traffic from driving over the delivery hose.
21. During fueling operations, tank vehicle brakes shall be set, chock blocks shall be in place and warning lights shall be in operation.
22. Motor vehicle fuel tanks shall not be topped off.
23. The dispensing hose shall be properly placed on an *approved* reel or in an *approved* compartment prior to moving the tank vehicle.
24. The *fire code official* and other appropriate authorities shall be notified when a reportable spill or unauthorized discharge occurs.
25. Operators shall place a drip pan or an absorbent pillow under each fuel fill opening prior to and during dispensing operations. Drip pans shall be liquid-tight. The pan or absorbent pillow shall have a capacity of not less than 3 gallons (11.36 L). Spills retained in the drip pan or absorbent pillow need not be reported. Operators, when fueling, shall have on their person an absorbent pad capable of capturing diesel fuel overfills. Except during fueling, the nozzle shall face upward and an absorbent pad shall be kept under the nozzle to catch drips. Contaminated absorbent pads or pillows shall be disposed of regularly in accordance with local, state and federal requirements.

Reason: Section 5706.5.4.5 covers fleet fueling operations, which require an operating permit to be conducted. This proposal does two things, adds Class I liquids to the fuels that can be dispensed, and replaces “where permitted” (an undefined term), with “where approved”, which clarifies that the fire code official needs to approve the mobile fueling to be conducted at various facilities and sites.
We understand that fleet fueling of Class I liquids, in addition to Class II or III liquids, has already been accepted in many state codes (e.g., Ohio State Fire Code & Oregon State Fire Code), and this is consistent with NFPA 30A, Section 9.6. However, like all fleet fueling operations, fleet fueling of Class I liquids is only allowed when approved by the fire code official, and is covered by an operational permit per Section 105.6.16.

This proposal is submitted by the ICC Fire Code Action Committee (FCAC). The FCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance assigned International Codes with regard to fire and life safety in new and existing buildings and facilities as well as the protection of life and property in wildland urban interface areas. In 2020 and 2021 the Fire-CAC held multiple virtual meetings that were open to any interested party. In addition, there were numerous virtual specific working group meetings that were also open to any interested parties, to develop, discuss and debate the proposed changes. Related documentation and reports are posted on the FCAC website at: https://www.iccsafe.org/products-and-services/i-codes/code-development/cs/fire-code-action-committee-fcac/

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal expands the fuels that can be dispensed at these operations so will not increase cost of compliance.

F212-21

Public Hearing Results

Committee Action: **As Submitted**

Committee Reason: The proposal was approved as it a reasonable allowance. This operation deals with commercial, governmental, industrial and farming installations which is limited to certain location and the fire code official will be involved with issuing an operational permit so it will be properly regulated. The term "approved" as revised gives clear authority to the fire code official. There is some concern that this could encourage bypassing compliance with Section 5707. (Vote: 9-5)

F212-21

Individual Consideration Agenda

Public Comment 1:

IFC: 5706.5.4.5

Proponents: Robert Davidson, representing Self (rjd@davidsoncodeconcepts.com) requests As Modified by Public Comment

Modify as follows:

2021 International Fire Code

5706.5.4.5 Commercial, industrial, governmental or manufacturing. Dispensing of Class I, II and III motor vehicle fuel from tank vehicles into the fuel tanks of motor vehicles located at commercial, industrial, governmental or manufacturing establishments is allowed where approved. ~~permitted, provided that such~~ Dispensing operations for Class I motor vehicle fuel shall be conducted in accordance with Section 5707 , dispensing operations ~~are~~ for Class II and III motor vehicle fuel shall be conducted in accordance with the following:

1. Dispensing shall occur only at sites that have been issued a permit to conduct mobile fueling.
2. The *owner* of a mobile fueling operation shall provide to the jurisdiction a written response plan that demonstrates readiness to respond to a fuel spill and carry out appropriate mitigation measures, and describes the process to dispose properly of contaminated materials.
3. A detailed site plan shall be submitted with each application for a permit. The site plan shall indicate: all buildings, structures and appurtenances on site and their use or function; all uses adjacent to the *lot lines* of the site; the locations of all storm drain openings, adjacent waterways or wetlands; information regarding slope, natural drainage, curbing, impounding and how a spill will be retained on the site property; and the scale of the site plan.

   Provisions shall be made to prevent liquids spilled during dispensing operations from flowing into buildings or off-site. Acceptable methods include, but shall not be limited to, grading driveways, raising doorsills or other *approved* means.
4. The *fire code official* is allowed to impose limits on the times and days during which mobile fueling operations is allowed to take place, and specific locations on a site where fueling is permitted.
5. Mobile fueling operations shall be conducted in areas not open to the public or shall be limited to times when the public is not present.
6. Mobile fueling shall not take place within 15 feet (4572 mm) of buildings, property lines, combustible storage or storm drains.

   Exceptions:

   1. The distance to storm drains shall not apply where an *approved* storm drain cover or an *approved* equivalent that will prevent any fuel from reaching the drain is in place prior to fueling or a fueling hose being placed within 15 feet (4572 mm) of the drain. Where placement of a storm drain cover will cause the accumulation of excessive water or difficulty in conducting the fueling, such cover shall not be used and the fueling shall not take place within 15 feet (4572 mm) of a drain.
   2. The distance to storm drains shall not apply for drains that direct influent to *approved* oil interceptors.

7. The tank vehicle shall comply with the requirements of NFPA 385 and local, state and federal requirements. The tank vehicle's specific functions shall include that of supplying fuel to motor vehicle fuel tanks. The vehicle and all its equipment shall be maintained in good repair.
8. Signs prohibiting smoking or open flames within 25 feet (7620 mm) of the tank vehicle or the point of fueling shall be prominently posted on three sides of the vehicle including the back and both sides.
9. A portable fire extinguisher with a minimum rating of 40:BC shall be provided on the vehicle with signage clearly indicating its location.
10. The dispensing nozzles and hoses shall be of an *approved* and *listed* type.
11. The dispensing hose shall not be extended from the reel more than 100 feet (30 480 mm) in length.
12. Absorbent materials, nonwater-absorbent pads, a 10-foot-long (3048 mm) containment boom, an *approved* container with lid and a nonmetallic shovel shall be provided to mitigate a minimum 5-gallon (19 L) fuel spill.
13. Tank vehicles shall be equipped with a "fuel limit" switch such as a count-back switch, to limit the amount of a single fueling operation to not more than 500 gallons (1893 L) before resetting the limit switch.

    Exception: Tank vehicles where the operator carries and can utilize a remote emergency shutoff device that, when activated, immediately causes flow of fuel from the tank vehicle to cease.
14. Persons responsible for dispensing operations shall be trained in the appropriate mitigating actions in the event of a fire, leak or spill. Training records shall be maintained by the dispensing company.
15. Operators of tank vehicles used for mobile fueling operations shall have in their possession at all times an emergency communications device to notify the proper authorities in the event of an emergency.
16. The tank vehicle dispensing equipment shall be constantly attended and operated only by designated personnel who are trained to handle and dispense motor fuels.
17. Fuel dispensing shall be prohibited within 25 feet (7620 mm) of any source of ignition.
18. The engines of vehicles being fueled shall be shut off during dispensing operations.
19. Nighttime fueling operations shall only take place in adequately lighted areas.
20. The tank vehicle shall be positioned with respect to vehicles being fueled to prevent traffic from driving over the delivery hose.

21. During fueling operations, tank vehicle brakes shall be set, chock blocks shall be in place and warning lights shall be in operation.
22. Motor vehicle fuel tanks shall not be topped off.
23. The dispensing hose shall be properly placed on an *approved* reel or in an *approved* compartment prior to moving the tank vehicle.
24. The *fire code official* and other appropriate authorities shall be notified when a reportable spill or unauthorized discharge occurs.
25. Operators shall place a drip pan or an absorbent pillow under each fuel fill opening prior to and during dispensing operations. Drip pans shall be liquid-tight. The pan or absorbent pillow shall have a capacity of not less than 3 gallons (11.36 L). Spills retained in the drip pan or absorbent pillow need not be reported. Operators, when fueling, shall have on their person an absorbent pad capable of capturing diesel fuel overfills. Except during fueling, the nozzle shall face upward and an absorbent pad shall be kept under the nozzle to catch drips. Contaminated absorbent pads or pillows shall be disposed of regularly in accordance with local, state and federal requirements.

Commenter's Reason: Extending the ability to include Class I motor fuels for fleet motor fueling is appropriate, but not by simply adding Class I to the existing scoping section.
The existing fleet motor fueling requirements were developed to provide for safe dispensing involving the hazards associated with Class II and III motor fuels, not Class I motor fuels. This was issue reviewed when On-Demand Mobile Fueling was added to the fire code and why a separate section, Section 5707, was created to specifically address the hazards associated with Class I motor fuels.

If one takes the time to compare the safety requirements of Section 5706.5.4.5 for fleet motor fueling with those of Section 5707 for on-demand mobile fueling there are major differences in the safety requirements such as:

	Class II and III Section 5706.5.4.5	Class I Section 5707
Separation from buildings and lot lines	15’	25’
Tank Vehicle/mobile fuel vehicle fuel limits	None	1600/800/60 gal
Fuel limit switch	500 gal	30 gal
Dispensing hose length	100’	50’
Fire extinguisher rating	40:BC	4A:80-BC
Approval and listing of nozzles and hoses	None	Required
Listed breakaway at nozzle	None	Required
Safety Cones	None	Required
Vehicle Flashers	None	Required
Night delivery lighting	None	Required

What this public comment does is modify the added language to provide for dispensing of Class I motor fuels by pointing to Section 5707 where the proper safety precautions for dispensing the Class I motor fuels are located in the fire code.

Cost Impact: The net effect of the public comment and code change proposal will not increase or decrease the cost of construction
This proposal does not address construction requirements. It addresses motor fuel dispensing operational issues.

Public Comment# 2874

F214-21

Proposed Change as Submitted

Proponents: Andrew Klein, representing Booster Fuels (andrew@asklein.com)

2021 International Fire Code

Revise as follows:

105.5.18 Flammable and combustible liquids. An operational permit is required:

1. To use or operate a pipeline for the transportation within facilities of *flammable* or *combustible liquids*. This requirement shall not apply to the off-site transportation in pipelines regulated by the Department of Transportation (DOTn) nor does it apply to piping systems.
2. To store, handle or use Class I liquids in excess of 5 gallons (19 L) in a building or in excess of 10 gallons (37.9 L) outside of a building, except that a permit is not required for the following:

   2.1. The storage or use of Class I liquids in the fuel tank of a motor vehicle, aircraft, motorboat, mobile power plant or mobile heating plant, unless such storage, in the opinion of the *fire code official*, would cause an unsafe condition.

   2.2. The storage or use of paints, oils, varnishes or similar flammable mixtures where such liquids are stored for maintenance, painting or similar purposes for a period of not more than 30 days.
3. To store, handle or use Class II or Class IIIA liquids in excess of 25 gallons (95 L) in a building or in excess of 60 gallons (227 L) outside a building, except for fuel oil used in connection with oil-burning equipment.
4. To store, handle or use Class IIIB liquids in tanks or portable tanks for fueling motor vehicles at motor fuel-dispensing facilities or where connected to fuel-burning equipment.

   Exception: Fuel oil and used motor oil used for space heating or water heating.
5. To remove Class I or II liquids from an underground storage tank used for fueling motor vehicles by any means other than the *approved*, stationary on-site pumps normally used for dispensing purposes.
6. To operate tank vehicles, equipment, tanks, plants, terminals, wells, fuel-dispensing stations, refineries, distilleries and similar facilities where *flammable* and *combustible liquids* are produced, processed, transported, stored, dispensed or used.
7. To place temporarily out of service (for more than 90 days) an underground, protected above-ground or above-ground *flammable* or *combustible liquid* tank.
8. To change the type of contents stored in a *flammable* or *combustible liquid* tank to a material that poses a greater hazard than that for which the tank was designed and constructed.
9. To manufacture, process, blend or refine *flammable* or *combustible liquids*.
10. To engage in the dispensing of liquid fuels into the fuel tanks of motor vehicles at commercial, industrial, governmental or manufacturing establishments in accordance with Section 5706.5.4 or to engage in on-demand mobile fueling operations in accordance with Section 5707.
11. To utilize a site for the dispensing of liquid fuels from tank vehicles into the fuel tanks of motor vehicles, marine craft and other special equipment at commercial, industrial, governmental or manufacturing establishments in accordance with Section 5706.5.4~~ or, where required by the *fire code official*, to utilize a site for on-demand mobile fueling operations in accordance with Section 5707~~.

5707.1.1 Approval required. Mobile fueling operations shall not be conducted without first obtaining a *permit* and approval from the *fire code official*. ~~Mobile fueling operations shall occur only at *approved* locations. The *fire code official* is authorized to approve individual locations or geographic areas where mobile fueling is allowed.~~

5707.3.1 Safety and emergency response plan. Mobile fueling operators shall have an approved written safety and emergency response plan that establishes policies and procedures for fire safety, spill prevention and control, personnel training and compliance with other applicable requirements of this code. <u>At a minimum, the plan shall ensure that operators take into consideration the following prior to commencing fueling:</u>

1. <u>Location of all buildings and structures.</u>
2. <u>*Location of lot lines* or property lines.</u>
3. <u>Location of electric car chargers and solar photovoltaic parking lot canopies.</u>
4. <u>Location of appurtenances on-site and their use or function.</u>
5. <u>Uses adjacent to the *lot lines* of the site.</u>
6. <u>Locations of storm drain openings and adjacent waterways or wetlands.</u>

7. Information regarding slope, natural drainage, curbing and impounding.

8. How a spill will be kept on the site property.

Delete without substitution:

~~**5707.3.3 Site plan**~~**.**
~~Where required by the *fire code official*, a site plan shall be developed for each location or area at which mobile fueling occurs. The site plan shall be in sufficient detail to indicate the following:~~

1. ~~All buildings and structures.~~
2. ~~*Lot lines* or property lines.~~
3. ~~Electric car chargers.~~
4. ~~Solar photovoltaic parking lot canopies.~~
5. ~~Appurtenances on-site and their use or function.~~
6. ~~All uses adjacent to the *lot lines* of the site.~~
7. ~~Fueling locations.~~
8. ~~Locationsof all storm drain openings and adjacent waterways or wetlands.~~
9. ~~Information regarding slope, natural drainage, curbing and impounding.~~
10. ~~How a spill will be kept on the site property.~~
11. ~~Scale of the site plan.~~

Reason: Permitting each site at which on-demand mobile fueling occurs has proven to be unpractical, time consuming and expensive with no added safety value. This proposal takes out the site-permitting requirements and places the responsibility of fueling onto the mobile fueling operator, similar to a hot-work permit. The mobile fueling operator will still have to have a valid operator permit, at which time jurisdictions can ensure that comprehensive training and safety plans are provided. Fire code officials can still enforce the code if they see violations, pulling the operator permit if necessary. This provides greater incentive to operators to operate within the limitations of the Code while reducing unnecessary paperwork and time spent on site permits.

Cost Impact: The code change proposal will decrease the cost of construction
This code change will decrease the cost of operations by reducing paperwork and downtime while waiting for permits. It will have no effect on construction costs.

F214-21

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: This proposal was disapproved as it takes away the specific site plan requirement and depends too much on the operator to simply follow a safety plan. Site plans are necessary to know where this is happening and in some cases may cause fueling is prohibited in certain locations based upon specific concerns with the site. Although these site plans are filed away they will likely be used in case of emergency. There is concern with how the operator will "take into consideration" the items proposed for the safety and emergency response plan. It was also noted that fueling location the scale of site plan and how spills will be handled are not addressed in revised Section 5707.3.1. The committee agreed that this language could be cleaned up but there were too many concerns as proposed. (Vote: 14-0)

F214-21

Individual Consideration Agenda

Public Comment 1:

Proponents: Andrew Klein, representing Booster Fuels (andrew@asklein.com); John Catlett, representing BOMA International

(catlettcodeconsulting@gmail.com) requests As Submitted

Commenter's Reason: There was a lot of support for this proposal, and even the opposition was only slight opposition. It is unrealistic that a filed-away site plan would be used in an emergency situation. Furthermore, all cosideratoins that would be in a site plan are monitored in real time by the operator. This proposal simply makes sense, and if an operator is not able to safely fuel gas, then their operator license will be pulled from a jurisdiction and they cannot operate anywhere.

Cost Impact: The net effect of the public comment and code change proposal will decrease the cost of construction
This code change will decrease the cost of operations by reducing paperwork and downtime while waiting for permits. It will have no effect on construction costs.

Public Comment# 2728

F219-21

Proposed Change as Submitted

Proponents: Andrew Klein, representing Booster Fuels (andrew@asklein.com)

2021 International Fire Code

Revise as follows:

5707.2.1 Mobile fueling vehicle classifications. An on-demand mobile fueling vehicle shall be characterized as one of the following:

1. **Tier 1 mobile fueling vehicle.** A tank vehicle that complies with NFPA 385 and that has chassis-mounted tanks where the aggregate capacity does not exceed ~~1,600~~ 4,500 gallons (~~6057~~ 17,034 L).
2. **Tier 2 mobile fueling vehicle.** A vehicle with one or more chassis-mounted tanks or containers that do not exceed 110 gallons (416 L) in capacity with an aggregate capacity that does not exceed 800 gallons (3028 L) or the weight capacity of the vehicle in accordance with DOTn.
3. **Tier 3 mobile fueling vehicle.** A vehicle that carries a maximum aggregate capacity of 60 gallons (227 L) of motor fuel in metal safety cans *listed* in accordance with UL 30 or other *approved* metal containers, each not to exceed 5 gallons (19 L) in capacity.

Reason: The 1600-gallon aggregate limit on the maximum capacity of a Tier 1 mobile fueling vehicle does not reflect the industry standard size for a mid-volume tank truck (approx. 2800 to 4500 gallons). Other than the fuel capacity differences, all Tier 1 mobile fueling vehicles are also required to comply with the requirements of Section 5706.6, and NFPA 385. The safety record for on-demand fueling operations the past few years should justify an increased fuel vehicle capacity, provided the size of the vehicles themselves do not pose obstruction and other difficulties.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This code change proposal expands what equipment can be used by 3rd-party companies and in no way affects construction costs.

F219-21

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: This proposal was disapproved as the increase in tank size is seen as excessive. No proposed mitigation for increased hazard has been presented nor has specific justification for the increase been provided. It should be noted that this proposal was heard prior to F218-21. (Vote: 14-0)

F219-21

Individual Consideration Agenda

Public Comment 1:

Proponents: Andrew Klein, representing Booster Fuels (andrew@asklein.com); John Catlett, representing BOMA International (catlettcodeconsulting@gmail.com) requests As Submitted

Commenter's Reason: This proposal was disapproved because no mitigation was proposed for the "increased hazard" of a greater quantity of fuel. These are tank vehicles, therefore there is no additonal hazard associated with the greater cargo capacities. The vehicles are all equipped with fuel limit switches, and a complete loss of containment event is deemed incredible for a tank vehicle.

Cost Impact: The net effect of the public comment and code change proposal will not increase or decrease the cost of construction
This code change proposal expands what equipment can be used by 3rd-party companies and in no way affects construction costs.

Public Comment# 2731

F225-21

Proposed Change as Submitted

Proponents: Andrew Klein, representing Booster Fuels (andrew@asklein.com)

2021 International Fire Code

Add new text as follows:

5707.5 Garage Fueling.
Where permitted by the *fire code official*, mobile fueling operations conducted in parking structures shall comply with Sections 5707.5.1 through 5707.5.8.

5707.5.1 Automated parking structures.
Vehicles shall not be fueled where elevated on a lift or stacker. Fueling shall be prohibited in automated and assisted-mechanical type parking structures.

5707.5.2 Floor levels. .
Mobile fueling shall be limited to the floor level of fire department access.

Exceptions:
Where fire department vehicle access is deemed acceptable to the *fire code official* , mobile fueling shall be permitted in parking structures of Type I construction, protected througout with an automatic sprinler system in accordance with Section 903.3.1.1 and comply with one of the following:

1. Up to three floor levels above or below the level of fire department vehicle access.
2. Up to 70 ft above grade level in open parking garages

5707.5.3 Maximum cargo capacity.
The cargo capacity of mobile fueling vehicles operating inside of parking structures shall not exceed 1600 gallons (6057 L).

5707.5.4 Fire extinguisher.
In addition to the fire extinguisher required by Section 5707.7.4, mobile fueling vehicles operating in parking structures shall be equipped with a minimum 2.5 gallon AR-AFFF vapor suppressing extinguisher. Extinguishers shall be maintained at a temperature within the manufacturer's limits.

5707.5.5 Spill mitigation.
Mobile fueling operators shall place a sock down grade from or around the area of fueling prior to fueling. When a spill or unplanned discharge occurs, the operator shall immediately cover the spill with the discharge of the vapor suppressing extinguisher.

5707.5.6 Audible alert.
In addition to the vehicle lights required in accordance with Section 5707.8.4, mobile fueling vehicles operating in garages shall emit an audible tone identical to the audible reversing alarm of the vehicle.

5707.5.7 Fuel limit.
The mobile fueling vehicle's *fuel limit switch* shall be set to a maximum of 5 gallons (19 L).

5707.5.8 Electrical equipment.
Mobile fueling shall not occur within 20 feet of electrical equipment located within 18 inches of the ground unless such electrical equipment is rated for Class I, Division 2 hazardous locations in accordance with the NFPA 70.

Reason: Over the past year, especially, mobile fueling has shown itself to be an indispensable service where available. Unfortunately, mobile fueling is unavailable in many cities because of space restrictions causing the need for garaged parking instead of lot parking. This code change proposal presents reasonable safeguards to allow the service to safely commence within structured parking.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This code change does not affect construction cost as it is simply adding provisions allowing garage mobile fueling.

F225-21

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: This proposal would allow mobile fueling within garages based only on the fire access being approved with no other criteria. There was concern with a sprinkler system being able to control a fuel spill fire within a parking garage that will be a much larger fire than a typical vehicle fuel fire. In addition NFPA 30A does not yet allow this activity. (Vote: 14-0)

F225-21

Individual Consideration Agenda

Public Comment 1:

IFC: 5707.5.1, 5707.5.2

Proponents: Andrew Klein, representing Booster Fuels (andrew@asklein.com); John Catlett, representing BOMA International (catlettcodeconsulting@gmail.com) requests As Modified by Public Comment

Further modify as follows:

2021 International Fire Code

5707.5.1 ~~Automated parking structures~~ Openness . ~~Vehicles shall not be fueled where elevated on a lift or stacker. Fueling shall be prohibited in automated and assisted-mechanical type parking structures.~~
Fueling operations shall be limited to open parking garages.

Exception: Where *approved* by the *fire code official*, fueling shall be permitted in closed parking garages while all vehicular access doors are in the fully open position.

5707.5.2 ~~Floor levels. levels.~~ Location . Mobile fueling shall be limited to the floor level of fire department ~~access.~~ access in garages of noncombustible construction . Vehicles shall not be fueled where elevated on a lift or stacker. Fueling shall be prohibited in automated and assisted-mechanical type parking structures.

~~**Exceptions:**~~
~~Where fire department vehicle access is deemed acceptable to the *fire code official*, mobile fueling shall be permitted in parking structures of Type I construction, protected througout with an automatic sprinler system in accordance with Section 903.3.1.1 and comply with one of the following:~~

1. ~~Up to three floor levels above or below the level of fire department vehicle access.~~
2. ~~Up to 70 ft above grade level in open parking garages~~

Commenter's Reason: There is a commercial need for fueling inside of garages for corporate vehicles that are stored in garages. This PC significantly restricts where a fire code official is able to approve mobile fueling operations within a garage. Procedures include mitigative controls sufficient to account for the increased risks of fueling in a garage.

Cost Impact: The net effect of the public comment and code change proposal will not increase or decrease the cost of construction
This proposal does not affect the cost of construction.

Public Comment# 2856

F228-21

Proposed Change as Submitted

Proponents: Eirene Knott, representing Metropolitan Kansas City Chapter of the ICC (Eirene.Knott@brrarch.com)

2021 International Fire Code

SECTION B104
FIRE-FLOW CALCULATION AREA

Revise as follows:

B104.1 General. The *fire-flow calculation area* shall be the total floor area of all floor levels within the *exterior walls*, and under the horizontal projections of the roof of a building~~, except as modified in Section B104.3~~.

Exceptions:

1. The fire-flow calculation area of buildings constructed of Type IA and Type IB construction shall be the area of the three largest successive floors.
2. Fire-flow calculation area for open parking garages shall be determined by the area of the largest floor.

B104.2 Area separation. Portions of buildings that are separated by *fire walls* without openings, constructed in accordance with the *International Building Code*, are allowed to be considered as separate *fire-flow calculation areas*.

Delete without substitution:

~~**B104.3 Type IA and Type IB construction.**~~
~~The *fire-flow calculation area* of buildings constructed of Type IA and Type IB construction shall be the area of the three largest successive floors.~~

~~**Exception:** *Fire-flow calculation area* for open parking garages shall be determined by the area of the largest floor.~~

Reason: My intention with this code change is to clarify the intention of the exception for parking garages. The way the current language reads, it implies that the exception only applies to parking garages of Type IA and IB construction as that's the charging language here. If one reads this in black and white, the exception will only apply to Types IA and IB parking garages, but that is not the intention. The intention is for parking garages to allow for this method of calculation and should not be noted as an exception just to Type IA and IB construction. By moving the language around, I believe this now clearly indicates that parking garages have their own method of calculation as do Types IA and IB construction.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This should not have any impact on the construction cost, but it may actually reduce the cost if this code language has been misinterpreted.

F228-21

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The committee stated that the reason for disapproval was the uncertainty of changing the technical requirement from the original intent for the fire flow requirement in open parking garages of Type IA and IB construction. (Vote: 11-3)

F228-21

Individual Consideration Agenda

Public Comment 1:

IFC: SECTION B104, B104.1, B104.2

Proponents: Eirene Knott, representing Metropolitan Kansas City Chapter of the ICC (eirene.knott@brrarch.com) requests As Modified by Public

Comment

Modify as follows:

2021 International Fire Code

SECTION B104
FIRE-FLOW CALCULATION AREA

B104.1 General . The *fire-flow calculation area* shall be the total floor area of all floor levels within the *exterior walls*, and under the horizontal projections of the roof of a building.

Exceptions:

1. The fire-flow calculation area of buildings constructed of Type IA and Type IB construction shall be the area of the three largest successive floors.
2. Fire-flow calculation area for open parking garages <u>of Type IA and IB construction </u>shall be determined by the area of the largest floor.

B104.2 Area separation . Portions of buildings that are separated by *fire walls* without openings, constructed in accordance with the *International Building Code*, are allowed to be considered as separate *fire-flow calculation areas*.

Commenter's Reason: During the committee hearings, the history of the flow calculations for the open parking garage was discussed. The language came from the BOCA code which allowed for parking garages of Types I and IIA to meet the area of the largest floor. The exception only applied to parking garages for those two construction types. This public comment is providing for that language to be added to the parking garage exception so as to clearly identify that the exception for parking garage calculations would apply only to those construction types rather than a universal exception for all construction types.
Based on the fire flow calculations, both the Types IA and IB are exceptions due to the nature of the construction type. The same exception applies to parking garages but only to Types IA and IB, which is what I'm attempting to clarify in this code change. I am not trying to change anything on how the calculations are determined, but rather to clarify that the permission for the parking garage calculation is specific to only Types IA and IB construction. All other parking garages would then be calculated as directed in B104.1.

Cost Impact: The net effect of the public comment and code change proposal will not increase or decrease the cost of construction
This is merely to clarify existing language; it should not impact construction costs.

Public Comment# 2334

F229-21

Proposed Change as Submitted

Proponents: Daniel Nichols, representing Metropolitan Transportation Authority, Construction and Development (dnichols@mnr.org)

2021 International Fire Code

Revise as follows:

TABLE B105.1(2) REFERENCE TABLE FOR TABLES B105.1(1) AND B105.2

FIRE-FLOW CALCULATION AREA (square feet)					FIRE FLOW (gallons per minute)[b]	FLOW DURATION (hours)
Type IA and IB[a]	Type IIA and IIIA[a]	Type IV and V-A[a]	Type IIB and IIIB[a]	Type V-B[a]		
0–22,700	0–12,700	0–8,200	0–5,900	0–3,600	1,500	2
22,701–30,200	12,701–17,000	8,201–10,900	5,901–7,900	3,601–4,800	1,750	
30,201–38,700	17,001–21,800	10,901–12,900	7,901–9,800	4,801–6,200	2,000	
38,701–48,300	21,801–24,200	12,901–17,400	9,801–12,600	6,201–7,700	2,250	
48,301–59,000	24,201–33,200	17,401–21,300	12,601–15,400	7,701–9,400	2,500	
59,001–70,900	33,201–39,700	21,301–25,500	15,401–18,400	9,401–11,300	2,750	
70,901–83,700	39,701–47,100	25,501–30,100	18,401–21,800	11,301–13,400	3,000	3
83,701–97,700	47,101–54,900	30,101–35,200	21,801–25,900	13,401–15,600	3,250	
97,701–112,700	54,901–63,400	35,201–40,600	25,901–29,300	15,601–18,000	3,500	
112,701–128,700	63,401–72,400	40,601–46,400	29,301–33,500	18,001–20,600	3,750	
128,701–145,900	72,401–82,100	46,401–52,500	33,501–37,900	20,601–23,300	4,000	4
145,901–164,200	82,101–92,400	52,501–59,100	37,901–42,700	23,301–26,300	4,250	
164,201–183,400	92,401–103,100	59,101–66,000	42,701–47,700	26,301–29,300	4,500	
183,401–203,700	103,101–114,600	66,001–73,300	47,701–53,000	29,301–32,600	4,750	
203,701–225,200	114,601–126,700	73,301–81,100	53,001–58,600	32,601–36,000	5,000	
225,201–247,700	126,701–139,400	81,101–89,200	58,601–65,400	36,001–39,600	5,250	
247,701–271,200	139,401–152,600	89,201–97,700	65,401–70,600	39,601–43,400	5,500	
271,201–295,900	152,601–166,500	97,701–106,500	70,601–77,000	43,401–47,400	5,750	
295,901–Greater[c]	166,501–Greater[c]	106,501–115,800	77,001–83,700	47,401–51,500	6,000	
—	—	115,801–125,500	83,701–90,600	51,501–55,700	6,250	
—	—	125,501–135,500	90,601–97,900	55,701–60,200	6,500	
—	—	135,501–145,800	97,901–106,800	60,201–64,800	6,750	
—	—	145,801–156,700	106,801–113,200	64,801–69,600	7,000	
—	—	156,701–167,900	113,201–121,300	69,601–74,600	7,250	
—	—	167,901–179,400	121,301–129,600	74,601–79,800	7,500	
—	—	179,401–191,400	129,601–138,300	79,801–85,100	7,750	
—	—	191,401–Greater[c]	138,301–Greater[c]	85,101–Greater[c]	8,000	

For SI: 1 square foot = 0.0929 m^2, 1 gallon per minute = 3.785 L/m, 1 pound per square inch = 6.895 kPa.

a. Types of construction are based on the *International Building Code*.

b. Measured at 20 psi residual pressure.

c. For fire flow calculation areas greater than the value, the fire code official is authorized to require additional fire flow, based on a consideration of access, fire hazards, exposure, and capabilities of the fire department.

Reason: The limitations of the fire flow calculation area are sourced back to the fire suppression rating schedule calculations. However, unlimited area buildings do create unique challenges for fire departments and additional fire flow might be needed to control fires due to unique exposures, multiple exposure protection, and the geometry of the building. The fire code official should have the ability to account for these specific needs when the values of the table are outside the original targeted protection.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal provides guidance to building arrangements not previously addressed.

F229-21

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The committee stated that the reasons for disapproval were that modifying Section B103.2 is probably the better place to do it and there are prescriptive ways of calculating fire flow for these kinds of buildings that use square footage or volume or a number of different ways that are a much better way to approach this rather than changing the table. Additionally, it was noted the proposal is too open ended and there would also need to be some coordination with the water utility because the fire code official could require something that's not technically feasible that will exhaust the capacity of the water system. (Vote: 13-1)

F229-21

Individual Consideration Agenda

Public Comment 1:

Proponents: Daniel Nichols, representing Metropolitan Transportation Authority, Construction and Development (dnichols@mnr.org) requests As Submitted

Commenter's Reason: We are requesting that the membership consider acceptance of proposal F229-21 and offer the following responses to the committee's reason and that of the testifiers on the proposal:
Methodology- The committee reason statement states there are other methods to calculate fire flow, such as the area or volume of the building. We agree that there are other methods to complete fire flow calculations and those are always available to the fire code official within the charging language for "approved fire flow" in Chapter 5 of the IFC. This proposal only effects the appendix, which is available for adoption by the jurisdiction or, if not adopted, reference by the fire code official as they see fit. An important note about the other fire flow methods mentioned: if we use the building scenario that this proposal cited (a Type IIB building 138,301 sf) the "area" method would require 46,100 GPM and the "volume" method would require 27,600 GPM. Whereas the aforementioned numbers are not achievable, locations like industrial complexes with dedicated fire protection water systems can easily get flows higher than 2,000 GPM.

Water Purveyors- One of the testifiers stated that it would be impossible for many water purveyors to provide such a fire flow. We do understand that issue for buildings being constructed wholly supplied by municipal sources, but it places a limitation on fire code officials requiring upgrades to dedicated fire protection water supplies, providing alternative water supply availability, as well as pushing projects to incorporate, fire sprinklers, fire walls and/or fire-rated construction to limit the fire flow calculation values.

We would ask the membership to reflect on their community and the challenges that the fire service has in providing adequate water supplies for buildings. This is not a transportation-related issue and effects many projects where large buildings are being constructed without consideration of the existing infrastructure.

Cost Impact: The net effect of the public comment and code change proposal will increase the cost of construction
This correction for buildings that exceed the values in Appendix B would increase the cost of construction if the jurisdiction adopts it.

Public Comment# 2873

F230-21

Proposed Change as Submitted

Proponents: Gary Ehrlich, representing NAHB (gehrlich@nahb.org)

2021 International Fire Code

Revise as follows:

D102.1 Access and loading. Facilities, buildings or portions of buildings hereafter constructed shall be accessible to fire department apparatus by way of an *approved* fire apparatus access road with an asphalt, concrete or other *approved* driving surface capable of supporting the imposed load of fire apparatus weighing up to 75,000 pounds (34 050 kg).

> **Exception:** An additional fire apparatus access road required by this appendix is permitted to be a sidewalk, driveway, pathway, court or other approved surface not accessible to public motor vehicles where designed by a registered design professional to meet the loading requirements and minimum specifications of this appendix, and the surface provides all-weather driving capabilities.

Reason: The current provisions of IFC Section 503, Appendix D and the definition of "fire department apparatus road" as written can be interpreted to require the construction of an actual road, street, lane or other feature potentially accessible to public vehicular traffic as well as fire department vehicles, complete with curbs and gutters, shoulders and other components and making a complete intersection with a main road, street, highway, etc. adjacent to the development. However, for long, narrow parcels of land which can only be physically accessed along one of the narrow sides, such an interpretation may result in placing the intersection created by the second access road closer to the main access to the development than is permitted by local highway or zoning ordinances.
Nothing in IFC Section 503 or Appendix D requires the additional road intersect a public way at the same elevation as the public way, or even be a true "road" accessible to vehicular traffic. A code-compliant "road" could simply be a sidewalk or other pathway primarily intended for pedestrian use but constructed to meet the width, loading and other requirements of a fire apparatus access road. Such a walking path would not need to form a true intersection with public streets but could simply end at a sloped or roll-up curb. The proposed exception clarifies such methods of constructing the additional fire department apparatus "road" are acceptable.

Cost Impact: The code change proposal will decrease the cost of construction
The exception could reduce the cost of constructing a fire apparatus access road by allowing for the elimination of curbs and gutters or other elements associated with a road open to public vehicles. The exception would also enable more cost-effective development of sites where the only option under which development of the site would otherwise be permitted would be providing alternative, potentially costly, means of fire protection.

F230-21

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The committee stated that one of reasons for disapproval was that the other pathways that are listed in the proposal may not be recognized as fire apparatus roads by the fire department, they could potentially slow response time and the locations listed are prone to obstructions. Another reason for disapproval was the need for a requirement to permanently identify these as a fire lane. (Vote: 12-2)

F230-21

Individual Consideration Agenda

Public Comment 1:

IFC: D102.1

Proponents: Gary Ehrlich, representing NAHB (gehrlich@nahb.org) requests As Modified by Public Comment

Modify as follows:

2021 International Fire Code

D102.1 Access and loading . Facilities, buildings or portions of buildings hereafter constructed shall be accessible to fire department apparatus by way of an *approved* fire apparatus access road with an asphalt, concrete or other *approved* driving surface capable of supporting the imposed load of fire apparatus weighing up to 75,000 pounds (34 050 kg).

Exception: Where two ~~An additional~~ fire apparatus access roads are required by Section 503.1.2 or by Sections D104, D105 or D106 ~~this appendixis~~ , the additional fire apparatus access road is permitted to be a ~~sidewalk,~~ driveway, pathway, court or other approved *fire lane*~~surface~~ not accessible to public motor vehicles where designed by a registered design professional to meet the loading requirements and minimum specifications of Section 503 and this appendix, and the surface provides all-weather driving capabilities. Marking or signs shall be provided in accordance with Section 503.3 and Section D103.6.

Commenter's Reason: This public comment addresses the IFC committee concerns with the proposal as well as those brought up by opponents in testimony. The proposed exception is revised to refer to the code-defined term “fire lane”. As defined in Chapter 2, a fire lane need not be accessible to public vehicular traffic and can be a passageway other than an actual road. A requirement for marking or signs identifying the additional path as a fire lane is also provided. Such marking or signs are already required by Section 503 and Appendix D regardless of whether a fire apparatus access road is open to public traffic or not. However, to address concerns the alternate means of passage for fire apparatus needed to be identified, a pointer to the existing marking and signage requirements is provided.

In addition, a pointer to the base code requirements for fire apparatus access roads in Section 503 is provided, addressing concerns those requirements needed to be referenced in addition to the dimensional and loading requirements within Appendix D. This will insure the minimum 20 foot width required per Section 503.2.1, the requirement to maintain the access road or fire lane unobstructed per Section 503.4, and the requirements for gates where they are provided are all recognized and maintained. To provide further clarity and reduce confusion, the reference to sidewalks is deleted. Should one want to construct a walkway or bikeway that can double as an access road or fire lane, those are covered under "pathway" as well as the "passageway" allowed for a fire lane.

Finally, it is clarified that the exception is intended to apply both where Appendix D provisions trigger a second fire apparatus access road based on the size of a building project, the number of dwelling units in a multifamily building, or the number of one- and two-family dwellings in a development and where the fire code official requires an additional access rod under the authority granted in Section 503.1.2.

Cost Impact: The net effect of the public comment and code change proposal will decrease the cost of construction
The original proposal could reduce the cost of constructing a fire apparatus access road by allowing for the elimination of curbs and gutters or other elements associated with a road open to public vehicles and enabling more cost-effective development of larger parcels. Since marking or signage is already required by the code and Appendix D, adding the pointer to those requirements does not change the cost of construction.

Public Comment# 2718

F231-21

Proposed Change as Submitted

Proponents: Gary Ehrlich, representing NAHB (gehrlich@nahb.org)

2021 International Fire Code

Revise as follows:

D107.1 One- or two-family dwelling residential developments. Developments of one- or two-family *dwellings* where the number of *dwelling units* exceeds 30 shall be provided with two separate and *approved* fire apparatus access roads.

Exceptions:

1. Where there are more than 30 *dwelling units* accessed from a single public or private fire apparatus access road and all *dwelling units* are equipped throughout with an *approved automatic sprinkler system* in accordance with Section 903.3.1.1, 903.3.1.2 or 903.3.1.3, access from two directions shall not be required.
2. Where the number of *dwelling units* on a single public or private fire apparatus access road does not exceed 50, the minimum unobstructed width of the single fire apparatus access road is 26 feet (7925 mm), and the development is not located in a wildand-urban interface area as defined in the *International Wildland-Urban Interface Code*, access from two directions shall not be required.
3. ~~2.~~ The number of *dwelling units* accessed from a single fire apparatus access road shall not be increased unless fire apparatus access roads will connect with future development, as determined by the *fire code official*.

Reason: One of the barriers to affordable housing frequently cited by NAHB members is availability of lots for development. In some cases, the dimensions of such parcels, surrounding development, surrounding terrain or other constraints make it difficult if not impossible to provide a second fire department apparatus road, even if constructed as a sidewalk, bike path or other feature only accessible to fire trucks, not accessible to public motor vehicles. A developer may either be faced with having to sacrifice planned dwelling units or providing alternative, potentially costly, means of fire protection in order to construct the development. Either solution increases the cost of construction for the homes in the development and may render them unaffordable to homebuyers or renters with modest incomes. Or, the developer may be forced to abandon the lot, meaning the IFC has improperly acted as a de facto zoning code.
The current 30 dwelling trigger is low compared to a multifamily development can contain up to 100 units. One of the reasons for the second fire department apparatus road is in case the primary access to the development is blocked by traffic congestion or an accident. Given the average household size is between 2 and 3 people, clearly a 100-unit multifamily building is likely to generate more traffic than 30 single-family houses. Average lot size has also been shrinking, so if travel distance is a concern it will take less time for fire equipment to traverse many current single-family developments than it may have previously. There is no reason for such a low trigger as 30 homes.

This proposal adds an exception that raises the trigger to 50 dwellings, or half the number of dwelling units at which a multifamily development triggers the second fire department apparatus road, if the minimum unobstructed width of the primary fire department apparatus road is increased to 26 feet in width to aid in both fire department access and evacuation, and the development is not in a wildfire-prone area.

Cost Impact: The code change proposal will decrease the cost of construction
The proposal will reduce the cost of constructing for developments of 31 to 50 houses by eliminating the need for the second fire apparatus access road and enabling development of slightly larger parcels. The exception would also enable more cost-effective development of sites where the only option under which development of the site would otherwise be permitted would be providing alternative, potentially costly, means of fire protection.

F231-21

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The committee stated that one of the reasons for disapproval was the issue of the hydrant locations and spacing that may need to be considered in the requirement. It was also noted that the proponent should consider the format of using an exception that may be better placed in a separate section. Additionally, it was stated that the 50 dwelling unit criteria is a lot of dwelling units on one road especially one that is a dead-end road. (Vote: 11-3)

F231-21

Individual Consideration Agenda

Public Comment 1:

IFC: D107.1, D107.1.1 (New), D107.1.2 (New)

Proponents: Gary Ehrlich, representing NAHB (gehrlich@nahb.org) requests As Modified by Public Comment

Modify as follows:

2021 International Fire Code

D107.1 One- or two-family dwelling residential developments . Developments of one- or two-family *dwellings* where the number of *dwelling units* exceeds 30 shall be provided with two separate and *approved* fire apparatus access roads.

Exceptions:

1. Where there are more than 30 *dwelling units* accessed from a single public or private fire apparatus access road and all *dwelling units* are equipped throughout with an *approved automatic sprinkler system* in accordance with Section 903.3.1.1, 903.3.1.2 or 903.3.1.3, access from two directions shall not be required.
2. Where there are not more than 50 dwellings on a single public or private fire apparatus access road complying with Section D107.1.1. ~~Where the number of *dwelling units* on a single public or private fire apparatus access road does not exceed 50, the minimum unobstructed width of the single fire apparatus access road is 26 feet (7925 mm), and the development is not located in a wildand-urban interface area as defined in the *International Wildland-Urban Interface Code*, access from two directions shall not be required required.~~ .
3. ~~The number of *dwelling units* accessed from a single fire apparatus access road shall not be increased unless fire apparatus access roads will connect with future development, as determined by the *fire code official*.~~

D107.1.1 One- or two-family dwelling residential developments having not more than 50 units .
Developments of one- or two-family dwellings where the number of dwelling units does not exceed 50 shall be permitted to have a single approved fire apparatus access road provided all of the following requirements are met:

1. The minimum unobstructed width of the single fire apparatus access road shall be 26 feet (7925 mm) and shall otherwise comply with Section 503 and Section D103.
2. Where the fire apparatus access road exceeds 150 feet in length the width and turnaround provisions of Section D103.4 shall be met.
3. A minimum of one fire hydrant on each side of the fire apparatus access road in accordance with Section 507.5 shall be provided. The fire code official shall be permitted to require additional hydrants and hydrant spacing based on the length of the fire apparatus access road, fire flow requirements, and the distance from any point on the street or road frontage to a hydrant.
4. The development is not located in a wildand-urban interface area as defined in the *International Wildland-Urban Interface Code.*

D107.1.2 Future Development . The number of *dwelling units* on a single fire apparatus access road shall not be increased unless fire apparatus access roads will connect with future development, as determined by the *fire code official.*

Commenter's Reason: This public comment addresses the IFC Committee reasons for disapproval of F230-21 as well as issues brought up by testifiers. The primary concerns were the clarity of the new exception, the possibility of the road being blocked by hoses, and the number of dwellings that could be on a dead-end road.
First, the allowance for a development having 50 or fewer dwellings is moved to its own subsection, with a pointer retained as new Exception #2, and the qualifiers are converted into a numbered list. This addresses the committee's suggestion the alternative would be better placed in its own section and generally improves the clarity.

Second, a requirement is added that at least one hydrant be placed on each side of the road, and a pointer to the hydrant spacing requirements of Section 507.5 is provided. This addresses concerns by committee members and opponents that access via a single road could be blocked if fire hydrants are only provided on one side of the road, as hoses may need to extend across the road and cannot be driven over. In addition, invoking the Section 507 requirements allows the fire code official to further modify the hydrant location and spacing to minimize the possibility of needing to extend hoses across the road.

Finally, a pointer to the dead-end turnaround requirements in Section D103.4 is added to address concerns raised about a single dead-end access road. It is noted As the D101.1 Scope provision requires a single road to comply with all the requirements of Section 503 and Appendix D the turnaround requirements should be triggered anyway, but there is certainly no harm in underscoring the fact a turnaround needs to be provided. It is noted Table D103.4 requires the fire code official to approve the minimum width and turnarounds for dead-end access roads exceeding 750 in length. Thus the code already addresses the issue of a longer road that was brought up in testimony and empowers the fire code official to require a wider road and additional turnarounds.

Cost Impact: The net effect of the public comment and code change proposal will decrease the cost of construction
The original proposal will reduce the cost of constructing for developments of 31 to 50 houses by eliminating the need for the second fire apparatus access road and enabling development of slightly larger parcels. The public comment would increase the cost to construct a single access road due to the requirement for additional fire hydrants, but the proposal together with the public comment would still likely decrease the cost of construction for the entire development.

Public Comment# 2730

F236-21

Proposed Change as Submitted

Proponents: Michael O'Brian, representing FCAC (fcac@iccsafe.org)

2021 International Fire Code

Add new text as follows:

APPENDIX O
VALET TRASH AND RECYCLING COLLECTION IN GROUP R-2 OCCUPANCIES

.

The provisions contained in this appendix are not mandatory unless specifically referenced in the adopting ordinance or legislation of the jurisdiction.About this appendix: Appendix O provides for trash and recycle collection services in Group R-2 occupancies. Occupants receiving this service place trash and recyclables in the corridor outside of their residence for pickup by a collection service on a regularly scheduled basis in accordance with restrictions, as prescribed by this appendix.

SECTION O101
SCOPE

O101.1 Scope. Valet trash collection in Group R-2 Occupancies shall comply with this Appendix.

SECTION O102
DEFINITIONS

O102.1 Definitions. For the purpose of this appendix certain terms are defined as follows:
VALET TRASH COLLECTION. A service provided whereby trash or recycling is placed outside of dwelling units in approved containers during prescribed times for collection by another party.

SECTION O103
CONTAINERS

O103.1 General. Containers used for valet trash collection shall comply with Sections O103.2 through O103.5.

O103.2 Integrity. Valet trash or recycling materials shall be stored in containers that are of liquid-tight construction and shall be equipped with tight-fitting lids.

O103.3 Height. Containers shall not exceed 30” in height.

Add new text as follows:

O103.4 Capacity and limit.
Individual containers shall not exceed 2.0 cubic feet (15 gallons) in capacity. Only one trash or recycling container per *dwelling uni* t or *sleeping unit* shall be permitted to be placed outside of the *dwelling unit* or *sleeping unit* at one time. Trash and recycling containers shall not be placed outside of a *dwelling unit* or *sleeping unit* at the same time.

O103.5 Construction materials.
Containers and lids used for valet trash collections shall be constructed entirely of noncombustible materials, or of materials that meet a peak rate of heat release not exceeding 300 kW/m2 when tested in accordance with ASTM E1354 at an incident heat flux of 50 kW/m2 in the horizontal orientation.

SECTION O104
CONTAINER LOCATION

O104.1 General. Placement of containers used for valet trash collection outside of a *dwelling unit* or *sleeping unit* shall comply with Sections O104.2 and O104.3.

O104.2 Minimum means of egress width. Containers used for *valet trash collection* shall not obstruct the minimum required egress width.

Add new text as follows:

O104.3 Stairways.

Containers used for *valet trash collection* shall not be placed on stair risers, within minimum required stairway landing dimensions, or anywhere in an *interior exit stairway*.

SECTION O105
ADDITIONAL REQUIREMENTS

O105.1 Time limits. Filled containers used for valet trash or recycling services shall not be placed outside a dwelling unit for more than 6 hours within in any 24-hour period. Empty approved containers used for valet trash or recycling services shall not remain in a corridor for more than 12 continuous hours in a 24 hour period.

Add new text as follows:

O105.2 Collection rules.
The property owner or manager shall have written valet service rules, hours and penalties provided to all tenants and occupants. The property owner or manager shall be responsible for implementing, monitoring, and enforcing all valet trash collection rules. A copy of the rules shall be provided to the *fire code official* upon request.

O105.3 Suspension of service.
The *fire code official* has the authority to order the suspension of *valet trash collection* that is not in compliance with this appendix.

SECTION O106
REFERENCED STANDARDS

TABLE O106.1 REFERENCED STANDARDS

STANDARD ACRONYM	STANDARD NAME	SECTIONS HEREIN REFERENCED
ASTM E1354-17	Standard Test Method for Heat and Visible Smoke Release Rates for Materials and Products Using an Oxygen Consumption Calorimeter	O103.5

O106.1 General. See Table O106.1 for standards that are referenced in various sections of this appendix. Standards are listed by the standard identification with the effective date, standard title, and the section or sections of this appendix that reference the standard.

Reason: Following rejection of a predecessor proposal last cycle, interested parties were welcome to participate in the FCAC discussion on this issue, and input was received from both the fire service and industry representatives. To be clear, this proposal is being advanced by FCAC to achieve reasonable and uniform regulations, and it is not something that was initiated as an industry proposal. Accordingly, FCAC did not feel that we should request or wait for industry to bring this forward vs. dealing with it as an FCAC initiative.
Currently, there are no provisions in the IFC specifically prohibiting or regulating the placement of combustible trash or recyclables in an exit access corridor, provided that such materials are not placed within the minimum required width of the means of egress. Code sections relevant to this discussion are as follows:

- IFC Section 315.3.2 specifically regulates "combustible materials" in the means of egress and does not prohibit combustible storage anywhere other than "exits or enclosures for stairways and ramps" or "during construction, demolition, remodeling or alterations." Accordingly, it is difficult to make a case that any other general section in the IFC possibly applicable to this discussion would be intended to add additional regulations for combustibles in exit access corridors when exit access corridors are specifically omitted from Section 315.3.2 and considering that IFC Section 102.10 establishes that specific provisions override general provisions in the event of a conflict.
- Some may argue that prohibition of valet trash can be accomplished under IFC Section 304.2, but that would require a determination that such materials constitute a "hazard to the public health, safety or welfare." A determination of that type is, at best, going to be inconsistent from jurisdiction to jurisdiction and is inconsistent with the "specific over general" rule established by IFC Section 102.10.
- Some may argue that prohibition of valet trash can be accomplished under IFC Section 1020.4, which requires that the minimum width of corridors not be obstructed, but there is no prohibition in this section of combustible material in a corridor if it does not obstruct the minimum required egress width.
- Some may argue that prohibition of valet trash can be accomplished under IFC Section 1032.2, which requires that a means of egress be maintained free from obstructions or impediments to full instant use in the case of fire or other emergency, but like Section 304.2, such determination is going to be inconsistent from jurisdiction to jurisdiction when it comes to valet trash services, and applying the code in this way would be inconsistent with the "specific over general" rule established by IFC Section 102.10.

Further, the issue of disallowing combustibles in corridors has been specifically adjudicated by ICC in two recent code cycles without being supported. Proposal F16-13 had FCAC recommending a change to Section 315.3.2 that would specifically disallow combustibles in corridors, and there was a failed Public Comment attempting to disallow combustibles in corridors serving an occupant load of 10 or more. Then, Proposal F20-16 recommended disallowing combustibles in corridors serving an occupant load of 30 or more, which was also unsuccessful. With ICC having three times rejected a change to the IFC that would disallow combustibles in corridors, any competent defense attorney would be well equipped to challenge a citation claiming that the presence of valet trash or recyclable materials in a corridor constitutes a code violation.

Nevertheless, the occurrence of inconsistent code interpretations and enforcement has become clear in discussions among fire code officials who participated in the FCAC work on this topic. Accordingly, this proposal seeks to add regulations for valet trash services into the IFC appendix, which will offer standardized regulations for jurisdictions choosing to allow the service. Jurisdictions choosing to take a different path and jurisdictions that already have statutory governance of valet trash service would have the option of not adopting the appendix. Regulations proposed for the appendix will establish reasonable precautions and restrictions, where adopted, including: 1) Reminding that containers for valet trash cannot obstruct the minimum egress width, 2) Regulating container construction to reduce fire risk, 3) Limiting the size of containers and requiring that they be equipped with "tight fitting" lids (some have mentioned that "tight fitting" is too vague for inclusion in the code, but the term is already used multiple times in the IBC and IFC), 4) Controlling the time of placement of containers outside of dwelling units, and 5) Providing suitable administrative controls.

Supporters of this proposal cite the value of reduced trash accumulation (a fire and health risk) inside of dwelling units by having frequent pickup service, the value of offering trash removal to elderly and disabled populations who have difficulty or are unable to get trash and recyclables to a trash collection area, and the value of the IFC offering specific controls for a currently unregulated service that is already occurring with plastic bags and highly combustible containers.

This proposal is submitted by the ICC Fire Code Action Committee (FCAC). The FCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance assigned International Codes with regard to fire and life safety in new and existing buildings and facilities as well as the protection of life and property in wildland urban interface areas. In 2020 and 2021 the Fire-CAC held multiple virtual meetings that were open to any interested party. In addition, there were numerous virtual specific working group meetings that were also open to any interested parties, to develop, discuss and debate the proposed changes. Related documentation and reports are posted on the FCAC website at: https://www.iccsafe.org/products-and-services/i-codes/code-development/cs/fire-code-action-committee-fcac/

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal relates to operations in a building and is not associated with any building construction requirements.

F236-21

Public Hearing Results

Committee Action: **As Modified**

Committee Modification:

O102.1 Definitions.
VALET TRASH COLLECTION. A service that removes ~~provided whereby~~ trash or recycling materials ~~is~~ placed outside of dwelling units or sleeping units ~~in approved containers during prescribed times~~ for collection ~~by another party~~.

Committee Reason: Approval was based upon the need to provide a framework for jurisdictions available where needed. This practice occurs currently with no guidance. It was noted that the appendix can be customized by a jurisdiction to meet their specific needs. This new appendix will offer a rated container whereas no rating is currently required. Note that some committee members struggled with locating such provisions in the fire code and have concern about enforceability. The modification revises the definition to better explain what is intended to regulated. This clarifies also that it covers both dwelling units and sleeping units. (Vote: 9-5).

F236-21

Individual Consideration Agenda

Public Comment 1:

IFC: O102.1, O103.2, O103.5

Proponents: William Koffel, representing National Valet Trash and Recycling Valet Trash Association (wkoffel@koffel.com); Andrew Klein, representing Valet Living (andrew@asklein.com) requests As Modified by Public Comment

Further modify as follows:

2021 International Fire Code

O102.1 Definitions. For the purpose of this appendix certain terms are defined as follows:
VALET TRASH COLLECTION. ~~A~~ An intermediary service that removes trash or recycling materials placed outside of dwelling units or sleeping units for final collection.

O103.2 Integrity. Valet trash or recycling materials shall be stored in containers that are of liquid-tight construction and shall be equipped with lids and the lid shall be in the fully closed position ~~tight-fitting lids.~~

O103.5 Construction materials . Containers and lids used for valet trash collections shall be constructed entirely of noncombustible materials, or of materials that meet a peak rate of heat release not exceeding 300 kW/m2 when tested in accordance with ASTM E1354 at an incident heat flux of 50 kW/m2 in the horizontal orientation.

Exceptions:

1. Containers in corridors or egress balconies in buildings protected by an *approved automatic sprinkler system* installed throughout in accordance with Section 903.3.1.1 or 903.3.1.2.
2. Containers on egress balconies in buildings with noncombustible exterior wall coverings.

Commenter's Reason: The Public Comment attempts to place all the potential changes to the Committee Action in one location, F236-21. There are three revisions to what the Committee approved as modified:
1. The definition is revised to clarify that traditional curbside trash collection at single family homes is not impacted.

2. The container lid language from F237-1 has been included, which was language the Committee preferred.

3. Exceptions to the container material requirements have been proposed. These revisions are consistent with other provisions already in Section 304 for larger waste containers. The revisions are also consistent with what was approved by the NFPA Life Safety Technical Committee on Residential Occupancies during the development of the 2021 Edition of the *Life Safety Code*. The language was not included in the *Code* due to Certified Amending Motions submitted to both NFPA 1 and NFPA 101 but it has been submitted as a Public Input for reconsideration of the issue by the Committee. It should be noted that the NFPA Standards Council determined that valet trash service was a life safety issue and therefore should be addressed by the appropriate NFPA 101 Technical Committees.

Cost Impact: The net effect of the public comment and code change proposal will not increase or decrease the cost of construction
The proposal relates to operations in a building and is not associated with any building construction requirements. The proposed exceptions will reduce the operational costs for some buildings.

Public Comment# 2911

F237-21

Proposed Change as Submitted

Proponents: William Koffel, representing National Valet Trash and Recycling Valet Trash Association (wkoffel@koffel.com)

2021 International Fire Code

Add new text as follows:

APPENDIX O
VALET TRASH AN RECYLING COLLECTION IN GROUP R-2 OCCUPANCIES

.

The provisions contained in this appendix are not mandatory unless specifically referenced in the adopting ordinance or legislation of the jurisdiction. About this appendix: Appendix O provides for trash and recycle collection services in Group R-2 occupancies. Occupants receiving this service place trash and recyclables in the corridor outside of their residence for pickup by a collection service on a regularly scheduled basis in accordance with restrictions, as prescribed by this appendix.

SECTION O101
SCOPE

O101.1 Scope.
Valet trash collection in Group R-2 Occupancies shall comply with this Appendix.

SECTION O102
DEFINITIONS

O102.1 Definitions.
For the purpose of this appendix certain terms are defined as follows:

VALET TRASH COLLECTION. A service provided whereby trash or recycling is placed outside of dwelling units in approved containers during prescribed times for collection by another party.

SECTION O103
CONTAINERS

O103.1 General.
Containers used for valet trash collection shall comply with Sections O103.2 through O103.5.

O103.2 Integrity.
Valet trash or recycling materials shall be stored in containers that are of liquid-tight construction and shall be equipped with lids and the lid shall be in the fully closed position

O103.3 Height.
Containers shall not exceed 30” in height.

0103.4 Capacity and Limit.
Individual containers shall not exceed 2.0 cubic feet (15 gallons) in capacity. Only one trash or recycling container per dwelling unit or sleeping unit shall be permitted to be placed outside of the dwelling unit or sleeping unit at one time. Trash and recycling containers shall not be placed outside of a dwelling unit or sleeping unit at the same time.

O103.5 Construction materials.
Containers and lids used for valet trash collections shall be constructed entirely of noncombustible materials, or of materials that meet a peak rate of heat release not exceeding 300 kW/m2 when tested in accordance with ASTM E1354 at an incident heat flux of 50 kW/m2 in the horizontal orientation.

Exception:
Containers in exterior egress balconies in buildings protected by an approved automatic sprinkler system installed throughout in accordance with Section 903.3.1.1 or 903.3.1.2, including the exterior egress balcony.

SECTION O104
CONTAINER LOCATION

0104.1 General.
Placement of containers used for valet trash collection outside of a dwelling unit or sleeping unit shall comply with Sections O104.2 and O104.3.

O104.2 Minimum means of egress width.
Containers used for valet trash collection shall not obstruct the minimum required egress width.

O104.3 Stairways. Containers used for valet trash collection shall not be placed on stair risers, within minimum required stairway landing dimensions, or anywhere in an interior exit stairway.

SECTION O105
ADDITIONAL REQUIREMENTS

O105.1 Time limits. Filled containers used for valet trash or recycling services shall not be placed outside a *dwelling unit* for more than 6 hours within in any 24-hour period. Empty approved containers used for valet trash or recycling services shall not remain in a corridor for more than 12 continuous hours in a 24 hour period.

O105.2 Collection rules. . The property owner or manager shall have written valet service rules, hours and penalties provided to all tenants and occupants. The property owner or manager shall be responsible for implementing, monitoring, and enforcing all valet trash collection rules. A copy of the rules shall be provided to the *fire code official* upon request.

O105.3 Suspension of service. The *fire code official* has the authority to order the suspension of valet trash collection that is not in compliance with this Appendix.

Revise as follows:

SECTION O106
REFERENCED STANDARDS

O106.1 General. See Table O106.1 for standards that are referenced in various sections of this appendix. Standards are listed by the standard identification with the effective date, standard title, and the section or sections of this appendix that reference the standard.

TABLE O106.1 REFERENCED STANDARDS

STANDARD ACRONYM	STANDARD NAME	SECTIONS HEREIN REFERENCED
ASTM E1354-17	Standard Test Method for Heat and Visible Smoke Release Rates for Materials and Products Using an Oxygen Consumption Calorimeter	O103.5

Reason: The proposal is identical to the FCAC proposal for a new valet trash appendix with two differences.

- **Section O103.2 Integrity** is revised to say that the lid must simply be in a closed position. IFC Sections 304 and 808.1 simply require lids on containers and do not reference "tight-fitting lids." The phrase "tight-fitting" is subjective. Does it require a means to keep the lid closed if the container is tipped? Some containers come with a security mechanism to limit access to the container. Is that what will be required? Requiring a lid to be in the closed position addresses the issue of containers being too full of material.

- **Section O103.4 Construction Materials** has a proposed exception for balconies in buildings with automatic sprinkler systems . The NFPA Life Safety Technical Committee on Residential Occupancies included several similar exceptions to the container requirements in a Second Revision approved by the Committee. It should be noted that the Second Revision was not upheld by the NFPA Standards Council based upon action taken on several Certified Amending Motions. The proposed language does not include all of the exceptions approved by the NFPA Committee; but rather, limits the exceptions to containers located on exterior egress balconies when the balcony and entire building are protected with an automatic sprinkler system. The proposed exception is consistent with provisions in Section 304 that address waste containers.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
While the proposal does not impact the cost of construction of a building, the proposed language will decrease the cost of containers required for valet trash.

F237-21

Public Hearing Results

Committee Action: **As Modified**

Committee Modification:

O103.5 Construction materials. Containers and lids used for valet trash collections shall be constructed entirely of noncombustible materials, or of materials that meet a peak rate of heat release not exceeding 300 kW/m2 when tested in accordance with ASTM E1354 at an incident heat flux of 50 kW/m2 in the horizontal orientation.

~~**Exception:**~~
~~Containers in exterior egress balconies in buildings protected by an approved automatic sprinkler system installed throughout in accordance with Section 903.3.1.1 or 903.3.1.2, including the exterior egress balcony.~~

Committee Reason: This proposal was approved consistent with action on taken F236-21 and addresses a necessary need for lids on the trash or recycling container. The exception for exterior egress balconies in buildings equipped throughout with a sprinkler systems was eliminated as it was felt necessary that the containers still comply with the fire performance criteria. (Vote: 9-5)

F237-21

Individual Consideration Agenda

Public Comment 1:

IFC: O102.1

Proponents: William Koffel, representing National Valet Trash and Recycling Valet Trash Association (wkoffel@koffel.com); Andrew Klein, representing Valet Living (andrew@asklein.com) requests As Modified by Public Comment

Further modify as follows:

2021 International Fire Code

O102.1 Definitions. For the purpose of this appendix certain terms are defined as follows:
VALET TRASH COLLECTION. ~~A~~ An intermediary service that removes ~~provided whereby~~ trash or recycling materials ~~is~~ placed outside of dwelling units or sleeping units for final collection ~~in approved containers during prescribed times for collection by another party.~~

Commenter's Reason: The proposed revisions to the definition to not include traditional curbside collection of trash as single family homes.

Cost Impact: The net effect of the public comment and code change proposal will not increase or decrease the cost of construction
The proposal relates to operations in a building and is not associated with any building construction requirements. The Public Comment merely clarifies a definition.

Public Comment# 2905

PM4-21

Proposed Change as Submitted

Proponents: Nicholas Capezza, representing Pool & Hot Tub Alliance (ncapezza@phta.org); Jennifer Hatfield, representing Pool & Hot Tub Alliance (jhatfield@phta.org)

2021 International Property Maintenance Code

Add new text as follows:

303.3 Operations and Maintenance.
The operations and maintenance of public swimming pools and spas shall comply with PHTA 2.

Add new standard(s) as follows:

PHTA

Pool & Hot Tub Alliance
4775 Granby Circle
Colorado Springs, CO 80919
USA

PHTA ANSI/PHTA/ICC-2 2021
Standard for Public Pool and Spa Operations and Maintenance

Reason: This proposal seeks to incorporate the ANSI/PHTA/ICC-2 *Standard for Public Pool and Spa Operations and Maintenance* into the *International Property Maintenance Code* to ensure maintenance and operations requirements and guidance exist for public pools and spas. The PHTA-2 is intended to cover public/commercial aquatic venues operation and maintenance, as a resource for jurisdictions seeking guidance on this topic. This Standard can then be used by state and local authorities as a health and safety document for the operation and maintenance of all types of public aquatic venues. Industry partners such as commercial pool and spa service companies, water park operators and public pool operators will then be required to use this Standard as the benchmark for the minimum standards to operate and maintain public aquatic venues. In many states building and health officials regulate public pools and spas together. By adding this Standard into the IPMC, we are following the intent of this Code "to ensure public health, safety and welfare insofar as they are affected by continued occupancy and maintenance of structures and premises" are followed. Further, as public health officials adopt this Standard by reference in their rule or ordinance, this ensures harmonization with what building departments have adopted, if they adopt the IPMC in their jurisdiction. This Standard coordinates with the design and construction requirements of the *International Swimming Pool and Spa Code*, creating harmonization among the I-Codes.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal will not increase the cost of construction because no additional labor, materials, equipment, appliances, or devices are mandated beyond what is currently required by the code.

Staff Analysis: A review of the standard proposed for inclusion in the code, PHTAANSI/PHTA/ICC-2 2021 Standard for Public Pool and Spa Operations and Maintenance, with regard to some of the key ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before March 20, 2021.

PM4-21

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The committee disapproved this proposal as the proposed standard was not yet completed and therefore may technically change. Further, the committee felt the proposed standard was not appropriate for the IPMC because property maintenance inspectors typically do not inspect pools as this is normally done by the health inspector. (Vote: 11-0)

PM4-21

Individual Consideration Agenda

Public Comment 1:

IPMC: APPENDIX C (New), C101 (New), C101.1 (New), C101.2 (New)

Proponents: Nicholas Capezza, representing Pool & Hot Tub Alliance (ncapezza@phta.org); Jennifer Hatfield, representing Pool & Hot Tub Alliance (jen@jhatfieldandassociates.com) requests As Modified by Public Comment

Replace as follows:

2021 International Property Maintenance Code

APPENDIX C
SWIMMING POOL MAINTENANCE AND OPERATIONS

The provisions contained in this appendix are not mandatory unless specifically referenced in the adopting ordinance.

C101
SWIMMING POOL OPERATION AND MAINTENANCE

C101.1 General .
The operations and maintenance of public swimming pools and spas shall comply with PHTA 2.

C101.2 Reference standards . ANSI/PHTA/ICC-2 2021 Standard for Public Pool and Spa Operations and Maintenance

Commenter's Reason: This public comment addresses a concern from the Code Committee that this Standard was not appropriate for the body of the Code but by placing it in the appendix, it will be available as a resource for health or building officials. This public comment would add the ANSI/PHTA/ICC-2 *Standard for Public Pool and Spa Operations and Maintenance,* which is intended to cover public/commercial aquatic venues operation and maintenance, as a resource for jurisdictions seeking guidance on this topic. This Standard can then be used by state and local authorities as a health and safety guidance document for the operation and maintenance of all types of public aquatic venues.
Industry partners such as commercial pool and spa service companies, water park operators and public pool operators can also use this Standard as the benchmark for the minimum standards to operate and maintain public aquatic venues. Further, public health officials can adopt this Standard through adoption of the IPMC by specifically referencing the appendix when adopting the Code by rule or ordinance. In many states building and health officials regulate public pools and spas together, by adding this Standard into the IPMC, we are providing one document that covers design, construction, operation and maintenance. This will make it easier for the building and health officials by having all requirements in one place.

It is also important to note that by putting this Standard in the IPMC appendix, rather than the body of the code, that action will be consistent with what the *International Swimming Pool and Spa Code* Committee recommended. The ISPSC committee voted to put this new PHTA-2 Standard in the appendix of the ISPSC to provide it as a resource, as we are now suggesting be done in the IPMC.

Cost Impact: The net effect of the public comment and code change proposal will not increase or decrease the cost of construction
This proposal will not increase the cost of construction because no additional labor, materials, equipment, appliances, or devices are mandated beyond what is currently required by the code.

Staff Analysis: In accordance with Section 3.6.3.1 of ICC Council Policy 28, the new referenced standard, ANSI/PHTA/ICC-2 2021, Standard for Public Pool and Spa Operations and Maintenance, must be completed and readily available prior to the Public Comment Hearing in order for this public comment to be considered.

Public Comment# 2852

PM12-21

Proposed Change as Submitted

Proponents: Kevin Stewart, American Lung Association, representing American Lung Association; Jane Malone, American Association of Radon Scientists and Technologists, representing American Association of Radon Scientists and Technologists; Thomas Bowles, representing EPA (bowles.thomas@epa.gov); Ruth Mcburney, representing CRCPD (rmcburney@crcpd.org); Jonathan Wilson, National Center for Healthy Housing, representing National Center for Healthy Housing (jwilson@nchh.org); Tobie Bernstein, representing Environmental Law Institute (bernstein@eli.org); David Kapturowski, representing Spruce Environmental Technologies, Inc. (dave@spruce.com)

2021 International Property Maintenance Code

CHAPTER 4
LIGHT, VENTILATION AND OCCUPANCY LIMITATIONS

SECTION 403
VENTILATION

Add new text as follows:

403.6 Radon.
Radon levels in multifamily buildings shall be tested in accordance with ANSI-AARST MAMF. Radon levels exceeding four pCi/L in multifamily buildings shall be mitigated in accordance with ANSI-AARST RMS-MF.

Add new standard(s) as follows:

AARST

AARST Consortium on National Radon Standards
527 N. Justice Street
Hendersonville, NC 28739
USA

ANSI/AARST MAMF-2017
Protocol for Conducting Measurements of Radon and Radon Decay Products in Multifamily Buildings

ANSI/AARST RMS-MF-2018
Radon Mitigation Standards for Multifamily Buildings

Reason: The purpose of this proposed requirement is to protect families from exposure to radon gas in multifamily buildings. A requirement for radon testing and mitigation will protect occupants who have no authority, capacity, or other means to address excessive radon levels in their homes. Radon is present in indoor air everywhere, regardless of building type or radon zone. Radon-induced lung cancer takes 21,000 lives in the US each year.
The awareness of the need to address radon in multifamily buildings is increasing. HUD's multifamily loan program (which finances both market-rate and subsidized properties) requires radon testing and mitigation in all multifamily properties according to the measurement and mitigation consensus standards.[1] Several states (Illinois, Minnesota, New Jersey, Oregon, Washington) require soil gas control in the construction of multifamily buildings. Since 2017, the International Green Construction Code, in conjunction with the related standard ASHRAE 189.1, has required soil gas control in new green buildings.

The standards included in this proposal have been vetted and approved by EPA, multiple regulatory states and by HUD (as mentioned above). They can be viewed for free at https://standards.aarst.org

More Background on Radon:

Epidemiological studies confirm that radon increases the risk of lung cancer in the general population. Radon is the second leading cause of lung cancer – second only to smoking – and more significant than secondhand smoke. In the US alone, 21,000 lung cancer deaths each year are caused by radon exposure. 3 The World Health Organization estimates that between 3% and 14% of all lung cancer cases worldwide are caused by radon exposure. 4 The Surgeon General of the United States issued a Health Advisory in 2005 warning Americans about the health risk from exposure to radon in indoor air. Dr. Richard Carmona, the Nation's Chief Physician, urged Americans find out how much radon they might be breathing. Dr. Carmona also stressed the need to remedy the problem as soon as possible when the radon level is 4 pCi/L or more.

Radon is a colorless and odorless gas that is a decay product of uranium and occurs naturally in soil and rock. The main source of high-level radon pollution in buildings is surrounding uranium-containing soil such as granite, shale, phosphate and pitchblende. Radon enters a building through cracks in walls, basement floors, foundations and other openings. There is no known threshold concentration below which radon exposure presents no risk. Even low concentrations of radon can result in a small increase in the risk of lung cancer.

[1] US Department of Housing and Urban Development, *Multifamily Accelerated Processing (MAP) Guide*, December 2020, page 9-36. Accessed at https://www.hud.gov/program_offices/housing/mfh/map/maphome

Cost Impact: The code change proposal will increase the cost of construction
The proposal will increase the cost of property maintenance. Testing will cost $50-80 per unit. Mitigation, if needed, will cost $1,500-$4,000 per unit. Costs can vary depending of structural and market factors.

Staff Analysis: A review of the standards proposed for inclusion in the code, ANSI/AARST MAMF-2017 Protocol for Conducting Measurements of Radon and Radon Decay Products in Multifamily Buildings and ANSI/AARST RMS-MF-2018 Radon Mitigation Standards for Multifamily Buildings, with regard to some of the key ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before March 20, 2021.

PM12-21

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The committee felt that the requirements were too far reaching by including Zone 3, which is noted for very low levels of radon. Further, the committee felt the requirements should also address allowances for historical structures and may be better placed in an appendix to allow for individual jurisdictions to adopt in applicable to their specific locations. (Vote: 10-1)

PM12-21

Individual Consideration Agenda

Public Comment 1:

IPMC: 403.6 (New)

Proponents: Jane Malone, representing American Assocation of Radon Scientists and Technologists; Jonathan Wilson, representing National Center for Healthy Housing (jwilson@nchh.org); Kevin Stewart, representing American Lung Association (kevin.stewart@lung.org); David Kapturowski, representing Spruce Environmental Technologies, Inc.; Thomas Bowles, representing Indoor Environments Division (bowles.thomas@epa.gov); Warren Friedman, representing Office of Lead Hazard Control and Healthy Homes (warren.friedman@hud.gov); Ruth McBurney, representing CRCPD (rmcburney@crcpd.org) requests As Modified by Public Comment

Replace as follows:

2021 International Property Maintenance Code

<u>**403.6** **Radon**</u> **.** <u>Radon present at levels at or above the EPA action level of 4 picocuries radon per liter of air (pCi/L) in the lowest habitable level of the dwelling shall be deemed hazardous. Radon levels shall be determined by an approved testing method. Radon levels equal to or exceeding 4 pCi/L or more shall be reduced by an approved mitigation method. A written radon test report with results less than 4 pCi/L shall be provided to the code official.</u>

Commenter's Reason: This comment presents language adapted from the National Healthy Housing Standard plus a requirement to deliver a compliant test report to the code official consistent with IRC Appendix F. Radon, which causes lung cancer, has been found in buildings in all areas.

Bibliography: National Healthy Housing Standard, 2018 Edition. Access at https://nchh.org/tools-and-data/housing-code-tools/national-healthy-housing-standard/

Cost Impact: The net effect of the public comment and code change proposal will increase the cost of construction
If radon is found, mitigation will cost $2500-4000 per ground-contact unit.

Public Comment# 2812

PM14-21

Proposed Change as Submitted

Proponents: Gerard Hathaway, representing New York State Department of State (Gerard.Hathaway@dos.ny.gov); China Clarke, representing New York State Dept of State (china.clarke@dos.ny.gov)

2021 International Property Maintenance Code

Revise as follows:

404.4 ~~Bedroom and living room~~ Habitable room and bedroom requirements. Every habitable room and *bedroom* ~~and living room~~ shall comply with the requirements of Sections 404.4.1 through 404.4.5.

404.4.1 Room area. Every habitable room ~~living room shall contain not less than 120 square feet (11.2 m^2) and every bedroom~~ shall contain not less than 70 square feet (6.5 m^2) and every bedroom occupied by more than one person shall contain not less than 50 square feet (4.6 m^2) of floor area for each *occupant* thereof.

404.5 Overcrowding. *Dwelling units* shall not be occupied by more *occupants* than permitted by the minimum area requirements of Table 404.5.

Revise as follows:

TABLE 404.5 MINIMUM AREA REQUIREMENTS

SPACE	MINIMUM AREA IN SQUARE FEET		
	1-2 occupants	3-5 occupants	6 or more occupants
Living room[a, b]	~~120~~ 70	120	150
Dining room[a, b]	No requirement	80	100
Bedrooms	Shall comply with Section 404.4.1		

For SI: 1 square foot = 0.0929 m^2.

a. See Section 404.5.2 for combined living room/dining room spaces.

b. See Section 404.5.1 for limitations on determining the minimum occupancy area for sleeping purposes.

Reason: The purpose of this code change is to coordinate the minimum room area requirements found in the International Property Maintenance Code (IPMC) with those found in the International Residential Code (IRC) and the International Building Code (IBC). We have received technical support questions on this subject in New York State, and nationally it has been discussed in industry related forums online.
IPMC 404.4.1 requires that every living room contain not less than 120 square feet (11.2 m2) and every bedroom contain not less than 70 square feet (6.5 m2). The IBC has similar language which is somewhat compatible with the IPMC, requiring that every dwelling unit shall have not less than one room (not specifically a living room) that shall have not less than 120 square feet(11.2 m2) of net floor area, and that other habitable rooms (not only but including bedrooms) shall have a net floor area of not less than 70 square feet (6.5 m2). However, IRC R304.1 simply requires that habitable rooms (including living rooms, bedrooms, etc.) shall have a floor area of not less than 70 square feet (6.5 m2).

Possible scenario: A dwelling unit could be constructed under the IRC or IBC with a 70 square foot living room as allowed by both the IRC and IBC, receive a Certificate of Occupancy, and they would not be in compliance with the 2018 IPMC, which requires a minimum 120 square foot living room. Section 404.5 Overcrowding and Table 404.5 Minimum Area Requirements are retroactive for property maintenance purposes and apply to dwelling units built under the IRC and IBC for municipalities who have adopted the IRC, IBC and IPMC. This could be a problem because municipalities often have local requirements to re-inspect properties when they change hands to confirm that the conditions of the C of O are still in place or as a regular inspection schedule. That inspection would turn up the non-compliance, even though the 70 square foot living room was originally built to code.

The proposed changes to IPMC 404.4 and 404.4.1 are meant to use language (the term "habitable rooms") which is compatible with both the IRC and IBC for consistency. Also, to allow small dwellings to have the minimum 70 square foot living rooms as intended by both the IRC and IBC.

This code change proposal also includes a change in IPMC 404.5 Overcrowding, specifically Table 404.5 Minimum Area Requirements. The "Living Room"/"1-2 occupants" cell of the table has been changed to delete the minimum 120 square foot requirement and allow a minimum 70 square foot Living Room for 1-2 occupants in small dwellings constructed under either the IRC or IBC.

This change continues the effort to allow smaller dwellings built under the IRC and IBC to be compatible with the IPMC once they are completed. Previous cycle code change proposal RB106-13 (R304.1, R304.2), approved for the 2015 IRC, removed the requirement that every dwelling unit have at least one room not less than 120 square feet from the IRC. One of the prime reasons given for that code change proposal was to allow small dwellings to be built under the IRC.

Some people believe that a 70 square foot living room for up to 2 occupants is too small when compared to the efficiency unit requirements that require a minimum of 120 square feet for a maximum of one occupant.

Under IBC Section 1207.4 "Efficiency dwelling units" it is stated that; "An efficiency living unit shall conform to the code except as modified herein." The section allows smaller units if specific provisions are followed. The IPMC has a corresponding Section 404.6 with occupancy limitations that apply only to Efficiency Units constructed under the IBC and does not apply to dwelling units constructed under the IRC.

The IPMC Efficiency Unit minimum floor area of 120SF is because it is allowed to be the only room except for the required separate closet and bathroom for one occupant and increasing by 100SF per additional occupant up to a total of three.

The IRC allows a minimum floor area of 70SF per habitable room (but, must still follow the requirements of the IPMC). A dwelling unit constructed under the IRC to minimum area requirements would have floor areas that add-up as follows: Living Room 70SF, plus Bedroom 70SF for one occupant (as a combined 140SF space this is already more than the 120SF minimum required for an Efficiency Unit in the IBC), plus bathroom, closets and any other non-habitable spaces. If there were two occupants that would add another 70SF if in separate bedrooms (one 100SF bedroom required if they shared).

Again, this proposed change allows Tiny Houses in the IRC and does not affect the requirements of the IBC and is meant simply to coordinate provisions of the IRC with the occupancy limitations of the IPMC.

New York State has already made this change as of May 12, 2020.

Cost Impact: The code change proposal will decrease the cost of construction
Allowing small homes to be built, without forcing them to provide a 120 square foot living room, will decrease cost.

PM14-21

Public Hearing Results

Committee Action: **As Submitted**

Committee Reason: The committee agreed that this proposal coordinates the minimum room area requirements found in the International Property Maintenance Code (IPMC) with those found in the International Residential Code (IRC) and the International Building Code (IBC). (Vote: 9-2)

PM14-21

Individual Consideration Agenda

Public Comment 1:

IPMC: 404.4

Proponents: Jonathan Siu, representing Self requests As Modified by Public Comment

Modify as follows:

2021 International Property Maintenance Code

404.4 Habitable room ~~and bedroom~~ requirements. Every habitable room ~~and~~ ~~*bedroom*~~ shall comply with the requirements of Sections 404.4.1 through 404.4.5.

Commenter's Reason: This public comment is editorial in nature, and is being submitted to complete the correlation with the IRC and IBC as stated in the IPMC Committee reason statement.
By definition in all three codes, habitable rooms (spaces) include bedrooms ("[A]space in a building for living, **sleeping**, eating or cooking." [emphasis mine]) As approved by the Committee, the code change proposal makes a distinction between habitable rooms and bedrooms by listing them separately. This is unnecessary and potentially confusing.

This public comment removes the distinction by deleting "and bedrooms" in the title and in the text, leaving "habitable rooms" as the scoping/charging language for the section. This change will not affect the application of the following subsections, nor the intent of the code change.

Cost Impact: The net effect of the public comment and code change proposal will decrease the cost of construction
The cost impact statement for the original code change proposal says proposal will result in a decrease in the cost of construction. This public comment is an editorial change that does not change the cost impact of the original proposal.

Public Comment# 2835

PM16-21

Proposed Change as Submitted

Proponents: Steven Rosenstock, Edison Electric Institute, representing Edison Electric Institute (srosenstock@eei.org)

2021 International Property Maintenance Code

Revise as follows:

602.2 Residential occupancies. Dwellings shall be provided with heating facilities capable of maintaining a room temperature of 68°F (20°C) in all habitable rooms, *bathrooms* and *toilet rooms* based on the winter outdoor design temperature for the locality indicated in Appendix D of the International Plumbing Code. Cooking appliances shall not be used, nor shall portable unvented fuel-burning space heaters be used, as a means to provide required heating. ~~The installation of one or more portable space heaters shall not be used to achieve compliance with this section.~~

Exception: In areas where the average monthly temperature is above 30°F (-1°C), a minimum temperature of 65°F (18°C) shall be maintained.

602.3 Heat supply. Every *owner* and *operator* of any building who rents, leases or lets one or more *dwelling units* or *sleeping units* on terms, either expressed or implied, to furnish heat to the *occupants* thereof shall supply heat during the period from [DATE] to [DATE] to maintain a minimum temperature of 68°F (20°C) in all habitable rooms, *bathrooms* and *toilet rooms*. <u>Cooking appliances shall not be used, nor shall portable unvented fuel-burning space heaters be used, as a means to provide required heating. The installation of one or more portable space heaters shall not be used to achieve compliance with this section.</u>

Exceptions:

1. When the outdoor temperature is below the winter outdoor design temperature for the locality, maintenance of the minimum room temperature shall not be required provided that the heating system is operating at its full design capacity. The winter outdoor design temperature for the locality shall be as indicated in Appendix D of the International Plumbing Code.
2. In areas where the average monthly temperature is above 30°F (-1°C), a minimum temperature of 65°F (18°C) shall be maintained.

Reason: This proposal modifies Sections 602.2 and 602.3 to make the language more enforceable and to put restrictions in the appropriate sections.
As currently written, section 602.2 is not enforceable for existing properties. It would require code officials to try to track the sale and use of portable space heaters in residential and commercial buildings (where the occupants own the building and own all of the heating equipment) on a continuous basis. If found, then a code official would have to confiscate such units, which are available in hardware stores and on-line, and could be replaced in a day.

In existing buildings, as currently written, 602.2 would prevent the use of such systems during periods of building renovations when central heating systems are taken off-line.

In existing buildings, it would prevent their use in times of emergencies (e.g., a central heating system shut down and could not be repaired or replaced for a significant amount of time, possibly allowing unsafe thermal conditions).

In existing buildings, portable electric space heaters do not create any emissions or indoor air quality issues.

Portable electric space heaters are safe to use in existing buildings and are required to meet safety standards, such as UL 1278.

The International Fire Code (IFC) allows the use of listed portable electric space heaters. Therefore, as currently written, 602.2

would conflict with the IFC. This code change will remove that conflict.

According to the US Energy Information Administration, Nationwide, **37% of U.S. households** supplement their main equipment with a secondary source of heat. **Almost half of these households use portable electric heaters**, the most common secondary heating choice in every climate region. (*emphasis added*) (see https://www.eia.gov/todayinenergy/detail.php?id=30672 for more information).

By moving the language from 602.2 to 602.3, the code will be more usable, more enforceable, and will ensure that the problems noted with landlords will still be solved by having the language in Section 602.3.

Bibliography: US Energy Information Administration, *Today in Energy*, "US households' heating equipment choices are diverse and vary by climate

region", April 6, 2017. Web site link: https://www.eia.gov/todayinenergy/detail.php?id=30672

Cost Impact: The code change proposal will not increase or decrease the cost of construction
Portable space heaters are appliances that are purchased by homeowners or building owners at hardware stores or at on-line web sites after a building has been built.

PM16-21

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The committee felt that unvented fuel-burning space heaters could be used for supplemental heat as long as the installed heating equipment provided was capable of providing the minimum heat required. Further, they disagreed with the proponents reason statement regarding the need for code officials to track the sale and use of portable space heaters in residential and commercial buildings. (Vote: 10-1)

PM16-21

Individual Consideration Agenda

Public Comment 1:

IPMC: 602.2, 602.3

Proponents: Steven Rosenstock, representing Edison Electric Institute (srosenstock@eei.org) requests As Modified by Public Comment

Modify as follows:

2021 International Property Maintenance Code

602.2 Residential occupancies . Dwellings shall be provided with heating facilities capable of maintaining a room temperature of 68°F (20°C) in all habitable rooms, *bathrooms* and *toilet rooms* based on the winter outdoor design temperature for the locality indicated in Appendix D of the International Plumbing Code. Cooking appliances shall not be used, nor shall portable unvented fuel-burning space heaters be used, as a means to provide required heating. <u>The use of portable electric space heaters shall be allowed on a temporary basis when the primary heating facilities are not able to provide heating.</u>

Exception: In areas where the average monthly temperature is above 30°F (-1°C), a minimum temperature of 65°F (18°C) shall be maintained.

602.3 Heat supply . Every *owner* and *operator* of any building who rents, leases or lets one or more *dwelling units* or *sleeping units* on terms, either expressed or implied, to furnish heat to the *occupants* thereof shall supply heat during the period from [DATE] to [DATE] to maintain a minimum temperature of 68°F (20°C) in all habitable rooms, *bathrooms* and *toilet rooms*. Cooking appliances shall not be used, nor shall portable unvented fuel-burning space heaters be used, as a means to provide required heating. The installation of one or more portable space heaters shall not be used to achieve compliance with this section.

Exceptions:

1. When the outdoor temperature is below the winter outdoor design temperature for the locality, maintenance of the minimum room temperature shall not be required provided that the heating system is operating at its full design capacity. The winter outdoor design temperature for the locality shall be as indicated in Appendix D of the International Plumbing Code.
2. In areas where the average monthly temperature is above 30°F (-1°C), a minimum temperature of 65°F (18°C) shall be maintained.

Commenter's Reason: This edit addresses concerns raised by the committee during the committee action hearings. The new language allows people who own and live in the affected dwelling units to use portable electric space heaters when the primary or central heating system is not working and not providing heat.
The language in 602.3 on cooking equipment and unvented space heaters in rental units is consistent with the current language in 602.2.

It should be noted that no one spoke against this proposal during the committee action hearings.

Cost Impact: The net effect of the public comment and code change proposal will not increase or decrease the cost of construction
The proposed edit will not change the cost of construction, since portable space heaters are purchased by homeowners after occupancy.

Public Comment# 2469

FS3-21

Proposed Change as Submitted

Proponents: Marcelo Hirschler, GBH International, representing self (mmh@gbhint.com)

2021 International Building Code

Revise as follows:

703.2.2 Analytical methods. The fire resistance of *building elements*, components or assemblies established by an analytical method shall be by any of the methods listed in this section, based on the fire exposure and acceptance criteria specified in ASTM E119 or UL 263.

1. *Fire-resistance* designs documented in approved sources.
2. Prescriptive designs of fire-resistance-rated *building elements*, components or assemblies as prescribed in Section 721.
3. Calculations in accordance with Section 722.
4. Engineering analysis based on a comparison of *building element,* component or assemblies designs having *fire-resistance ratings* as determined by the test procedures set forth in ASTM E119 or UL 263.
5. *Fire-resistance* designs certified by an *approved* agency.
6. Fire resistance ratings obtained by extension of data from fire resistance tests conducted in accordance with ASTM E119 when using the principles contained in ASTM E2032.

Add new text as follows:

ASTM

ASTM International
100 Barr Harbor Drive, P.O. Box C700
West Conshohocken, PA 19428

E2032	Standard Guide for Extension of Data From Fire Resistance Tests Conducted in Accordance with ASTM E 119 (2009, reapproved 2017)

Reason: ASTM E2032 provides a mandatory method to calculate a fire resistance rating by extension of the results of fire tests conducted in accordance with ASTM E119. This method has been in use for many years and should also be specifically referenced in the code.
1. Note that the methodology in ASTM E2032 is based on having conducted successful tests in accordance with ASTM E119. Furthermore, the methodology in the standard cannot be used for developing fire resistance ratings without having conducted such tests.

2. Note that ASTM E2032 (although labeled a "guide") is written in mandatory language and has been issued by a consensus standards organization (ASTM) and, thus, complies with CP 28.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal simply adds another option without deleting an existing option.

Staff Analysis: A review of the standard proposed for inclusion in the code, ASTM E2032 Standard Guide for Extension of Data From Fire Resistance Tests Conducted in Accordance with ASTM E 119 (2009, reapproved 2017), with regard to some of the key ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before March 20, 2021.

FS3-21

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The committee concluded that the proposed item 6 text to section 703.2.2 is similar to the existing section 703.2.2 item 4. Adding proposed item 6 text to section 703.2.2 will create confusion. (Vote: 7-6)

FS3-21

Individual Consideration Agenda

Public Comment 1:

IBC: 703.2.2

Proponents: Marcelo Hirschler, representing self (mmh@gbhint.com) requests As Modified by Public Comment

Modify as follows:

2021 International Building Code

703.2.2 Analytical methods . The fire resistance of *building elements*, components or assemblies established by an analytical method shall be by any of the methods listed in this section, based on the fire exposure and acceptance criteria specified in ASTM E119 or UL 263.

1. *Fire-resistance* designs documented in approved sources.
2. Prescriptive designs of fire-resistance-rated *building elements*, components or assemblies as prescribed in Section 721.
3. Calculations in accordance with Section 722.
4. Fire-resistance ratings obtained by using the methodology of ASTM E2032 to extend data from fire resistance tests determined by the test procedures set forth in ASTM E119 or UL 263.
5. ~~4.~~ Engineering analysis based on a comparison of *building element,* component or assemblies designs having *fire-resistance ratings* as determined by the test procedures set forth in ASTM E119 or UL 263.
6. ~~5.~~ *Fire-resistance* designs certified by an *approved* agency.
~~6. Fire resistance ratings obtained by extension of data from fire resistance tests conducted in accordance with ASTM E119 when using the principles contained in ASTM E2032.~~

Commenter's Reason: The technical committee was concerned that the new language could have been confused with the language in item 4. In order to solve that problem, the public comment places the new language as item 4 and maintains the existing item 4 as a more generic option, since the use of ASTM E2032 is one example of engineering analysis that has been standardized, and is, in fact, one that is widely used.
The public comment also adds "UL 263" to "ASTM E119", to be consistent with the existing section 4.

Cost Impact: The net effect of the public comment and code change proposal will not increase or decrease the cost of construction
The proposal and comment add another option and will not require anything new.

Public Comment# 2311

FS9-21

Proposed Change as Submitted

Proponents: Shane Nilles, City of Cheney, WA, representing WABO (snilles@cityofcheney.org); Micah Chappell, representing Washington Association of Building Officials (micah.chappell@seattle.gov)

2021 International Building Code

Revise as follows:

~~**704.2 Column protection.** Where columns are required to have protection to achieve a *fire-resistance rating*, the entire column shall be provided individual encasement protection by protecting it on all sides for the full column height, including connections to other structural members, with materials having the required *fire-resistance rating*. Where the column extends through a ceiling, the encasement protection shall be continuous from the top of the foundation or floor/ceiling assembly below through the ceiling space to the top of the column.~~

~~**Exception:** Columns that meet the limitations of Section 704.4.1.~~

704.2 ~~**704.3**~~ **Protection of the primary structural frame** ~~**other than columns**~~**.** Members of the *primary structural frame* ~~other than columns~~ that are required to have protection to achieve a *fire-resistance rating* ~~and support more than two floors or one floor and roof, or support a *load-bearing wall* or a *nonload-bearing wall* more than two *stories* high,~~ shall be provided individual encasement protection by protecting them on all sides for the full length, including connections to other structural members, with materials having the required *fire-resistance rating*.

~~**Exception**~~ **Exceptions:** ~~Individual encasement protection on all sides shall be permitted on all exposed sides provided that the extent of protection is in accordance with the required *fire-resistance rating*, as determined in Section 703.~~

1. Individual encasement protection is permitted to be interrupted where the primary structural member is in direct contact with another structural member.
2. Primary structural members other than columns that do not support more than two floors or one floor and roof, or a load-bearing wall or a nonload-bearing wall more than two stories high, are permitted to be protected by the membrane of a fire-resistance rated wall or horizontal assembly.
3. Members that are integral elements in walls of light-frame construction, including studs, columns, and boundary elements located entirely between the top and bottom plates or tracks, shall be permitted to be protected by the membrane of a fire-resistance rated wall assembly.

~~**704.4**~~ **704.3 Protection of secondary structural members.** *Secondary structural members* that are required to have protection to achieve a *fire-resistance rating* shall be protected by individual encasement protection, by the membrane of a fire-resistance rated wall or horizontal assembly, or a combination of both.

~~**704.4.1 Light-frame construction.** Studs, columns and boundary elements that are integral elements in *walls* of *light-frame construction* and are located entirely between the top and bottom plates or tracks shall be permitted to have required *fire-resistance ratings* provided by the membrane protection provided for the *wall*.~~

~~**704.4.2 Horizontal assemblies.** *Horizontal assemblies* are permitted to be protected with a membrane or ceiling where the membrane or ceiling provides the required *fire-resistance rating* and is installed in accordance with Section 711.~~

Reason: The current language is confusing and misleading. It does not follow regular code language structure that provides charging language, and exceptions thereto. It further divides the primary structural elements into two separate sections, columns and those other than columns, and it also mixes some secondary member language in with the primary structure section. This proposal restructures and consolidates into two sections, primary and secondary members, to have the charging language first and outlines the appropriate exceptions thereto. This will lead to more consistent application and safer buildings without increasing the stringency of the provisions.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
Proposal only restructures the code section language to be more understandable.

FS9-21

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The committee concluded that the proposed text is not editorial. The proposal is making technical changes without providing technical justification. (Vote: 13-0)

FS9-21

Individual Consideration Agenda

Public Comment 1:

IBC: 704.2 , 704.3, 704.4.1, 704.4.2

Proponents: Shane Nilles, representing WABO TCD (snilles@cityofcheney.org); Micah Chappell, representing Washington Association of Building Officials (micah.chappell@seattle.gov) requests As Modified by Public Comment

Modify as follows:

2021 International Building Code

704.2 Protection of the primary structural frame . Members of the *primary structural frame* that are required to have protection to achieve a *fire-resistance rating* shall be provided individual encasement protection by protecting them on all sides for the full length, including connections to other structural members, with materials having the required *fire-resistance rating*. Where a column extends through a ceiling, the encasement protection shall be continuous from the top of the foundation or floor/ceiling assembly below through the ceiling space to the top of the column.

Exceptions:

1. ~~Individual encasement protection is permitted to be interrupted where the primary structural member is in direct contact with another structural member.member~~ Individual encasement protection on all sides shall be permitted on all exposed sides provided that the extent of protection is in accordance with the required fire-resistance rating, as determined in Section 703.
2. Primary structural members other than columns that do not support more than two floors or one floor and roof, or a load-bearing wall or a nonload-bearing wall more than two stories high, are permitted to be protected by the membrane of a fire-resistance rated wall or horizontal ~~assembly.~~ assembly where the membrane provides the required *fire-resistance rating* .
3. ~~Members that are integral elements in walls of light-frame construction, including studs, columns, and boundary elements located entirely between the top and bottom plates or tracks, shall be permitted to be protected by the membrane of a fire-resistance rated wall assembly.~~ Columns that meet the limitations of Section 704.3.1.

704.3 Protection of secondary structural members . *Secondary structural members* that are required to have protection to achieve a *fire-resistance rating* shall be protected by individual encasement protection, or by the membrane of a fire-resistance rated wall or horizontal assembly, where the membrane provides the required *fire-resistance rating*~~, or a combination of both.both.~~

704.3.1 Light-frame construction . Studs, columns and boundary elements that are integral elements in *walls* of *light-frame construction* and are located entirely between the top and bottom plates or tracks shall be permitted to have required *fire-resistance ratings* provided by the membrane protection provided for the *wall*.

704.3.2 Horizontal assemblies . *Horizontal assemblies* are permitted to be protected with a membrane or ceiling where the membrane or ceiling provides the required *fire-resistance rating* and is installed in accordance with Section 711.

Commenter's Reason: The proposal was intended to rewrite and rearrange the sections without changing the intent. The committee felt that the language rewriting has some unintended consequences. We have addressed those concerns by maintaining the existing language that was identified as being critical, while still providing for a much-needed restructuring to make the code easier to interpret and apply. In that process we determined that there are some perceivable technical changes that we feel are still consistent with the intent and how these sections are most commonly interpreted:

1. The exception permitting the individual encasement of primary structural members to be provided on exposed sides only where the unexposed sides are other elements that afford the same required protection has been expanded to apply to columns as well.
2. Currently there is a hole in the code where there is no type of protection method prescribed for primary structural members that do not support more than two floors or one floor and roof, or a load-bearing wall or a nonload-bearing wall more than two stories high, the proposal clarifies that the intent is that they must still be protected, but rather than by “individual encasement”, they are permitted to be protected by the membrane on an assembly they are located in.
3. Currently the main section for secondary members is to be protected by individual encasement only, but then there are two subsections that clarify those within horizontal assemblies, or light-frame walls, are permitted to be protected by the membrane of the horizontal assembly or wall respectively. This suggests that secondary members are actually intended to be protected by either individual encasement, or by the membrane of an assembly, which may be selected by the designer depending on what is more feasibly constructive and appropriate. The

proposal simply adds that language into the charging language to be clearer.

Cost Impact: The net effect of the public comment and code change proposal will not increase or decrease the cost of construction
There should be negligible or no change in costs. The proposal is primarily to clarify the intent of the code. Clarified language may lead to a decrease in costs in areas where membrane protection clarified to be allowed on secondary members in lieu of individual encasement.

Public Comment# 2356

FS12-21

Proposed Change as Submitted

Proponents: Stephen DiGiovanni, Clark County, representing Self (sdigiovanni@clarkcountynv.gov)

2021 International Building Code

Revise as follows:

705.2.3.1 Balconies and similar projections. Balconies and similar projections of combustible construction other than *fire-retardant-treated wood* shall be *fire-resistance* rated where required by Table 601 for floor construction or shall be of heavy timber construction in accordance with Section 2304.11. The aggregate length of the projections shall not exceed 50 percent of the building's perimeter on each floor.

Exceptions:

1. On buildings of Types I and II construction, three *stories* or less above *grade plane*, *fire-retardant-treated wood* shall be permitted for balconies, porches, decks and exterior *stairways* not used as required exits.
2. Untreated wood and plastic composites that comply with ASTM D7032 and Section 2612 are permitted for pickets, rails and similar *guard* components that are limited to 42 inches (1067 mm) in height.
3. Balconies and similar projections on buildings of Types III, IV-HT and V construction shall be permitted to be of Type V construction and shall not be required to have a *fire-resistance rating* where sprinkler protection is extended to these areas.
4. Where sprinkler protection is extended to the balcony areas, the aggregate length of the balcony on each floor shall not be limited.

Reason: The Ad Hoc Committee for Tall Wood Buildings (TWB) was formed by the ICC Board of Directors in 2016 to explore the building science of tall wood buildings with the scope to investigate the feasibility of and take action on developing code changes. A total of 17 proposals were presented and approved in the Group A and Group B code cycles leading to the 2021 edition of the I-codes. Having provided the technical foundation for deploying tall wood buildings in the various codes, the Ad Hoc Committee for Tall Wood Buildings was sunset in 2020.
Upon reflection of the codes, there appears to be at least one item that was not adequately addressed by the TWB. In particular, this proposal seeks to address the allowance of balconies and similar projections on Type IV buildings to be constructed of Type V construction.

A goal of the TWB code changes was to minimize exterior fire spread for Type IV buildings that were proposed for increased heights over what was previously permitted for traditional Type IV Heavy Timber construction. The committee took particular care in eliminating combustibles from the exterior walls for Types IV-A, IV-B, and IV-C construction, as evidenced by the language presented for IBC Section 602.4. The only combustibles permitted are mass timber elements, and a water barrier. Outboard of these materials, the proposals required non-combustible protection with a minimum rating of 40 minutes. The allowances in IBC 705.2.3.1 to allow Type V balconies and projection, exterior of and thus without the benefit of the non-combustible protection, are incongruent with the TWB code proposals in terms of the type of construction materials allowed and the lack of protection in place. While it can be argued that the specific language in Section 602.4 overrides the general exception in Section 705.2.3.1, still the apparent conflicting provisions would benefit from clarification. For this reason, the proposed fix is being offered. In adding the new construction types, the TWB took care to not affect the existing requirements for traditional Type IV Heavy Timber construction. Where the TWB found codes that were to be maintained for traditional Type IV construction, but were not applicable to the new Type IV-A, IV-B, and IV-C construction types, the committee proposed a change to add the -HT designator, to clarify the particular code requirement applied to Type IV-HT only.

Thus, in order to correct an apparent code conflict, to clarify the intent of the TWB, and to maintain consistency with the traditional Type IV Heavy Timber construction, the proposal simply seeks to add a "-HT" designator to the Type IV construction addressed in Exception 3, thus eliminating the perceived allowance of adding balconies and similar projections of Type V construction for new Types IV-A, IV-B and IV-C construction.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
Cost impact is based on interpretation of the code conflict between IBC 602.4 and IBC 705.2.3.1. The author's interpretation is that Type V balconies are not currently permitted on Types IV-A, IV-B, and IV-C construction, and that this proposal only seeks to clarify the code's intent, and thus there is no cost impact.

FS12-21

Public Hearing Results

Committee Action: **As Submitted**

Committee Reason: The committee concluded that the proposal clarifies and corrects the type of construction within the exception. The committee encourages the proponent to fix the conflict with section 705.2.2. (Vote: 8-5)

FS12-21

Individual Consideration Agenda

Public Comment 1:

IBC: 705.2.2, 705.2.3.1

Proponents: Stephen DiGiovanni, representing Self (sdigiovanni@clarkcountynv.gov) requests As Modified by Public Comment

Replace as follows:

2021 International Building Code

705.2.2 Type III, IV or V construction . Projections from walls of Type III, IV-HT or V construction shall be of any *approved* material. Projections from walls of Type IV-A, IV-B or IV-C construction shall be of materials consistent with the materials permitted in exterior walls, including exterior noncombustible protection provisions, as set forth in Section 602.4

705.2.3.1 Balconies and similar projections . Balconies and similar projections of combustible construction other than*fire-retardant-treated wood* shall be *fire-resistance* rated where required by Table 601 for floor construction or shall be of heavy timber construction in accordance with Section 2304.11. The aggregate length of the projections shall not exceed 50 percent of the building's perimeter on each floor.

Exceptions:

1. On buildings of Types I and II construction, three *stories* or less above *grade plane*, *fire-retardant-treated wood* shall be permitted for balconies, porches, decks and exterior*stairways* not used as required exits.
2. Untreated wood and plastic composites that comply with ASTM D7032 and Section 2612 are permitted for pickets, rails and similar *guard* components that are limited to 42 inches (1067 mm) in height.
3. Balconies and similar projections on buildings of Types III, IV-HT and V construction shall be permitted to be of Type V construction and shall not be required to have a *fire-resistance rating* where sprinkler protection is extended to these areas.
4. Where sprinkler protection is extended to the balcony areas, the aggregate length of the balcony on each floor shall not be limited.

Commenter's Reason: The purpose of the proposal remains the same, to address code provisions that do not coincide with the efforts of the Ad Hoc Committee for Tall Wood Buildings. The original proposal sought to address this by amending Section 705.2.3.1 to clarify that Type V construction is not a permitted material for balconies and other projections from Types IV-A, IV-B and IV-C construction. During the the code committee hearing and discussion it was noted that Section 705.2.2 also required revision for consistency. The proposed revision to Section 705.2.2 allows any approved material to continue to be used for projections from exterior walls of Type IV-HT construction. Further, the proposed revision limits projections from exterior walls of Type IV-A, IV-B, and IV-C to those materials that are permitted for the exterior wall, including requiring the application of those provisions of 602.4 calling for non-combustible protection of mass timber elements.

Cost Impact: The net effect of the public comment and code change proposal will not increase or decrease the cost of construction
As indicated with the original proposal, the cost impact is based on interpretation of the code. The author's interpretation is that Type V balconies are not currently permitted on Types IV-A, IV-B and IV construction, that this proposal only seeks to clarify the code's intent, and thus there is no cost impact due to the proposed code change.

Public Comment# 2220

FS18-21

Proposed Change as Submitted

Proponents: Eirene Knott, BRR Architecture, representing Metropolitan Kansas City Chapter of the ICC (eirene.knott@brrarch.com)

2021 International Building Code

Add new text as follows:

705.6 Continuity.
The fire-resistance rating of exterior walls shall extend from the top of the foundation or floor/ceiling assembly below to one of the following:

1. The underside of the floor or roof sheathing, deck or slab above.
2. The underside of a one-hour fire-resistance rated floor/ceiling or roof/ceiling assembly.

Parapets shall be provided as required by Section 705.11.

Revise as follows:

~~705.6~~ **705.7 Structural stability.** ~~*Exterior walls* shall extend to the height required by Section 705.11.~~ Interior structural elements that brace the *exterior wall* but that are not located within the plane of the *exterior wall* shall have the minimum *fire-resistance rating* required in Table 601 for that structural element. Structural elements that brace the *exterior wall* but are located outside of the *exterior wall* or within the plane of the *exterior wall* shall have the minimum *fire-resistance rating* required in Table 601 and Table 705.5 for the *exterior wall.*

Reason: This is the same proposal that was brought forth last code cycle, FS-19. Steve pointed out a problem with the code in the continuity of exterior wall ratings. While his proposal may have been too simplistic, it really does provide the needed clarification on how to address the continuity of the required exterior wall rating. This is a huge issue in Type III construction where there is little direction on how the supporting construction for the exterior walls are to be rated, especially in the case of a parapet. FS-20 of the same code cycle got into too many specific requirements but attempted to address the same concern.

Cost Impact: The code change proposal will decrease the cost of construction
I like the Steve Thomas's reason statement from last cycle - this will reduce the cost because confusion will be eliminated and people won't be making things up.

In all seriousness, this could reduce the cost of construction as it will clearly define how exterior wall continuity is to be provided.

FS18-21

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The committee concluded that the proposal is not clear enough and missing significant technical aspects. The committee recommended that the proponent work on more clarification during the public comment phase. Such as addressing the intersection with a rated roof ceiling assembly and protecting the sides. (Vote: 13-0)

FS18-21

Individual Consideration Agenda

Public Comment 1:

IBC: 705.6, 705.11.1

Proponents: Eirene Knott, representing Metropolitan Kansas City Chapter of the ICC (eirene.knott@brrarch.com) requests As Modified by Public Comment

Modify as follows:

2021 International Building Code

705.6 Continuity . The fire-resistance rating of exterior walls shall extend from the top of the foundation or floor/ceiling assembly below to one of the following:

1. The underside of the floor or roof sheathing, deck or slab above.
2. The underside of a ~~one-hour fire-resistance rated~~ floor/ceiling or roof/ceiling ~~assembly.~~ assembly having a fire-resistance rating equal to or greater than the exterior wall and the fire separation distance is greater than 10 feet .

Parapets shall be provided as required by Section 705.11.

705.11.1 Parapet construction . Required ~~Parapets~~ parapets shall have the same *fire-resistance rating* as that required for the supporting wall, and on any side adjacent to a roof surface, shall have noncombustible faces for the uppermost 18 inches (457 mm), including counterflashing and coping materials. The height of the parapet shall be not less than 30 inches (762 mm) above the point where the roof surface and the wall intersect. Where the roof slopes toward a parapet at a slope greater than 2 units vertical in 12 units horizontal (16.7-percent slope), the parapet shall extend to the same height as any portion of the roof within a *fire separation distance* where protection of wall openings is required, but the height shall be not less than 30 inches (762 mm).

Commenter's Reason: The committee was concerned that the original code change was too broad and missing technical aspects. There was concern about how the floor/ceiling or roof/ceiling assemblies that may carry a higher rating were to be addressed. There was also concern about an exterior wall condition that may have been needing a rating due to proximity to the property line, thus the added language on the fire separation distance.
The additional language to the parapet section is to clearly indicate that when the parapet is required, then it must comply. Parapets may be provided on a building which are not required and in those instances, the parapet does not need to comply with the parapet language.

Cost Impact: The net effect of the public comment and code change proposal will decrease the cost of construction
With the clarification on how exterior wall continuity is to be provided, it may decrease the cost of construction.

Public Comment# 2733

FS19-21

Proposed Change as Submitted

Proponents: David Tyree, representing AWC (dtyree@awc.org); Paul Coats, representing American Wood Council (pcoats@awc.org)

2021 International Building Code

Add new text as follows:

<u>705.6.1</u> <u>Supporting construction</u>.
<u>Construction that supports gravity loads from fire-resistance-rated exterior walls shall have a fire-resistance rating that is equal to or greater than the required fire resistance rating of the supported wall. For achieving the required fire resistance rating for exposure from the interior of the building, ceiling materials shall be permitted to contribute to the required fire-resistance of the supporting construction.</u>

<u>705.6.1.1</u> <u>Materials</u>.
<u>The material requirements of floor/ceiling assemblies shall be in accordance with requirements for interior building elements for the Type of Construction, including portions of the floor/ceiling construction that support gravity loads from an exterior wall.</u>

Reason: There is increasing controversy about the requirements for loadbearing exterior walls in Type III construction when floors intersect the exterior wall in typical “platform” framing. Driving this are overlapping concerns for maintaining the fire resistance of the exterior wall at the intersection with the floor, as well as material requirements for the floor structure, given that the wall itself is required to be fire-retardant treated wood if wood framing is used.
Platform framing can be accomplished without compromising the fire resistance of the exterior wall. When an unrated or one-hour fire-resistance rated floor intersects and supports the two-hour exterior wall at each floor level, the code requires the construction supporting the wall to have the same fire-resistance rating as the supported wall. This can be accomplished by several means, such as providing extra rim board members or blocking, and extra protection for the floor elements at the intersection. AWC’s Design for Code Acceptance No. 3 (DCA 3) document has design details to maintain the required fire resistance of the wall for fire exposure from the interior of the building, and, when required by IBC Section 705.5, for exposure from the exterior as well. One example of these details (there are four details in DCA 3) is shown below this reason statement.

Maintaining the fire resistance of supporting construction plays a much more important role in the performance of the wall than the use of fire-retardant treated wood in the supporting floor. There is no demonstrated increase in fire-resistance rating for fire-retardant-treated wood when compared to untreated wood. Fire-retardant treated wood exhibits reduced flame spread, but it does not increase the fire-resistance rating of the assembly. In other words, requiring the end of the floor to be fire-retardant treated does not increase the fire-resistance of the wall. The code does not require elements of the floor to be fire-retardant treated even if they serve to support the gravity loads from the wall above. However, it does require those supporting floor elements to provide fire resistance equal to that required for the wall.

The current code language is subject to multiple interpretations, including requiring the floor elements to be fire-retardant-treated or prohibiting platform details altogether. These interpretations are costly and do not serve to increase safety. Often, they may jeopardize the fire performance of the floor for the sake of protecting the wall. The proposed subsections will clarify the issues, encouraging a practical and effective approach without compromising fire resistance or safety.

[Below page 7 from DCA 3 here: Figure 1B example detail and accompanying “methodology” notes]

FIRE-RESISTANCE-RATED WOOD-FRAME WALL AND FLOOR/CEILING ASSEMBLIES 7

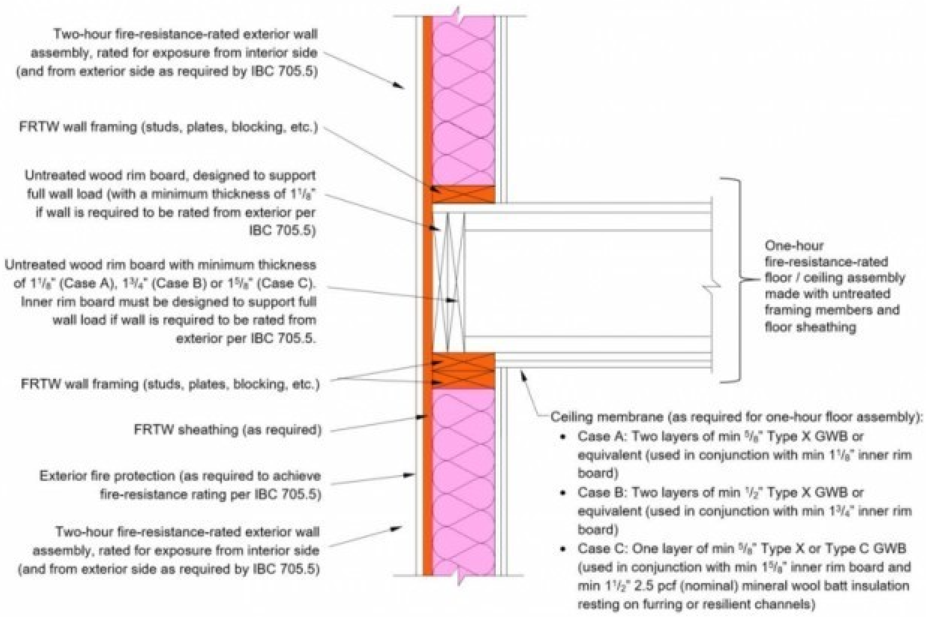


Figure 1B: Example detail for Type III-A exterior wall–floor intersection with two rim boards

Methodology:

Fire-resistance for exposure from interior side:

- Case A: Minimum $1^1/_8$-inch-thick inner rim board plus two layers of minimum $^5/_8$ in. Type X GWB in the ceiling membrane provides 2 hours of protection to the outer rim board, based on the NDS-calculated time for the char depth to reach the inner rim board / outer rim board interface plus 40 minutes for each layer of $^5/_8$ in. Type X GWB (per IBC Table 722.6.2(1)).
- Case B: Minimum $1^3/_4$-inch-thick inner rim board plus two layers of minimum $^1/_2$ in. Type X GWB in the ceiling membrane provides 2 hours of protection to the outer rim board, based on the NDS-calculated time for the char depth to reach the inner rim board / outer rim board interface plus 25 minutes for each layer of $^1/_2$ in. Type X GWB (per IBC Table 722.6.2(1)).
- Case C: Minimum $1^5/_8$-inch-thick inner rim board plus one layer of minimum $^5/_8$ in. Type X GWB in the ceiling membrane plus minimum $1^1/_2$-inch-thick, 2.5 pcf (nominal) mineral wool batt insulation provides 2 hours of protection to the outer rim board, based on the NDS-calculated time for the char depth to reach the inner rim board / outer rim board interface, plus 40 minutes for the $^5/_8$ in. Type X GWB (per IBC Table 722.6.2(1)), plus 15 minutes for the mineral wool batt insulation.

The outer rim board must be designed to support the load from the wall above.

Fire-resistance for exposure from exterior side (where required per IBC Section 705.5): A combination of exterior fire protection, FRTW sheathing, and minimum $1^1/_8$-inch-thick outer rim board is used to provide two hours of protection to the inner rim board. Layers to the exterior of the outer rim board (e.g., exterior fire protection, FRTW sheathing, etc.) must be sufficient to provide at least 80 minutes of protection to the outer rim board. The inner rim board must be designed to support the load from the wall above.

Note: *NDS®* is the *2018 National Design Specification® for Wood Construction*

Bibliography: AWC Design for Code Acceptance (DCA) 3 - Fire-Resistance-Rated Wood-Frame Wall and Floor/Ceiling Assemblies can be downloaded at https://awc.org/codes-standards/publications/dca3

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This code change only clarifies the intent of this section for more uniform and consistent application. It may decrease costs in some jurisdictions depending on interpretation and application of the current code language.

FS19-21

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The committee concluded that the proposed language is confusing for the building official. The committee recommended that the proposed language is a good step in the right direction but needs to address more aspects, such as intersections and rated assemblies. (Vote: 7-5)

FS19-21

Individual Consideration Agenda

Public Comment 1:

IBC: 705.6.1, 705.6.1.1

Proponents: David Tyree, representing AWC (dtyree@awc.org) requests As Modified by Public Comment

Modify as follows:

2021 International Building Code

705.6.1 ~~Supporting construction~~ Floor Assemblies in Type III Construction . ~~Construction that~~ In Type III construction where a floor assembly supports gravity loads from ~~fire-resistance-rated exterior walls shall have a fire-resistance rating that is equal to or greater than the required fire resistance rating of the supported wall. For achieving the required fire resistance rating for exposure from the interior of the building, ceiling materials shall be permitted to contribute to the required fire-resistance of the supporting construction.~~ an exterior wall, the fire-resistance rating of the portion of the floor assembly that supports the exterior wall shall not be less than the fire-resistance rating required for the exterior wall in Table 601. The fire-resistance rating provided by the portion of the floor assembly supporting and within the plane of the exterior wall shall be permitted to include the contribution of the ceiling membrane when considering exposure to fire from the inside. Where a floor assembly supports gravity loads from an exterior wall, the building elements of the floor construction within the plane of the exterior wall, including but not limited to, rim joists, rim boards, and blocking, shall be in accordance with the requirements for interior building elements of Type III Construction.

~~**705.6.1.1 Materials .** The material requirements of floor/ceiling assemblies shall be in accordance with requirements for interior building elements for the Type of Construction, including portions of the floor/ceiling construction that support gravity loads from an exterior wall.~~

Commenter's Reason: The original proposal is rewritten to address opposition testimony and comments from the committee members during their discussion. The reason statement provided with the original proposal is applicable and pertinent to what is being proposed in this public comment and should be made a part of the record.
Following is a detailed explanation of the proposed text addressing each of the statements made in opposition to this proposal. The first sentence of 705.6.1 limits the application of this section to ONLY Type III construction. No other material interests are affected. Although it is not stated, the criteria will most commonly apply to platform construction where the floor assembly is supported by the top of the wall below and the wall above is supported by that floor assembly. The portion of the floor assembly directly within the gravity load path of the exterior wall is required to provide a two-hour fire-resistance rating as required by Table 601. This requirement is to ensure the fire resistance rating required of the exterior wall of the story above, will continue through the supporting segment of the floor assembly, to the exterior wall of the story below. The second sentence states that it is permissible to consider the contribution from the ceiling membrane when assessing the fire-resistance rating of the floor assembly at the exterior wall. A ceiling membrane may or may not be present, but as shown in AWC's DCA3, it is an appropriate design assumption to consider its contribution when the fire rating of the floor assembly supporting the exterior wall is to be based on fire exposure from the interior of the building.

The original section and subsection have now been combined to better clarify the construction and fire-resistive requirements of the intersection of the exterior wall and floor construction. With the combination of all of the requirements in one section, it clarifies the nature of the material permitted as building elements in the floor construction of Type III construction. The terms “building element” and “floor construction” are from Table 601 to eliminate confusion. Typically, material at the perimeter of the floor assembly (construction) may include a single rim joist, multiple rim joists and/or blocking to achieve the required fire-resistance rating, while also maintaining a gravity load path for the duration of the required fire resistance rating. AWC's DCA 3 provides specific examples of how this can be achieved. Material requirements for the materials within the wall space but part of the floor construction are to be consistent with what is required for the interior floor assembly, not the exterior wall. For example, if the exterior wall studs are light gauge steel, the perimeter material in the floor assembly which bears on the wall below can be constructed of any material permitted for the interior building elements in Type III construction, provided the required fire resistance rating, as clarified in 705.6.1, is demonstrated.

To better understand how these revisions interrelate to the original proposal, we felt it would be helpful to include the section in it's entirety so it could be reviewed and considered in the proper context as follows:

705.6 Structural stability. Exterior walls shall extend to the height required by Section 705.11. Interior structural elements that brace the exterior wall but that are not located within the plane of the exterior wall shall have the minimum fire-resistance rating required in Table 601 for that structural element. Structural elements that brace the exterior wall but are located outside of the exterior wall or within the plane of the exterior wall shall have the minimum fire-resistance rating required in Table 601 and Table 705.5 for the exterior wall.

705.6.1 Floor Assemblies in Type III Construction.
In Type III construction where a floor assembly supports gravity loads from an exterior wall, the fire-resistance rating of the portion of the floor assembly that supports the exterior wall shall not be less than the fire-resistance rating required for the exterior wall in Table 601. The fire-resistance rating provided by the portion of the floor assembly supporting and within the plane of the exterior wall shall be permitted to include the contribution of the ceiling membrane when considering exposure to fire from the inside. Where a floor assembly supports gravity loads from an exterior wall, the building elements of the floor construction within the plane of the exterior wall, including but not limited to, rim joists, rim boards, and blocking, shall be in accordance with the requirements for interior building elements of Type III Construction.

Cost Impact: The net effect of the public comment and code change proposal will not increase or decrease the cost of construction
This code change only clarifies the intent of this section for more uniform and consistent application. It may decrease costs in some jurisdictions depending on interpretation and application of the current code language.

Public Comment# 2376

FS23-21

Proposed Change as Submitted

Proponents: Tony Crimi, A.C. Consulting Solutions Inc., representing International Firestop Council

2021 International Building Code

Add new text as follows:

705.11 Penetrations.
Penetrations into or through exterior walls required to have a fire-resistance rating shall comply with Section 714. Penetrations by ducts and air transfer openings shall comply with Section 705.10.

Exception: Penetrations in exterior walls that are permitted to have unprotected openings do not require protection of penetrations.

Revise as follows:

714.4 Fire-resistance-rated walls. Penetrations into or through exterior walls, *fire walls*, *fire barriers*, *smoke barrier* walls and *fire partitions* shall comply with Sections 714.4.1 through 714.4.~~3~~ 4. Penetrations in *smoke barrier* walls shall also comply with Section 714.5.4.

Add new text as follows:

714.4.4 Penetrations in exterior walls.
Walls that are permitted to have unprotected openings in accordance with 705.8 do not require protection of penetrations.

Reason: This proposal adds a requirement to protect penetrations where a fire-resistance rated exterior wall is not allowed to have any other unprotected openings. The language here mirrors the existing requirements to protect joints, openings, and duct and air transfer openings in exterior walls. Although this is for very limited situations, in those cases where it applies, it is critical to also protect penetrations. Currently, the IBC does not limit the size, type, or number of unprotected penetrations through exterior walls, even when no other unprotected elements are allowed, including windows, doors, joints and vents. Fires can spread through unprotected penetrations just as easily as through other unprotected elements. If an exterior wall does not allow unprotected openings, it is because the building is close to a property line. This need for defined limiting distances is well established in the IBC.
By comparison, IBC 705.9 states:

705.9 Joints. *Joints* made in or between *exterior walls* required by this section to have a *fire-resistance rating* shall comply with Section 715.

Exception: *Joints* in *exterior walls* that are permitted to have unprotected openings.

Cost Impact: The code change proposal will increase the cost of construction
This code change proposal will increase the cost of construction, but only for fire resistance rated exterior walls that are not otherwise permitted to have unprotected openings.

FS23-21

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The committee indicated the proposal is unnecessary, and there is no issue with the current code text. (Vote: 11-2)

FS23-21

Individual Consideration Agenda

Public Comment 1:

IBC: 705.11, 714.4, 714.4.4

Proponents: Tony Crimi, representing representing North American Insulation Manufacturers Association (NAIMA) (tcrimi@sympatico.ca) requests As Modified by Public Comment

Modify as follows:

2021 International Building Code

705.11 Penetrations . Penetrations into or through exterior walls required to have a fire-resistance rating shall comply with Section 714. Penetrations by ducts and air transfer openings shall comply with Section 705.10.

Exception: Penetrations in exterior walls that are permitted to have unprotected openings do not require protection of penetrations.

714.4 Fire-resistance-rated walls . Penetrations into or through exterior walls, *fire walls*, *fire barriers*, *smoke barrier* walls and *fire partitions* shall comply with Sections 714.4.1 through 714.4.4. Penetrations in *smoke barrier* walls shall also comply with Section 714.5.4.

<u>**Exception:** Penetrations in exterior walls that are permitted to have unprotected openings in accordance with Section 705.8.</u>

~~**714.4.4 Penetrations in exterior walls .** Walls that are permitted to have unprotected openings in accordance with 705.8 do not require protection of penetrations.~~

Commenter's Reason: Although this is for very limited situations, in those cases where it applies, it is reasonable to expect that the level of fire performance required by the Code is maintained. Protection of penetrations through fire resistance rated exterior walls which are not otherwise permitted to have unprotected openings is a glaring omission.
During the Hearings, there was testimony that some jurisdictions have already been enforcing this provision because it seems consistent with the intent of the current IBC. The language here has also been modified per the testimony and discussions to further simplify interpretation and enforcement.

Currently, the IBC does not limit the size, type, or number of unprotected penetrations through exterior walls, even when no other unprotected elements are allowed, including windows, doors, joints and vents. Fires can spread through unprotected penetrations just as easily as through other unprotected elements. If an exterior wall does not allow unprotected openings, it is because the building is close to a property line. This need for defined limiting distances is well established in the IBC. As such, those levels of risk to adjacent buildings need to be maintained by explicitly clarifying the need to protect penetrations.

Cost Impact: The net effect of the public comment and code change proposal will increase the cost of construction
While there may be some increased cost, this only occurs in a very limited number of building conditions.

Public Comment# 2658

Public Comment 2:

IBC: 705.11, 714.4, 714.4.4

Proponents: Ronald Geren, representing Self (ron@specsandcodes.com) requests As Modified by Public Comment

Modify as follows:

2021 International Building Code

~~**705.11**~~ <u>**705.9**</u> **Penetrations.** Penetrations into or through exterior walls required to have a fire-resistance rating shall comply with Section 714. ~~Penetrations by ducts and air transfer openings shall comply with Section 705.10.~~

Exception: Penetrations in exterior walls that are permitted to have unprotected openings ~~do not require protection of penetrations~~.

714.4 Fire-resistance-rated walls . Penetrations into or through exterior walls, *fire walls*, *fire barriers*, *smoke barrier* walls and *fire partitions* shall comply with Sections 714.4.1 through ~~714.4.4.~~ <u>714.4.3.</u> Penetrations in *smoke barrier* walls shall also comply with Section 714.5.4.

~~**714.4.4 Penetrations in exterior walls .** Walls that are permitted to have unprotected openings in accordance with 705.8 do not require protection of penetrations.~~

Commenter's Reason: The requirements for exterior walls in Section 705 currently do not address penetrations--just openings, joints, and ducts and air transfer openings. The opening requirements could apply to penetrations, but since there is no definition for openings and the sections for fire-resistance-rated assemblies include separate sections for openings, penetrations, joints, and ducts and air transfer openings (e.g., Section 706.8 Openings, 706.9 Penetrations, Section 706.10 Joints, and Section 706.11 Ducts and air transfer openings for fire walls) could lead users to believe that penetrations are not considered openings, which leaves the question: how does one handle penetrations? The addition of a section specifically for penetrations provides the answer.
However, unlike fire-resistance-rated wall assemblies (i.e., fire walls, fire barriers, and fire partitions), exterior walls have unique requirements. For

example, exterior walls are not always required to have protected openings. this unique characteristic needs to be taken into consideration when applying requirements for penetrations, just like it does for joints. The current requirement for joints in exterior walls (Section 705.9) allows joints to be unprotected if unprotected openings are permitted. A similar exception should be provided for penetrations.

The revisions offered in this public comment simply the requirements. The first is the relocation of the new penetrations section. The revision places the new section before the joints section so that each of the sections (i.e., openings, penetrations, joints, and ducts and air transfer openings) follow the same order as they appear in the sections for fire-resistance-rated assemblies. The second revision deletes the sentence referring to ducts and air transfer openings, as this is unnecessary since they are not considered penetrations and are covered in separate sections. The third revision deletes the last part of the exception so that it is written similarly to the exception for joints. The fourth, and last, revision deletes in its entirety the new Section 714.4.4 and its reference in Section 714.4. This section is unnecessary since Section 714 is only applicable when penetrations would be required to be protected per the new Section 705.9, which is similar to Section 715 (Joints and Voids). Although Section 717 (Ducts and Air Transfer Openings) does have a section addressing exterior walls, the section only states what type of protection is required and does not provide an exception to the protection requirement.

Cost Impact: The net effect of the public comment and code change proposal will not increase or decrease the cost of construction
However, in jurisdictions where all penetrations in exterior walls are required to be protected because of a lack of clarity in the code, the cost will decrease slightly.

Public Comment# 2316

FS25-21

Proposed Change as Submitted

Proponents: sarah rice, The Preview Group. Inc., representing The Preview Group (srice@preview-group.com)

2021 International Building Code

Revise as follows:

706.2 Structural stability. *Fire walls* shall be designed and constructed to allow collapse of the structure on either side without collapse of the wall under fire conditions~~. *Fire walls* designed and constructed in accordance with NFPA 221 shall be deemed to comply with this section.~~

> **Exception:** In *Seismic Design Categories* D through F, where double *fire walls* are used in accordance with NFPA 221, floor and roof sheathing not exceeding $^{3}/_{4}$ inch (19.05 mm) thickness shall be permitted to be continuous through the wall assemblies of *light frame construction*.

Add new text as follows:

706.3 Double Fire Walls.
Back to back walls designed and constructed in accordance with NFPA 221 shall be deemed to be fire walls and shall comply with this section.

706.5 Double Fire Wall Fire-resistance.
Each wall of a double fire wall assembly shall have a minimum fire-resistance rating as specified in Table 706.5.

TABLE 706.5 DOUBLE FIRE WALL FIRE-RESISTANCE

Fire resistance of a double fire wall assembly (hours)	Minimum fire resistance of each wall in a double fire wall assembly (hours)
4	3
3	2
2	1

Reason: Currently the IBC relies on the reference to NFPA 45 for the constructability details for a double fire wall, including the means by which a fire-resistance rating is assigned to a double fire wall assembly. While a very old concept, the IBC only recently came to include a specific acknowledgement and regulations for its use. As often happens with new regulations, we are seeing interesting interpretations , and in this case the most common is in regard to the determination the fire ratings needed for each of the walls that make up a double fire wall assembly.
This proposal seeks to add a new section and a new table that will add clarity by specifically stating what the minimum fire-resistance rating must be for each of the walls that make up a double fire wall assembly. The values specified in new Table 706.5 are fundamentally based upon Harmathy's Ten Rules of Fire Endurance Ratings (1965) and are consistent with those found in NFPA 45, and which have been documented by actual fire tests.

Harmany's Rule 1 - The "thermal"1 fire endurance of a construction consisting of a number of parallel layers is greater than the sum of the "thermal" fire endurances characteristic of the individual layers when exposed separately to fire. The minimum performance of an untested assembly can be estimated if the fire endurance of the individual components is known. Though the exact rating of the assembly cannot be stated, the endurance of the assembly is greater than the sum of the endurance of the components.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The code change only adds clarity to the construction of a double fire wall.

FS25-21

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The committee indicated the proposal is not needed since NFPA 221 already includes double firewalls provisions. The committee mentioned that the disapproval is based on the approval of FS 29-21. (Vote: 11-2)

FS25-21

Individual Consideration Agenda

Public Comment 1:

IBC: 706.2, 706.3, 706.5, TABLE 706.5, 706.4, TABLE 706.4

Proponents: Sarah Rice, representing The Preview Group. Inc. (srice@preview-group.com) requests As Modified by Public Comment

Modify as follows:

2021 International Building Code

706.2 Structural stability . *Fire walls* shall be designed and constructed to allow collapse of the structure on either side without collapse of the wall under fire conditions. Fire walls designed and constructed in accordance with NFPA 221 shall be deemed to comply with this section.

> **Exception:** In *Seismic Design Categories* D through F, where double *fire walls* are used in accordance with NFPA 221, floor and roof sheathing not exceeding $^{3}/_{4}$ inch (19.05 mm) thickness shall be permitted to be continuous through the wall assemblies of *light frame construction*.

~~**706.3 Double Fire Walls .** Back-to-back walls designed and constructed in accordance with NFPA 221 shall be deemed to be fire walls and shall comply with this section.~~

~~**706.5 Double Fire Wall Fire-resistance .** Each wall of a double fire wall assembly shall have a minimum fire-resistance rating as specified in Table 706.5.~~

TABLE ~~706.5 DOUBLE FIRE WALL FIRE-RESISTANCE~~

~~Fire resistance of a double fire wall assembly (hours)~~	~~Minimum fire resistance of each wall in a double fire wall assembly (hours)~~
~~4~~	~~3~~
~~3~~	~~2~~
~~2~~	~~1~~

706.4 Fire-resistance rating . *Fire walls*<u>, *including double fire walls*,</u> shall have a *fire-resistance rating* of not less than that required by Table 706.4.

TABLE 706.4 FIRE WALL FIRE-RESISTANCE RATINGS

GROUP	FIRE-RESISTANCE RATING OF A SINGLE FIRE WALL (hours)	FIRE-RESISTANCE RATING OF EACH WALL IN A DOUBLE FIRE WALL (hours)
A, B, E, H-4, I, R-1, R-2, U	3[a]	2c
F-1, H-3b, H-5, M, S-1	3	2
H-1, H-2	4[b]	3b
F-2, S-2, R-3, R-4	2	1

a. In Type II or V construction, walls shall be permitted to have a 2-hour fire-resistance rating.

b. For Group H-1, H-2 or H-3 buildings, also see Sections 415.7 and 415.8.

c. In Type II or V construction each wall in a double fire wall shall be permitted to have a 1-hour fire-resistance rating.

Commenter's Reason: As stated in the original Reason statement, to know what the fire-resistance rating is for each wall in a double fire wall, the IBC solely relies on the reference to NFPA 221 in Section 706.2. Only there have been interpretations made by AHJ's that because the reference to NFPA 221 is in the section titled "Structural stability" that ONLY the structural stability provisions of NFPA 221 are to be used - that the constructability details and fire resistance ratings in NFPA 221 do not apply. When this was never the intent when the reference to NFPA 221 was originally brought into the code - by a code change that I submitted!
The revision to Table 706.4 is is not technically a change, as the same information is found in NFPA 221, but rather it it is intended to provide a tool that makes it clear to both the designer and the AHJ know what the minimum fire-resistance rating of each of the walls that make up a double fire wall must be.

Should the committee action for FS29-21 be sustained (approved as modified), having the fire resistance rating of the double fire walls within the body of the IBC will not be a conflict, only a correlation.

Cost Impact: The net effect of the public comment and code change proposal will not increase or decrease the cost of construction
This is a correlation code change to add clarity and does not affect cost of construciton.

Public Comment# 2965

FS29-21

Proposed Change as Submitted

Proponents: David Collins, representing The American Institute of Architects (dcollins@preview-group.com)

2021 International Building Code

Add new text as follows:

706.1.2 Double fire walls.
Double fire walls designed and constructed in accordance with NFPA 221 and its Annex shall be deemed to comply with this section.

Revise as follows:

706.2 Structural stability. *Fire walls* shall be designed and constructed to allow collapse of the structure on either side without collapse of the wall under fire conditions. ~~*Fire walls* designed and constructed in accordance with NFPA 221 shall be deemed to comply with this section.~~

> **Exception:** In *Seismic Design Categories* D through F, where double *fire walls* are used in accordance with NFPA 221, floor and roof sheathing not exceeding $^{3}/_{4}$ inch (19.05 mm) thickness shall be permitted to be continuous through the wall assemblies of *light frame construction*.

Reason: The use of NFPA 221 for the design and construction of double fire walls is permitted in Section 706.2 regarding structural stability. Additional details and specific requirements in NFPA 221 go beyond simply structural stability and should be a part of the designated requirements for design of fire walls.

Cost Impact: The code change proposal will decrease the cost of construction
This code change adds clarification how NFPA 221 is used to provide for double fire walls which are signifiantly less expensive to build than independent fire walls.

FS29-21

Public Hearing Results

Committee Action: **As Modified**

Committee Modification:

706.1.2 ~~Double fire walls~~ Deemed to comply. ~~Double f~~ Fire walls designed and constructed in accordance with NFPA 221 and its Annex shall be deemed to comply with this section.

Committee Reason: The committee concluded the modification corrected the proposal by adding "Deemed to comply". The proposed change adds clarity to the code section by adding the Annex and NFPA 221. (Vote: 13-0)

FS29-21

Individual Consideration Agenda

Public Comment 1:

IBC: 706.1.2

Proponents: David Collins, representing The American Institute of Architects (dcollins@preview-group.com) requests As Modified by Public Comment

Further modify as follows:

2021 International Building Code

706.1.2 Deemed to comply . Fire walls designed and constructed in accordance with NFPA 221 ~~and its Annex~~ and providing the reqired fire resistance required in Section 706.4 shall be deemed to comply with this section.

Commenter's Reason: An error in the changes was called to our attention after the committee hearing. NFPA 221 does not include a requirement for a specific fire resistance. It depends on the building code to set the fire resistance requirement. FS29 makes NFPA 221"deemed to comply" with Section 706 which includes the requierd fire resistance. Similarly, the NFPA 221 Annex includes non-mandrory languge which can cause problems with design and enforcement.
The code change committee approved this change as modified. With this additional modification, Section 706.4 is referenced directly to establish the necessary fire resistance and the NFPA 221 Annex material would no longer be referenced.

Cost Impact: The net effect of the public comment and code change proposal will not increase or decrease the cost of construction
This clarification will not increase or decrease the cost of construction.

Public Comment# 2600

Public Comment 2:

IBC: 706.1.2

Proponents: Jonathan Siu, representing Self; David Collins, representing The American Institute of Architects (dcollins@preview-group.com) requests As Modified by Public Comment

Further modify as follows:

2021 International Building Code

706.1.2 Deemed to comply. Fire walls designed and constructed in accordance with NFPA 221 ~~and its Annex~~ shall be deemed to comply with this section <u>subject to the limitations of Section 102.4. The required fire resistance rating shall be determined by Section 706.4 .</u>

Commenter's Reason: The purposes of this public comment are 1) to prevent adoption of commentary as code requirements; 2) to clarify that the code will still govern over the adopted reference standard; and 3) to clarify how to determine the fire-resistance rating for fire walls designed and constructed using NFPA 221. Our intent is to allow the use of NFPA 221 so designers can utilize the pieces in NFPA 221 to construct double fire walls and to rate each wall as prescribed in NFPA 221, as well as create vestibules for doors to facilitate connections through the fire wall, without reducing the protections required by the IBC.
First, as approved (as modified) by the committee, FS29-21 directly references the annex to NFPA 221—essentially, adopting the annex as code. However, according to introductory notes before the requirements and before the annex, the annex is clearly commentary (“Annex A is not part of the requirements of this NFPA document, but is included for informational purposes only. This annex contains explanatory material….”)

Second, there are provisions in NFPA 221 that are less stringent than IBC or where NFPA 221 does not address a requirement in IBC. This public comment points the user back to IBC Section 102.4 to set the IBC provisions as the minimum requirements for fire wall construction.

As approved by the committee, NFPA 221 is a wholesale replacement for the IBC provisions for fire walls (“deemed to comply”). Essentially, nothing in IBC Section 706 would apply. Ordinarily, Section 102.4 would say that where there’s a conflict between the code and a standard, the code governs. In this case, since NFPA 221 is “deemed to comply” with IBC, at least three requirements in the IBC will not be able to be enforced:

1. IBC 706.3 requires fire walls be constructed of noncombustible materials, with an exception for Type V construction. NFPA 221 doesn’t appear to address fire wall materials at all. So one could argue that NFPA 221 would allow combustible materials in Types III and IV construction, where IBC would not. There is another code change that may align these but at this moment, there is a disconnect.
2. IBC allows termination of fire walls at the inside face of noncombustible exterior sheathing, exterior siding, or other exterior finishes (IBC 706.5 Exception 2). NFPA 221 adds “limited combustible” sheathing/siding/other finishes to the exception (NFPA 221 Section 6.9.1.2). “Limited combustibles” is not defined in the IBC, nor in NFPA 221, so it will be difficult for the code officials to enforce. In addition, on its face, “limited combustibles” is less stringent than noncombustible.
3. IBC prohibits duct and air transfer openings at lot lines (IBC 706.1.1 and 706.11). NFPA 221 points back to the building code in Section 4.9.2 (“Unless required otherwise by the applicable building code…”), but since NFPA 221 is “deemed to comply,” IBC Section 706 is no longer in play. Therefore, there is no prohibition in NFPA 221 for duct and air transfer openings at lot lines/party walls.

Thirdly, NFPA 221 does not contain any requirements for fire resistance rating of the fire walls. On the other hand, it does provide the fire resistance of each wall in a double fire wall, whereas the IBC does not. This public comment points the user who wants comply with NFPA 221 to IBC 706.4 so they will know the required fire resistance ratings on which to base a design.

Cost Impact: The net effect of the public comment and code change proposal will decrease the cost of construction
The original cost impact statement said the proposal will "add clarification how NFPA 221 is used to provide for double fire walls, which are significantly less expensive to build than independent fire walls." This public comment will not change that, and will not affect how fire walls are constructed under the IBC.

Public Comment 3:

IBC: 706.1.2

Proponents: Stephen Skalko, representing Masonry Alliance for Codes and Standards (svskalko@svskalko-pe.com) requests As Modified by Public Comment

Further modify as follows:

2021 International Building Code

706.1.2 Deemed to comply . Fire walls designed and constructed in accordance with NFPA 221 ~~and its Annex~~ shall be deemed to comply with this section.

Commenter's Reason: Reformatting of Section 706 by FS29-21, which was Approved As Modified, places compliance with NFPA 220 into a stand-a-alone deemed to comply section in the IBC, which makes sense. However, including "**the Annex"** from NFPA 220 as part of the deemed to comply for the IBC does not for two reasons.
First, there are two annexes in NFPA 220; **Annex A – Explanatory Material**, and, **Annex B Informational References**. Using the term "the Annex" does not tell the user of the IBC which annex is considered deemed-to-comply. Not all features of either annex are necessarily suitable to be considered "deemed-to-comply".

Second, NFPA makes it clear that both Annexes are not a part of the requirements of NFPA 220, and are intended for "informational purposes only". In fact, Annex A contains multiple instances of permissive language, such as "should" and "may". A word search indicated "should" is used about 45 times in Annex A. Clearly, the application of provisions in Annex A will require some judgement by the user and the approval by authority having jurisdiction (AHJ) to determine if the suggested actions to meet fire wall requirements intended by the IBC are appropriate. FS29-21 as worded does not give the AHJ much choice in deciding if the portions of Annex A are acceptable.

Recommend Approval as Further Modified by this public comment to delete any use of either Annex to NFPA 220 since those annexes are intended for informational purposes only.

Cost Impact: The net effect of the public comment and code change proposal will not increase or decrease the cost of construction
This change will not have an impact on the cost of construction.

Public Comment# 2924

FS31-21

Proposed Change as Submitted

Proponents: Dennis Richardson, representing self (dennisrichardsonpe@yahoo.com)

2021 International Building Code

Revise as follows:

706.3 Materials. *Fire walls* shall be of any *approved* noncombustible materials.

Exception: Buildings of Type III, IV and V construction.

Reason: The requirement for noncombustible fire walls in buildings of type III and IV construction is problematic in tall buildings, control of shrinkage or differential vertical shrinkage between dissimilar noncombustible fire wall materials and the combustible building bearing wall construction may cause damage to the fire wall. In high seismic areas the last thing the structural designer wants to do is put a heavy, earthquake load attracting concrete or masonry wall in a relatively light wood structure.
When CLT was added to the code, a three hour load bearing E-119 test was provided by the American Wood Council to justify the fire resistance of CLT. It was constructed of 5 ply CLT with one layer of 5/8" type X gypsum each side. In the 2021 code the same three hour bearing wall for Type IV-A construction would require 2/3 of the fire resistance to come from noncombustible protection on each side so the wall would have 3 layers of 5/8" type x gypsum or equivalent on each side and would be expected to last in an E 119 test for over 4 hours. Because the wall is constructed of similar materials as the remainder of the structure, differential shrinkage issues would be minimized. There is no reason why Type IV construction can not have combustible fire walls as they would be expected to perform better than noncombustible walls both from a shrinkage compatibility standpoint and from a fire performance standpoint.

The core of Type III buildings are the same as Type V construction. Two hour combustible fire walls are allowed in Type V buildings and the allowable area is equal to half of the allowable area of Type III buildings. If double 2 hour wood frame fire walls were allowed in Type III construction the area per two hour wall would be exactly the same. Having two-two hour walls at the fire wall location would actually provide better resistance to collapse in a fire than the current practice of a one hour wood bearing wall on each side of the noncombustible three hour fire wall wall. Differential settlement issues would also go away with this option making damage to the noncombustible fire wall due to shrinkage of the wood bearing walls less of a factor.

Another potential combustible fire wall for Type III would be CLT. The advantage of CLT fire walls in Type III would be the immediate performance once installed to minimize the danger of construction fires instead of waiting for the wall to be completed.

Cost Impact: The code change proposal will decrease the cost of construction
Following science and allowing options of more materials that perform equal or better to current noncombustible fire walls would result in less cost.

FS31-21

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The committee concluded there seems to be a lot of performance uncertainty and prefers to be careful on giving allowances to Type III and IV construction. (Vote: 8-5)

FS31-21

Individual Consideration Agenda

Public Comment 1:

IBC: 706.3

Proponents: Shane Nilles, representing WABO TCD (snilles@cityofcheney.org); Micah Chappell, representing Washington Association of Building Officials (micah.chappell@seattle.gov) requests As Modified by Public Comment

Modify as follows:

2021 International Building Code

706.3 Materials . *Fire walls* shall be constructed of any ~~*approved* noncombustible~~ materials that are permitted for exterior walls based on the most restrictive type of construction adjoining the *fire wall* .

> **Exception:** ~~Buildings of Type III, IV and V construction.~~ Double wall fire walls are permitted to have each wall constructed with materials permitted for the exterior walls based on the type of construction of their respective side.

Commenter's Reason: The way that fire walls are applied, to create separate buildings for purposes of allowable area and type of construction, by nature has the same effect as two adjoining exterior walls. This modification recognizes that fact and provides provision to treat the specifications for materials of fire walls to be consistent with that which would be required for exterior walls. This will lead to a fair and logical approach to determining the permissible materials for firewalls.

Cost Impact: The net effect of the public comment and code change proposal will not increase or decrease the cost of construction
Cost of construction should not change as the proposed provisions are not more restrictive. It is possible that costs may be decreased in certain scenarios such as double walls where the materials used for one side of the wall are permitted to be less restrictive per the exception.

Note from ICC staff: This PC is based on floor modification ruled in order and discussion during the CAH.

Public Comment# 2553

Public Comment 2:

IBC: 706.3

Proponents: Dennis Richardson, representing self (dennisrichardsonpe@yahoo.com) requests As Modified by Public Comment

Replace as follows:

2021 International Building Code

706.3 Materials . *Fire walls* shall be of any *approved* noncombustible materials.

> **~~Exception~~ Exceptions:**
>
> 1. In Seismic Design Categories D through F, buildings greater than 4 stories of Types IIIA or IV construction where the main occupancy is regulated in Section 420.
> 2. Buildings of Type V construction.

Commenter's Reason: As a code official if you truly believe in public safety considering all sources including both fire and earthquakes please fully read this reason statement and consider with an open mind.
First of all, fire walls are a reflection of allowable area provisions which are somewhat arbitrary at best made up of an amalgamation of the legacy codes when the IBC was formed. Fifteen years ago, I served as one of the building official representatives on the ICC Code Technology Committee, Height and Area Study Group. We met several times in multiple cities but ultimately only slightly tweaked the height and area requirements fixing a couple of allowable area anomalies.

Later the workgroup was renamed the Balanced Fire Protection work group to reflect the fact that building performance depends on a number of factors especially the contribution of active fire protection measures (like sprinklers) and passive fire protection measures (like built in fire resistance and the degree of compartmentalization). We developed a white paper that was considered for submittal as an appendix to the IBC which noted there are two types of passive compartmentation in buildings:

First: One hour compartmentalization commonly found between dwelling units and between floors in multi- family residential.

Second: Two to four hour compartmentalization found between fire walls and in some cases between floors that determine fire area and building area in IBC 707.3.10 and 706.4.

As wood buildings with area limitations get taller over three stories the maximum building footprint gets smaller and smaller as a designer adds more stories over three stories in IBC Sections 506.2.3 and 506.2.4. Addressing structural compatibility caused by differential shrinkage in wood buildings (as required in IBC Section 2304.3.3) becomes increasingly complex if different materials are used for fire walls than for structural support. Finally seismic detailing requires that structural materials transmit forces across fire walls both parallel and perpendicular to the fire wall so that the building does not tear itself apart in an earthquake. This becomes even more critical as buildings get taller. Finally when noncombustible fire walls are required in a relatively light wood building in addition to the wood framing that provides vertical and lateral support, typically more dead load is added that must be resisted as lateral loads and overturning by the structural system.

The IBC Section 420 regulates occupancy in Groups I-1, R-1, R-2, R-3, and R-4 by mandating fire rated separation of walls and floors between dwelling and sleeping units as well as separation of dwelling and sleeping units from other occupancy groups regardless of whether or not the designer chooses separated or nonseparated occupancies in Section 508. There are no exceptions for these minimum one hour separations in IBC 708.3 and 711.2.3 in buildings of Type IIIA and IV construction.

Fires starting in a one hour compartment protected by an NFPA 13 sprinkler system (required if over 4 stories) nearly always do not leave the compartment of origin. Fire walls in these types of buildings RARELY IF EVER even function as a fire wall. However a very large portion of residential buildings built in high seismic areas WILL be exposed to strong motion from earthquakes during the building life. One thing that is sure for a large residential building is they are almost ALWAYS occupied when an earthquake strikes.

The IBC Fire Safety Committee split 8 to 5 in their disapproval of FS 31-21 language to allow combustible fire walls in any building of Type III or Type IV construction. Their official reason is there seems to be performance uncertainty and they prefer to be careful with allowances in Type III and IV construction. One thing is for sure there are a multitude of wood walls with a fire resistance rating and structural properties required for a fire wall and by not allowing them this section of the code creates detailing and compatibility issues which can be a problem for structural performance and safety during earthquakes.

This public comment proposal narrows the focus of the original proposal to one hour minimum compartmentalized primarily residential buildings built over 4 stories and hence protected by an NFPA 13 sprinkler system. Please vote to reverse the 8-5 decision of the committee for this highly compartmentalized and protected subset of the original proposal. This proposal will result in greater seismic resilience in multi family housing which are highly likely to be subjected to earthquake loads during their building life.

Cost Impact: The net effect of the public comment and code change proposal will decrease the cost of construction
This proposal gives designers more options for construction of fire walls in Types IIIA and IV buildings in high seismic areas.

Public Comment# 2917

FS32-21

Proposed Change as Submitted

Proponents: Christopher Athari, Hoover Treated Wood Products, representing Hoover Treated Wood Products (cathari@frtw.com)

2021 International Building Code

Revise as follows:

706.3 Materials. *Fire walls* shall be of any *approved* noncombustible materials.

Exception: Buildings of <u>Type III or </u> Type V construction.

Reason:
Fire-retardant-treated wood is currently allowed for use in Type III construction in lieu of noncombustible materials in exterior walls. This code change eliminates any potential conflict with Section 602.3.

Note that the fire resistances listed in Table 706.4 would remain unchanged.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
Eliminates a potential conflict in the code and grants designers more flexibility.

FS32-21

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The committee deemed the proposal does not stipulate the use of Fire-Retardant-Treated wood in Type III construction which is less conservative than the current requirements. (Vote: 11-1)

FS32-21

Individual Consideration Agenda

Public Comment 1:

IBC: 706.3

Proponents: Christopher Athari, representing Hoover Treated Wood Products (cathari@frtw.com); Mike Eckhoff, representing Hoover Treated Wood Products, Inc. (meckhoff@frtw.com) requests As Modified by Public Comment

Modify as follows:

2021 International Building Code

706.3 Materials . *Fire walls* shall be of any *approved* noncombustible materials.

~~Exception~~ <u>Exceptions</u>:

<u>1.</u> Buildings of Type V construction.

<u>2.</u> <u>Buildings of Type III construction where the fire wall is constructed with fire-retardant-treated wood complying with Section 2303.2 and is limited to a fire resistance rating of 3 hours or less.</u>

Commenter's Reason: I am seeking approval as modified by public comment. I understood the committee’s concern coming out of the CAH and have updated the proposal as noted in the modification. In my opinion, there was confusion that the proposed fire walls would be entirely constructed out of fire-retardant-treated wood (FRTW) as opposed to allowing FRTW to be used in their construction.

For both framed steel and wood stud supported fire rated assemblies, the gypsum board membranes perform equally and produce the bulk of the fire resistance. Once the assembly is breached, wood performs better than steel. See bibliography.

Currently, Type III construction allows for the use of untreated combustible materials in all locations except in a fire wall or an exterior wall. The code already allows a 2-hour exterior wall constructed of FRTW. Recognizing and approving the use of FRTW in fire walls is entirely logical as it has been historically allowed to substitute for noncombustible materials.

This change will give manufacturers the ability to create and test designs to meet the requirements using a greater variety of building materials. In addition to promoting competition and affordability, replacing other materials with wood has a potential carbon sequestration benefit.

Bibliography: American Wood Council. TR9: Heat Release Rates of Construction Assemblies. Available online at:
https://awc.org/pdf/codes-standards/publications/tr/AWC-TR09-0707.pdf

https://awc.org/pdf/codes-standards/publications/tr/AWC-TR09-Appendix-0708.pdf

Cost Impact: The net effect of the public comment and code change proposal will not increase or decrease the cost of construction
There is no change to current methods of construction. This change will allow for another option.

Public Comment# 2736

FS34-21

Proposed Change as Submitted

Proponents: Paul Coats, representing American Wood Council (pcoats@awc.org)

2021 International Building Code

Revise as follows:

706.3 Materials. *Fire walls* shall be ~~of any *approved* noncombustible materials.~~ constructed of any of the following materials:

~~**Exception:** Buildings of Type V construction.~~

1. Fire walls in buildings of Type I, II, IV-A, and IV-B construction shall be of any noncombustible materials permitted by this code.
2. Fire walls in buildings of Type III, IV-C, and IV-HT construction shall be of noncombustible materials, or cross-laminated timber (CLT) and appurtentant heavy timber structural members having noncombustible protection on each side of the fire wall with a minimum assigned time of 80 minutes for a two-hour fire wall and 120 minutes for a three-hour fire wall and complying with Section 722.7.
3. Fire walls in buildings of Type V construction shall be of any materials permitted by this code.

Reason: This proposal does two things. First, it changes the structure of the section. The new structure will specify the materials based on a list that corresponds to the types of construction (i.e., Types I, II, III, IV, and V). Second, this proposal would permit cross-laminated timber walls with noncombustible protection as fire walls in Types III, IV-C, and IV-HT construction.
The ICC Tall Wood Building Ad Hoc Committee (TWB) reviewed extensive data, including various presentations, at the inception of its work. Upon deliberation of that information, they decided that there seemed to be three levels of construction performance for the new mass timber systems. The TWB Codes Work Group determined that, based on the available data and research, the construction type with mid-level protection, Type IV-B construction, performed equivalently to Type I-B. Since Type I-B is a noncombustible type of construction, it makes sense to include Types IV-A and IV-B in item 1 which requires noncombustible materials for fire walls. The net effect here is that buildings of those two mass timber types will be required to use noncombustible materials for fire walls.

Type IV-C and IV-HT are unprotected mass timber types of construction. It makes sense to permit fire walls to be constructed of mass timber elements of the required fire resistance with the additional caveat of having the required noncombustible protection typically required of rated walls in Types IV-A (and IV-B) construction. In Types IV-A and IV-B construction, the TWB required that where mass timber is required to be rated and protected, the noncombustible protection must constitute at least two-thirds of the required fire resistance rating of the assembly. For a two-hour fire wall, two-thirds of the rating is 80 minutes (at least two layers of 5/8-inch Type X gypsum wall board), and for a three-hour fire wall, it is 120 minutes (at least three layers of 5/8-inch Type X gypsum wall board). In the testing undertaken at the U.S. Bureau of Alcohol, Tobacco, Firearms and Explosives fire test lab during the TWB deliberations, this amount of protection was shown to be sufficient to protect mass timber and keep it from becoming involved in the full burn-out of a high fuel load fire without sprinkler activation or fire department intervention. Therefore mass timber fire walls constructed with the noncombustible protection as required in Type IV-A construction will result in performance more than adequate for the hazards associated with buildings of IV-C and IV-HT construction. Buildings of Type III construction are more limited in area and height than IV-C construction and therefore can be well served by these same rated and protected mass timber fire walls.

Reference to Section 722.7 provides for establishing the contribution of the noncombustible material to the required fire-resistance rating of the fire wall and the installation details for gypsum wall board layers as required for walls in the new Type IV-A and IV-B construction types.

Bibliography: For test reports, testing videos, and other supporting documentation related to the new mass timber provisions in the 2021 IBC, see this web page: https://awc.org/tallmasstimber.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
Since the proposal adds additional options for materials in three construction types, it will not increase the cost of construction. It may decrease the cost of construction when protected cross-laminated timber is used in lieu of noncombustible materials, depending on the variables involved.

FS34-21

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: Based on the committee decision and comments on code changes FS31-21 and FS 32-21. (Vote: 7-5)

Individual Consideration Agenda

Public Comment 1:

IBC: 706.3

Proponents: David Tyree, representing AWC (dtyree@awc.org) requests As Modified by Public Comment

Modify as follows:

2021 International Building Code

706.3 Materials . *Fire walls* shall be constructed of any of the following materials:

1. Fire walls in buildings of Type I, II, ~~IV-A,~~ and ~~IV-B~~ construction shall be of any noncombustible materials permitted by this code.
2. Fire walls in buildings of Type III~~, IV-C, and IV-HT~~ construction shall be of noncombustible materials, or cross-laminated timber (CLT) and appurtentant heavy timber structural members having noncombustible protection on each side of the fire wall with a minimum assigned time of 80 minutes for a two-hour fire wall and 120 minutes for a three-hour fire wall and complying with Section 722.7.
3. Fire walls in buildings of Type V construction shall be of any materials permitted by this code.

Commenter's Reason: The committee indicated disapproval of our original proposal was based on their earlier actions on FS31-21 and FS33-21. Taking that reason into consideration we have modified the original proposal to limit the Type of Construction that can use properly rated and protected CLT walls to Type III. Given the structural integrity of CLT when coupled with the added noncombustible protection that will be used to obtain the necessary fire resistance ratings we feel the concerns raised by the committee have been satisfied.

Cost Impact: The net effect of the public comment and code change proposal will not increase or decrease the cost of construction
This proposal will allow more alternative methods to comply with the code requirement for fire walls.

Public Comment# 2300

FS45-21

Proposed Change as Submitted

Proponents: Michael O'Brian, representing FCAC (fcac@iccsafe.org)

2021 International Building Code

Add new definition as follows:

CONTINUITY HEAD-OF-WALL JOINT SYSTEM. An assemblage of specific materials or products that are designed to resist the passage of fire through voids created at the intersection of fire barriers and the underside of nonfire-resistance-rated roof assemblies for a prescribed period of time.

Revise as follows:

[BF] F RATING. The time period that the *through-penetration firestop system*~~, or~~ *perimeter fire containment system* or *continuity head-of-wall joint system* limits the spread of fire through the penetration or void.

[BF] T RATING. The time period that the *penetration firestop system*, including the penetrating item, or *continuity head-of-wall joint system* limits the maximum temperature rise to 325°F (~~163~~ 181°C) above its initial temperature through the penetration or void on the nonfire side~~ when tested in accordance with ASTM E814 or UL 1479~~.

707.9 Voids at intersections. The voids created at the intersection of a *fire barrier* and a nonfire-resistance-rated *roof assembly* or a nonfire-resistance-rated *exterior wall* assembly shall ~~be filled. An *approved* material or system shall be used to fill the void, and shall be securely installed in or on the intersection for its entire length so as not to dislodge, loosen or otherwise impair its ability to accommodate expected building movements and to retard the passage of fire and hot gases~~ comply with Section 715.

715.2 Installation. Systems or materials protecting *joints* and voids shall be securely installed in accordance with the manufacturer's installation instructions in or on the *joint* or void for its entire length so as not to dislodge, loosen or otherwise impair its ability to accommodate expected building movements and to resist the passage of fire and hot gases. *Fire-resistant joint systems*, ~~or~~ systems used to protect voids at exterior curtain walls and fire-resistance-rated floor intersections , and *continuity head-of-wall joint systems* shall also be installed in accordance with the listing criteria.

Add new text as follows:

715.6 Fire barriers/nonfire-resistance-rated roof assembly intersections.
Voids created at the intersection of a fire barrier and the underside of a nonfire-resistance-rated roof sheathing, slab or deck above shall be filled by an approved material to retard the passage of fire and hot gases, or shall be protected by an approved continuity head-of-wall joint system tested in accordance with ASTM E2837 to provide an F rating/T rating for a time period not less than the required fire-resistance rating of the fire barrier in which it is installed.

Add new standard(s) as follows:

ASTM

ASTM International
100 Barr Harbor Drive, P.O. Box C700
West Conshohocken, PA 19428

E2837-2013 (2017)	Standard Test Method for Determining the Fire Resistance of Continuity Head-of- Wall Joint Systems Installed Between Rated Wall Assemblies and Nonrated Horizontal Assemblies

Reason: This proposal revises the requirements for protecting voids at the intersection of a fire barrier and the underside of a nonfire-resistance-rated roof assembly as follows:
A. It moves the details on how to protect this void from Section 707.9 to new Section 715.6, leaving Section 707.9 as simply a pointer to Section 715.

B. The phrase relating to installation in a manner "so as not to dislodge, loosen or otherwise impair its ability to accommodated expected building movement" is not necessary in new Section 715.6 as it has been incorporated into Section 715.2 of the 2021 IBC.

C. New Section 715.6 includes an OPTION for protecting this void with a tested continuity head-of-wall joint system, without changing the current protection option. The use of a continuity head-of-wall joint system provides a simpler method for code compliance and enforcement as the system defines the materials necessary and the installation details.

D. A definition of continuity head-of-wall joint system is provided.

E. The definition of F rating is being revised to add continuity head-of-wall joint systems.

F. The definition of T rating is being revised to add reference continuity head-of-wall joint systems. In addition, it is being revised to remove reference to the two firestop test standards. Because these two firestop test standards were similarly removed from the definition of the F rating during the last code cycle, this change provides further consistency.

G. ASTM E2837 is being added as new referenced standard.There are currently over 20 continuity head-of-wall joint system tested and certified by UL.
This proposal is submitted by the ICC Fire Code Action Committee (FCAC). The FCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance assigned International Codes with regard to fire and life safety in new and existing buildings and facilities as well as the protection of life and property in wildland urban interface areas. In 2020 and 2021 the Fire-CAC held multiple virtual meetings that were open to any interested party. In addition, there were numerous virtual specific working group meetings that were also open to any interested parties, to develop, discuss and debate the proposed changes. Related documentation and reports are posted on the FCAC website at: https://www.iccsafe.org/products-and-services/i-codes/code-development/cs/fire-code-action-committee-fcac/

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal does not increase construction cost as it simply makes some editorial changes and offers an additional option to install a tested continuity head-of-wall joint system.

Staff Analysis: A review of the standard proposed for inclusion in the code, E2837-2013(2017), Standard Test Method for Determining the Fire Resistance of Continuity Head-of- Wall Joint Systems Installed Between Rated Wall Assemblies and Nonrated Horizontal Assemblies, with regard to some of the key ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before March 20, 2021.

FS45-21

Public Hearing Results

Committee Action: **As Modified**

Committee Modification:

CONTINUITY HEAD-OF-WALL ~~JOINT~~ SYSTEM. An assemblage of specific materials or products that are designed to resist the passage of fire through voids created at the intersection of *fire barriers* and the underside of nonfire-resistance-rated *roof assemblies* for a prescribed period of time.

[BF] F RATING. The time period that the *through-penetration firestop system, perimeter fire containment system* or *continuity head-of-wall ~~joint~~ system* limits the spread of fire through the penetration or void.
[BF] T RATING. The time period that the *penetration firestop system*, including the penetrating item, or *continuity head-of-wall ~~joint~~ system* limits the maximum temperature rise to 325°F (181°C) above its initial temperature through the penetration or void on the nonfire side.
715.2Installation.
Systems or materials protecting
joints and voids shall be securely installed in accordance with the manufacturer's installation instructions in or on the *joint* or void for its entire length so as not to dislodge, loosen or otherwise impair its ability to accommodate expected building movements and to resist the passage of fire and hot gases. *Fire-resistant joint systems,* systems used to protect voids at exterior curtain walls and fire-resistance-rated floor intersections, and *continuity head-of-wall ~~joint~~ systems* shall also be installed in accordance with the listing criteria.
715.6Fire barriers/nonfire-resistance-rated roof assembly intersections.
Voids created at the intersection of a *fire barrier* and the underside of a nonfire-resistance-rated roof sheathing, slab or deck above shall be filled by an *approved* material to retard the passage of fire and hot gases, or shall be protected by an *approved continuity head-of-wall ~~joint~~ system* tested in accordance with ASTM E2837 to provide an *F rating*/*T rating* for a time period not less than the required *fire-resistance rating* of the *fire barrier* in which it is installed.

Committee Reason: The committee concluded the modification enhances the proposed text by removing the word joint from the continuity head-of-wall system. The proposal removes redundant language and gives another option for voids to be protected by an approved continuity head-of-wall joint system tested in accordance with ASTM E2837 to provide an F rating/T rating. (Vote: 8-5)

FS45-21

Individual Consideration Agenda

Public Comment 1:

IBC: SECTION 202, 715.6

Proponents: Nestor Iwankiw, representing Metal Building Manufacturers Association (niwankiw@jensenhughes.com) requests As Modified by Public Comment

Further modify as follows:

2021 International Building Code

[BF] T RATING . The time period that the *penetration firestop system*, including the penetrating item, ~~or *continuity head-of-wall system system*~~ limits the maximum temperature rise to 325°F (181°C) above its initial temperature through the penetration ~~or void~~ on the nonfire side.

715.6 Fire barriers/nonfire-resistance-rated roof assembly intersections . Voids created at the intersection of a fire barrier and the underside of a nonfire-resistance-rated roof sheathing, slab or deck above shall be filled by an approved material to retard the passage of fire and hot gases, or shall be protected by an approved continuity head-of-wall system tested in accordance with ASTM E2837 to provide an F rating/~~T rating~~ for a time period not less than the required fire-resistance rating of the fire barrier in which it is ~~installed.~~ installed,but no more than 1 hour.

Commenter's Reason: The reasons for the modification consist of 1) F rating and T rating confusion, and 2) the lack of a maximum duration limit for the testing in accordance with ASTM E2837.

F Rating and T Rating Confusion: In the added section 715.6 Fire barriers/nonfire-resistance-rated roof assembly intersections, it requires that the system is tested ". . . to provide an F rating/T rating for a time period not less than the required fire-resistance rating of the fire barrier in which it is installed." Since F ratings and T ratings are usually different, this requirement is ambiguous. Does this mean that both F ratings and T ratings must meet the fire barrier rating, or just one of them? Listed assemblies for fire barriers, such as those listed in the UL database, provide one rating in terms of time, and the rating is not identified as a F rating or T rating. So there would be questions and confusion on whether assemblies meet these new requirements. To eliminate this confusion, the proposed modifications remove the T rating requirements in Section 715.6, and remove "continuity head-of-wall system" from the definition of T rating.

Maximum Duration Limit: Providing a maximum limit of 1 hour addresses the condition where a fire-resistance rated wall assembly intersects with a nonfire-resistance-rated roof assembly. An assembly in the void with a rating, such as 1-hour, is not the weak link of the fire protection system. The weak link is the nonfire-resistance-rated roof assembly; it will fail first.

Also, the 1-hour duration limit was selected for the following reasons:

1. Limited availability of approved assemblies:

- Total available assemblies are limited, only 24 UL listed continuity head of wall assemblies.
- 23 of 24 UL listed assemblies are 1-hour.
- The 23 1-hour UL listed assemblies are one-unique design , gypsum board clad metal stud framed wall intersecting metal building roof system
- According to IBC Table 508.4, Required Separation of Occupancies, where permitted, there are a total of 50 conditions, only 16 are 1 hour, the other 34 are 2-hour, 3-hour, and 4-hour.

2. The limited availability of systems greater than 1-hour will require a significant investment in testing and new assemblies may not be available in time of code adoption.

3. Assemblies with higher ratings typically require more material, such as another layer of gypsum board, a thicker bead of firecaulk, more mineral wool, and more fasteners.

4. More material will requires more time for construction, which will increase the inspection time for building officials

In summary, the proposed modifications will truly not increase the cost of construction because available systems can be used for all fire-barrier walls, and will not require the development of new systems, additional materials, construction time, and inspection time. It will also clarify the system rating requirement to avoid potential interpretation issues.

Cost Impact: The net effect of the public comment and code change proposal will not increase or decrease the cost of construction
However, without this modification, the code change proposal will increase construction costs. due to the following:

•The limited availability of systems greater than 1-hour will require a significant investment in testing.

•Assemblies with higher ratings typically require more material, such as another layer of gypsum board, a thicker bead of firecaulk, more mineral wool, and more fasteners.

•More material will require more time for construction, which will increase the inspection time for building officials.

Public Comment# 2610

Public Comment 2:

Proponents: Vincent Sagan, representing Metal Building Manufacturers Association (vsagan@mbma.com) requests Disapprove

Commenter's Reason: This proposal has the following significant flaws:

- The revisions do not fully replace the deleted text in Section 707.9, specifically the voids created at the intersection of a fire barrier and a nonfire-resistance-rated exterior wall assembly. A new section is required because Section 715 only addresses intersections at curtain walls. The proposal eliminates a condition that is currently permitted. Other related proposals add a section similar to the above, but there is no guarantee that the other proposals will be approved.
- In the added section 715.6 Fire barriers/nonfire-resistance-rated roof assembly intersections, it requires that the system is tested “. . . to provide an F rating/T rating for a time period not less than the required fire-resistance rating of the fire barrier in which it is installed.” Since F ratings and T ratings are usually different, this requirement is ambiguous. Does this mean that both F ratings and T ratings must meet the fire barrier rating, or just one of them? Listed assemblies for fire barriers, such as those listed in the UL database, provide one rating in terms of time, and the rating is not identified as a F rating or a T rating. So there would be questions and confusion on whether assemblies meet these new requirements.

Cost Impact: The net effect of the public comment and code change proposal will not increase or decrease the cost of construction
No change to code.

Public Comment# 2251

FS49-21

Proposed Change as Submitted

Proponents: John Williams, representing Healthcare Committee (ahc@iccsafe.org)

2021 International Building Code

Revise as follows:

710.4 Continuity. *Smoke partitions* shall extend from the top of the foundation or floor below to the underside of the floor or roof sheathing, deck or slab above or to the underside of the ceiling above where the ceiling membrane is constructed to limit the transfer of smoke.

> <u>**Exception:** In Group I-2, a lay-in ceiling system shall be considered capable of limiting the transfer of smoke where the ceiling tiles that weigh a minimum of one pound per square foot and where the HVAC system is fully ducted in accordance with Section 603 of the *International Mechanical Code.*</u>

Reason: Current interpretation of an allowable ceiling system is to be "monolithic." This type of ceiling is not feasible in a hospital setting, because main utility and ductwork lines run in the corridor to keep them out of patient care areas. This would facilitate the need for many access panels which compromise the smoke tight nature of the monolithic ceiling. The construction of the lay-in system would basically mean no open portions or gaps in the ceiling, either as an architectural feature or between items such as louvers. Normal ceiling fixtures such as lights, sprinkler heads, and diffusers and grills (as part of a fully ducted air system) can be considered part of the smoke tight system, as there is no opportunity for smoke to travel straight through them. A tight fitting lay-in grid is defined as one with no gaps in them, which is easily enforced via visual inspection and is therefore simply maintained.
Group I-2 is being specified, to make clear that this allowance applies to nursing homes (Condition 1) and hospitals (Condition 2), which is consistent with federal standards.

Lay in ceiling assemblies meeting this requirement would be consistent with listed fire resistance rated floor and roof ceiling assemblies using lay-in ceilings as a component of the assembly. Enforcement of this provision including fire code maintenance inspections would be far less challenging than currently exists for the fire-resistance rated floor- and roof-ceiling assemblies which require a specific manufacture's product for each of the assemblies that are listed by an approved testing facility. This proposal would allow any manufacturer's product to be used as long as it met the 1 pound per square foot criteria and other code requirements related to combustibility or flame spread. This is also supported by UL's BXUV Guide Information - Fire Resistance Ratings - ANSI/UL 263, Section III - FLOOR-CEILINGS AND ROOF-CEILINGS, Paragraph 10 which states "Hold down clips are required for assemblies incorporating ceiling panels weighing less that 1 lb per square foot."

As noted in past studies, the ceiling tile weight is also consistent with the findings of NBSIR 81-2444 Smoke Movement Through A Suspended Ceiling System (by John H Klote, 1982, NBS/VA), as noted on page 4 which states "[t]he ceiling tiles weighed 49.6 N/m2 (1.00 lb/ft2). During plan review, a cut sheet of the desired ceiling tile (readily available from any manufacturer) can be included in the review package or the one pound per square foot criteria can be listed in the specifications. The NBSIR 81-2444 report also notes in its abstract and conclusions that "smoldering fires of the type examined in this test series are not significant problems in hospitals." This is even more true today because of the expanded use of non combustible materials in construction as well as bedding and other typically used items in the hospital.

In terms of enforcement, hospitals have maintenance teams that are tasked with performing preventative maintenance and timely repairs as not to compromise the environment of care. Also, each hospital has personnel resources that deal specifically with regulatory issues. This regulatory staff has many regulations that deal with direct patient care, but they also help monitor the environment of care. There is also Infection Prevention professionals that Multidisciplinary teams regularly round in the hospital, reviewing delivery of care and the condition of the built environment. The multidisciplinary rounding team typically consists of representatives from Facilities, Regulatory, Infection Prevention, and leadership from the nursing care team. The status of a ceiling system is a key element that is observed to maintain its integrity.

A ceiling's role is a component of the life safety system of the hospital, by way of the relationship to activation of sprinkler heads and control of smoke. With the exception of mechanical rooms, all spaces in a patient care area have ceilings as part of the life safety system of the hospital, in particular the corridor. it is also a key component of the infection prevention elements of the hospital. These are some elements that Infection Prevention professionals focus on for the integrity of the ceiling:

· Minimize dust and particulates to enter patient care environments, including corridors, patient rooms, procedure rooms, storage rooms of medical supply, clean utility rooms, among others.

· Contribute to the air pressure relationships provided for each room. For example, negative pressure patient bed rooms to treat patients with infectious diseases.

When monitoring the integrity of the ceiling, missing or cracked tiles are a main area of focus, and are easily seen by all staff. The replacement of a ceiling tile is a top priority of a hospital maintenance department. This information is also tracked by the agencies that regulate hospitals, including Centers for Medicare and Medicaid Services (CMS), and deemed authorities including The Joint Commission (TJC). According to TJC, in 2009, citations in the Life Safety portion of surveys that involved ceilings ranked #2 in 2009. In 2019, this citation rank fell to #6. This demonstrates the focus on the issue, even when the criteria for a citation can be the smallest scratch, or stain from a water leak, much less the more obvious missing or tile with a corner out or other damage.

This code change proposal is a key element of compliance with the federal standards that are enforced for I-2 occupancies, and are important to be aligned with those standards.

Also limiting the HVAC system to ducted systems will preclude the possibility of an open plenum return system. Plenum systems are generally not used in hospitals due to the required pressure relationships foe infection prevention considerations and to maintain more accurate control of the temperature and humidity control.

Corridor walls are built to structure in most cases based on FGI (acoustic requirements), however, having to access the above ceiling space for inspection and maintenance causes issues with infection control, whereas maintaining a suspended acoustic ceiling to limit the transfer of smoke is visible and easily maintained and as noted above, is being done as part of infection control procedures with the interdisciplinary team.

This proposal is submitted by the ICC Committee on Healthcare (CHC). The CHC was established by the ICC Board to evaluate and assess contemporary code issues relating to healthcare facilities. This is a joint effort between ICC and the American Society for Healthcare Engineering (ASHE), a subsidiary of the American Hospital Association, to eliminate duplication and conflicts in healthcare regulation. In 2020 the CHC held several virtual meeting, which included members of the committees as well as any interested parties, to discuss and debate the proposed changes. Information on the CHC, including: meeting agendas; minutes; reports; resource documents; presentations; and all other materials developed in conjunction with the CHC effort can be downloaded from the CHC website at CHC.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This represents current common practice in Group I-2 facilities.

FS49-21

Public Hearing Results

Committee Action: **As Submitted**

Committee Reason: The committee concluded the proposal clarifies the limitation of the transfer of smoke in Group I-2. (Vote: 11-2)

FS49-21

Individual Consideration Agenda

Public Comment 1:

Proponents: Tony Crimi, representing representing North American Insulation Manufacturers Association (NAIMA) (tcrimi@sympatico.ca) requests Disapprove

Commenter's Reason: There is no evidence that the weight of ceiling tile required will provide any resistance to smoke movement. The historic context for the 1 lbs/ft^2 density was in order to waive the requirement for hold down clips in air plenums, so that the tiles would not be dislodged. It was not related to prevent smoke migration into the plenum during a fire. Fire resistance ratings do not measure or limit smoke movement into plenums. Typical pressure differentials across these barriers are sufficient to draw smoke through the perimeter of these tile and grid systems.I would also note that the IMC defines *Plenums* as an enclosed portion of the building structure, other than an occupiable space being conditioned, that is designed to allow air movement, and thereby serve as part of an air distribution system. As such, the ceiling space can be used as a plenum and the ceiling tiles could be subject to this pressure differential.
Also, as was pointed out by a Committee member 7.11.2.5 has similar requirements related to fire resistance ratings which uses more quantitative requirements, but it is not related to preventing smoke movement. In fact, 7.11.2.4.4 would still require horizontal smoke barriers to comply with Section 709. As such, this will create a conflict in the Code.

Cost Impact: The net effect of the public comment and code change proposal will not increase or decrease the cost of construction
No change to code.

Public Comment# 2660

FS51-21

Proposed Change as Submitted

Proponents: Michael O'Brian, representing FCAC (fcac@iccsafe.org)

2021 International Building Code

Revise as follows:

712.1.3.2 Automatic shutters. Protection of the vertical opening by *listed* or *approved* shutters at every penetrated floor shall be permitted in accordance with this section. The shutters shall be installed in accordance with the manufacturer's instructions. The shutters shall be of noncombustible construction and have a *fire-resistance rating* of not less than 1.5 hours. The shutter shall be so constructed as to close immediately upon the actuation of a smoke detector installed in accordance with Section 907.3.1 and shall completely shut off the well opening. Escalators shall cease operation when the shutter begins to close. The shutter shall operate at a speed of not more than 30 feet per minute (152.4 mm/s) and shall be equipped with a sensitive leading edge to arrest its progress where in contact with any obstacle, and to continue its progress on release therefrom.

Reason: This proposal requires the shutters used to protect escalator openings to be *listed* or *approved*, rather rather than just approved. It also requires them to be installed in accordance with the manufacturer's instructions.
There is currently a product available which is being marketed to meet this code provision, and is *listed* in a manner consistent with this proposal.

This proposal is submitted by the ICC Fire Code Action Committee (FCAC). The FCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance assigned International Codes with regard to fire and life safety in new and existing buildings and facilities as well as the protection of life and property in wildland urban interface areas. In 2020 and 2021 the Fire-CAC held multiple virtual meetings that were open to any interested party. In addition, there were numerous virtual specific working group meetings that were also open to any interested parties, to develop, discuss and debate the proposed changes. Related documentation and reports are posted on the FCAC website at: https://www.iccsafe.org/products-and-services/i-codes/code-development/cs/fire-code-action-committee-fcac/

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal will not increase construction cost but instead will now recognize both listed or approved shutters.

FS51-21

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The committee objects to adding "listed or" in section 712.1.3.2, while it is not prohibited in the section. The proposal could be confusing by requiring listed as an alternative to "approved". The committee also disagrees with the cost impact statement since the proposal will increase the cost of construction. (Vote: 8-5)

FS51-21

Individual Consideration Agenda

Public Comment 1:

Proponents: Michael O'Brian, representing FCAC (fcac@iccsafe.org) requests As Submitted

Commenter's Reason: This public comment is asking that this proposal be approved as submitted (AS). The committee was concerned that the language should say "listed and approved." However, the listed products are fairly limited at this time and requiring "listed or aproved" provides flexibility and would not increase the cost of applying the code.

Cost Impact: The net effect of the public comment and code change proposal will not increase or decrease the cost of construction
The 2021 IBC only requires they be approved. This proposal and PC simply provides more flexibility. The revised code text recognizes that there are some listed products available but would not be limited to listed products.

FS56-21

Proposed Change as Submitted

Proponents: Homer Maiel, PE, CBO, representing ICC Tri-Chapter (Peninsula, East Bay, Monterey Bay) (hmaiel@gmail.com)

2021 International Building Code

Revise as follows:

713.12.1 Penthouse mechanical rooms. A fire/*smoke damper* shall not be required at the penetration of the *rooftop structure* where *shaft enclosures* extend up through the *roof assembly* into a *rooftop structure* conforming to Section 1511. ~~Ductwork in the*shaft* shall be connected directly to HVAC equipment.~~

Reason: The design of the mechanical system that is conveyed by the shaft enclosure may or may not contain actual duct work. However, even if the shaft itself were utilized as the means of conveying the exhaust or supply air and there were no direct connection to the HVAC equipment there should not be any created hazard which would require the installation of the fire/smoke damper at the shaft penetration of the roof.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This is clarifying where code is silent. It will not affect construction cost.

FS56-21

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The committee concluded deleting the sentence "Ductwork in the shaft shall be connected directly to HVAC equipment" from section 713.12.1 will cause confusion and misinterpretation. (Vote: 13-0)

FS56-21

Individual Consideration Agenda

Public Comment 1:

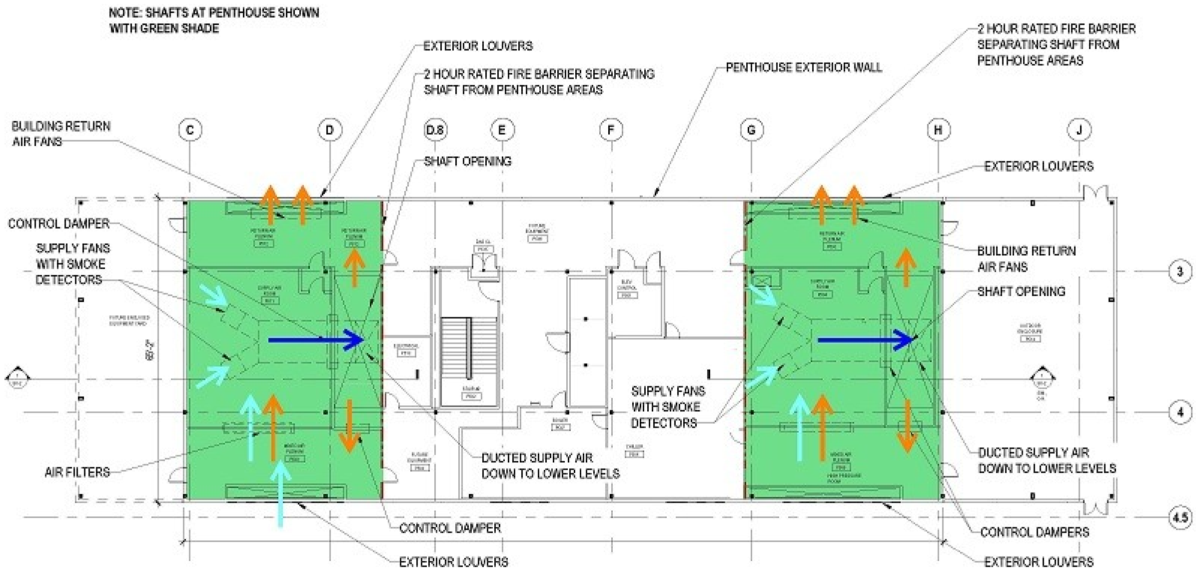
Proponents: Homer Maiel, representing ICC Tri-Chapter (Peninsula, East Bay, Monterey Bay) (hmaiel@gmail.com) requests As Submitted

Commenter's Reason: The mechanical HVAC system design where the supply or exhaust air is conveyed via an internal building shaft, to or from the mechanical penthouse, may not actually be provided with a mechanical duct system for the design of the HVAC system. The removal of the last sentence of the provision above does not appear to be relevant if the HVAC system under consideration follows the other existing code provisions and is thereby found acceptable to the AHJ approving the submitted design drawings.
The design of the HAVC system must meet all other provisions of the code to assure that smoke will not be conveyed from the mechanical room in the Penthouse to the internal portions of the building.

The HVAC supply air design may not have mechanical duct but use the shaft itself as a mean of conveyance between the mechanical room within the Penthouse and the floors of the building.

Likewise, the HVAC exhaust design may not have mechanical duct for the exhaust system but instead use the shaft itself as the means of conveyance of the exhaust air from theinternal portions of thebuilding up to the mechanical room at the Penthouse for discharge to the exterior atmosphere or to be used as a portion of recirculated make-up air for the HVAC system supply air for the building, when permitted by the International Mechanical Code, Chapter 4.

Attached sketches show just one example of where the design of the HVAC system utilized the shaft itself for conveying the exhaust to the penthouse level

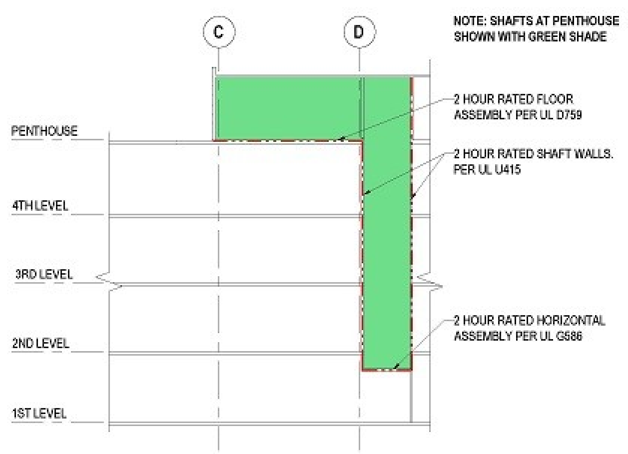


1 **SHAFTS AT PENTHOUSE INQUIRY - PENTHOUSE PLAN**

SCALE: 1/16" = 1'-0"

DATE: June 30, 2020

SK-1
ALT-2

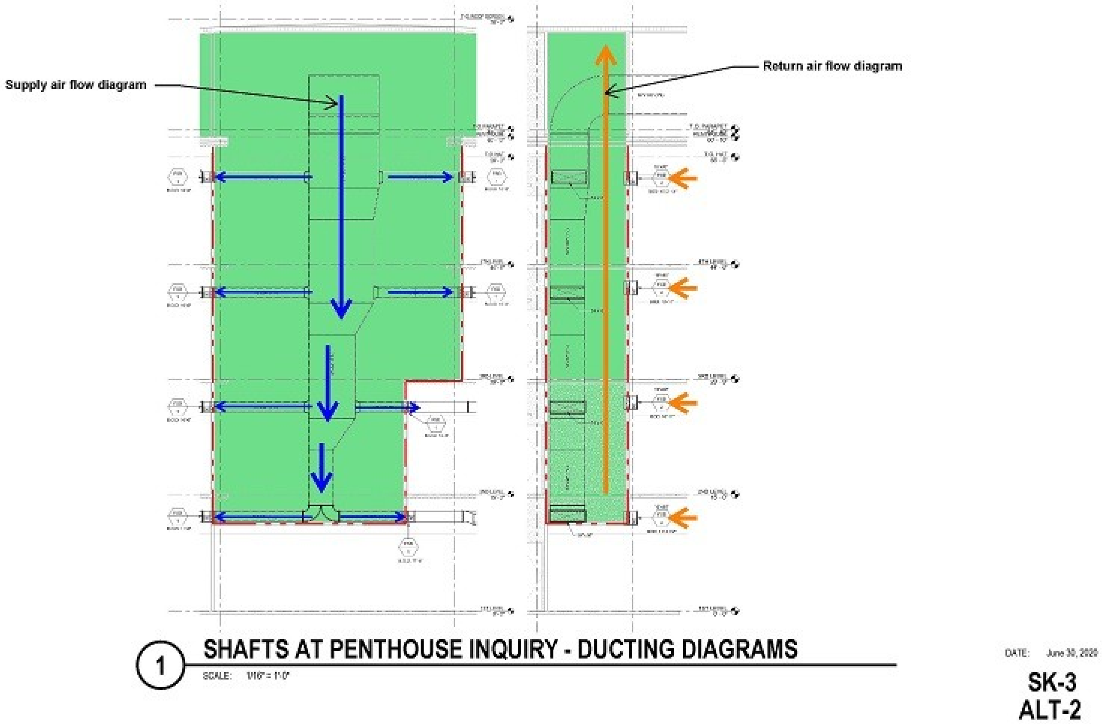


1 **SHAFTS AT PENTHOUSE INQUIRY - PARTIAL SECTION**

SCALE: 1/16" = 1'-0"

DATE: June 30, 2020

SK-2
ALT-2



Cost Impact: The net effect of the public comment and code change proposal will not increase or decrease the cost of construction
This is clarifying where code is silent. It will not affect construction cost.

Public Comment# 2559

FS60-21

Proposed Change as Submitted

Proponents: William Koffel, representing Firestop Contractors Association International (wkoffel@koffel.com)

2021 International Building Code

Revise as follows:

714.3 Sleeves. Where sleeves are used, they shall be ~~securely fastened to the assembly penetrated~~ installed in accordance with manufacturer's installation instructions and the listing criteria for the listed system. Where listed systems are not used, sleeves shall be securely fastened to the assembly penetrated. The space between the item contained in the sleeve and the sleeve itself and any space between the sleeve and the assembly penetrated shall be protected in accordance with this section. Insulation and coverings on or in the penetrating item shall not penetrate the assembly unless the specific material used has been tested as part of the assembly in accordance with this section.

Reason: Currently, sleeve installation details are only described generically in this section. The listing needs to be the guiding document for sleeve installations with firestop systems. Not all sleeves are required by the listing to be securely fastened to the assembly. In fact, some listings state fastening is not required. This change allows the instructions shown in the listing to take precedence, where it is part of the listing criteria. If the system is not a listed system, the sleeves shall be securely attached to the assembly penetrated.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The proposed language is consistent with current construction practice.

FS60-21

Public Hearing Results

Committee Action: **As Submitted**

Committee Reason: The committee concluded the proposal clarifies the current language for sleeves. The committee advised the proponent to clarify the second sentence of the proposal in the public comment phase. (Vote: 13-0)

FS60-21

Individual Consideration Agenda

Public Comment 1:

IBC: 714.3

Proponents: William Koffel, representing Firestop Contractors Association International (wkoffel@koffel.com) requests As Modified by Public Comment

Modify as follows:

2021 International Building Code

714.3 Sleeves . Where sleeves are used, they shall be ~~installed~~ securely fastened to the assembly penetrated and installed in accordance with the sleeve manufacturer's installation instructions. ~~and the~~ Where listed systems are used, the sleeve shall be installed in accordance with the listing criteria for the ~~listed~~ system. ~~Where listed systems are not used, sleeves shall be securely fastened to the assembly penetrated.~~ The space between the item contained in the sleeve and the sleeve itself and any space between the sleeve and the assembly penetrated shall be protected in accordance with this section. Insulation and coverings on or in the penetrating item shall not penetrate the assembly unless the specific material used has been tested as part of the assembly in accordance with this section.

Commenter's Reason: Although the Committee approved FS60-21 As Submitted, the Committee did note that the second sentence needed to be clarified during the Public Comment period. The Public Comment attempts to clarify the requirements be resequencing some of the language, as recommended by at least one Committee member.

Cost Impact: The net effect of the public comment and code change proposal will not increase or decrease the cost of construction

Editorial clarification.

Public Comment# 2778

FS64-21

Proposed Change as Submitted

Proponents: David Renn, PE, SE, City and County of Denver, representing Code Change Committee of ICC Colorado Chapter (david.renn@denvergov.org)

2021 International Building Code

714.5 Horizontal assemblies. Penetrations of a *fire-resistance-rated* floor, floor/ceiling assembly or the ceiling membrane of a roof/ceiling assembly not required to be enclosed in a *shaft* by Section 712.1 shall be protected in accordance with Sections 714.5.1 through 714.5.4.

Revise as follows:

714.5.1 Through penetrations. *Through penetrations* of *horizontal assemblies* shall comply with Section 714.5.1.1 or 714.5.1.2.

Exceptions:

1. Penetrations by steel, ferrous or copper conduits, pipes, tubes or vents or concrete or masonry items through a single fire-resistance-rated floor assembly where the *annular space* is protected with materials that prevent the passage of flame and hot gases sufficient to ignite cotton waste when subjected to ASTM E119 or UL 263 time-temperature fire conditions under a minimum positive pressure differential of 0.01 inch (2.49 Pa) of water at the location of the penetration for the time period equivalent to the *fire-resistance rating* of the construction penetrated. Penetrating items with a maximum 6-inch (152 mm) nominal diameter shall not be limited to the penetration of a single fire-resistance-rated floor assembly, provided that the aggregate area of the openings through the assembly does not exceed 144 square inches (92 900 mm^2) in any 100 square feet (9.3 m^2) of floor area.
2. Penetrations in a single concrete floor by steel, ferrous or copper conduits, pipes, tubes or vents with a maximum 6-inch (152 mm) nominal diameter, provided that the concrete, grout or *mortar* is installed the full thickness of the floor or the thickness required to maintain the *fire-resistance rating*. The penetrating items shall not be limited to the penetration of a single concrete floor, provided that the area of the opening through each floor does not exceed 144 square inches (92 900 mm^2).
3. Penetrations by *listed* electrical boxes of any material, provided that such boxes have been tested for use in fire-resistance-rated assemblies and installed in accordance with the instructions included in the listing.
4. <u>Penetrations of concrete floors or ramps within parking garages or structures constructed in accordance with Sections 406.5 and 406.6 where the areas above and below the penetrations are parking areas.</u>

Reason: Section 712.1.10 currently permits unprotected vertical openings in parking garages for ramps, elevators and duct systems and Section 715.1 currently permits unprotected joints in floors and ramps within parking garages or structures. Based on these allowances, it goes to reason that penetrations through floors and ramps of parking garages should also be permitted to be unprotected. This proposal allows such unprotected penetrations but is limited to concrete floors and ramps since these unprotected penetrations do not compromise the fire-resistance rating of the floor, while an unprotected penetration through a floor/ceiling assembly would allow a fire enter the cavity of the assembly and compromise the fire-resistance rating. These unprotected penetrations are further limited to penetrations with parking above and below the penetration, which is consistent with 712.1.10 and 715.1 that allow vertical openings and joints "in" or "within" parking garages or structures - this also essentially prohibits concealed penetrations which could allow a fire through a penetration to go undetected for some period of time.

Cost Impact: The code change proposal will decrease the cost of construction
This proposal will allow unprotected penetrations in garages which will reduce the cost of construction due to a reduction in through-penetration firestop systems.

FS64-21

Public Hearing Results

Committee Action: **As Submitted**

Committee Reason: The committee concluded that this exception for "penetrations of concrete floors or ramps within parking garages or structures constructed per Sections 406.5 and 406.6 where the areas above and below the penetrations are parking areas" is common sense. (Vote: 10-3)

FS64-21

Individual Consideration Agenda

Public Comment 1:

Proponents: Tony Crimi, representing representing North American Insulation Manufacturers Association (NAIMA) (tcrimi@sympatico.ca) requests Disapprove

Commenter's Reason: The current provisions in the IBC for unprotected vertical openings in parking garages are limited to a few areas that are easily identifiable within the parking structure, like ramps and elevators. Penetrations can be located throughout the parking garage, be more difficult to locate and access for fire fighting, and are often located directly adjacent to parked vehicles. It is also not uncommon that significant quantities of other combustible materials are stored in parking garages, whether temporarily or not.
There have been a number of recent cases and studies around the world that are demonstrating that fire safety in parking garages should be enhanced, not further reduced as the intent of FS75In recent years Europe has seen a series of large fires (Liverpool, UK (2017); Cork, Ireland (2018); Stavanger, Norway (2019); Warsaw, Poland (2020)) that brought the car park fire safety into the focus of the public discussion. We are also seeing new battery technologies which are leading to much more rapid fire growth than previously contemplated in parking garage design. The fire accidents caused by the thermal runaway of lithium-ion battery has impeded the development of electric vehicles, but also demonstrated that additional fire safety precautions are needed.

Another recent study on fires from electric vehicles concluded that in just 22 seconds, cell thermal runaway spreads flames throughout the battery compartment. A full-scale fire test was carried out on a battery system of seventeen 3P6S battery modules mounted with control systems in a car chassis. One battery module was overcharged until thermal runaway occurred. Within five seconds, thermal runaway spread to the four adjacent modules. Released gas was immediately ignited, with jet flame and smoke, and temperatures reached over 600°C. These five modules then smouldered, and further modules ignited after around two minutes. The authors note that water fire suppression would be hindered by the battery pack casings.[1]

Parking garages often have penetrants (piping, electrical conduit, cables, etc) extending vertically through multiple levels of the parking garage. Unprotected penetrations will allow fire to spread vertically, uncontrolled, exposing multiple levels with significant fire loads and significantly impact fire fighting operations and the ability to compartmentalize a fire to a single floor. As written FS64 includes both sprinklered and unsprinklered parking garages. It has always been the intent in the IBC to limit the fire and hot gases from spreading vertically even in nonfire resistance rated assemblies. No additional justification or information is provided as to why this would no longer be needed. Not providing effective vertical fire separations in a parking garage is contrary to good fire safety practices.

Bibliography: [1] Li, Huang, Peng, Wen, Yang, Xulai, Chen, Haodong, Sun, Jinhua, Wang, Qingsong, Full-Scale Experimental Study on the Combustion Behavior of Lithium Ion Battery Pack Used for Electric Vehicle Fire Technology, Volume 56- 6, November 01, 2020, https://doi.org/10.1007/s10694-020-00988-w

Cost Impact: The net effect of the public comment and code change proposal will not increase or decrease the cost of construction
No change to code.

Public Comment# 2511

FS67-21

Proposed Change as Submitted

Proponents: Timothy Pate, Colorado Chapter ICC Code change Committee, representing City and County of Broomfield (tpate@broomfield.org)

2021 International Building Code

Revise as follows:

714.5.2 Membrane penetrations. Penetrations of membranes that are part of a *horizontal assembly* shall comply with Section 714.5.1.1 or 714.5.1.2. Where floor/ceiling assemblies are required to have a *fire-resistance rating*, recessed fixtures shall be installed such that the required *fire resistance* will not be reduced.

Exceptions:

1. *Membrane penetrations* by steel, ferrous or copper conduits, pipes, tubes or vents, or concrete or masonry items where the *annular space* is protected either in accordance with Section 714.5.1 or to prevent the free passage of flame and the products of combustion. The aggregate area of the openings through the membrane shall not exceed 100 square inches (64 500 mm^2) in any 100 square feet (9.3 m^2) of ceiling area in assemblies tested without penetrations.
2. Ceiling *membrane penetrations* of maximum 2-hour *horizontal assemblies* by steel electrical boxes that do not exceed 16 square inches (10 323 mm^2) in area, provided that the aggregate area of such penetrations does not exceed 100 square inches (44 500 mm^2) in any 100 square feet (9.29 m^2) of ceiling area, and the *annular space* between the ceiling membrane and the box does not exceed $^1/_8$ inch (3.2 mm).
3. *Membrane penetrations* by electrical boxes of any size or type, that have been *listed* as part of an opening protective material system for use in *horizontal assemblies* and are installed in accordance with the instructions included in the listing.
4. *Membrane penetrations* by *listed* electrical boxes of any material, provided that such boxes have been tested for use in fire-resistance-rated assemblies and are installed in accordance with the instructions included in the listing. The *annular space* between the ceiling membrane and the box shall not exceed $^1/_8$ inch (3.2 mm) unless *listed* otherwise.
5. The *annular space* created by the penetration of a fire sprinkler, provided that it is covered by a metal escutcheon plate.
6. Noncombustible items that are cast into concrete *building elements* and that do not penetrate both top and bottom surfaces of the element.
7. The ceiling membrane of a maximum 1-hour fire-resistance-rated horizontal assembly is permitted to be interrupted with a single 2 inch nominal thickness wood top plate and a maximum 2-hour fire-resistance-rated *horizontal assembly* is permitted to be interrupted with the double 2 inch nominal thickness wood top plate of a wall assembly that is sheathed with Type X *gypsum wallboard*, provided that all penetrating items through the ~~double~~ top plates are protected in accordance with Section 714.5.1.1 or 714.5.1.2 and the ceiling membrane is tight to the top plates.
8. Ceiling *membrane penetrations* by listed luminaires (light fixtures) or by luminaires protected with *listed* materials, which have been tested for use in fire-resistance-rated assemblies and are installed in accordance with the instructions included in the listing.

Reason: This code change is proposing to add language to allow a single 2 X wood top plate to be equivalent to one layer of 5/8" type X drywall for a one hour rated horizontal floor/ceiling or roof/ceiling assembly. It also still allows a double 2 X wood top plate to be equivalent to two layers of 5/8" type X drywall for a two hour rated horizontal floor/ceiling or roof/ceiling assembly. It adds language to clarify that the top plates need to be nominal size - that is at least 1 1/2" thick. We have seen some architects and engineers specify a 3/4" thick top plate in order to allow a gap between top of wall to the floor or roof trusses in taller wood buildings and this change would clarify the original intent of the code change that I was able to get approved by the membership.
IBC section 722.1 states that the calculated fire resistance of exposed wood members and wood decking shall be permitted in accordance with Chapter 16 of ANSI/AWC National Design Specification for Wood Construction (NDS). This chapter gives a nominal char rated of 1.5 inches of wood thickness per hour of fire resistance. Per NDS's calculations a single 2 X wood stud provides an equivalent of 60 minutes of fire protections. Per IBC Table 722.6.2(1), 5/8 inch Type X gypsum wall board provides 40 minutes of fire protection, so the protection by a 2 X wood stud is above and beyond that provided by one layer of 5/8 inch Type X gypsum. Utilizing the IBC calculated fire resistance method, a single 2 X wood top plate provides equal or greater fire resistance to one layer of 5/8 inch Type X gypsum and a double 2 X wood top plate provides equal or greater fire resistance to two layers of 5/8 inch Type X gypsum.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This code change proposal is to clarify the intent of the original code change that brought this exception into the code.

FS67-21

Public Hearing Results

This proposal includes published errata

Errata: The proponent did not underline some new text. See the Consolidated Monograph Updates document; https://cdn-web.iccsafe.org/wp-content/uploads/2021-GROUP-A-CONSOLIDATED-MONOGRAPH-UPDATES-Updated-4-02-2021-complete.pdf.

Committee Action: **As Submitted**

Committee Reason: The committee determined the proposal is a suitable acknowledgment of existing practice without any issues. The proposal allows the use of a single or double top plate. The committee is also concerned about the possible insufficient attachment of the gypsum wallboard to a single top plate. (Vote: 12-1)

FS67-21

Individual Consideration Agenda

Public Comment 1:

Proponents: Tim Earl, representing The Gypsum Association (tearl@gbhint.com) requests Disapprove

Commenter's Reason: The proposed single top plate is both unfeasible and a reduction in fire safety.
The overwhelming majority of one-hour horizontal assemblies (e.g. floor-ceiling assemblies) listed in the GA-600 *Fire Resistance and Sound Control Design Manual* are comprised as follows:

1. Two layers of 5/8" type X gypsum panels, which means a total system depth of 1-1/4" inches, or
2. One layer of a 5/8" type X gypsum panel and a layer of resilient channel (1/2" deep), which means a total system depth of 1-1/8".

In addition, GA-216 *Application and Finishing of Gypsum Panel Products* prescribes that the fasteners for the panels must be set a minimum of 3/8" from the edge of the panel.

Nominal 2x lumber is 1-1/2" deep. Because best practice is to hang the ceiling panels first and then the wall panels, and since the ceiling membrane must be abutted to the top plate anyway as prescribed in the code, there is not adequate top plate surface left on which to fasten the wall panels once the ceiling is installed.

Cost Impact: The net effect of the public comment and code change proposal will not increase or decrease the cost of construction
No change to code if this PC is approved.

Public Comment# 2634

Public Comment 2:

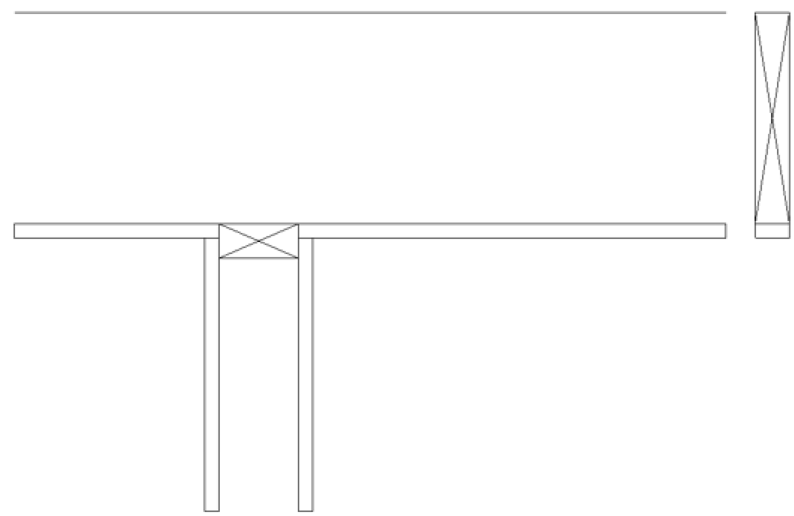
Proponents: Jonathan Roberts, representing UL LLC (jonathan.roberts@ul.com) requests Disapprove

Commenter's Reason: In looking more closely at the impact of this proposal we have identified unintended consequences that make it problematic to implement this construction for wood stud walls. For the reasons explained below, we urge Disapproval of FS67-21 because this change leads to an unforeseen consequence of improper constructability.
This construction method decreases the depth of the wood surface needed at the top of the wall to properly fasten the gypsum material. In the case of the single top plate with a single layer of 5/8" attached to the ceiling or floor joists above (see figure 1) the remaining wood surface would be 7/8 of an inch or less and would not allow for nails or screws attaching the gypsum to be driven in straight, as required for proper attachment (see figure 2). Securing gypsum with fasteners driven at an angle results in breaking the face paper or fracturing the gypsum core.

Many fire-resistance rated ceiling designs require the use of resilient channels and this proposed construction method further reduces the available surface for nailing. Figure 3 illustrates an additional reduction of ¾ of an inch of fastening surface on the top plate, leaving only ¼ inch of wood surface accessible below the gypsum on the ceiling. This proposed code change results in too little nailing surface for the gypsum on the wall at the top plate resulting in construction where the gypsum cannot be properly fastened as required for the construction.

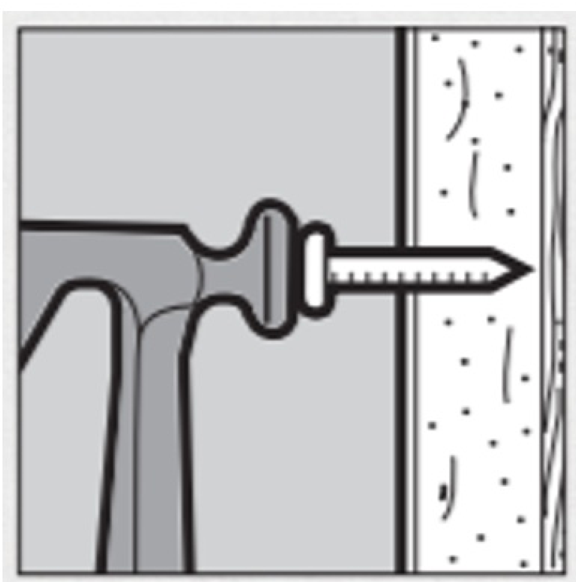
In addition to not being able to construct the wall properly, decreasing the requirement for the top plate from the currently required, two top plates to only one for the intersection of a 1-Hour rated horizontal assembly with a type-X gypsum sheathed wall, is not supported by any technical data to show there is no reduction of the fire resistance for the horizontal assemblies with the reduced thickness of a single top plate wall.

Figures 1 through 3 – Provided to illustrate the problems that will arise during construction with a single top plate.



This illustrates a single top plate and one layer of gypsum (no furring strips of channels in place) there is insufficient space to nail or screw straight into the top plate.

Figure 1



(Proper Nailing - Drive nails in straight, not at an angle. Do not overdrive or countersink nails. This results in breaking the face paper or fracturing the gypsum core.)

Figure 2

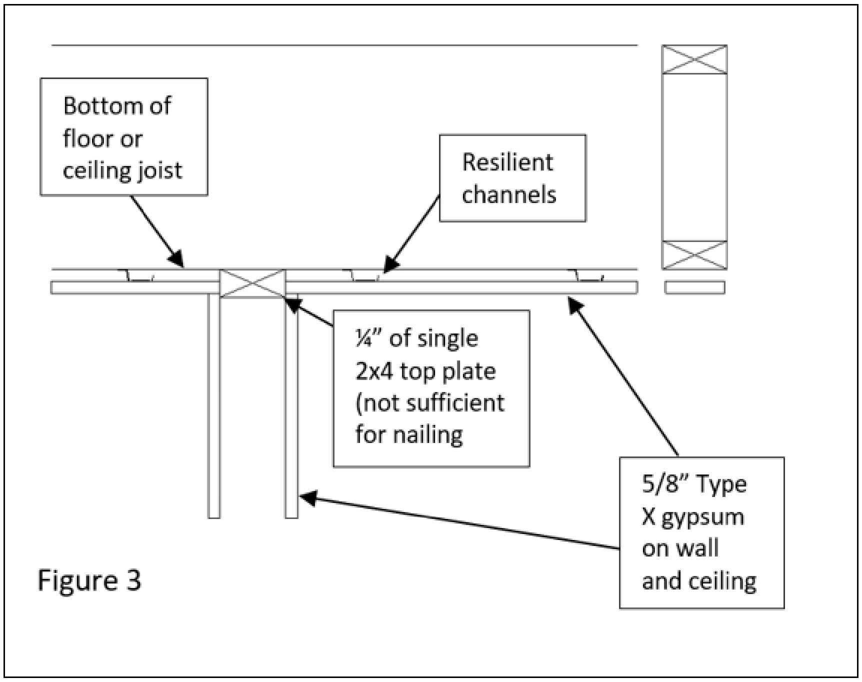


Figure 3

Cost Impact: The net effect of the public comment and code change proposal will not increase or decrease the cost of construction
No change to code.

Public Comment# 2648

FS74-21

Proposed Change as Submitted

Proponents: Tony Crimi, representing North American Insulation Manufacturers Association (NAIMA), representing representing North American Insulation Manufacturers Association (NAIMA)

2021 International Building Code

Revise as follows:

715.4 Exterior ~~curtain~~ wall/fire-resistance-rated floor intersections. Voids created at the intersection of exterior ~~curtain~~ wall assemblies and fire-resistance-rated floor or floor/ceiling assemblies shall be protected with an *approved perimeter fire containment system* to prevent the interior spread of fire. Such systems shall provide an *F rating* for a time period not less than the *fire-resistance rating* of the floor or floor/ceiling assembly.

715.4.1 Fire test criteria. *Perimeter fire containment systems* shall be tested in accordance with the requirements of ASTM E2307.

Exception: Voids created at the intersection of the exterior curtain wall assemblies and floor assemblies where the vision glass extends to the finished floor level shall be permitted to be protected with an approved ~~material~~ system to prevent the interior spread of fire. Such ~~material~~ systems shall be securely installed and capable of preventing the passage of flame and hot gases sufficient to ignite cotton waste in the horizontal orientation where subjected to ASTM E119 time-temperature fire conditions under a minimum positive pressure differential of 0.01 inch (0.254 mm) of water column (2.5 Pa) for the time period not less than the fire-resistance rating of the floor assembly.

Reason: This proposal provides additional clarification to the requirements and exceptions for perimeter fire containment systems (PFC).
First, it clarifies that a perimeter fire containment system can be installed in the voids between a floor assembly and any exterior wall or curtain wall. It then clarifies that, for the exception in 715.4, the protection of the void needs to be based on a system that has been test to ASTM E119, but in the horizontal orientation. This clarifies that it would not be acceptable for any individual material that has been part of an ASTM E119 test to be acceptable if it has not been tested in some configuration that represents an installation that is similar to the intended purpose here. For example, an insulation material tested to ASTM E119 within the cavity of an interior wall assembly provides no assurance that that material would provide the intended protection for a void installed horizontally between a floor assembly and a curtain wall. Information such as joint width, adhesion to substrates, fastening, etc. need to be representative of what is being installed

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The proposal clarifies the intent of the provision and the exception.

FS74-21

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The committee concluded that extending section 715.4 to all walls without any technical data is not acceptable because this section was initially introduced in the code to address exterior curtain wall/fire-resistance-rated floor intersections. (Vote: 11-2)

FS74-21

Individual Consideration Agenda

Public Comment 1:

IBC: 715.4, 715.4.1

Proponents: Tony Crimi, representing representing North American Insulation Manufacturers Association (NAIMA) (tcrimi@sympatico.ca) requests As Modified by Public Comment

Modify as follows:

2021 International Building Code

715.4 Exterior curtain wall/fire-resistance-rated floor intersections . Voids created at the intersection of exterior curtain wall assemblies and fire-resistance-rated floor or floor/ceiling assemblies shall be protected with an *approved perimeter fire containment system* to prevent the interior spread of fire. Such systems shall provide an *F rating* for a time period not less than the *fire-resistance rating* of the floor or floor/ceiling assembly.

715.4.1 Fire test criteria . *Perimeter fire containment systems* shall be tested in accordance with the requirements of ASTM E2307.

> **Exception:** Voids created at the intersection of the exterior curtain wall assemblies and floor assemblies where the vision glass extends to the finished floor level shall be permitted to be protected with an approved system to prevent the interior spread of fire. Such systems shall be securely installed and capable of preventing the passage of flame and hot gases sufficient to ignite cotton waste in the horizontal orientation where subjected to ASTM E119 time-temperature fire conditions under a minimum positive pressure differential of 0.01 inch (0.254 mm) of water column (2.5 Pa) for the time period not less than the fire-resistance rating of the floor assembly.

Commenter's Reason: During the CAH deliberations, the primary issue of concern was the removal of the word "curtain" wall from 715.4. This public comment restores that language. The remainder of the proposal is then intend to clarify that what is needed in the exception is for the generic system is installed to achieve this needs to include all of the materials that were used to demonstrate that it can work successfully in a horizontal orientation.
For example, we should not be using ASTM E119 data from a wall assembly where the "material" in the stud cavity can be used to protect this type of condition. It would not have been tested horizontally. Furthermore, its' performance in the wall would have been significantly enhanced by wallboard protecting it. It is important that the IBC specify these requirements more clearly.

Cost Impact: The net effect of the public comment and code change proposal will not increase or decrease the cost of construction
The proposal clarifies the intent of the provision and the exception.

Public Comment# 2366

FS75-21

Proposed Change as Submitted

Proponents: David Renn, PE, SE, City and County of Denver, representing Code Change Committee of ICC Colorado Chapter (david.renn@denvergov.org)

2021 International Building Code

Revise as follows:

715.4 Exterior curtain wall/fire-resistance-rated floor intersections. Voids created at the intersection of exterior curtain wall assemblies and fire-resistance-rated floor or floor/ceiling assemblies shall be protected with an*approved perimeter fire containment system* to prevent the interior spread of fire. Such systems shall provide an *F rating* for a time period not less than the *fire-resistance rating* of the floor or floor/ceiling assembly.

Exception: *Approved perimeter fire containment system* shall not be required for voids in the following locations:

1. Floors within a single *dwelling unit.*
2. Floors and ramps within parking garages or structures constructed in accordance with Sections 406.5 and 406.6.
3. *Mezzanine* floors.

715.5 Exterior curtain wall/nonfire-resistance-rated floor assembly intersections. Voids created at the intersection of exterior curtain wall assemblies and nonfire-resistance-rated floor or floor/ceiling assemblies shall be filled with an*approved* material or system to retard the interior spread of fire and hot gases ~~between *stories*~~.

Exception: *Approved* material or system to retard the interior spread of fire and hot gases shall not be required for voids in the following locations:

1. Floors within a single *dwelling unit.*
2. Floors and ramps within parking garages or structures constructed in accordance with Sections 406.5 and 406.6.
3. *Mezzanine* floors.

Reason: Section 715.3 for fire-resistant joint systems includes exceptions for several types of floors, which essentially allows open joints between fire-resistant floors or floor/ceiling assemblies. This proposal extends exceptions that are applicable to curtain wall/floor intersections to the void at the curtain wall/floor intersection. If an an open joint within these floors is acceptable, it goes to reason that it is also acceptable to have an open void between these floors and exterior curtain wall. The exceptions for this condition include floors within a dwelling unit, floors and ramps in parking garages or structures, and mezzanine floors. An example of the use of these exceptions is a parking garage on the lower floors of a building that have exterior curtain walls to "hide" the garage to match the exterior appearance of the building above the garage levels. Also, in Section 715.5, the words "between stories" is proposed to be deleted to align the wording of this section with that of 715.4 and 715.3.

Cost Impact: The code change proposal will decrease the cost of construction
For certain conditions, this proposal will remove the requirement for approved systems at voids at curtain wall/floor intersections so the cost of construction will decrease.

FS75-21

Public Hearing Results

This proposal includes unpublished errata

Errata: Proposal's reason statement. The proponent did not use the correct section. The two references in the reason statement to 715.1 should be 715.3 instead, based on the renumbering of the section in 2021 IBC.
Reason Statement**:** Section 715.3 ~~715.1~~for fire-resistant joint systems includes exceptions for several types of floors, which essentially allows open joints between fire-resistant floors or floor/ceiling assemblies. This proposal extends exceptions that are applicable to curtain wall/floor intersections to the void at the curtain wall/floor intersection. If an an open joint within these floors is acceptable, it goes to reason that it is also acceptable to have an open void between these floors and exterior curtain wall. The exceptions for this condition include floors within a dwelling unit, floors and ramps in parking garages or structures, and mezzanine floors. An example of the use of these exceptions is a parking garage on the lower floors of a building that have exterior curtain walls to "hide" the garage to match the exterior appearance of the building above the garage levels. Also, in Section 715.5, the words "between stories" is proposed to be deleted to align the wording of this section with that of 715.4 and 715.3 ~~715.1~~.

Committee Action: **As Submitted**

Committee Reason: The committee based their approval on the proponent's reason statement and concluded the code change clarifies existing criteria. The committee also mentioned that the relocation is necessary and practical. (Vote: 11-2)

FS75-21

Individual Consideration Agenda

Public Comment 1:

Proponents: Tony Crimi, representing representing North American Insulation Manufacturers Association (NAIMA) (tcrimi@sympatico.ca) requests Disapprove

Commenter's Reason: As written, FS75 would not even require perimeter openings to be filled with any material, leaving them entirely open though all floors of the parking garage, in a direct vertical path. The current provisions in the IBC for unprotected vertical openings in parking garages are limited to a few areas that are easily identifiable within the parking structure, like ramps and elevators. Joints and voids at curtain walls extend extensively throughout an entire parking structure, where openings will often be located directly adjacent to parked vehicles, which can further complicate fire fighting operations. Furthermore, when this is applied in dwelling units, it can create a path between floors of sleeping areas at the perimeter joint which would cause a significant reduction in fire safety. It is also not uncommon that significant quantities of other combustible materials are stored in parking garages, whether temporarily or not.
There have been a number of recent cases and studies around the world that are demonstrating that fire safety in parking garages should be enhanced, not further reduced as the intent of FS75In recent years Europe has seen a series of large fires (Liverpool, UK (2017); Cork, Ireland (2018); Stavanger, Norway (2019); Warsaw, Poland (2020)) that brought the car park fire safety into the focus of the public discussion. We are also seeing new battery technologies which are leading to much more rapid fire growth than previously contemplated in parking garage design. The fire accidents caused by the thermal runaway of lithium-ion battery has impeded the development of electric vehicles, but also demonstrated that additional fire safety precautions are needed.

Another recent study on fires from electric vehicles concluded that in just 22 seconds, cell thermal runaway spreads flames throughout the battery compartment. A full-scale fire test was carried out on a battery system of seventeen 3P6S battery modules mounted with control systems in a car chassis. One battery module was overcharged until thermal runaway occurred. Within five seconds, thermal runaway spread to the four adjacent modules. Released gas was immediately ignited, with jet flame and smoke, and temperatures reached over 600°C. These five modules then smouldered, and further modules ignited after around two minutes. The authors note that water fire suppression would be hindered by the battery pack casings.[1]

As written FS75 includes both sprinklered and unsprinklered parking garages. It has always been the intent in the IBC to limit the fire and hot gases from spreading vertically even in nonfire resistance rated assemblies. No additional justification or information is provided as to why this would no longer be needed. Not providing effective vertical fire separations in a parking garage is contrary to good fire safety practices.

Bibliography: [1] Li, Huang, Peng, Wen, Yang, Xulai, Chen, Haodong, Sun, Jinhua, Wang, Qingsong, Full-Scale Experimental Study on the Combustion Behavior of Lithium Ion Battery Pack Used for Electric Vehicle Fire Technology, Volume 56- 6, November 01, 2020, https://doi.org/10.1007/s10694-020-00988-w

Cost Impact: The net effect of the public comment and code change proposal will not increase or decrease the cost of construction
No change to code.

Public Comment# 2652

FS83-21

Proposed Change as Submitted

Proponents: Mike Nugent, Chair, representing ICC Building Code Action Committee (bcac@iccsafe.org); Michael O'Brian, representing FCAC (fcac@iccsafe.org)

2021 International Building Code

Revise as follows:

716.2.2.1 Door assemblies in corridors and smoke barriers. *Fire door* assemblies required to have a minimum *fire protection rating* of 20 minutes where located in *corridor* walls or *smoke barrier* walls having a *fire-resistance rating* in accordance with Table 716.1(2) shall be tested in accordance with NFPA 252 or UL 10C without the hose stream test.

Exceptions:

1. Viewports that require a hole not larger than 1 inch (25 mm) in diameter through the door, have not less than a 0.25-inch-thick (6.4 mm) glass disc and the holder is of metal that will not melt out where subject to temperatures of 1,700°F (927°C).
2. *Corridor* door assemblies in occupancies of Group I-2 shall be in accordance with Section 407.3.1.
3. Unprotected openings shall be permitted for *corridors* in multitheater complexes where each motion picture auditorium has not fewer than one-half of its required *exit* or *exit access doorways* opening directly to the exterior or into an *exit passageway*.
4. Horizontal sliding doors in *smoke barriers* that comply with Sections 408.6 and 408.8.4 in occupancies in Group I-3.
5. In corridor walls required to have a fire-resistance rating in accordance with Section 1020.2, an elevator hoistway door opening directly into the corridor is not required to meet the smoke and draft control door assembly requirements in this section where the elevator connect 3 stories or less and the building is equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1 or 903.3.1.2.

1020.2.1 Hoistway ~~opening~~ protection. Elevator hoistway doors in elevators hoistway enclosures required to be fire resistance rated shall be protected in accordance with Section 716. Elevator hoistway doors ~~openings~~ shall also be protected in accordance with Section ~~3006.2.1~~ 3006.2.

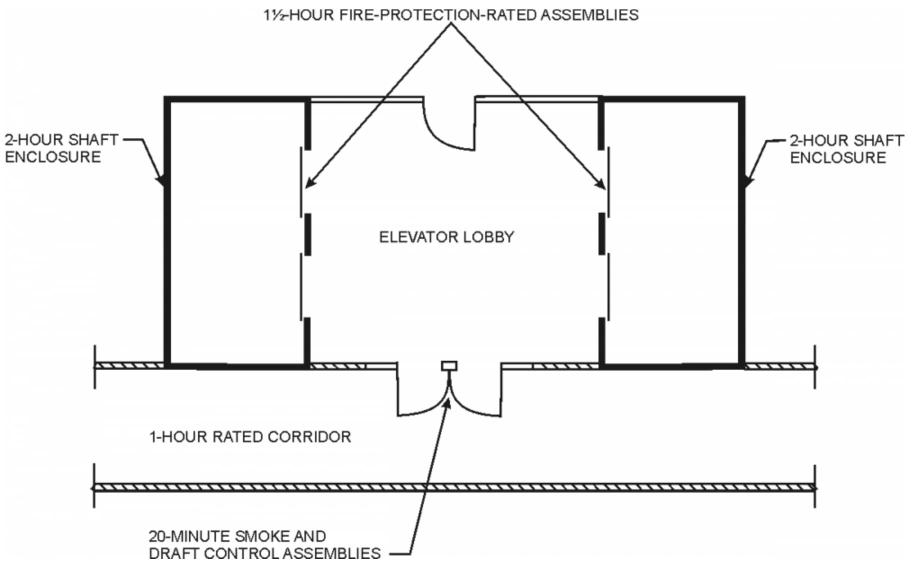
Reason: The intent of this proposal is to allow for two and three story Group R and Group I-1 buildings that do not have to have elevator lobbies to not have smoke and draft control at the doors. Even with sprinklers, these buildings have fire resistance rated corridors.
Elevators are within vertical shafts and are sent to fire barrier protection requirements in Section 712.1.1, 713.14 and 3002.1. Section 707.6 in fire barriers references Section 716 for opening protection of all openings, which would include door through the shaft to allows entrance into the elevator car. Elevator car doors often open directly into a rated corridor, so Section 716.2.2.1 is applicable to those elevator doors.

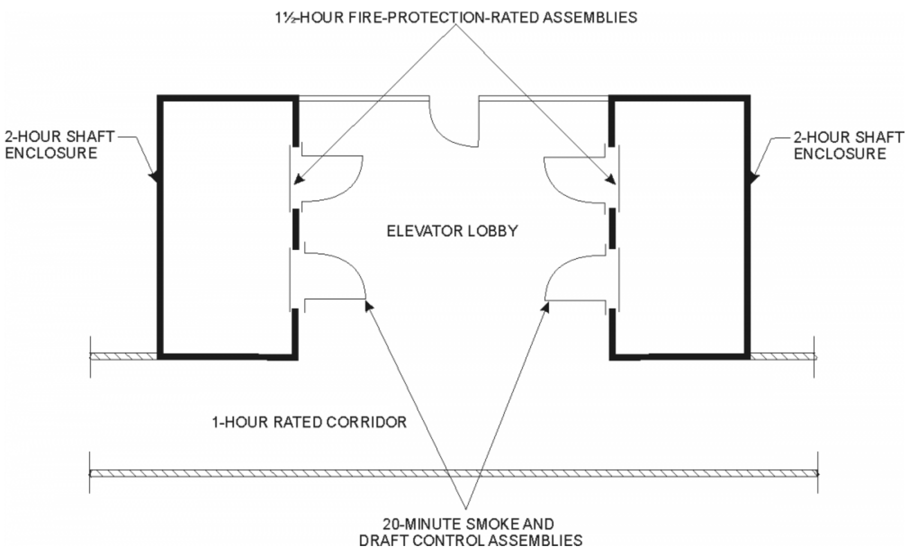
The new exception 5 in Section 716.2.2.1 is to allow for elevators in low rise building to not to have to meet the smoke and draft requirements of opening protectives in corridors. While many elevator hoistway/vertical shaft doors are tested and labeled for the 1-hour or $1^1/2$-hour fire resistance rating (see Section 716.2.1), very few, if any of the doors typically sold in the United States will also meet the smoke and draft requirements (see Section 716.2.2.1.1) that would allow them to open directly into a fire-resistance-rated corridor.

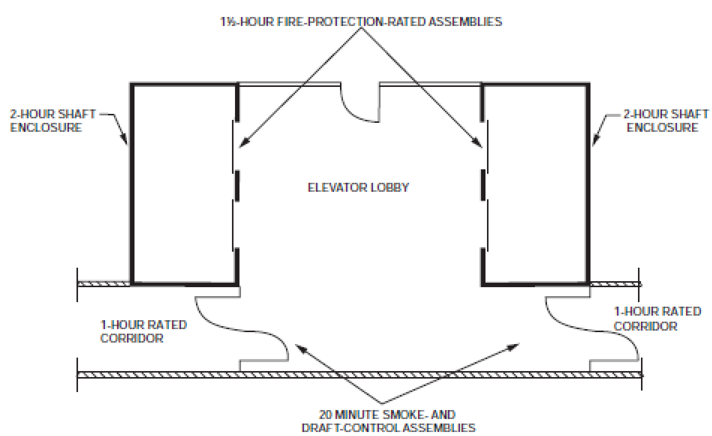
Current text literally results in elevator lobbies or other protection in front of the elevator doors in all rated corridors. There would not be significant stack effect for the movement of smoke with this minimal allowance. The code currently allows other floor vertical openings in Sections 712 and 1019.3 for four stories, so how is the elevator shaft more of a hazard? This allowance would make these buildings then require elevator lobbies/elevator opening protect at the same point, thus coordinating Section 716 and 3006.

The pointer in Section 1020.2.1 is in recognition that elevator entrance doors in rated corridors have to meet both criteria.

Below are what is currently required in even 2 story building with rated corridors.







Commentary Figure 1020.6(6)
ELEVATOR LOBBY/CORRIDOR OPTION 4

This proposal is submitted by the ICC Building Code Action Committee (BCAC) and ICC Fire Code Action Committee (BCAC).

BCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2020 the BCAC has held several virtual meetings open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the BCAC website at BCAC.

The FCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance assigned International Codes with regard to fire and life safety in new and existing buildings and facilities as well as the protection of life and property in wildland urban interface areas. In 2020 and 2021 the Fire-CAC held multiple virtual meetings that were open to any interested party. In addition, there were numerous virtual specific working group meetings that were also open to any interested parties, to develop, discuss and debate the proposed changes. Related documentation and reports are posted on the FCAC website at: FCAC.

Cost Impact: The code change proposal will decrease the cost of construction
This will be a decrease in some 2 and 3 story buildings. The shaft would need a fire resistant elevator entrance door, but would not require a lobby or other protection options to meet the smoke and draft control.

FS83-21

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The committee concluded the proposed text is not clear on the number of stories. Based on the reason statement, "The intent of this proposal is to allow for two and three-story Group R and Group I-1 buildings". However, the proponent indicated the text could be applicable for five-story or six-story buildings. (Vote: 9-4)

FS83-21

Individual Consideration Agenda

Public Comment 1:

IBC: 716.2.2.1

Proponents: Mike Nugent, representing ICC Building Code Action Committee (bcac@iccsafe.org) requests As Modified by Public Comment

Modify as follows:

2021 International Building Code

716.2.2.1 Door assemblies in corridors and smoke barriers . *Fire door* assemblies required to have a minimum *fire protection rating* of 20 minutes where located in *corridor* walls or *smoke barrier* walls having a *fire-resistance rating* in accordance with Table 716.1(2) shall be tested in accordance with NFPA 252 or UL 10C without the hose stream test.

Exceptions:

1. Viewports that require a hole not larger than 1 inch (25 mm) in diameter through the door, have not less than a 0.25-inch-thick (6.4 mm) glass disc and the holder is of metal that will not melt out where subject to temperatures of 1,700°F (927°C).
2. *Corridor* door assemblies in occupancies of Group I-2 shall be in accordance with Section 407.3.1.
3. Unprotected openings shall be permitted for *corridors* in multitheater complexes where each motion picture auditorium has not fewer than one-half of its required *exit* or *exit access doorways* opening directly to the exterior or into an *exit passageway*.
4. Horizontal sliding doors in *smoke barriers* that comply with Sections 408.6 and 408.8.4 in occupancies in Group I-3.
5. In corridor walls required to have a fire-resistance rating in accordance with Section 1020.2, an elevator hoistway door opening directly

into the corridor is not required to meet the smoke and draft control door assembly requirements in this section where the elevator ~~connect~~ <u>is located in a building</u> 3 stories or less <u>in height</u> and the building is equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1 or 903.3.1.2.

Commenter's Reason: The modification is to address the concern raised by the committee. The intent is to allow for 2 and 3 story building with rated corridors to not have to have an elevator lobby or doors/curtains in front of the elevator openings.

Cost Impact: The net effect of the public comment and code change proposal will decrease the cost of construction
This will be a decrease in some 2 and 3 story buildings. The shaft would need a fire resistant elevator entrance door, but would not require a lobby or other protection options to meet the smoke and draft control.

Public Comment# 2631

Public Comment 2:

Proponents: William Koffel, representing Fire Safe North America (wkoffel@koffel.com) requests Disapprove

Commenter's Reason: FSNA requests that the ICC Membership support the action of both the Fire Safety and General Code Development Committees.
FS83-21 proposes to eliminate a requirement that has been in the IBC and requires that openings between elevator hoistways and corridors required to have a fire-resistance rating be protected with smoke- and draft-control assemblies. A proposal submitted by the ICC Code Technology Committee reinforced the requirement by adding Section 3006.2.1 in the 2018 Edition of the IBC. Another BCAC proposal (G182-21) proposed to eliminate Section 3006.2.1 and added language to 3006.2 for buildings more than three stories in height. However, FS83-21 proposes to eliminate the requirement from Chapter 7 which would apply to buildings up to three stories in height without technical justification.

BCAC indicates that the requirement should be deleted because the stack effect in buildings up to three stories is not significant. While we agree with that statement, the requirement in this paragraph is intended to protect the integrity of a corridor required to have a fire-resistance rating, regardless of the height of the building. While FSNA opposed the G182-21 that deleted Section 3006.2.1, we did so only because it was heard before FS83-21. It should be noted that the Committee Action on G182-21 was Approval as Modified and the modification retained 3006.2.1. The Committee noted the need to protect elevator hoistway openings in corridors even in two- and three-story buildings. FSNA would support the removal of Section 3006.2.1 but only if the requirements in Chapter 7 remain as they currently exist in the IBC. FSNA agrees with both the Fire Safety Committee and General Committee actions that elevator hoistway openings in corridors required to have a fire-resistance rating need to be protected regardless of the height of the building. Why should the requirement only apply to buildings four stories or more in height? Why should the elevator hoistway opening be one of the few openings that are not required to be protected with smoke- and draft-control assemblies. It is recognized that currently available elevator doors do not meet the smoke- and draft-control assembly requirements. However, FS84-21, which as Approved as Submitted by the Committee, addresses the issue by identifying methods by which the elevator hoistway openings can be protected to meet current Code requirements.

Most buildings three stories or less in height are served by hydraulic elevators. In addition to the hydraulic fluid, such elevators are have electrical equipment, brakes, and pumps that can be reasonably credible fire scenarios. According to NFPA, a review of NFIRS data indicates that there are credible documented incidents of elevator equipment being the item ignited. One such incident was an elevator transformer fire in a three story hospital in Massachusetts in which oily black smoke from the fire filled an occupied hospital. Although sprinklers were provided in most areas of the building, sprinklers were not provided in the machine room on the first floor. One of the two transformers overheated, igniting the oil which resulted in the production of heavy black smoke. (Kenneth J. Tremblay, 1996, "Firewatch," *NFPA Journal*, September/October.

Although BCAC failed to provide any technical justification to support FS83-21, Koffel Associates did an analysis using FDS modeling. The modeling focused on fires involving the hydraulic oil lines and tanks. Three fire scenarios were modeled simulating a pool fire at the bottom of the shaft (container failure) and a container leak at the bottom of the shaft. The elevator cab remained on the First Floor and the elevator hoistway door openings were closed for all three fire scenarios, both of which are conservative assumptions. The leakage area of the elevator opening was 0.55 sq ft from the Smoke Control Handbook. The smoke detector provided for elevator recall on the third floor activated between 7.2 second and 25.2 seconds. The modeling clearly illustrates that the protected exit access corridor can be impacted by a fire in an elevator shaft.

It should be noted that the proposal does not consider whether sprinklers will be in the elevator hoistway. In many occupancies, fire-resistance rated corridors are only required in buildings that are not protected with an automatic sprinkler system. In those buildings that are protected with an automatic sprinkler system, the elevator shaft may not have a sprinkler within the shaft. At the time of submission of the Public Comment a Certified Amended Motion to eliminate the requirement for a sprinkler at the bottom of the elevator shaft from the 2022 Edition of NFPA 13 was being voted on by the NFPA membership.

The blanket deletion of the requirement to protect elevator hoistway openings into corridors having a fire-resistance rating also does not consider egress arrangement (possibility of being in a dead end corridor), occupant load, or occupant conditions (sleeping or density). Absent any justification that such openings in fire-resistance rated corridors need not be protected in all instances, other than buildings four or more stories in height, FSNA encourages the ICC membership to support the positions of both the Fire Safety and General Code Development Committees.

Cost Impact: The net effect of the public comment and code change proposal will not increase or decrease the cost of construction
No change to code.

Public Comment# 2518

FS86-21

Proposed Change as Submitted

Proponents: Tony Crimi, representing International Firestop Council

2021 International Building Code

Revise as follows:

717.2.1 Smoke control system. Where the installation of a *fire damper* will interfere with the operation of a required smoke control system in accordance with Section 909, ducts used to supply uncontaminated air shall be protected with a shaft enclosure in accordance with Section 713, or tested in accordance with ASTM E2816, with equal F and T ratings, or shall utilize other *approved* alternative protection. ~~shall be utilized.~~ Where mechanical systems including ducts and *dampers* utilized for normal building ventilation serve as part of the smoke control system, the expected performance of these systems in smoke control mode shall be addressed in the rational analysis required by Section 909.4.

Add new standard(s) as follows:

ASTM

ASTM International
100 Barr Harbor Drive, P.O. Box C700
West Conshohocken, PA 19428

ASTM E2816	Standard Test Methods for Fire Resistive Metallic HVAC Duct Systems

Reason: This proposal adds the option to install tested and Listed pressurization ducts that supply uncontaminated air for stairwell pressurization to be enclosed with an ASTM E2816 tested system.
The ASTM standard evaluates the fire performance of metallic duct systems based on the same fire exposure, principles and criteria for fire-resistance rating that are defined in ASTM E119. The Standard has the ability to test the fire performance of HVAC ducts for both supply (pressurization) and return air, in the vertical and horizontal orientation, and includes the penetration firestop system installed. The fire performance of pressurization ducts are evaluated by both Condition A – Horizontal, and Condition B – Vertical,, which are the test configurations appropriate for pressurization ducts.

The ASTM E2816 standard was developed to establish requirements for fire resistive enclosure systems applied to metallic HVAC ducts in order to provide a tested alternate to required fire-resistance-rated shafts. When pressurization ducts are used, the protection is installed continuously from the air handling equipment to the air inlet and outlet terminals, so the penetration firestop systems installed in these ASTM E2816 protected ducts are included as part of the tested Condition A and Condition B systems. There are several systems currently Listed and in use for these applications.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The proposal adds an additional option, but does not remove any prior options.

Staff Analysis: A review of the standard proposed for inclusion in the code, ASTM E2816 Standard Test Methods for Fire Resistive Metallic HVAC Duct Systems, with regard to some of the key ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before March 20, 2021.

FS86-21

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The committee concluded the proposed standard is beneficial; however, technical issues need to be addressed. (Vote: 13-0)

FS86-21

Individual Consideration Agenda

Public Comment 1:

IBC: 717.2.1

Proponents: john pattillo, representing Conquest Firespray LLC (jpattillo@conquest-firespray.com) requests As Modified by Public Comment

Modify as follows:

2021 International Building Code

717.2.1 Smoke control system . Where the installation of a *fire damper* will interfere with the operation of a required smoke control system in accordance with Section 909, ducts used to supply ~~uncontaminated~~ air shall be protected with a shaft enclosure in accordance with Section 713, or ~~tested in accordance with~~ a fire rated duct enclosure tested by all Conditions (A and B and C and D) per ASTM E2816 ~~, with equal F and T ratings, or shall utilize other~~ or *approved* alternative protection shall be utilized. Where mechanical systems including ducts and *dampers* utilized for normal building ventilation serve as part of the smoke control system, the expected performance of these systems in smoke control mode shall be addressed in the rational analysis required by Section 909.4. For pressurization systems the rational analysis shall address the average air temperature, inside the duct, at the point of discharge.

Commenter's Reason: ASTM E2816 is a full-scale, fire-resistance rating test requiring an ASTM E119 compliant furnace to conduct the fire test. ASTM E2816 follows the same test protocols as ASTM E119 regarding the test's test specimen size, instrumentation and requirements for performing the fire test. In addition, ASTM E2816 requires the ductwork be pressurized or have airflow during the entire fire test. Also, fire-resistance rated ductwork must be tested to all four Conditions (A, B, C and D) in order to be code compliant and used everywhere a conventional ductwork is used in a building.
Testing all four Conditions (A, B, C and D) is required in order for the ductwork to comply with Section 707, Fire Barriers, 717 Ducts and air transfer openings and Section 712, Vertical Openings, Subsection 712.1.5, Ducts and Section 703.2.1 Nonsymmetrical wall construction, where testing both sides of all nonsymmetrical fire barriers is required.

ASTM E2816 nomenclature for all four conditions:

Condition A: Fire Outside Exposure, Horizontal Orientation

Condition B: Fire Outside Exposure, Vertical Orientation

Condition C: Fire Inside Exposure, Horizontal Orientation

Condition D: Fire Inside Exposure, Vertical Orientation

Corresponding ASTM E814 Standard Test Method for Fire Tests of Penetration Firestop Systems is also required.

Cost Impact: The net effect of the public comment and code change proposal will not increase or decrease the cost of construction
The reasoning for no change in costs.

Reasoning 1:

Today, the assemblies referenced in the code require several different contractors to install a code compliant assembly:

The mechanical contractor will install hvac ductwork and fans designed to carry the air flow.

A second contractor (typically drywall) will install metal hangers and drywall to construct the 2 hour rated enclosure

The code change will eliminate the additional contractor (namely drywall)

Effects on the project costs:

A faster installation will reduce the time for the installation of the assembly

Less field personnel are necessary on the project

Less field coordination is necessary as one trade (drywall) is eliminated

Saves space as the fire rated ductwork assembly requires less physical dimension which allows easier coordination

Reasoning 2

This code change is an option for the design and construction industry.

The design and construction industry can measure the cost benefits of an assembly under several criteria

1. Is the first cost of the assembly less
2. Is the long term cost of the assembly less
3. Does the assembly take less space to install
4. Does the assembly take less time to install
5. Does the assembly take less field personnel to install

These questions are answered by the introduction of this change

Yes to items 1, 3, 4, and 5

Reasoning 3:

Because this assembly is an option the market and bidding contractors will always choose the lease expensive option and the market pricing will meet the demand

More competition will drive down costs

For example, if today the cost of a drywall enclosure to too expensive, and a fire resistant duct is chosen the market will swing towards the fire resistant ductwork assembly.

This will drive the market to the least cost solution.

Public Comment# 2525

FS93-21

Proposed Change as Submitted

Proponents: William Koffel, representing Air Movement and Control Association (wkoffel@koffel.com)

2021 International Building Code

Revise as follows:

717.6.2.1.2 Static systems. Static *ceiling radiation dampers* shall be provided with systems that are not designed to operate during a fire.

Exceptions:

1. Where a static *ceiling radiation damper* is installed at the opening of a duct, a *smoke detector* shall be installed inside the duct or outside the duct with sampling tubes protruding into the duct. The detector or tubes in the duct shall be within 5 feet (1524 mm) of the *damper*. Air outlets and inlets shall not be located between the detector or tubes and the damper. The detector shall be *listed* for the air velocity, temperature and humidity anticipated at the point where it is installed. Other than in mechanical smoke control systems, *dampers* shall be closed upon fan shutdown where local *smoke detectors* require a minimum velocity to operate.
2. ~~2. Where a static *ceiling radiation damper* is installed in a ceiling, the *ceiling radiation damper* shall be permitted to be controlled by a smoke detection system installed in the same room or area as the *ceiling radiation damper.*~~

~~3~~ 2. A static *ceiling radiation damper* shall be permitted to be installed in a room where an occupant sensor is provided within the room that will shut down the system.

Reason: Exception 2 does not make sense because the exception implies that the dampers are motor-driven, which they are not. Static ceiling radiation dampers are not really able to be effectively controlled by the smoke detection system. Static ceiling radiation dampers have no provision in UL 555C or UL 263 that makes them compatible with any kind of wiring, unless perhaps by a switch (which is impractical). Thus, the exception does not really apply and should be removed for technical accuracy.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
There is no added cost to this proposal, since it is just clarifying technical capabilities of existing equipment as detailed in this section.

FS93-21

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The committee disapproval is based on the proponent's request to bring it back in the public comment phase. (Vote: 13-0)

FS93-21

Individual Consideration Agenda

Public Comment 1:

IBC: 717.6.2.1, 717.6.2.1.1, 717.6.2.1.2

Proponents: William Koffel, representing Air Movement and Control Association (wkoffel@koffel.com); Eirene Knott, representing Metropolitan Kansas City Chapter of the ICC (eirene.knott@brrarch.com) requests As Modified by Public Comment

Replace as follows:

2021 International Building Code

717.6.2.1 Ceiling radiation dampers testing and installation . *Ceiling radiation dampers* shall be tested in accordance with Section 717.3.1. *Ceiling radiation dampers* shall be installed in accordance with the details specified in the fire-resistance-rated assembly and the manufacturer's instructions and the listing.

717.6.2.1.1 Dynamic systems . Only *ceiling radiation dampers labeled* for use in dynamic systems shall be installed in heating, *ventilation* and air-conditioning systems <u>that do not automatically shut down</u> ~~designed to operate with fans on~~ during a fire.

717.6.2.1.2 Static systems . Static *ceiling radiation dampers* shall <u>only</u> be <u>installed</u> ~~provided~~ <u>in</u> ~~with~~ systems that ~~are~~ <u>automatically shut down in the event of</u> ~~not designed to operate during~~ a fire.

~~**Exceptions:**~~

1. ~~Where a static *ceiling radiation damper* is installed at the opening of a duct, a *smoke detector* shall be installed inside the duct or outside the duct with sampling tubes protruding into the duct. The detector or tubes in the duct shall be within 5 feet (1524 mm) of the *damper*. Air outlets and inlets shall not be located between the detector or tubes and the damper. The detector shall be *listed* for the air velocity, temperature and humidity anticipated at the point where it is installed. Other than in mechanical smoke control systems, *dampers* shall be closed upon fan shutdown where local *smoke detectors* require a minimum velocity to operate.~~
2. ~~Where a static *ceiling radiation damper* is installed in a ceiling, the *ceiling radiation damper* shall be permitted to be controlled by a smoke detection system installed in the same room or area as the *ceiling radiation damper*.~~
3. ~~A static *ceiling radiation damper* shall be permitted to be installed in a room where an occupant sensor is provided within the room that will shut down the system.~~

Commenter's Reason: There were three Public Proposals (FS93-21, FS94-21, and FS95-21) attempting to revise these sections. During the Committee Action Hearings, the proponents agreed to work together to develop a Public Comment to address the concerns with the current code text (which is new to the 2021 Edition of the IBC). The Committee voted for Disapproval of all three proposals based on the proponents' request to bring the item back during the Public Comment period.
This Public Comment is the result of the work by the three proponents. The proposed text greatly simplifies the section while still accomplishing the intent of identifying when static dampers are appropriate.

Cost Impact: The net effect of the public comment and code change proposal will not increase or decrease the cost of construction
Clarification and simplification of current code text.

Staff Analysis: The public comments on Code Change Proposals FS93-21 and FS95-21 address requirements in a contradicting manner. FS93-21 PC1 proposes deleting all the exceptions in Section 717.6.2.1.2, Static systems. FS95-21 PC1 proposes keeping exceptions 1 and 3 in Section 717.6.2.1.2, Static systems. The eligible ICC voting members are urged to make their intentions clear with their actions on these proposals.

Public Comment# 2816

FS95-21

Proposed Change as Submitted

Proponents: Shaun Ray, representing Shaun Ray (shaunr@mtlfab.com)

2021 International Building Code

Revise as follows:

717.6.2.1.2 Static systems. Static *ceiling radiation dampers* shall be provided with systems that are not designed to operate during a fire.

Exceptions:

1. Where a static *ceiling radiation damper* is installed at the opening of a duct, a *smoke detector* shall be installed inside the duct or outside the duct with sampling tubes protruding into the duct. The detector or tubes in the duct shall be within 5 feet (1524 mm) of each static ceiling radiation ~~the~~ *damper* installed in the system. Air outlets and inlets shall not be located between the detector or tubes and the damper. Each ~~The~~ detector shall be *listed* for the air velocity, temperature and humidity anticipated at the point where it is installed. Other than in mechanical smoke control systems, *dampers* shall be closed upon fan shutdown where local *smoke detectors* require a minimum velocity to operate.

~~2.~~ ~~Where a static *ceiling radiation damper* is installed in a ceiling, the *ceiling radiation damper* shall be permitted to be controlled by a smoke detection system installed in the same room or area as the *ceiling radiation damper.*~~

~~3~~ 2. A static *ceiling radiation damper* shall be permitted to be installed in a room where an occupant sensor is provided within the room that will shut down the system.

3. Static radiation dampers shall be allowed for installation in systems that can possibly continue operation during a fire, provided a thermal control switch is used at or within 1 foot (305 mm) of each static ceiling damper. The thermal control switch shall be listed, provide a resettable feature and be accessible for inspection and service. The thermal control switch shall be tested/evaluated for the maximum air velocity and temperature of the system design and shall be independent of the activation of static ceiling dampers during a fire. Each thermal control switch is to be connected to activate fan shutdown when elevated temperature is detected at any static ceiling damper location within the system.

4. For control switches and sensing devices noted in these exceptions, information shall be provided at the air handler for heat, ventilation and air-conditioning service and repair technicians stating that shutdown devices are present in the system. Further instruction regarding installation, inspection and repair of such devices shall be provided by the manufacturer.

Reason: It is known that the large majority of floor/ceiling designs used for residential construction are tested under static (no airflow) conditions during fire exposure. Where system design does not take into account the requirement for dynamic ceiling designs (which include dynamic ceiling dampers), or in cases where a dynamic ceiling design does not exist for the application, workaround solutions have been used. In some jurisdictions, a single thermal sensing switch has been allowed to address the requirement of fan shutdown in the event of a fire.
The use of a single thermal switch (typically located near the return or supply duct connected at the furnace or air handler) is not adequate protection in the event of a fire. In multi-room residential construction, a fire could originate in a room on a separate floor and could be three, four, five or more rooms separated from the room or closet that the furnace fan resides. Static ceiling designs are tested with zero airflow at the start of a fire exposure. These ceilings are tested with substantial loading on the floor, which in some instances results in ceiling collapse very soon after the rated exposure (such as 1-hour fire rated) has concluded. It has been long understood that UL testing of such floors that have not been evaluated for conditions that allow a fan to operate at the beginning of a fire should require some control means to cease fan operation once a fire is detected in the room that the rated floor/ceiling is exposed. However, code language does not specifically state that thermal or smoke detection at the air handler alone is adequate (or inadequate) coverage to ensure that static ceiling designs indeed only see a fire exposure without airflow during the start of a fire.

Furthermore, a static ceiling damper is not tested/evaluated to endure the physical shock that may occur during activation under a dynamic condition. In other words, a damper might be damaged if it closes while airflow is still present. If this happens, the damaged ceiling damper cannot continue to provide its listed performance expectations even if the furnace fan is shut down soon after the static ceiling damper activates (closes). It is not a stretch to consider that a static ceiling damper located in a room one or more floors or multiple rooms away from the furnace will activate during a fire in that room prior to a sensor located at the supply duct near the furnace detects a rise in temperature adequate enough to shut down the fan.

The minor wording change proposed in Exception 1 ensures that the code's intention is that a protection device (smoke detector) is used for each static ceiling damper installed. Current language could be interpreted as requiring just one smoke detector for one static ceiling damper per system even though multiple static ceiling dampers are likely used in the entire system. The added wording is intended to clarify the code's intent.

Exception 2 specifies use of static ceiling radiation dampers that have a provision to allow a smoke detector to control the damper (interpreted as being able to “close” a static ceiling radiation damper). Such ceiling radiation dampers are rare (and likely costly). Due to the rarity of the possible application/solution, the inclusion of this exception probably provides more confusion than resolution.

Exception 3 is also a limited application. Bathrooms that have motion sensing that turns on lights and exhaust fans as a person enters the room, comes to mind. When no one is occupying the room, the exhaust fan shuts down. In such applications, a static ceiling radiation damper could be a suitable solution. However, the wording “when unoccupied” is added to clarify when a fan system would be shut down regardless of a fire or not. This exception could also be applied to ceiling damper/exhaust fan combinations that are currently on the market and have been tested in a static ceiling design for use where the fan is in operation during the start of a fire. Testing such as this establishes precedence that testing/listing laboratories take into account that a damper could become damaged if closure occurs before a fan can be completely shut down. Devices tested and listed are intended for applications such as used for a bathroom exhaust and are independent of the HVAC system in a building.

New Exception 4 is added to clarify comments made earlier in this justification. Simply providing a heat sensing device at or near the furnace that is intended to shut down the fan during a fire does not adequately address concerns that could arise from such practices. Exception 4 is a means to improve on what is currently intended in the 2021 IMC.

Since it is possible that nuisance tripping may occur from protective sensing devices installed within the HVAC system, an exception note (New note 5) should be included to allow service technicians to be made aware that fan shutdown could be a result of a sensing device that has provided a change in control signal to the furnace/air handler. This label or other means of notification located at the furnace would be provided so that the technician is not wasting hours of time trouble shooting a service call related to a furnace that is not operating as expected.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The proposed changes and new additions to Sec. 607.6.2.1.2 are intended to clarify the current intent of the code. Inclusion of control switches such as a thermostat switch could be less expensive when compared to smoke detection sensing elements and ceiling dampers that allow the ability to be closed upon a fan shutdown, which are currently prescribed in this section of the code.

FS95-21

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The committee disapproval is based on the proponent's request to bring it back in the public comment phase. (Vote: 13-0)

FS95-21

Individual Consideration Agenda

Public Comment 1:

IBC: 717.6.2.1.2

Proponents: Shaun Ray, representing Shaun Ray (shaunr@mtlfab.com) requests As Modified by Public Comment

Replace as follows:

2021 International Building Code

717.6.2.1.2 Static systems . Static *ceiling radiation dampers* shall be provided with systems that are not designed to operate during a fire.

Exceptions:

1. Where a static *ceiling radiation damper* is installed at the opening of a duct, a *smoke detector* shall be installed inside the duct or outside the duct with sampling tubes protruding into the duct. The detector or tubes in the duct shall be within 5 feet (1524 mm) of ~~the~~ each *damper*. Air outlets and inlets shall not be located between the detector or tubes and the damper. The detector shall be *listed* for the air velocity, temperature and humidity anticipated at the point where it is installed. Other than in mechanical smoke control systems, *dampers* shall be closed upon fan shutdown where local *smoke detectors* require a minimum velocity to operate.

2. ~~Where a static *ceiling radiation damper* is installed in a ceiling, the *ceiling radiation damper* shall be permitted to be controlled by a smoke detection system installed in the same room or area as the *ceiling radiation damper*.~~

2.~~3.~~ A static *ceiling radiation damper* shall be permitted to be installed in a room where an occupant sensor is provided within the room that will shut down the system when the room is vacant.

Commenter's Reason:

1. There were three Public Proposals (FS93-21, FS94-21, and FS95-21) attempting to revise 717.6.2.1.2. FS93-12 looked to delete Exception 2. FS94-21 simply requested to add when the room is vacant at the end of Exception 3. FS95-21 looked to clarify whether one or more smoke detectors are required in Exception 1. FS95-121 also attempted to add 2 new Exceptions that addressed an alternative method of shutting off the HVAC system in the event of fire. During the Committee Action Hearings, the proponents agreed to work together to develop a Public Comment to address the concerns with the current code text. The Committee voted for Disapproval of all three proposals based on the proponents" request to bring them back during the Public Comment period. I worked with the proponents of FS93-21 and FS94-21 but could not agree with their conclusion to remove all Exceptions from 717.6.2.1.2 (which was not the intent of FS93-21 or FS94-12 during the CAH of April 2021). I therefore have submitted my Public Comment which retains Exception 1 and 3, while addressing the concern about how smoke detection should be applied to allow static radiation ceiling dampers to be used in dynamic applications.
2. Exception 1 has been modified to add the word "each" before the word "damper". Current wording in the IBC (and IMC) could be interpreted as "for each damper", "for only one damper" or something in-between. Earlier this year, I confirmed with ICC (through code intent Q&A) that the code's intention is to have multiple smoke detectors if the system (including static ceiling dampers) services multiple rooms. In most all cases, HVAC systems indeed provide air flow to more than one room in a building. By adding the word "each" to Exception 1, this helps the AHJ understand that a single smoke detector is not the intent of the Code.
3. Exception 2 is confusing. Smoke detectors used to control a static ceiling radiation damper (which are 99+% of the time activated by use of a fusible link) does more harm than good. Exception 2 should be deleted. Since proponents of FS-93-21 and FS94-21 now want to remove ALL 3 Exceptions, one can conclude that we are all in agreement to remove Exception 2.
4. Exceptions 1 & 3 for when static ceiling radiation dampers can be used in "dynamic" applications are important and should remain in the code. Other methods of controlling an HVAC system to shut down in the event of fire are expected to be developed in the future. As new methods become more common place this Exceptions section can be modified to provide even more valuable guidance for system designers, contractors and AHJ's.

Bibliography: CABS.GuideInfo - Ceiling Dampers (UL Product iQ website)
Fire performance measured by UL 263 is based upon the assumption that **air movement will be effectively stopped at the start of a fire.** Ceiling dampers intended for use in HVAC systems where the airflow is operational at the time of a fire, such as in a smoke-control system, or from other situations in which the fan system is operational at the time of a fire, are investigated for dynamic closure. **Ceiling dampers intended for use where the air movement is effectively stopped at the start of a fire are not required to be investigated for dynamic closure.**

Cost Impact: The net effect of the public comment and code change proposal will not increase or decrease the cost of construction
Changes proposed are for clarification purposes only.

Staff Analysis: The public comments on Code Change Proposals FS93-21 and FS95-21 address requirements in a contradicting manner. FS93-21 PC1 proposes deleting the exceptions in Section 717.6.2.1.2, Static systems. FS95-21 PC1 proposes keeping exceptions 1 and 3 in Section 717.6.2.1.2, Static systems. The eligible ICC voting members are urged to make their intentions clear with their actions on these proposals.

Public Comment# 2847

FS101-21

Proposed Change as Submitted

Proponents: Jonathan Humble, American Iron and Steel Institute, representing American Iron and Steel Institute (jhumble@steel.org)

2021 International Building Code

Revise as follows:

722.1 General. The provisions of this section contain procedures by which the *fire resistance* of specific materials or combinations of materials is established by calculations. These procedures apply only to the information contained in this section and shall not be otherwise used. The calculated *fire resistance* of specific materials or combinations of materials shall be established by one of the following:

1. *Concrete,* concrete *masonry* and clay *masonry* assemblies shall be permitted in accordance with ACI 216.1/TMS 0216.
2. Precast and precast, prestressed *concrete* assemblies shall be permitted in accordance with PCI 124.
3. Steel assemblies shall be permitted in accordance with Chapter 5 of ASCE 29 <u>and Appendix 4 of AISC 360.</u>
4. Exposed wood members and wood decking shall be permitted in accordance with Chapter 16 of ANSI/AWC NDS.

Reason: ANSI/AISC 360-16 *Specification for Structural Steel Buildings* is a consensus developed standard that applies to the design, fabrication, and erection of structural steel systems. Appendix 4 contains provisions for the design and evaluation of structural steel components, systems, and frames under fire conditions, and it includes methods of design to determine fire resistance or fire resistance rated protection (a) by analysis and (b) by qualification testing. The proposed revision to Section 722.1 will direct users to Appendix 4 for the steel-specific calculation procedures for fire resistance ratings. We are proposing to use this pointer method as it mirrors the other current pointer methods by the concrete, masonry, and timber provisions that appear in Section 722.1.
The upcoming 2022 edition of ANSI/AISC 360 will further consolidate existing steel-related provisions from other standards into one location. This will allow users to refer to one source for all steel-related calculation procedures for structural design and evaluation for design fire scenarios.

Bibliography: There are four attached files to this code change proposal. They are:
AISC-360-2022-Appendix-4-Prone-Draft

AISC-360-2022-Change-List-Section-12-Prone-Draft

AISC-360-2022-Summary-of-Revisions

AISC-360-2022-Description-of-Appendix-4

Cost Impact: The code change proposal will not increase or decrease the cost of construction
Any cost associated with this proposal will be borne at the owner's project requirement and/or design stages of a building project. Incorporating ANSI/AISC 360 Appendix 4 will provide the user with a greater number of options for achieving the required, or program required, minimum for fire resistance. In addition, this reference will allow the user the opportunity to examine and design more effectively through an efficient selection of fire protection materials versus choosing the conservative approach as shown in the prescriptive provisions of the building code. It will be up to the building owner to choose a method to apply in order to determine if the cost of construction will increase or decrease.

FS101-21

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The committee determined the proposal provides another option for fire resistance calculations, but it needs more work. The committee suggested including more reason statement language for non-structural engineers. The proponent is encouraged to look into a specific section of AISC instead of referencing the entire Appendix 4. (Vote: 13-0)

FS101-21

Individual Consideration Agenda

Public Comment 1:

IBC: 722.1

Proponents: Kevin LaMalva, representing Self requests As Modified by Public Comment

Modify as follows:

2021 International Building Code

722.1 General. The provisions of this section contain procedures by which the *fire resistance* of specific materials or combinations of materials is established by calculations. These procedures apply only to the information contained in this section and shall not be otherwise used. The calculated *fire resistance* of specific materials or combinations of materials shall be established by one of the following:

1. *Concrete,* concrete *masonry* and clay *masonry* assemblies shall be permitted in accordance with ACI 216.1/TMS 0216.
2. Precast and precast, prestressed *concrete* assemblies shall be permitted in accordance with PCI 124.
3. Steel assemblies shall be permitted in accordance with Chapter 5 of ASCE 29 <u>and Section 4.3</u> of AISC 360 <u>Appendix 4</u>.
4. Exposed wood members and wood decking shall be permitted in accordance with Chapter 16 of ANSI/AWC NDS.

Commenter's Reason: At the ICC Code Action Hearings, the originally submitted FS101-21 Proposal was unanimously disapproved by the ICC Fire Safety Committee (13-0). To address the many concerns this proposal raises, I propose the modification contained herein (FS101-21-LAMALVA-1).

FS101-21-LAMALVA-1 serves as a key clarification for the originally submitted FS101-21 Proposal. Although the originally submitted FS101-21 Proposal has some validity, it must be fixed to prevent gross misinterpretation and unintended consequences in practice. Notably, the originally submitted FS101-21 Proposal is seriously flawed because it lacks a section clarification that would inappropriately introduce performance-based structural engineering (PBSE) provisions into IBC Section 722. AISC 360 Appendix 4 contains sections pertaining to both analytical methods to calculate fire resistance as well as PBSE under fire conditions based upon structural engineering limit states. As deliberated within the ICC FCAC Working Group on PBSE for fire conditions that I co-chaired over an approximately two-year period, PBSE provisions based on structural engineering limit states and realistic growth and decay fire exposures do not belong in IBC Section 722. Also, the originally submitted FS101-21 Proposal would be in conflict with the Society of Fire Protection Engineers (SFPE) Core Competencies Guide which states that “The prescriptive compliance method relates to the qualification and prescription of structural fire protection as measured by the level of fire resistance, including the understanding of fire testing qualification, equivalence calculations per fire testing and its specific acceptance criteria, and explicit simulation of fire testing (if permissible)” and that “Structural fire [design] relates to the explicit design of structural systems to adequately endure thermal load effects from structural design fires based on specific performance objectives. This alternative method requires participation by a structural engineer.” Hence, the originally submitted FS101-21 Proposal would create an unnecessary conflict and confuse both fire protection engineers and structural engineers alike. FS101-21-LAMALVA-1 rectifies the critical flaw of the originally submitted FS101-21 Proposal, which does not specifically identify Section 4.3 of AISC 360 Appendix 4 exclusively - the section of AISC 360 Appendix 4 that specifically pertains to analytical methods to calculate fire resistance. Hence, I propose FS101-21-LAMALVA-1 for approval, and strongly urge disapproval of the originally submitted FS101-21 Proposal.

Bibliography: SFPE Recommended Minimum Technical Core Competencies for the Practice of Fire Protection Engineering, Society of Fire Protection Engineers, Bethesda, Maryland, 2018

Cost Impact: The net effect of the public comment and code change proposal will not increase or decrease the cost of construction
Any cost associated with this proposal will be borne at the owner’s project requirement and/or design stages of a building project

Public Comment# 2241

FS102-21

Proposed Change as Submitted

Proponents: Jeffrey S. Grove, P.E. FSFPE, Jensen Hughes, representing Jensen Hughes (jgrove@jensenhughes.com)

2021 International Building Code

Revise as follows:

TABLE 722.2.1.4(1) MULTIPLYING FACTOR FOR FINISHES ON NONFIRE-EXPOSED SIDE OF CAST-IN-PLACE OR PRECAST CONCRETE WALL

TYPE OF FINISH APPLIED TO CONCRETE OR CONCRETE MASONRY WALL	TYPE OF AGGREGATE USED IN CONCRETE OR CONCRETE MASONRY			
	Concrete: siliceous or carbonate concrete masonry: siliceous or carbonate; solid claybrick	Concrete: sand-lightweight concrete masonry: clay tile; hollow clay brick; concrete masonry units of expanded shale and < 20% sand	Concrete: lightweight concrete masonry: concrete masonry units of expanded shale, expanded clay, expanded slag, or pumice < 20% sand	Concrete masonry: concrete masonry units of expanded slag, expanded clay, or pumice
Portland cement-sand plaster	1.00	0.75[a]	0.75[a]	0.50[a]
Gypsum-sand plaster	1.25	1.00	1.00	1.00
Gypsum-vermiculite or perlite plaster	1.75	1.50	1.25	1.25
Gypsum wallboard	3.00	2.25	2.25	2.25

For SI: 1 inch = 25.4 mm.

a. For Portland cement-sand plaster $^5/_8$ inch or less in thickness and applied directly to the concrete or concrete masonry on the nonfire-exposed side of the wall, the multiplying factor shall be 1.00.

TABLE 722.2.1.4(2) TIME ASSIGNED TO FINISH MATERIALS ON FIRE-EXPOSED SIDE OF CAST-IN-PLACE OR PRECAST CONCRETE WALL

FINISH DESCRIPTION	TIME[b] (minutes)
Gypsum wallboard	
$^3/_8$ inch	10
$^1/_2$ inch	15
$^5/_8$ inch	20
2 layers of $^3/_8$ inch	25
1 layer of $^3/_8$ inch, 1 layer of $^1/_2$ inch	35
2 layers of $^1/_2$ inch	40
Type X gypsum wallboard	
$^1/_2$ inch	25
$^5/_8$ inch	40
Portland cement-sand plaster applied directly to concrete masonry	See Note a
Portland cement-sand plaster on metal lath	
$^3/_4$ inch	20
$^7/_8$ inch	25
1 inch	30
Gypsum sand plaster on $^3/_8$-inch gypsum lath	
$^1/_2$ inch	35
$^5/_8$ inch	40
$^3/_4$ inch	50
Gypsum sand plaster on metal lath	
$^3/_4$ inch	50
$^7/_8$ inch	60
1 inch	80

For SI: 1 inch = 25.4 mm.

a. The actual thickness of Portland cement-sand plaster, provided that it is $^5/_8$ inch or less in thickness, shall be permitted to be included in determining the equivalent thickness of the masonry for use in Table 722.3.2.

b. The time assigned is not a finish rating.

Reason: Design professionals may cite Table 722.2.1.4(2) as justification for the added fire-resistance from one layer of 5/8 inch Type X gypsum wallboard to one side of a wood stud or steel stud wall assembly to increase the overall rating of the assembly by 40 minutes because this is the first table that references gypsum wallboard protection. However, the charging language in Section 722.2.1.4 states these time values are only applicable to cast-in-place or precast concrete walls. Section 722.6 provides more appropriate guidance.
The first part of this proposal is to modify the titles of Tables 722.2.1.4 (1) and 722.2.1.4 (2) and add clarifying language that these tables only apply to cast-in-place and precast concrete walls. This clarification in the title ensures that the reader understands that these time values can only be used for concrete type walls.

The second part of this proposal is to add a note to Table 722.2.1.4 (2) stating that the times found in the table are not associated with the finish ratings, as defined in the front of the UL Fire Resistance Directory. This note was taken directly from Table 722.6.2 (1). UL Designs have shown that the finish rating of 5/8 inch Type X gypsum wallboard is closer to 20-24 minutes rather than the 40 minutes assumed by the client. UL Design U332 states the finish rating of a single layer 5/8 inch Type X gypsum wallboard as 23 minutes.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
There will be no cost impact associated with this proposal as these changes are clarification in nature.

FS102-21

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The committee has several concerns with modifying table 722.2.1.4(1) title to include " Cast-in-place or precast concrete". CMU is included in the table but is not included in the proposed table title. The change does not correspond with the material shown in table 722.2.1.4(1). The proposal also creates a disconnect with the text in table 722.2.1.4(1). (Vote: 13-0)

FS102-21

Individual Consideration Agenda

Public Comment 1:

IBC: TABLE 722.2.1.4(2)

Proponents: Daniel Martin, representing Jensen Hughes (dmartin@jensenhughes.com) requests As Modified by Public Comment

Replace as follows:

2021 International Building Code

TABLE 722.2.1.4(2) TIME ASSIGNED TO FINISH MATERIALS ON FIRE-EXPOSED SIDE OF WALL[a]

FINISH DESCRIPTION	TIME[b] (minutes)
Gypsum wallboard	
$^{3}/_{8}$ inch	10
$^{1}/_{2}$ inch	15
$^{5}/_{8}$ inch	20
2 layers of $^{3}/_{8}$ inch	25
1 layer of $^{3}/_{8}$ inch, 1 layer of $^{1}/_{2}$ inch	35
2 layers of $^{1}/_{2}$ inch	40
Type X gypsum wallboard	
$^{1}/_{2}$ inch	25
$^{5}/_{8}$ inch	40
Portland cement-sand plaster applied directly to concrete masonry	See Note ~~a~~ c
Portland cement-sand plaster on metal lath	
$^{3}/_{4}$ inch	20
$^{7}/_{8}$ inch	25
1 inch	30
Gypsum sand plaster on $^{3}/_{8}$-inch gypsum lath	
$^{1}/_{2}$ inch	35
$^{5}/_{8}$ inch	40
$^{3}/_{4}$ inch	50
Gypsum sand plaster on metal lath	
$^{3}/_{4}$ inch	50
$^{7}/_{8}$ inch	60
1 inch	80

For SI: 1 inch = 25.4 mm.

a. This table applies to precast concrete, cast-in-place concrete, or masonry walls.

b. The time assigned is not a finish rating.

~~a~~ c. The actual thickness of Portland cement-sand plaster, provided that it is $^{5}/_{8}$ inch or less in thickness, shall be permitted to be included in determining the equivalent thickness of the masonry for use in Table 722.3.2.

Commenter's Reason: The intent of the original proposal attempted to accomplish two things: specify that Tables 722.2.1.4(1) and 722.2.1.4(2) were to only be used for concrete and masonry walls and add a note that the time values in Table 722.2.1.4(2) were not actual finish rating times. This was an attempt to limit confusion with wood stud framed walls membrane protection times which are found Table 722.6.2(1). The committee and opposition speakers did not oppose the addition of the finish rating note to the end of the table. Opposition speakers were in favor of adding in the finish rating note to match Table 722.6.2(1). The committee and opposition stated that the proposed title changes did not successfully capture all applicable concrete and masonry wall materials, specifically concrete masonry type materials.
This public comment was developed in cooperation with some of those that spoke in opposition to the original proposal. Instead of changing the titles in both tables, this public comment will only modify Table 722.2.1.4(2) by adding a note to clarify its applicability to concrete and concrete masonry based wall construction. The contents of Table 722.2.1.4(1) clearly show its applicability to concrete and masonry wall types and will not be modified. This new note will successfully capture the wall construction materials that were omitted in the original proposal. The finish rating note will remain the same as what was originally proposed. As a formatting clarification, the Note numbering has also been updated.

I urge your support of overturning the committee action of Disapproval and vote for As Modified by this public comment.

Cost Impact: The net effect of the public comment and code change proposal will not increase or decrease the cost of construction
There will be no cost impact associated with this proposal as these changes are clarification in nature.

Public Comment# 2732

FS104-21

Proposed Change as Submitted

Proponents: Tim Earl, representing The Gypsum Association (tearl@gbhinternational.com)

2021 International Building Code

Revise as follows:

TABLE 722.6.2(1) TIME ASSIGNED TO WALLBOARD MEMBRANES ON WOOD FRAME[a, b, c, d, e]

DESCRIPTION OF FINISH	TIME[~~e~~ f] (minutes)
$^3/_8$-inch wood structural panel bonded with exterior glue	5
$1^5/_{32}$-inch wood structural panel bonded with exterior glue	10
$1^9/_{32}$-inch wood structural panel bonded with exterior glue	15
$^3/_8$-inch gypsum wallboard	10
$^1/_2$-inch gypsum wallboard	15
$^5/_8$-inch gypsum wallboard	30
$^1/_2$-inch Type X gypsum wallboard	25
$^5/_8$-inch Type X gypsum wallboard	40
Double $^3/_8$-inch gypsum wallboard	25
$^1/_2$-inch + $^3/_8$-inch gypsum wallboard	35
Double $^1/_2$-inch gypsum wallboard	40

For SI: 1 inch = 25.4 mm.

a. These values apply only where membranes are installed on framing members that are spaced 16 inches o.c. or less.

b. Gypsum wallboard installed over framing or furring shall be installed so that all edges are supported, except $^5/_8$-inch Type X gypsum wallboard shall be permitted to be installed horizontally with the horizontal joints staggered 24 inches each side and unsupported but finished.

c. On wood frame floor/ceiling or roof/ceiling assemblies, gypsum board shall be installed with the long dimension perpendicular to framing members and shall have all joints finished.

d. The membrane on the unexposed side shall not be included in determining the fire resistance of the assembly. Where dissimilar membranes are used on a wall assembly, the calculation shall be made from the least fire-resistant (weaker) side.

e. *Fire-resistance ratings* calculated for assemblies using this table shall be limited to not more than one hour. ~~The time assigned is not a finished rating.~~

f. The time assigned is not a finished rating.

Reason: This proposal inserts language to clarify the use of this table. Although this information is already stated in Section 7.6, it is far removed from the table itself (by 10 pages in the 2018 edition, for example). If a user simply opens the code book to this table, they may miss this important information.
Specifically, this proposal adds the words “on wood frame” to the title, along with a footnote stating the limitations on fire resistance ratings calculated using this table.

Again, this is not new information. It is already in Section 7.6, but needs to be restated in the table for greater visibility.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal simply adds some clarification to the table with no change in requirements.

FS104-21

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The committee determined clarification is not needed for table 722.6.2(1). The requirements are clarified in Section 722.6.1.1. Section 722.6.1.1 specifies that Fire-resistance ratings calculated for assemblies using the methods in Section 722.6 shall be limited to not more than 1 hour. (Vote: 13-0)

FS104-21

<u>Individual Consideration Agenda</u>

Public Comment 1:

IBC: TABLE 722.6.2(1)

Proponents: Tim Earl, representing The Gypsum Association (tearl@gbhint.com) requests As Modified by Public Comment

Modify as follows:

2021 International Building Code

TABLE 722.6.2(1) TIME ASSIGNED TO WALLBOARD MEMBRANES ON WOOD FRAME[a, b, c, d~~, e~~]

DESCRIPTION OF FINISH	TIME[~~f~~e] (minutes)
$^{3}/_{8}$-inch wood structural panel bonded with exterior glue	5
$1^{5}/_{32}$-inch wood structural panel bonded with exterior glue	10
$1^{9}/_{32}$-inch wood structural panel bonded with exterior glue	15
$^{3}/_{8}$-inch gypsum wallboard	10
$^{1}/_{2}$-inch gypsum wallboard	15
$^{5}/_{8}$-inch gypsum wallboard	30
$^{1}/_{2}$-inch Type X gypsum wallboard	25
$^{5}/_{8}$-inch Type X gypsum wallboard	40
Double $^{3}/_{8}$-inch gypsum wallboard	25
$^{1}/_{2}$-inch + $^{3}/_{8}$-inch gypsum wallboard	35
Double $^{1}/_{2}$-inch gypsum wallboard	40

For SI: 1 inch = 25.4 mm.

a. These values apply only where membranes are installed on framing members that are spaced 16 inches o.c. or less.

b. Gypsum wallboard installed over framing or furring shall be installed so that all edges are supported, except $^{5}/_{8}$-inch Type X gypsum wallboard shall be permitted to be installed horizontally with the horizontal joints staggered 24 inches each side and unsupported but finished.

c. On wood frame floor/ceiling or roof/ceiling assemblies, gypsum board shall be installed with the long dimension perpendicular to framing members and shall have all joints finished.

d. The membrane on the unexposed side shall not be included in determining the fire resistance of the assembly. Where dissimilar membranes are used on a wall assembly, the calculation shall be made from the least fire-resistant (weaker) side.

~~e. *Fire-resistance ratings* calculated for assemblies using this table shall be limited to not more than one hour.~~

e. ~~f.~~ The time assigned is not a finished rating.

Commenter's Reason: This proposal is necessary to address confusion with the application of this table. We often receive calls from people trying to apply this table to assemblies other than wood.
This public comment deletes the new footnote proposed in the original proposal, based on conversations with opponents. The text of 722.6 already contains this information, so it is not necessary to repeat it here in the table.

Cost Impact: The net effect of the public comment and code change proposal will not increase or decrease the cost of construction
This public comment and code change are simply a clarification, with no impact on cost.

Public Comment# 2626

FS108-21

Proposed Change as Submitted

Proponents: Shamim Rashid-Sumar, National Ready Mixed Concrete Association, representing National Ready Mixed Concrete Association (ssumar@nrmca.org); Larry Williams, representing Steel Framing Industry Association (williams@steelframingassociation.org)

2021 International Building Code

Revise as follows:

803.3 Heavy timber exemption. <u>In buildings equipped throughout with an automatic sprinkler system installed in accordance with Section 903.3,</u> ~~Exposed~~ <u>exposed</u> portions of *building elements* complying with the requirements for buildings of heavy timber construction in Section 602.4 or Section 2304.11 shall not be subject to *interior finish* requirements except in *interior exit stairways*, interior exit *ramps*, and exit passageways.

Reason: The intent of this code change is to require exposed portions of building elements in buildings of Type IV construction to comply with the interior finish requirements of Chapter 8, unless the building is protected by automatic sprinklers. Exposed timber building elements in interior exit stairways, interior exit ramps, and exit passageways will continue to meet the interior finish requirements of Chapter 8, regardless of sprinkler protection.
Based on revisions in the 2018 edition of the IBC, exposed portions of building elements in Type IV construction in means of egress elements such as interior exit stairways, interior exit ramps, and exit passageways are required to comply with the interior finish requirements of Chapter 8. Exposed elements of Type IV construction in these means of egress components must meet the minimum interior wall and ceiling finish requirements of Table 803.13.

With the revisions to Type IV construction in the 2021, glue-laminated or cross-laminated timber may be used to form large portions of entire interior surfaces of rooms, corridors, and enclosures that form part of the necessary access to the means of egress. These spaces should also comply with interior finish requirements, particularly in any instances where the timber elements are exposed in buildings that are not protected with automatic sprinkler protection. The revisions to Type IV construction and allowance for portions of exposed timber in the 2021 revisions of the IBC are based on the provision of automatic sprinklers in the building.

Cost Impact: The code change proposal will increase the cost of construction
The code change may result in minimal increase in the cost of construction as interior finish with a lower flame spread index required would be required in buildings not equipped with automatic sprinkler protection. However, when considering overall cost impact, the proposal may decrease costs or losses over time due to fire incidents.

FS108-21

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The committee determined that the proposed text is not clear. The reason statement does not state the hazards that need to be mitigated with this proposal. The cost impact is not minimal, as stated in the proposal. The proposal imposes a new restriction without justification. (Vote: 13-0)

FS108-21

Individual Consideration Agenda

Public Comment 1:

IBC: 803.3

Proponents: Shamim Rashid-Sumar, representing National Ready Mixed Concrete Association (ssumar@nrmca.org) requests As Modified by Public Comment

Modify as follows:

2021 International Building Code

803.3 Heavy timber exemption. ~~In buildings equipped throughout with an automatic sprinkler system installed in accordance with Section 903.3, exposed~~ Exposed portions of *building elements* in Type IV-HT constructioncomplying with the requirements for buildings of heavy timber construction in Section 602.4 or Section 2304.11 shall not be subject to *interior finish* requirements except in *interior exit stairways*, interior exit *ramps*, and exit passageways.

Commenter's Reason: FS108-21 is recommended for Approval As Modified By Public Comment. The public comment seeks to address the concerns of the proponent of the proposed code change regarding extension of the heavy timber exception to interior finish requirements to Type IV-A, IV-B, and IV-C construction, while addressing the committee's concerns on imposing new restrictions to Type IV-HT construction.
With the revisions to Type IV construction in the 2021 edition of the Code, glue-laminated or cross-laminated timber may be used to form large portions of entire interior surfaces of rooms, corridors, and enclosures that form part of the necessary access to the means of egress. These spaces should also comply with interior finish requirements.

The modification clarifies that the heavy timber exception in Section 803.3 applies to Type IV-HT construction, without imposing additional requirements for automatic sprinkler protection. Type IV-A, IV-B, and IV-C are required to comply with the interior finish requirements of Chapter 8.

Recommend APPROVAL AS MODIFIED BY PUBLIC COMMENT for FS108-21.

Cost Impact: The net effect of the public comment and code change proposal will not increase or decrease the cost of construction
The public comment will result in editorial changes to the code and will not increase or decrease the cost of construction.

Public Comment# 2832

FS111-21

Proposed Change as Submitted

Proponents: Tony Crimi, representing International Firestop Council

2021 International Building Code

909.20.2 Construction. The *smokeproof enclosure* shall be separated from the remainder of the building by not less than 2-hour *fire barriers* constructed in accordance with Section 707 or *horizontal assemblies* constructed in accordance with Section 711, or both. Openings are not permitted other than the required *means of egress* doors. The vestibule shall be separated from the *stairway* or *ramp* by not less than 2-hour *fire barriers* constructed in accordance with Section 707 or *horizontal assemblies* constructed in accordance with Section 711, or both. The open exterior balcony shall be constructed in accordance with the *fire-resistance rating* requirements for floor assemblies.

909.20.2.1 Door closers. Doors in a *smokeproof enclosure* shall be self- or automatic closing by actuation of a smoke detector in accordance with Section 716.2.6.6 and shall be installed at the floor-side entrance to the *smokeproof enclosure*. The actuation of the smoke detector on any door shall activate the closing devices on all doors in the *smokeproof enclosure* at all levels. Smoke detectors shall be installed in accordance with Section 907.3.

Add new text as follows:

909.20.2.2 Pressurized stair and vestibule air supply.
Where the installation of a fire damper will interfere with the operation of a required smoke control system in accordance with Section 909, ducts used to supply uncontaminated air to a smokeproof enclosure shall be protected with a shaft enclosure in accordance with Section 713 or a fire resistive metallic duct assembly tested in accordance with ASTM E2816. When installed, the required rating of a duct assembly tested in accordance with ASTM E2816 shall have equal F and T ratings not less than the assembly penetrated.

Add new standard(s) as follows:

ASTM

ASTM International
100 Barr Harbor Drive, P.O. Box C700
West Conshohocken, PA 19428

ASTM E2816-20a   Standard Test Methods for Fire Resistive Metallic HVAC Duct Systems

2021 International Fire Code

[BF] 909.20.2 Construction. The *smokeproof enclosure* shall be separated from the remainder of the building by not less than 2-hour *fire barriers* constructed in accordance with Section 707 of the *International Building Code* or *horizontal assemblies* constructed in accordance with Section 711 of the *International Building Code*, or both. Openings are not permitted other than the required *means of egress* doors. The vestibule shall be separated from the *stairway* or *ramp* by not less than 2-hour *fire barriers* constructed in accordance with Section 707 of the *International Building Code* or *horizontal assemblies* constructed in accordance with Section 711 of the *International Building Code*, or both. The open exterior balcony shall be constructed in accordance with the *fire-resistance-rating* requirements for floor assemblies.

[BF] 909.20.2.1 Door closers. Doors in a *smokeproof enclosure* shall be self-closing or automatic closing by actuation of a smoke detector in accordance with Section 716.2.6.6 of the *International Building Code* and shall be installed at the floor-side entrance to the *smokeproof enclosure*. The actuation of the smoke detector on any door shall activate the closing devices on all doors in the *smokeproof enclosure* at all levels. Smoke detectors shall be installed in accordance with Section 907.3.

Add new text as follows:

[FS] 909.20.2.2 Pressurized stair and vestibule air supply..
Where the installation of a fire damper will interfere with the operation of a required smoke control system in accordance with Section 909, ducts used to supply uncontaminated air to a smokeproof enclosure shall be protected with a shaft enclosure in accordance with Section 713 or a fire resistive metallic duct assembly tested in accordance with ASTM E2816. When installed, the required rating of a duct assembly tested in accordance with ASTM E2816 shall have equal F and T ratings not less than the assembly penetrated.

Add new standard(s) as follows:

ASTM

ASTM International
100 Barr Harbor Drive, P.O. Box C700
West Conshohocken, PA 19428-2959

ASTM E2816-20a   Standard Test Methods for Fire Resistive Metallic HVAC Duct Systems

Reason: This proposal would add the option to install HVAC ducts installed to supply uncontaminated air for stairwell pressurization to be

protected either with a shaft in accordance with section 713, a tested system in accordance with ASTM E2816 *Standard Test Methods for Fire Resistive Metallic HVAC Duct Systems*, or any other approved alternative means.
The ASTM E2816 standard evaluates the fire performance of metallic duct systems based on the same fire exposure, principles and criteria for fire-resistance rating that are defined in ASTM E119. The ASTM E2816 standard has the ability to test the fire performance of HVAC ducts for both supply (pressurization) and return air, in the vertical and horizontal orientation, and includes the penetration firestop system installed. The fire performance of pressurization ducts are evaluated by both Condition A – Horizontal, and Condition B – Vertical,, which are the test configurations appropriate for pressurization ducts. The ASTM E2816 standard was developed to establish requirements for fire resistive enclosure systems applied to metallic HVAC ducts in order to provide a tested alternate to required fire-resistance-rated shafts. When pressurization ducts are used, the protection is installed continuously from the air handling equipment to the air inlet and outlet terminals, so the penetration firestop systems installed in these ASTM E2816 protected ducts are included as part of the tested configuration A and configuration B systems. There are several systems currently Listed and in use for these applications.

Bibliography: ASTM E2816-20a, Standard Test Methods for Fire Resistive Metallic HVAC Duct Systems

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The proposal does not mandate any particular system, but provides several options for protection of these pressurization ducts, including currently approved methods.

Staff Analysis: A review of the standard proposed for inclusion in the code, ASTM E2816 Standard Test Methods for Fire Resistive Metallic HVAC Duct Systems, with regard to some of the key ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before March 20, 2021.

FS111-21

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The committee concluded disapproval as requested by the proponent to bring back in the public comment phase. (Vote: 13-0)

FS111-21

Individual Consideration Agenda

Public Comment 1:

IBC: 909.20.2, 909.20.2.1, 909.20.2.2; IFC: [BF] 909.20.2, [BF] 909.20.2.1, [FS] 909.20.2.2

Proponents: john pattillo, representing Conquest Firespray LLC requests As Modified by Public Comment

Modify as follows:

2021 International Building Code

909.20.2 Construction . The *smokeproof enclosure* shall be separated from the remainder of the building by not less than 2-hour *fire barriers* constructed in accordance with Section 707 or *horizontal assemblies* constructed in accordance with Section 711, or both. Openings are not permitted other than the required *means of egress* doors. The vestibule shall be separated from the *stairway* or *ramp* by not less than 2-hour *fire barriers* constructed in accordance with Section 707 or *horizontal assemblies* constructed in accordance with Section 711, or both. The open exterior balcony shall be constructed in accordance with the *fire-resistance rating* requirements for floor assemblies.

909.20.2.1 Door closers . Doors in a *smokeproof enclosure* shall be self- or automatic closing by actuation of a smoke detector in accordance with Section 716.2.6.6 and shall be installed at the floor-side entrance to the *smokeproof enclosure*. The actuation of the smoke detector on any door shall activate the closing devices on all doors in the *smokeproof enclosure* at all levels. Smoke detectors shall be installed in accordance with Section 907.3.

909.20.2.2 Pressurized stair and vestibule air supply . Where the installation of a fire damper will interfere with the operation of a required smoke control system in accordance with Section 909, ducts used to supply ~~uncontaminated~~ air to a smokeproof enclosure shall be protected with a shaft enclosure in accordance with Section 713 or a fire resistive metallic duct assembly tested ~~in~~ <u>to all four conditions (A, B, C and D) in</u> accordance with ASTM E2816. ~~When installed, the required rating of a duct assembly tested in accordance with ASTM E2816 shall have equal F and T ratings not less than the assembly penetrated.~~

2021 International Fire Code

[BF] 909.20.2 Construction . The *smokeproof enclosure* shall be separated from the remainder of the building by not less than 2-hour *fire barriers* constructed in accordance with Section 707 of the *International Building Code* or *horizontal assemblies* constructed in accordance with Section 711 of the *International Building Code*, or both. Openings are not permitted other than the required *means of egress* doors. The vestibule shall be separated from the *stairway* or *ramp* by not less than 2-hour *fire barriers* constructed in accordance with Section 707 of the *International Building Code* or *horizontal assemblies* constructed in accordance with Section 711 of the *International Building Code*, or both. The open exterior balcony shall be constructed in accordance with the *fire-resistance-rating* requirements for floor assemblies.

[BF] 909.20.2.1 Door closers . Doors in a *smokeproof enclosure* shall be self-closing or automatic closing by actuation of a smoke detector in accordance with Section 716.2.6.6 of the *International Building Code* and shall be installed at the floor-side entrance to the *smokeproof enclosure*. The actuation of the smoke detector on any door shall activate the closing devices on all doors in the *smokeproof enclosure* at all levels. Smoke detectors shall be installed in accordance with Section 907.3.

[FS] 909.20.2.2 Pressurized stair and vestibule air supply. . Where the installation of a fire damper will interfere with the operation of a required smoke control system in accordance with Section 909, ducts used to supply ~~uncontaminated~~ air to a smokeproof enclosure shall be protected with a shaft enclosure in accordance with Section 713 or a fire resistive metallic duct assembly tested <u>to all four conditions (A, B, C and D)</u> in accordance with ASTM E2816. ~~When installed, the required rating of a duct assembly tested in accordance with ASTM E2816 shall have equal F and T ratings not less than the assembly penetrated.~~

Commenter's Reason: ASTM E2816 is a full-scale, fire-resistance rating test requiring an ASTM E119 compliant furnace to conduct the fire test. ASTM E2816 follows the same test protocols as ASTM E119 regarding the test's test specimen size, instrumentation and requirements for performing the fire test. In addition, ASTM E2816 requires the ductwork be pressurized or have airflow during the entire fire test. Also, fire-resistance rated ductwork must be tested to all four Conditions (A, B, C and D) in order to be code compliant and used everywhere a conventional ductwork is used in a building.
Testing all four Conditions (A, B, C and D) is required in order for the ductwork to comply with Section 707, Fire Barriers, 717 Ducts and air transfer openings and Section 712, Vertical Openings, Subsection 712.1.5, Ducts and Section 703.2.1 Nonsymmetrical wall construction, where testing both sides of all nonsymmetrical fire barriers is required.

ASTM E2816 nomenclature for all four conditions:

Condition A: Fire Outside Exposure, Horizontal Orientation

Condition B: Fire Outside Exposure, Vertical Orientation

Condition C: Fire Inside Exposure, Horizontal Orientation

Condition D: Fire Inside Exposure, Vertical Orientation

Corresponding ASTM E814 Standard Test Method for Fire Tests of Penetration Firestop Systems is also required.

Cost Impact: The net effect of the public comment and code change proposal will not increase or decrease the cost of construction
The reasoning for no change in costs.
Reasoning 1:

Today, the assemblies referenced in the code require several different contractors to install a code compliant assembly:

The mechanical contractor will install hvac ductwork and fans designed to carry the air flow.

A second contractor (typically drywall) will install metal hangers and drywall to construct the 2 hour rated enclosure

The code change will eliminate the additional contractor (namely drywall)

Effects on the project costs:

A faster installation will reduce the time for the installation of the assembly

Less field personnel are necessary on the project

Less field coordination is necessary as one trade (drywall) is eliminated

Saves space as the fire rated ductwork assembly requires less physical dimension which allows easier coordination

Reasoning 2

This code change is an option for the design and construction industry.

The design and construction industry can measure the cost benefits of an assembly under several criteria

1. Is the first cost of the assembly less
2. Is the long term cost of the assembly less
3. Does the assembly take less space to install
4. Does the assembly take less time to install
5. Does the assembly take less field personnel to install

These questions are answered by the introduction of this change

Yes to items 1, 3, 4, and 5

Reasoning 3:

Because this assembly is an option the market and bidding contractors will always choose the lease expensive option and the market pricing will meet the demand

More competition will drive down costs

For example, if today the cost of a drywall enclosure to too expensive, and a fire resistant duct is chosen the market will swing towards the fire resistant ductwork assembly.

This will drive the market to the least cost solution.

Public Comment# 2670

FS113-21

Proposed Change as Submitted

Proponents: Jeffrey S. Grove, P.E. FSFPE, Jensen Hughes, representing Jensen Hughes (jgrove@jensenhughes.com)

2021 International Building Code

Revise as follows:

909.20.5 Stairway and ramp pressurization alternative. Where the building is equipped throughout with an *automatic sprinkler system* in accordance with Section 903.3.1.1, the vestibule is not required, provided that each *interior exit stairway* or *ramp* is pressurized to not less than 0.10 inch of water (25 Pa) and not more than 0.35 inches of water (87 Pa) in the *shaft* relative to the ~~building~~ floor of fire origin measured with all *interior exit stairway* and *ramp* doors closed under maximum anticipated conditions of stack effect and wind effect.

2021 International Fire Code

Revise as follows:

[BF] 909.20.5 Stairway and ramp pressurization alternative. Where the building is equipped throughout with an*automatic sprinkler system* in accordance with Section 903.3.1.1, the vestibule is not required, provided that each *interior exit stairway* or *ramp* is pressurized to not less than 0.10 inch of water (25 Pa) and not more than 0.35 inch of water (87 Pa) in the shaft relative to the ~~building~~ floor of fire origin measured with all *interior exit stairway* and *ramp* doors closed under maximum anticipated conditions of stack effect and wind effect.

Reason: Section 202 of the IBC defines “Building” as: Any structure utilized or intended for supporting or sheltering any occupancy.
Using term “building” as a reference point to measure pressure differentials is ambiguous. The proposed change clearly defines the reference point. In addition, this change aligns with Section 4.6 NFPA 92 which states as follows:

*4.6.1 General. When stairwell pressurization systems are provided, the pressure difference between the **smoke zone** and the stairwell, with zero and the design number of doors open, shall be as follows:*

(1) Not less than the minimum pressure difference specified in 4.4.2

(2) Not greater than the maximum pressure difference specified in 4.4.2.2

NFPA 92, Section 3.3.25.2 defines Smoke Zone as: The smoke control zone in which the fire is located.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This code change is a clarification and does not have a cost impact.

FS113-21

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The committee concluded the proposed text of "floor of fire origin" is confusing compared to checking any and every floor in practice. The general practice for stairwell pressurization systems is to check the pressure from a stairway ending to the floor or landing outside the door. (Vote: 13-0)

FS113-21

Individual Consideration Agenda

Public Comment 1:

IBC: 909.20.5; IFC: [BF] 909.20.5

Proponents: Jeffrey Grove, representing Jensen Hughes (jgrove@jensenhughes.com) requests As Modified by Public Comment

Replace as follows:

2021 International Building Code

909.20.5 Stairway and ramp pressurization alternative . Where the building is equipped throughout with an *automatic sprinkler system* in accordance with Section 903.3.1.1, the vestibule is not required, provided that each *interior exit stairway* or *ramp* is pressurized to not less than 0.10 inch of water (25 Pa) and not more than 0.35 inches of water (87 Pa) in the *shaft* relative to the ~~building~~ floor(s) of fire origin measured with all *interior exit stairway* and *ramp* doors closed under maximum anticipated conditions of stack effect and wind effect.

2021 International Fire Code

[BF] 909.20.5 Stairway and ramp pressurization alternative . Where the building is equipped throughout with an *automatic sprinkler system* in accordance with Section 903.3.1.1, the vestibule is not required, provided that each *interior exit stairway* or *ramp* is pressurized to not less than 0.10 inch of water (25 Pa) and not more than 0.35 inch of water (87 Pa) in the shaft relative to the ~~building~~ floor(s) of fire origin measured with all *interior exit stairway* and *ramp* doors closed under maximum anticipated conditions of stack effect and wind effect.

Commenter's Reason: The proposed change does not modify the intent of the code, nor decrease the level of protection. The proposed modification clarifies the intent of stairway and ramp pressurization: to prevent smoke migration from the floor of origin (floors of origin, in the case of non-separated or interconnected floors) into the enclosed pressurized stairway or ramp. This modification is also consistent with the code intent to assume only a single fire occurrence in a building as considered design scenarios. As floor assemblies or floor/ceiling assembles form a smoke barrier between floors, a single fire scenario would occur on one floor. The exception is when a fire occurs on a floor that is non-rated and/or atmospherically connected to other floors. Where more than one floor is atmospherically connected, the pressure differentials must be maintained on all interconnected floors. Where floor, atrium or zoned smoke control is provided, the pressure differentials must be maintained relative to all floor(s) of fire origin and/or smoke zone(s) of origin.
There are multiple conditions that can impact the ability to obtain the minimum pressure differentials, without exceeding the maximum, on all levels. Other systems such as HVAC systems with large air changes typically provided in server rooms, elevator pressurization systems, kitchen exhaust systems, etc. will adversely impact the ability to maintain pressure differentials within the stair enclosures relative to all floors simultaneously on any given floor(s) of origin.

While pressure differentials to enclosed stairs/ramps may be achieved on all floors within a building, mitigating the impact generally would require multiple dampers and complex sequence of operation that jeopardize the reliability of the system, particularly for very tall high-rise buildings.

The term "floor(s) of fire origin" is consistent with the fact that every connected story of a pressurized stair is a potential fire origin and a design scenario. Each and every individual story that the stair connects to needs to be a design scenario for the stair pressurization system, the proposed change does not intend to change that. The intent of the proposed change is to clarify that system sequencing and interaction with other normal/emergency systems is most critical for the pressure differential between the stairway and a given design origin floor or group of floors, as determined by the designer and authority

Requiring maintenance of minimum pressures on all floors assumes there could be fire events on multiple floors simultaneously and/or substantial smoke migration across fire-resistance-rated floor separations. This contradicts a fundamental intent of Section 909 which is to consider only one fire event at a time to determine operational sequences. In addition, this change aligns with Section 4.6 NFPA 92 (2015 Edition) which states as follows:

*4.6.1*General. When stairwell pressurization systems are provided, the pressure difference between the* ***smoke zone*** *and the stairwell, with zero and the design number of doors open, shall be as follows:*

(1) Not less than the minimum pressure difference specified in 4.4.2

(2) Not greater than the maximum pressure difference specified in 4.4.2.2

NFPA 92, Section 3.3.25.2 defines Smoke Zone as: The smoke control zone in which the fire is located.

Cost Impact: The net effect of the public comment and code change proposal will not increase or decrease the cost of construction
This code change is a clarification and does not have a cost impact.

Public Comment# 2846

FS117-21

Proposed Change as Submitted

Proponents: Tony Crimi, representing International Firestop Council

2021 International Building Code

Revise as follows:

909.21.3 Ducts for system. Any duct system that is part of the pressurization system shall be protected with the same *fire-resistance rating* as required for the elevator *shaft* enclosure.

Exception: Ducts tested and listed in accordance with ASTM E2816 having equal F andT ratings not less than the assembly being penetrated.

Add new standard(s) as follows:

ASTM

ASTM International
100 Barr Harbor Drive, P.O. Box C700
West Conshohocken, PA 19428

ASTM E2816-20a	Standard Test Methods for Fire Resistive Metallic HVAC Duct Systems

2021 International Fire Code

Revise as follows:

[BF] 909.21.3 Ducts for system. Any duct system that is part of the pressurization system shall be protected with the same *fire-resistance rating* as required for the elevator shaft enclosure.

Exception: Ducts tested and listed in accordance with ASTM E2816 having equal F and T ratings not less than the assembly being penetrated.

Add new standard(s) as follows:

ASTM

ASTM International
100 Barr Harbor Drive, P.O. Box C700
West Conshohocken, PA 19428-2959

ASTM E2816-20a	Standard Test Methods for Fire Resistive Metallic HVAC Duct Systems

Reason: This proposal adds the option to install tested and Listed pressurization ducts that supply uncontaminated air for stairwell pressurization to be enclosed with an ASTM E2816 tested system.
The ASTM E2816 standard evaluates the fire performance of metallic duct systems based on the same fire exposure, principles and criteria for fire-resistance rating that are defined in ASTM E119. The ASTM E2816 Standard has the ability to test the fire performance of HVAC ducts for both supply (pressurization) and return air, in the vertical and horizontal orientation, and includes the penetration firestop system installed. The fire performance of pressurization ducts are evaluated by both Condition A – Horizontal, and Condition B – Vertical,, which are the test configurations appropriate for pressurization ducts.

The ASTM E2816 standard was developed to establish requirements for fire resistive enclosure systems applied to metallic HVAC ducts in order to provide a tested alternate to required fire-resistance-rated shafts. When these pressurization ducts are used, the protection is installed continuously from the air handling equipment to the air inlet and outlet terminals, so the penetration firestop systems installed in these ASTM E2816 protected ducts are included as part of the tested Condition A and Condition B systems. There are several systems currently Listed and in use for these applications.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The proposal only adds an additional option to existing requirements.

Staff Analysis: A review of the standard proposed for inclusion in the code, ASTM E2816 Standard Test Methods for Fire Resistive Metallic HVAC Duct Systems, with regard to some of the key ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before March 20, 2021.

FS117-21

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The committee disapproval is based on the proponent's request. (Vote: 13-0)

FS117-21

Individual Consideration Agenda

Public Comment 1:

IBC: 909.21.3; IFC: [BF] 909.21.3

Proponents: john pattillo, representing Conquest Firespray LLC requests As Modified by Public Comment

Modify as follows:

2021 International Building Code

909.21.3 Ducts for system. Any duct system that is part of the pressurization system shall be protected with the same *fire-resistance rating* as required for the elevator *shaft* enclosure.

> **Exception:** Ducts tested ~~and~~ <u>to all four conditions (A, B, C, and D)</u> ~~and listed~~ in accordance with ASTM E2816 ~~having equal F and T ratings not less than the assembly being penetrated~~.

2021 International Fire Code

[BF] 909.21.3 Ducts for system. Any duct system that is part of the pressurization system shall be protected with the same *fire-resistance rating* as required for the elevator shaft enclosure.

> **Exception:** Ducts tested ~~and~~ <u>to all four conditions (A, B, C and D)</u> ~~and listed~~ in accordance with ASTM E2816 ~~having equal F and T ratings not less than the assembly being penetrated~~.

Commenter's Reason: ASTM E2816 is a full-scale, fire-resistance rating test requiring an ASTM E119 compliant furnace to conduct the fire test. ASTM E2816 follows the same test protocols as ASTM E119 regarding the test's test specimen size, instrumentation and requirements for performing the fire test. In addition, ASTM E2816 requires the ductwork be pressurized or have airflow during the entire fire test. Also, fire-resistance rated ductwork must be tested to all four Conditions (A, B, C and D) in order to be code compliant and used everywhere a conventional ductwork is used in a building.
Testing all four Conditions (A, B, C and D) is required in order for the ductwork to comply with Section 707, Fire Barriers, 717 Ducts and air transfer openings and Section 712, Vertical Openings, Subsection 712.1.5, Ducts and Section 703.2.1 Nonsymmetrical wall construction, where testing both sides of all nonsymmetrical fire barriers is required.

ASTM E2816 nomenclature for all four conditions:

> Condition A: Fire Outside Exposure, Horizontal Orientation
>
> Condition B: Fire Outside Exposure, Vertical Orientation
>
> Condition C: Fire Inside Exposure, Horizontal Orientation
>
> Condition D: Fire Inside Exposure, Vertical Orientation

Corresponding ASTM E814 Standard Test Method for Fire Tests of Penetration Firestop Systems is also required.

Cost Impact: The net effect of the public comment and code change proposal will not increase or decrease the cost of construction
The reasoning for no change in costs.
Reasoning 1:

Today, the assemblies referenced in the code require several different contractors to install a code compliant assembly:

> The mechanical contractor will install hvac ductwork and fans designed to carry the air flow.
>
> A second contractor (typically drywall) will install metal hangers and drywall to construct the 2 hour rated enclosure

The code change will eliminate the additional contractor (namely drywall)

Effects on the project costs:

A faster installation will reduce the time for the installation of the assembly

Less field personnel are necessary on the project

Less field coordination is necessary as one trade (drywall) is eliminated

Saves space as the fire rated ductwork assembly requires less physical dimension which allows easier coordination

Reasoning 2

This code change is an option for the design and construction industry.

The design and construction industry can measure the cost benefits of an assembly under several criteria

1. Is the first cost of the assembly less
2. Is the long term cost of the assembly less
3. Does the assembly take less space to install
4. Does the assembly take less time to install
5. Does the assembly take less field personnel to install

These questions are answered by the introduction of this change

Yes to items 1, 3, 4, and 5

Reasoning 3:

Because this assembly is an option the market and bidding contractors will always choose the lease expensive option and the market pricing will meet the demand

More competition will drive down costs

For example, if today the cost of a drywall enclosure to too expensive, and a fire resistant duct is chosen the market will swing towards the fire resistant ductwork assembly. This will drive the market to the least cost solution.

Public Comment# 2672

FS121-21

Proposed Change as Submitted

Proponents: Christopher Athari, Hoover Treated Wood Products, representing Hoover Treated Wood Products (cathari@frtw.com); James Gogolski, representing self (jgogolski@frtw.com)

2021 International Building Code

Revise as follows:

1402.5 Water-resistive barriers. *Exterior walls* on buildings of Type I, II, III or IV construction that are greater than 40 feet (12 192 mm) in height above grade plane and contain a combustible *water-resistive barrier* shall be tested in accordance with and comply with the acceptance criteria of NFPA 285.Combustibility shall be determined in accordance with Section 703.3. For the purposes of this section, *fenestration* products, flashing of *fenestration* products and *water-resistive-barrier* flashing and accessories at other locations, including through wall flashings, shall not be considered part of the *water-resistive barrier*.

Exceptions:

1. Walls in which the *water-resistive barrier* is the only combustible component and the *exterior wall* has a wall covering of brick, concrete, stone, terra cotta, stucco or steel with minimum thicknesses in accordance with Table 1404.2.
2. Walls in which the *water-resistive barrier* is the only combustible component and the *water-resistive barrier* complies with the following:

   2.1 A peak heat release rate of less than 150 kW/m2, a total heat release of less than 20 MJ/m2 and an effective heat of combustion of less than 18 MJ/kg when tested on specimens at the thickness intended for use, in accordance with ASTM E1354, in the horizontal orientation and at an incident radiant heat flux of 50 kW/m2.

   2.2. A flame spread index of 25 or less and a smoke-developed index of 450 or less as determined in accordance with ASTM E84 or UL 723, with test specimen preparation and mounting in accordance with ASTM E2404.

3. <u>Walls constructed of fire-retardant-treated wood complying with Section 2303.2 and tested in accordance with and comply with the acceptance criteria of NFPA 285, and the water-resistive barrier shall comply with Exception 1 or Exception 2.</u>

Reason: Building cladding fires, such as the Grenfell Tower fire in London, UK, have prompted review of the application of the NFPA 285 test standard to identify potential existing conflicts and areas of needed improvement or clarification. Section 1402.5 appears to create a conflict resulting in significant industry confusion regarding the use of fire-retardant-treated wood (FRTW) in Types I, II, III, & IV construction as allowed by Section 602 and 603. This section suggests that FRTW cannot be used with a NFPA 285-compliant water-resistive barrier beyond 40 feet in height. The code currently allows FRTW used in Type III construction to extend to 85 feet in height. As FRTW does not meet the definition of “noncombustible” per Section 703.5, exceptions 1 and 2 cannot be applied. This change provides for the needed clarification to permit FRTW to be used as permitted in Section 602 and 603 in conjunction with a NFPA 285 compliant water-resistive barrier.
One of the arguments from the last code cycle was that the industry wanted this exception because they cannot pass NFPA 285. However, recent tests have resulted in a UL listing for an FRTW lumber and plywood assembly. Demonstrating compliance with NFPA 285 (UL-EWS0045).

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This code change proposal will not increase or decrease the cost of construction. There is a potential for construction savings where FRTW use was denied due to existence of a combustible water-resistive barrier.

FS121-21

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The committee agreed with the reason statement on the need to be careful not to repeat building cladding fires, such as the Grenfell Tower fire in London, UK. The committee's disapproval is based on the charging statement of section 1402.5 to meet section 703.3 or to have an exception based on having one combustible component based on the previous testing. The fire-retardant-treated wood is not predictable based on testing since NFPA 285 is a test for the entire exterior wall assembly. The proponent could rewrite the whole exception by addressing the condition of only having a combustible weather barrier and a fire-retardant-treated wood. The proponent needs to have backup data. (Vote: 11-1)

FS121-21

Individual Consideration Agenda

Public Comment 1:

IBC: 1402.5

Proponents: James Gogolski, representing Hoover Treated Wood Products, Inc. (jgogolski@frtw.com) requests As Modified by Public Comment

Modify as follows:

2021 International Building Code

1402.5 Water-resistive barriers . *Exterior walls* on buildings of Type I, II, III or IV construction that are greater than 40 feet (12 192 mm) in height above grade plane and contain a combustible *water-resistive barrier* shall be tested in accordance with and comply with the acceptance criteria of NFPA 285.Combustibility shall be determined in accordance with Section 703.3. For the purposes of this section, *fenestration* products, flashing of *fenestration* products and *water-resistive-barrier* flashing and accessories at other locations, including through wall flashings, shall not be considered part of the *water-resistive barrier*.

Exceptions:

1. Walls in which the *water-resistive barrier* is the only combustible component and the *exterior wall* has a wall covering of brick, concrete, stone, terra cotta, stucco or steel with minimum thicknesses in accordance with Table 1404.2.
2. Walls in which the *water-resistive barrier* is the only combustible component and the *water-resistive barrier* complies with the following:

   2.1 A peak heat release rate of less than 150 kW/m^2, a total heat release of less than 20 MJ/m^2 and an effective heat of combustion of less than 18 MJ/kg when tested on specimens at the thickness intended for use, in accordance with ASTM E1354, in the horizontal orientation and at an incident radiant heat flux of 50 kW/m^2.

   2.2 A flame spread index of 25 or less and a smoke-developed index of 450 or less as determined in accordance with ASTM E84 or UL 723, with test specimen preparation and mounting in accordance with ASTM E2404.

3. Walls constructed of fire-retardant-treated wood complying with Section 2303.2 and tested in accordance with and complying with the acceptance criteria of NFPA 285,~~and the water-resistive barrier shall comply with Exception 1 or Exception 2.~~ where the fire-retardant-treated wood and the water-resistive barrier constitute the only combustible wall components, and where the water-resistive barrier complies with the following:

   3.1. A peak heat release rate of less than 150 kW/m2, a total heat release of less than 20 MJ/m2 and an effective heat of combustion of less than 18MJ/kg when tested on specimens at the thickness intended for use, in accordance with ASTM E1354, in the horizontal orientation and at an incident radiant heat flux of 50 kW/m2.

   3.2. A flame spread index of 25 or less and a smoke-developed index of 450 or less as determined in accordance with ASTM E84 or UL 723, with test specimen preparation and mounting in accordance with ASTM E2404.

Commenter's Reason: This section requires exterior walls to be tested to NFPA 285 when a combustible water resistive barrier (WRB) is used underneath wall cladding. Fundamentally, this requirement is an exterior surface or undercladding propagation-of-fire concern as demonstrated by Exception 1, which exempts testing requirements when the WRB is the only combustible material in the noncombustible wall.
The proposed exception extends the same exception to Type III exterior walls employing fire-retardant-treated wood (FRTW) construction that is currently allowed for noncombustible construction. These FRTW walls are required to comply with NFPA 285, exempting only the thin (low-fuel) WRB from being part of the test in the exception. The reason being is that each thin WRB used requires its own separate test with every variation of cladding considered. This additional testing adds substantial costs to construction.

The currently allowed noncombustible exception is frequently applied when gypsum board is used as the exterior sheathing in Type I and II construction when the excepted WRB is placed in contact with the face of the gypsum board. IBC Section 703.3.1 allows the facing of the gypsum board to have up to 0.125 inch thickness of combustible material as the face. This material is then tested for 10 minutes per ASTM E84 (UL723), and if it demonstrates a maximum allowable flame spread of 50, then it is recognized for this purpose as being acceptable as a noncombustible material.

In the case of Type III construction where FRTW is used in exterior walls, the WRB is placed in contact with the FRTW sheathing that is tested for 30 minutes per ASTM E84 (UL723) with a maximum allowable flame spread of 25. As required in IBC Section 2303.2, the FRTW's test is three times the duration required for gypsum board and must have no more than half of the 50 flame spread required by the code for gypsum board.

Therefore, since the surface burning performance of FRTW is required to be substantially more restrictive than gypsum board, it seems entirely reasonable to allow the same exception allowing thin membrane WRBs with extremely limited fire propagation potential.

This is a fire-resistance-rated and tested assembly. Most fire-resistant assemblies are not tested with a WRB. In these cases, the WRB is allowed by the exception and is considered an insignificant source of fuel or energy for combustion.

Exceptions 1 and 2 in this section allow a product with a flame spread of 50 to be used for this thin (low-fuel) sheathing. We are requesting the use of FRTW with a maximum flame spread of 25 to be allowed the same exception.

Cost Impact: The net effect of the public comment and code change proposal will not increase or decrease the cost of construction
There is a potential for construction cost savings because fire-retardant-treated wood will not need to be tested with every possible combination of WRBs and cladding types

Public Comment# 2840

FS123-21

Proposed Change as Submitted

Proponents: Jeffrey H. Greenwald, North American Modern Building Alliance, representing North American Modern Building Alliance (jgreenwald@operativegreenwald.com)

2021 International Building Code

Add new text as follows:

1402.5 Vertical and lateral flame propagation.
Exterior wall assemblies of buildings of Type I, II, III or IV construction that contain a combustible *exterior wall covering*, combustible *water-resistive barrier*, or combustible insulation shall be tested in accordance with and comply with the acceptance criteria of NFPA 285 and shall comply with sections 1402.5.1 though 1402.5.5, as applicable. Combustibility shall be determined in accordance with Section 703.3. Plastics, other than *foam plastic insulation*, shall comply with the applicable provisions of Chapter 26.

1402.5.1 Water-resistive barriers.
Exterior wall assemblies containing a combustible water-resistive barrier shall comply with Section 1402.6.

1402.5.2 Metal Composite Material (MCM) exterior wall coverings.
Exterior wall assemblies greater than 40 feet in height above grade plane with an MCM exterior wall covering shall comply with Section 1406.

1402.5.3 Exterior Insulation and Finish Systems (EIFS) exterior wall coverings.
Exterior wall assemblies of any height above grade plane with an EIFS exterior wall covering shall comply with Section 1407.

1402.5.4 High-Pressure Decorative Exterior-Grade Compact Laminate (HPL) exterior wall coverings.
Exterior wall assemblies greater than 40 feet in height above grade plane with an HPL exterior wall covering shall comply with Section 1408.

1402.5.5 Foam Plastic Insulation.
Exterior wall assemblies of any height above grade plane containing foam plastic insulation shall comply with Section 2603.

Reason: This is a clarification of the general requirement for testing of vertical and lateral flame propagation of noncombustible exterior wall assemblies containing combustible components. Evaluation of vertical and lateral flame propagation in accordance with NFPA 285 is applicable to all combustible exterior wall assemblies where permitted for installation in or on exterior walls of Type I, II, III, IV construction. Current IBC Section 1402.5 only describes the case of water-resistive barriers with other combustible wall coverings and components addressed in other sections Chapter 14 and 26. This proposed code change also provides references to sections containing more specific information and applicable requirements regarding the application of NFPA 285 testing

The North American Modern Building Alliance (NAMBA) is focused on addressing fire safety through the development and enforcement of building codes. Members of NAMBA are: ACC Center for the Polyurethanes Industry, ACC North American Flame Retardant Alliance, Atlas Roofing Corp., BASF Corporation, Carlisle Construction Materials, Covestro, DuPont, EIFS Industry Members Association, GAF, Huntsman, Kingspan Insulation LLC, Metal Construction Association, Owens Corning, Polyisocyanurate Insulation Manufacturers Association, Rmax - A Business Unit of the Sika Corporation.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The proposal does not change existing performance or construction requirements.

FS123-21

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The committee disapproval is based on the proponent's request and based on committee action on FS122-21. (Vote: 12-0)

FS123-21

Individual Consideration Agenda

Public Comment 1:

IBC: 1402.5, 1402.5.1, 1402.5.2, 1402.5.3, 1402.5.4, 1402.5.5, 1402.5.6 (New)

Proponents: Jeffrey Greenwald, representing North American Modern Building Alliance (jgreenwald@operativegreenwald.com) requests As Modified by Public Comment

Modify as follows:

2021 International Building Code

1402.5 Vertical and lateral flame propagation . Exterior wall assemblies of buildings of Type I, II, III or IV construction that contain a combustible *exterior wall covering*, combustible insulation , or combustible *water-resistive barrier*, ~~or combustible insulation shall be tested in accordance with and comply with the acceptance criteria of NFPA 285 and~~ shall comply with sections 1402.5.1 though ~~1402.5.5~~ 1402.5.6, as applicable. ~~Combustibility shall be determined in accordance with Section 703.3. Plastics, other than *foam plastic insulation*, shall comply with the applicable provisions of Chapter 26.~~ Where compliance with NFPA 285 and associated acceptance criteria is required in Sections 1402.5.1 through 1402.5.6, the exterior wall assembly shall be tested in accordance with and comply with the acceptance criteria of NFPA 285.

1402.5.1 Combustible water-resistive barriers . Exterior walls ~~wall assemblies assemblies~~ containing a combustible water-resistive barrier shall comply with Section 1402.6.

1402.5.2 Metal Composite Material (MCM) ~~exterior wall coverings~~ . Exterior walls ~~wall assemblies greater than 40 feet in height above grade plane with an MCM exterior wall coveringcovering shall~~ containing MCM systems shall comply with Section 1406.

1402.5.3 Exterior Insulation and Finish Systems (EIFS) ~~exterior wall coverings~~ . Exterior walls ~~wall assemblies of any height above grade plane with an EIFS exterior wall covering~~ containing EIFS shall comply with Section 1407.

1402.5.4 High-Pressure Decorative Exterior-Grade Compact Laminate (HPL) system ~~exterior wall coverings~~ . Exterior walls ~~wall assemblies greater than 40 feet in height above grade plane with with an HPL exterior wall covering covering shall comply~~ containing an HPL system shall comply with Section 1408.

1402.5.5 Foam Plastic Insulation . Exterior walls ~~wall assemblies of any height above grade plane~~ containing foam plastic insulation shall comply with Section 2603.

1402.5.6 Insulated Metal Panels (IMP) . Exterior walls containing *insulated metal panels* shall comply with Section 1409.

Commenter's Reason: This Public Comment seeks to do two things:

1. Revise the language to be equivalent to FS122-21 that was Approved as Modified, and
2. Add an additional reference to [new] Section 1409 for insulated metal panels (IMPs).

[New] Section 1409 regarding Insulated Metal Panels (IMP) was Approved as Submitted under FS149-21 Part I. Under the [new] Section 1409, insulated metal panels (IMP) are subject to NFPA 285 testing if the core insulation is combustible. As such, adding a reference to Section 1409 is appropriate and in line with the intent of both FS122-21 and FS-123-21.

FS123-21, similar to FS122-21, was disapproved by request of the proponent. What this public comment does is incorporate the language approved with FS122-21 and adds a new section (1402.5.6) that provides that linkage for IMPs.

The North American Modern Building Alliance (NAMBA) is focused on addressing fire safety through the development and enforcement of building codes. Members of NAMBA are: ACC Center for the Polyurethanes Industry, ACC North American Flame Retardant Alliance, Atlas Roofing Corp., BASF Corporation, Carlisle Construction Materials, Covestro, DuPont, EIFS Industry Members Association, EPS Industry Alliance, GAF, Huntsman, Kingspan Insulation LLC, Metal Construction Association, Owens Corning, Polyisocyanurate Insulation Manufacturers Association, and Rmax - A Business Unit of the Sika Corporation.

Cost Impact: The net effect of the public comment and code change proposal will not increase or decrease the cost of construction
The proposal does not change existing performance or construction requirements.

Public Comment# 2563

FS124-21

Proposed Change as Submitted

Proponents: Jeffrey H. Greenwald, North American Modern Building Alliance, representing North American Modern Building Alliance (jgreenwald@operativegreenwald.com)

2021 International Building Code

Add new definition as follows:

ENGINEERING ANALYSIS.
A report from an approved source or an approved agency providing an analysis of alternative building elements, components, assemblies, designs, constructions, or other identified attributes and comparing them to existing data or prescriptive designs for compliance of the alternative with identified provisions prescribed by the code or other identified standard.

Add new text as follows:

1402.7 Vertical and lateral flame propagation compliance methods.
When exterior wall assemblies are required in this Chapter to be tested for vertical and lateral flame propagation in accordance with, and comply with the acceptance criteria of NFPA 285, compliance with the requirements shall be established by any of the following:

1. An exterior wall assembly tested in accordance with and meeting the acceptance criteria of NFPA 285.
2. An exterior wall assembly design listed by an approved agency for compliance with NFPA 285.
3. An engineering analysis based on NFPA 285 test data as allowed by Section 104.11.

Reason: The new proposal defines engineering analysis, a term that is widely used within the IBC. Terms used in the I-Codes include engineering evaluation, engineering assessment, engineering calculations, engineering judgement, engineering analysis, and rational analysis with “engineering analysis” used most often in the IBC. Engineering analyses are used to perform critical performance evaluation support the use of alternate materials and methods as allowed in Section 104.11.
The new section on compliance methods assists code enforcement by providing three compliance methods for those exterior wall assemblies that must be tested in accordance with NFPA 285. While the Code accepts the concept of approval-by-analysis under Section 104.11 this proposal provides specific guidance to credible sources of compliance information for required NFPA 285 testing

In the context of exterior wall assemblies of Type I – IV construction, analysis of deviations from an as-tested assembly are an acceptable means by which to support recognition of a modified assembly. All analysis or extension of results must be substantiated as being based on the fire exposure and acceptance criteria of NFPA 285. Upon submission of such documentation to the building official, the engineering analysis or engineering judgement can be approved as the basis for showing compliance with Section 2603.5.5 of the code.

Each compliance method is addressed below:

1. NFPA 285 test data, from an accredited laboratory, for the exterior wall assembly confirms specific performance of a specific assembly.

2. Designs listed by an accredited and approved agency will be based on successful NFP 285 testing of the exterior wall assembly and accompanying analysis of data.

3. Analysis of deviations in construction or material(s) from a successful NFPA 285 test using principles of fire science and fire protection engineering is an appropriate means to support recognition of an assembly where such analysis considers influences that deviation(s) will have on the performance of the tested assembly and determines the deviations will not significantly alter the full-scale results.

The North American Modern Building Alliance (NAMBA) is focused on addressing fire safety through the development and enforcement of building codes. Members of NAMBA are: ACC Center for the Polyurethanes Industry, ACC North American Flame Retardant Alliance, Atlas Roofing Corp., BASF Corporation, Carlisle Construction Materials, Covestro, DuPont, EIFS Industry Members Association, GAF, Huntsman, Kingspan Insulation LLC, Metal Construction Association, Owens Corning, Polyisocyanurate Insulation Manufacturers Association, Rmax - A Business Unit of the Sika Corporation.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The proposal clarifies methods available to designers, builders, and building officials that are acceptable to support verification and approval exterior wall assemblies regarding testing and compliance with the acceptance criteria of NFPA 285.

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The committee concluded there are serious issues with the proposal and a lot of controversy with it. Section 104.11, Alternative materials, design, and methods of construction and equipment, could be used. The proposed definition of engineering analysis is not broad enough to apply to the use of the term currently in the code. The proposal could have been submitted as two different proposals for each item. (Vote: 13-0)

FS124-21

Individual Consideration Agenda

Public Comment 1:

IBC: , 1402.7

Proponents: Jeffrey Greenwald, representing North American Modern Building Alliance (jgreenwald@operativegreenwald.com) requests As Modified by Public Comment

Modify as follows:

2021 International Building Code

~~**ENGINEERING ANALYSIS .** A report from an approved source or an approved agency providing an analysis of alternative building elements, components, assemblies, designs, constructions, or other identified attributes and comparing them to existing data or prescriptive designs for compliance of the alternative with identified provisions prescribed by the code or other identified standard.~~

1402.7 Vertical and lateral flame propagation compliance methods . When exterior wall assemblies are required in this Chapter to be tested for vertical and lateral flame propagation in accordance with, and comply with the acceptance criteria of NFPA 285, compliance with the requirements shall be established by any of the following:

1. An exterior wall assembly tested in accordance with and meeting the acceptance criteria of NFPA 285.
2. An exterior wall assembly design listed by an approved agency for compliance with NFPA 285.
3. ~~An engineering~~ An ~~engineering~~ approved analysis based on ~~NFPA 285 test data as allowed by Section 104.11 104.11.~~ an assembly or condition tested in accordance with and meeting the acceptance criteria of NFPA 285 .

Commenter's Reason: This Public Comment is necessary to address concerns raised during opposition testimony and by committee statements supporting Disapproval. Our members believe that clarification of prescriptive compliance pathways regarding NFPA 285 provides clear and valuable guidance to all code users and for the enforcement of the Code. The three pathways described in the proposal are to the same as those prescribed and allowed for other large-scale assembly tests (often accompanied by Labeling) such as ASTM E119 / UL 263, and several other disciplines not related to fire testing or fire performance. Where this proposal differs is that it prescribes all three routes to compliance within a single section.

This Public Comment:

- Removes the Engineering Analysis term and proposed definition.
- Retains the [New] Section 1402.7, but with revisions to:
  - Remove “engineering” terminology
  - Remove reference to 104.11
  - Add clarifying language regarding the analysis is based on NFPA 285 data for a tested assembly / condition
  - Add language requiring approval of the analysis

Publications describing NFPA 285 and the use of NFPA 285 test data for analysis of assembly fire performance are included with this public comment.

We respectfully request Approval FS124-21 as Modified by this Public Comment. The modification is an improvement to the original proposal and addresses concerns expressed during the Committee Action Hearings.

The North American Modern Building Alliance (NAMBA) is focused on addressing fire safety through the development and enforcement of building codes. Members of NAMBA are: ACC Center for the Polyurethanes Industry, ACC North American Flame Retardant Alliance, Atlas Roofing Corp., BASF Corporation, Carlisle Construction Materials, Covestro, DuPont, EIFS Industry Members Association, EPS Industry Alliance, GAF, Huntsman, Kingspan Insulation LLC, Metal Construction Association, Owens Corning, Polyisocyanurate Insulation Manufacturers Association, and Rmax - A Business Unit of the Sika Corporation.

Bibliography:

1. NFPA 285 - Extending Data with Comparative Engineering Analysis, IIBEC Interface, March 2021
2. NFPA 285 Engineering Judgements: A Practical Compliance Option, The Construction Specifier, June 2021

The link for the two articles: https://www.modernbuildingalliance.us/resources/

See labels: IIBEC Interface Article and Construction Specifier Article and use download resource button.

Cost Impact: The net effect of the public comment and code change proposal will not increase or decrease the cost of construction
The proposal clarifies existing methods available to designers, builders, and building officials that are acceptable to support verification and approval exterior wall assemblies regarding testing and compliance with the acceptance criteria of NFPA 285.

Public Comment# 2799

FS125-21

Proposed Change as Submitted

Proponents: Jeffrey H. Greenwald, North American Modern Building Alliance, representing North American Modern Building Alliance (jgreenwald@operativegreenwald.com); Bob Zabcik, representing Metal Construction Association (MCA) (bob@ztech-consulting.com)

2021 International Building Code

Add new text as follows:

1402.8 Exterior wall veneers manufactured using combustible adhesives.
Exterior wall assemblies on buildings of Type I, II, III or IV construction that are greater than 40 feet (12,192 mm) in height above grade plane and contain an exterior wall veneer manufactured using a combustible adhesive to laminate a metal core with noncombustible facing materials shall be tested in accordance with, and comply with, the acceptance criteria of NFPA 285, with the adhesive level at the maximum application rate intended for use. Combustibility shall be determined in accordance with Section 703.3.

Exception:

1. Walls in which the adhesive is the only combustible component and the adhesive complies with the following:
   1.1. A peak heat release rate of less than 150 kW/m2, a total heat release of less than 20 MJ/m2 and an effective heat of combustion of less than 18 MJ/kg when tested, in accordance with ASTM E1354, with the adhesive applied to a noncombustible substrate at the maximum application rate intended for use, in the horizontal orientation and at an incident radiant heat flux of 50 kW/m2.

   1.2. A flame spread index of 25 or less and a smoke-developed index of 450 or less as determined in accordance with ASTM E84 or UL 723.

Reason: This proposed new section is specific to exterior wall veneers composed of a metal core and facings that are both noncombustible materials, and the facings are laminated to the core using a combustible laminating adhesive. IBC Section 703.3.1 on noncombustible materials does not address the condition of combustible adhesives used to adhere a noncombustible surfacing (i.e. facings) to a noncombustible base (i.e. a metal core). The language of Section 703.3.1 has, in practice, been interpreted such that the scope of the exception includes veneer materials / products with a noncombustible core and thin facings (noncombustible or having limited surface burning characteristics), even though a combustible adhesive present.

Interpreting Section 703.3.1 in such manner has resulted in determinations that the veneer materials described above are considered noncombustible and, therefore, exterior wall coverings using these materials are not required to be tested in accordance with, or comply with the acceptance criteria of, NFPA 285 even though the veneer may contain a combustible material (the adhesive) of unknown and unregulated flammability. The IBC does not currently contain provisions regulating the flammability of combustible adhesives when used in exterior wall applications. The proposed change establishes a flame propagation requirement for this type of exterior veneer when used in exterior wall covering applications.

The proposal contains an exception to required NFPA 285 testing for the condition where the combustible adhesive is the only combustible component in the exterior wall assembly and the adhesive complies with specific flammability limitations and surface burning characteristics. The flammability limitations and surface burning characteristics prescribed in the proposed exception are equivalent to those currently recognized for the condition where a combustible water resistive barrier is the only combustible component in an exterior wall assembly.
The North American Modern Building Alliance (NAMBA) is focused on addressing fire safety through the development and enforcement of building codes. Members of NAMBA are: ACC Center for the Polyurethanes Industry, ACC North American Flame Retardant Alliance, Atlas Roofing Corp., BASF Corporation, Carlisle Construction Materials, Covestro, DuPont, EIFS Industry Members Association, GAF, Huntsman, Kingspan Insulation LLC, Metal Construction Association, Owens Corning, Polyisocyanurate Insulation Manufacturers Association, Rmax - A Business Unit of the Sika Corporation.

Figure 1. Metal honeycomb core (facing removed on lower half) – Combustible adhesives used to attach both top and bottom facings.

Figure 2. Corrugated metal core panel (End View) - Combustible adhesives used to attach both top and bottom facings.

Cost Impact: The code change proposal will increase the cost of construction
By expanding required compliance with NFPA 285, the proposal will increase testing for a segment of this exterior wall covering putting them at a level that is consistent with other exterior wall coverings specifically identified in the IBC including Metal Composite Materials (MCM), Exterior Insulation and Finish Systems (EIFS), High-Pressure Laminates (HPL), etc.

FS125-21

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The committee disapproval is based on the committee action on FS121-21. (Vote: 11-1)

FS125-21

Individual Consideration Agenda

Public Comment 1:

IBC: 1402.8

Proponents: Jeffrey Greenwald, representing North American Modern Building Alliance (jgreenwald@operativegreenwald.com); Bob Zabcik, representing Metal Construction Association (MCA) (bob@ztech-consulting.com) requests As Modified by Public Comment

Modify as follows:

2021 International Building Code

1402.8 Exterior wall veneers manufactured using combustible adhesives . Exterior wall assemblies on buildings of Type I, II, III or IV construction that are greater than 40 feet (12,192 mm) in height above grade plane and contain an exterior wall veneer manufactured using a combustible adhesive to laminate a metal core with noncombustible facing materials shall be tested in accordance with, and comply with, the acceptance criteria of NFPA 285, with the adhesive level at the maximum application rate intended for use. Combustibility shall be determined in accordance with Section 703.3.

~~**Exception:**~~

~~1. Walls in which the adhesive is the only combustible component and the adhesive complies with the following:~~
   - ~~1.1. A peak heat release rate of less than 150 kW/m2, a total heat release of less than 20 MJ/m2 and an effective heat of combustion of less than 18 MJ/kg when tested, in accordance with ASTM E1354, with the adhesive applied to a noncombustible substrate at the maximum application rate intended for use, in the horizontal orientation and at an incident radiant heat flux of 50 kW/m2.~~
   - ~~1.2. A flame spread index of 25 or less and a smoke-developed index of 450 or less as determined in accordance with ASTM E84 or UL 723.~~

Commenter's Reason: This proposal and public comment are necessary to address a loophole by which the use of certain exterior cladding materials containing a combustible adhesive in Type I-IV construction are not required to undergo NFPA 285 tests because they "…shall be acceptable as noncombustible…" under the Exception to Section 703.3.1. In effect, this loophole allows the unregulated use of a combustible adhesive in exterior wall veneers of Type I-IV construction. While the volume of this adhesive may be limited, it has been shown to lead to excessive flame propagation in exterior veneer uses. The proposal and this PC seek to add a prescriptive requirement for NFPA 285 testing when these materials are used in or on exterior walls of Type I-IV construction.
This Public Comment removes the proposed Exception that the committee found objectionable while retaining the prescribed requirement for NFPA 285 testing when these materials are used on exterior walls of Type I-IV construction.

The committee's reason for Disapproval was based on the Disapproval action taken on FS121-21 that sought to add an exception to NFPA 285 testing for exterior walls containing a combustible WRB and FRTW. This code proposal is actually the opposite of FS121-21 in that it seeks to add the NFPA 285 testing requirement for these metal-core with metal-faced laminated panel products using combustible adhesives.This loophole in the IBC allows exterior laminated panels to be exempt from the fire performance criteria of NFPA 285 when used on exterior walls of Type I-IV buildings greater than 40ft in height even though there is a known potential flame propagation. Metal-core panels with thin metal faces adhered using a combustible laminating adhesive have shown significant flame propagation in NFPA 285 testing, and several other large-scale tests around the world (also due to excessive vertical and lateral flame spread). These test results have led to significant limitations in the use of this product type on high-rise and even mid-rise buildings in both England and Australia.

Language contained in IBC Section 703.3.1 has been used to accept this type of material as noncombustible. This proposal does nothing to change 703.3.1 but adds a prescriptive requirement for metal core laminated panels to be tested in accordance with NFPA 285 when used as an exterior wall veneer on exterior walls for buildings taller than 40ft in height as is required for all other combustible materials (i.e., combustible WRBs, MCM, HPL, EIFS, foam plastic insulation, etc.).

In the initial proposal, the intent of the exception was to limit the amount of combustible material; as is currently allowed for walls containing only a combustible WRB. This exception has been eliminated because:

- No cone calorimeter data exists to provide a benchmark on the adhesive performance with respect to the exception criteria.
- It would be rare, if not impossible for this type of panel to be installed without the use of a WRB, so a combustible limitation based on the adhesive being the only combustible material in the exterior wall assembly is not realistic and the exceptions of Section 1402.5 would not apply; thus NFPA 285 testing would be required.

At the hearings in April, there was no opposition to this proposal. This proposal actually adds a requirement for NFPA 285 testing of what is technically a combustible cladding element; which is currently being installed as noncombustible due to the loophole in the IBC. A final comment from the committee was a reference to Grenfell Tower and that "we need to get this issue addressed correctly." That is exactly what this proposal is designed to do. Take what has been shown to be a combustible cladding material with vertical and lateral flame spread issues and require testing to NFPA 285.

We respectfully request Approval as Modified by this Public Comment.

The North American Modern Building Alliance (NAMBA) is focused on addressing fire safety through the development and enforcement of building codes. Members of NAMBA are: ACC Center for the Polyurethanes Industry, ACC North American Flame Retardant Alliance, Atlas Roofing Corp., BASF Corporation, Carlisle Construction Materials, Covestro, DuPont, EIFS Industry Members Association, EPS Industry Alliance, GAF, Huntsman, Kingspan Insulation LLC, Metal Construction Association, Owens Corning, Polyisocyanurate Insulation Manufacturers Association, and Rmax - A Business Unit of the Sika Corporation.

Cost Impact: The net effect of the public comment and code change proposal will increase the cost of construction
By expanding required compliance with NFPA 285, the proposal will increase testing for a segment of this exterior wall covering putting them at a level that is consistent with other exterior wall coverings specifically identified in the IBC including Metal Composite Materials (MCM), Exterior Insulation and Finish Systems (EIFS), High-Pressure Laminates (HPL), etc.

Public Comment# 2802

FS129-21

Proposed Change as Submitted

Proponents: Jeffrey H. Greenwald, North American Modern Building Alliance, representing North American Modern Building Alliance (jgreenwald@operativegreenwald.com)

2021 International Building Code

Revise as follows:

1403.8 Plastics. ~~Plastic panel, apron or spandrel walls as defined in this code shall not be limited in thickness, provided that such plastics and their assemblies conform to the requirements of Chapter 26 and are constructed of *approved* weather-resistant materials of adequate strength to resist the wind *loads* for cladding specified in Chapter 16.~~ Plastics intended for use in or on *exterior walls* shall comply with the applicable requirements of Chapter 14 and of Chapter 26.

Reason: This proposal revises the language of 1403.8 in order to maintain confirmation of the general acceptance of plastics used in exterior wall assemblies under Section 1403 Materials, but provide more relevant references.
Plastic (and plastic panel), apron (and plastic apron), spandrel (and spandrel wall), and plastic spandrel (and plastic spandrel wall) are not defined terms within Chapter 2 of the IBC, therefore, the "…as defined…" language of Section 1403.8 is incorrect and creates confusion that distracts the User from the more relevant sections of the IBC. This section has caused confusion because the referenced products and applications ("Plastic panel, apron or spandrel walls …") are more specifically addressed under other sections of the Code. Dating to the 2000 Edition of the IBC, this section has become outdated as more specific provisions have been added to Chapters 14, 16, 17 and 26 over the last 20+ years.
The North American Modern Building Alliance (NAMBA) is focused on addressing fire safety through the development and enforcement of building codes. Members of NAMBA are: ACC Center for the Polyurethanes Industry, ACC North American Flame Retardant Alliance, Atlas Roofing Corp., BASF Corporation, Carlisle Construction Materials, Covestro, DuPont, EIFS Industry Members Association, GAF, Huntsman, Kingspan Insulation LLC, Metal Construction Association, Owens Corning, Polyisocyanurate Insulation Manufacturers Association, Rmax - A Business Unit of the Sika Corporation.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The proposal does not change existing performance or construction requirements.

FS129-21

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The committee concluded that the language in the proposal could be misleading to contain all the plastics within a wall. The reference to chapter 14 is not appropriate, while the section is in chapter 14. The proposed text is not clear and not concise. The proponent could incorporate the approved FS120-21 code change text of "exterior wall assembly" to clarify the proposal's intent. (Vote: 13-0)

FS129-21

Individual Consideration Agenda

Public Comment 1:

IBC: 1403.8

Proponents: Jeffrey Greenwald, representing North American Modern Building Alliance (jgreenwald@operativegreenwald.com) requests As Modified by Public Comment

Modify as follows:

2021 International Building Code

1403.8 Plastics . Plastics intended for use in or on *exterior walls* shall comply with the applicable requirements ~~of Chapter 14 and~~ of Chapter 26.

Commenter's Reason: FS129 was submitted to revise Section 1403.8 since this section has become outdated as more specific provisions have been added to Chapters 14, 16, 17 and 26. This public comment removes the reference to Chapter 14 in response to committee comments. The public comment now provides a direct reference to Chapter 26 where the requirements for the use of plastics in building construction and components are addressed.
We respectfully request Approval as Modified by this Public Comment.

The North American Modern Building Alliance (NAMBA) is focused on addressing fire safety through the development and enforcement of building codes. Members of NAMBA are: ACC Center for the Polyurethanes Industry, ACC North American Flame Retardant Alliance, Atlas Roofing Corp., BASF Corporation, Carlisle Construction Materials, Covestro, DuPont, EIFS Industry Members Association, EPS Industry Alliance, GAF, Huntsman, Kingspan Insulation LLC, Metal Construction Association, Owens Corning, Polyisocyanurate Insulation Manufacturers Association, and Rmax - A Business Unit of the Sika Corporation.

Cost Impact: The net effect of the public comment and code change proposal will not increase or decrease the cost of construction
The proposal does not change existing performance or construction requirements.

Public Comment# 2805

FS144-21

Proposed Change as Submitted

Proponents: Theresa Weston, representing The Holt Weston Consultancy, LLC (holtweston88@gmail.com)

2021 International Building Code

Add new definition as follows:

RAINSCREEN. An assembly applied to an exterior wall which consists of, at minimum, an outer layer, an inner layer, and a cavity between them sufficient for the passive removal of liquid water and water vapor.

Revise as follows:

TABLE 1404.3(3) CLASS III VAPOR RETARDERS

ZONE	CLASS III VAPOR RETARDERS PERMITTED FOR:[a, b]
4	Vented cladding over wood structural panels Vented cladding over fiberboard Vented cladding over gypsum Continuous insulation with *R*-value ≥ R2.5 over 2 × 4 wall Continuous insulation with *R*-value ≥ R3.75 over 2 × 6 wall
5	Vented cladding over wood structural panels Vented cladding over fiberboard Vented cladding over gypsum Continuous insulation with *R*-value ≥ R5 over 2 × 4 wall Continuous insulation with *R*-value ≥ R7.5 over 2 × 6 wall
6	Vented cladding over fiberboard Vented cladding over gypsum Continuous insulation with *R*-value ≥ R7.5 over 2 × 4 wall Continuous insulation with *R*-value ≥ R11.25 over 2 × 6 wall
7	Continuous insulation with *R*-value ≥ R10 over 2 × 4 wall Continuous insulation with *R*-value ≥ R15 over 2 × 6 wall
8	Continuous insulation with *R*-value ≥ R12.5 over 2 × 4 wall Continuous insulation with *R*-value ≥ R20 over 2 × 6 wall

a. Vented cladding shall include vinyl lap siding, polypropylene, or horizontal aluminum siding, brick veneer with airspace as specified in this code, *rainscreens*, and other approved vented claddings.

b. The requirements in this table apply only to insulation used to control moisture in order to permit the use of Class III vapor retarders. The insulation materials used to satisfy this option also contribute to but do not supersede the thermal envelope requirements of the International Energy Conservation Code.

Reason: Rainscreens are aa common and growing construction technique that is not material specific. The concept of cladding and substrates layers separated by a cavity that allows water to drain and air flow to accelerate drying is the most basic understanding of how a rainscreen system works. This proposal seeks to define the term *rainscreen* and to add to include *rainscreens* to the list of vented claddings that work in a system with Class III Vapor Retarder assemblies.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This does not add a new requirement but clarifies existing requirements and already existing option and so will not either increase or decrease the cost of construction.

FS144-21

Public Hearing Results

Committee Action: As Modified

Committee Modification:

RAINSCREEN SYSTEM. An assembly applied to the exterior side of an exterior wall which consists of, at minimum, an outer layer, an inner layer, and a cavity between them sufficient for the passive removal of liquid water and water vapor.

TABLE 1404.3(3) CLASS III VAPOR RETARDERS

Portions of table not shown remain unchanged.

a. Vented cladding shall include vinyl lap siding, polypropylene, or horizontal aluminum siding, brick veneer with airspace as specified in this code, ~~rainscreens~~ *rainscreen systems,* and other approved vented claddings.

b. The requirements in this table apply only to insulation used to control moisture in order to permit the use of Class III vapor retarders. The insulation materials used to satisfy this option also contribute to but do not supersede the thermal envelope requirements of the International Energy Conservation Code.

Committee Reason: The committee concluded that the modification is an essential addition to clarify the exterior side of the exterior wall. Adding the word "system" is critical to guide to the appropriate system. The proposal defines an already used concept. (Vote: 13-0)

Individual Consideration Agenda

Public Comment 1:

Proponents: David Collins, representing The American Institute of Architects (dcollins@preview-group.com) requests Disapprove

Commenter's Reason: The AIA urges RAINA to withdraw the two code change proposals that add a definition for rainscreens to Chapters 2 (FS144) and requirements for rainscreens to Chapter 14 (FS151). Instead we urge RAINA to work towards a fully vetted and scientifically-based code change for the next cycle that AIA and other parties can all support. The AIA Building Performance Knowledge Committee (BPKC)worked for many years to develop “Definitions for Building Performance”. One of the goals of developing these definitions was to assist clear communication between architects, owners, product manufacturers, contractors and code officials. Due to the lack of clear definitions of many terms, and in particular the term “Rainscreen”, communication has been seriously impaired. Some people interpret rainscreen to mean any open joint cladding, others think it must be part of a pressure-equalized rainscreen assembly, others feel 1/16” high bumps on house wraps will produce a rainscreen. Obviously these are widely varying concepts. The AIA BPKC has published a definition of rainscreen wall assembly based on elevated performance for the control of water infiltration using building science principles.

RAINSCREEN WALL ASSEMBLY: A type of exterior wall that is designed and detailed to reduce the movement of water through joints in cladding while promoting both drainage and air movement within the drainage cavity. A rainscreen assembly comprises a structurally supported exterior cladding, an airspace and a water-resistive barrier that also serves as air barrier. Continuous thermal insulation may be included within the airspace.

With the formation of RAINA, the AIA sees a great opportunity to further clarify the use of rainscreens and supports the idea of defining rainscreen in the code. However, the definitions included in the two proposed code changes presented by RAINA are so brief and vague that the AIA cannot support them. The AIA feels the proposed definitions in the IBC would further contribute to the misunderstanding and misuse of the term currently in the design and construction industry. Furthermore the AIA feels the new definitions provide no useful information to allow code officials to better serve the public health, safety and welfare. Finally, adoption of such a weak definition will make implementation of a more robust definition much more difficult in the future.

Cost Impact: The net effect of the public comment and code change proposal will not increase or decrease the cost of construction
No change to code.

Public Comment# 2606

FS146-21

Proposed Change as Submitted

Proponents: Jeffrey H. Greenwald, North American Modern Building Alliance, representing North American Modern Building Alliance (jgreenwald@operativegreenwald.com); William Egan, representing EIFS Industry Members Association (EIMA) (bill@billegangroup.com)

2021 International Building Code

Add new text as follows:

1407.5 Exterior walls of buildings of any height.
Exterior wall assemblies containing an EIFS *exterior wall covering* shall be tested in accordance with, and comply with the acceptance criteria of, NFPA 285 and comply with Section 2603.5.

Reason: This code proposal clarifies the fire testing requirements for EIFS systems and add a reference to Section 2603.5 to ensure the exterior wall assemblies with EIFS exterior wall coverings will comply with the relevant requirements for fire resistance (E119/UL 263), surface burning characteristics (E84/UL 723), vertical and lateral flame propagation (NFPA 285), and ignition resistance (NFPA 268). The current Section 1407.1 references, "…in addition to other applicable requirements of […] Chapter 26.," the new proposed Section 1407.5 provides clear and specific reference to the codified fire testing and fire performance requirements for exterior wall assemblies containing foam plastic insulation and associated exterior coatings and facings.

The North American Modern Building Alliance (NAMBA) is focused on addressing fire safety through the development and enforcement of building codes. Members of NAMBA are: ACC Center for the Polyurethanes Industry, ACC North American Flame Retardant Alliance, Atlas Roofing Corp., BASF Corporation, Carlisle Construction Materials, Covestro, DuPont, EIFS Industry Members Association, GAF, Huntsman, Kingspan Insulation LLC, Metal Construction Association, Owens Corning, Polyisocyanurate Insulation Manufacturers Association, Rmax - A Business Unit of the Sika Corporation.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The proposal does not change existing performance or construction requirements.

FS146-21

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The committee indicated this is an unnecessary and unclear pointer. The fire testing criteria is already addressed in ASTM E2568. (Vote: 9-4)

FS146-21

Individual Consideration Agenda

Public Comment 1:

IBC: 1407.5

Proponents: Jeffrey Greenwald, representing North American Modern Building Alliance (jgreenwald@operativegreenwald.com) requests As Modified by Public Comment

Modify as follows:

2021 International Building Code

1407.5 Exterior walls of buildings of any height . Exterior wall assemblies containing an EIFS *exterior wall covering* shall ~~be tested in accordance with, and comply with the acceptance criteria of, NFPA 285 and~~ comply with Section 2603.5.

Commenter's Reason: FS146 was recommended for disapproval since fire test requirements in section 2603.5 are contained in ASTM E 2568

(Standard Specification for Exterior Insulation and Finish Systems) which is referenced in section 1407.2.
The North American Modern Building Alliance requests FS146-21 to be approved as modified for the following reasons:

1. ASTM standards are living documents subject to change and modification at any time. Stakeholders, including Building Code officials, may not have ready access to the applicable edition of the ASTM standard that is in the code therefore a specific reference to section 2603.5 should be included under section 1407.
2. The addition of proposed section 1407.5 adds a clear pointer that will be helpful to all stakeholders (building code officials, design professionals, contractors, owners, etc.) as to the fire performance requirements for EIFS with foam plastic insulation.
3. NFPA 285 is a test requirement within section 2603.5 therefore the proposed modification removes this unnecessary reference, plus NFPA 285 only applies as set forth in 2603.5.

The proposed change and Public Comment are supported by EIMA, the EIFS industry trade association.

We respectfully request Approval as Modified by this Public Comment.

The North American Modern Building Alliance (NAMBA) is focused on addressing fire safety through the development and enforcement of building codes. Members of NAMBA are: ACC Center for the Polyurethanes Industry, ACC North American Flame Retardant Alliance, Atlas Roofing Corp., BASF Corporation, Carlisle Construction Materials, Covestro, DuPont, EIFS Industry Members Association, EPS Industry Alliance, GAF, Huntsman, Kingspan Insulation LLC, Metal Construction Association, Owens Corning, Polyisocyanurate Insulation Manufacturers Association, and Rmax - A Business Unit of the Sika Corporation.

Cost Impact: The net effect of the public comment and code change proposal will not increase or decrease the cost of construction
The proposal does not change existing performance or construction requirements.

Public Comment# 2472

FS147-21

Proposed Change as Submitted

Proponents: Jeffrey H. Greenwald, North American Modern Building Alliance, representing North American Modern Building Alliance (jgreenwald@operativegreenwald.com); William F Egan, Bill Egan Group LLC, representing EIFS Industry Members Association (EIMA) (bill@billegangroup.com)

2021 International Building Code

Add new text as follows:

1407.7 Fire-resistance.
Where EIFS are used on *exterior walls* required to have a *fire-resistance rating* in accordance with Section 705, evidence shall be submitted to the building official that the required *fire-resistance rating* is maintained.

> **Exception:** EIFS which are part of an exterior wall assembly not containing foam plastic insulation and are installed on the outer surface of a fire-resistance-rated exterior wall in a manner such that the attachments do not penetrate through the entire exterior wall assembly, shall not be required to comply with this section.

Reason: The proposal adds a new subsection to Section 1407, EIFS (Exterior Insulation and Finish Systems), consistent with Sections 1406 (on MCM systems) and 1408 (on HPL systems), that requires evidence is provided to support that a fire resistance rating, when required by Section 705, is not reduced. The proposal adds this same language to Section 1407 on EIFS.
Section 1407.2 requires that “EIFS shall be constructed such that it meets the performance characteristics required in ASTM E2568.” The ASTM specification contains a requirement equivalent to what is proposed, but adding this proposed language to the IBC makes it easier for the code official to note that the same requirement to verify fire-resistance applies to EIFS as it does to the other assemblies.

The North American Modern Building Alliance (NAMBA) is focused on addressing fire safety through the development and enforcement of building codes. Members of NAMBA are: ACC Center for the Polyurethanes Industry, ACC North American Flame Retardant Alliance, Atlas Roofing Corp., BASF Corporation, Carlisle Construction Materials, Covestro, DuPont, EIFS Industry Members Association, GAF, Huntsman, Kingspan Insulation LLC, Metal Construction Association, Owens Corning, Polyisocyanurate Insulation Manufacturers Association, Rmax - A Business Unit of the Sika Corporation.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The proposal does not change existing performance or construction requirements.

FS147-21

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The committee concluded this code change is not needed since ASTM E2568 already addresses this issue. (Vote: 10-3)

FS147-21

Individual Consideration Agenda

Public Comment 1:

Proponents: Jeffrey Greenwald, representing North American Modern Building Alliance (jgreenwald@operativegreenwald.com) requests As Submitted

Commenter's Reason: FS147-21 was Disapproved by the committee for the stated reason that the committee believed ASTM E2568 *Standard Specification for Exterior Insulation and Finish Systems* (referenced and required in Section 1407.2) already addresses the issue of fire resistance for EIFS.
The North American Modern Building Alliance requests FS147-21 to be Approved as Submitted for the following reasons:

1. ASTM standards are living documents subject to change and modification at any time.
2. Stakeholders, including Building Code officials, may not have ready access to ASTM E2568, therefore, a specific reference to section 705 for the applicable requirements should be included under section 1407.
3. The addition of proposed new section 1407.7 adds a clear pointer that will be helpful to all stakeholders (building code officials, design professionals, contractors, owners, etc.) as to the fire resistance requirements for EIFS.

The proposed change and Public Comment are supported by EIMA, the EIFS industry trade association.

We respectfully request Approval as Submitted.

The North American Modern Building Alliance (NAMBA) is focused on addressing fire safety through the development and enforcement of building codes. Members of NAMBA are: ACC Center for the Polyurethanes Industry, ACC North American Flame Retardant Alliance, Atlas Roofing Corp., BASF Corporation, Carlisle Construction Materials, Covestro, DuPont, EIFS Industry Members Association, EPS Industry Alliance, GAF, Huntsman, Kingspan Insulation LLC, Metal Construction Association, Owens Corning, Polyisocyanurate Insulation Manufacturers Association, and Rmax - A Business Unit of the Sika Corporation.

Cost Impact: The net effect of the public comment and code change proposal will not increase or decrease the cost of construction
The proposal does not change existing performance or construction requirements.

Public Comment# 2473

FS150-21

Proposed Change as Submitted

Proponents: Michael O'Brian, representing FCAC (fcac@iccsafe.org)

2021 International Building Code

Add new text as follows:

SECTION 1410
BIPV SYSTEMS FOR EXTERIOR WALL COVERINGS AND FENESTRATION

1410.1 Listing required.
In addition to complying with other provisions of this code, BIPV systems used as exterior wall coverings or fenestration shall be listed and labeled in accordance with UL 1703 or both UL 61730-1 and UL 61730-2.

Reason: Building Integrated Photovoltaic (BIPV) Systems are increasingly becoming popular due to efforts to achieve Net Zero Energy. Requirements for BIPV Systems used as roof assemblies and roof coverings are already addressed in Chapter 15. New applications for BIPV systems are systems that are used as either exterior wall coverings or fenestration. The IBC is silent on the requirements for such systems. Chapter 14 contains a variety of requirements for exterior wall coverings and exterior wall assemblies. Clearly, if BIPV systems are included in exterior walls they should comply with all such requirements (including fire tests and weather protection). In addition to those requirements, this proposal requires that BIPV systems be listed and labeled in accordance with the applicable UL standards. Note these UL standards are already addressed in the IBC.
This proposal is submitted by the ICC Fire Code Action Committee (FCAC). The FCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance assigned International Codes with regard to fire and life safety in new and existing buildings and facilities as well as the protection of life and property in wildland urban interface areas. In 2020 and 2021 the Fire-CAC held multiple virtual meetings that were open to any interested party. In addition, there were numerous virtual specific working group meetings that were also open to any interested parties, to develop, discuss and debate the proposed changes. Related documentation and reports are posted on the FCAC website at: https://www.iccsafe.org/products-and-services/i-codes/code-development/cs/fire-code-action-committee-fcac/

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This code change proposal will not increase or decrease the cost of construction. This proposal clarifies what requirements apply to BIPV systems used as an exterior wall covering or fenestration.

FS150-21

Public Hearing Results

Committee Action: **As Submitted**

Committee Reason: The proposal provides needed installation guidelines for BIPV systems used as exterior wall coverings or fenestration to be listed and labeled. The committee also mentioned that the safety glazing issue and adding duality to those products need to be addressed. The committee suggested including a general reference to chapter 14. (Vote: 9-4)

FS150-21

Individual Consideration Agenda

Public Comment 1:

IBC: SECTION 1410, 1410.1

Proponents: Marcelo Hirschler, representing self (mmh@gbhint.com) requests As Modified by Public Comment

Modify as follows:

2021 International Building Code

SECTION 1410
BIPV SYSTEMS FOR EXTERIOR WALL COVERINGS AND FENESTRATION

1410.1 Listing required . In addition to complying with Section 1405 ~~other provisions of this code~~, BIPV systems used as exterior wall coverings or fenestration shall be listed and labeled in accordance with UL 1703 or both UL 61730-1 and UL 61730-2.

Commenter's Reason: The systems proposed to be added to the IBC are described in the proposal as exterior wall coverings. Section 1405 is entitled "COMBUSTIBLE MATERIALS ON THE EXTERIOR SIDE OF EXTERIOR WALLS". Therefore the requirements for exterior wall coverings are contained in Section 1405. In order to ensure that the same requirements as other exterior wall coverings apply, this public comment revises the wording to clarify that BIPVs need to meet the requirements of Section 1405 while leaving them in the new section for more visibility. No requirements are being proposed to be changed.
This public comment addresses the concerns of the committee regarding a reference to the relevant sections of chapter 14.

Cost Impact: The net effect of the public comment and code change proposal will not increase or decrease the cost of construction
The public comment simply clarifies the proposal.

Public Comment# 2373

S10-21

Proposed Change as Submitted

Proponents: Mike Nugent, Chair, representing ICC Building Code Action Committee (bcac@iccsafe.org); Michael O'Brian, Chair, representing FCAC (fcac@iccsafe.org)

THIS CODE CHANGE WILL BE HEARD BY THE IBC-FIRE SAFETY CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THAT COMMITTEE.

2021 International Building Code

Add new definition as follows:

RAISED-DECK SYSTEM. (For application to Chapter 15 only). A system consisting of decking or pavers supported by pedestals installed over a roof assembly to provide a walking surface.

Add new text as follows:

1511.9 *Raised-deck systems* installed over a *roof assembly*.
Raised-deck systems installed above a *roof assembly* shall comply with Sections 1511.9.1 through 1511.9.5.

1511.9.1 Installation.
The installation of a *raised-deck system* shall comply with all of the following:

1. The perimeter of the *raised-deck system* shall be surrounded on all sides by parapet walls or by a noncombustible enclosure approved to prevent fire intrusion below the *raised-deck system*. The parapet wall or enclosure shall extend above the plane of the top surface of the *raised deck system*.
2. A *raised-deck system* shall be installed above a listed roof assembly.

   Exception:
   Where the roof assembly is not required to have a fire classification in accordance with Section 1505.2.
3. A *raised-deck system* shall be installed in accordance with the manufacturer's installation instructions.
4. A *raised-deck system* shall not obstruct or block plumbing or mechanical vents, exhaust, or air inlets.

1511.9.2 Fire classification.
The *raised-deck system* shall be tested, listed and labeled with a fire classification in accordance with Section 1505. The fire classification of the *raised deck system* shall be not less than the fire classification for the *roof covering* over which it is installed.

Exception: Where the top surface of the raised deck system consists of brick, masonry or concrete materials, a fire classification is not required.

1511.9.3 Pedestals or supports.
The pedestals or supports for the *raised deck system* shall be installed in accordance with manufacturer's installation instructions.

1511.9.4 Structural requirements.
The *raised-deck system* shall be designed for wind loads in accordance with Chapter 16 and Section 1504.5. The *raised-deck system* shall be designed for seismic loads in accordance with Chapter 16.

1511.9.5 Roof drainage.
The *raised-deck system* shall not impede the operation of the roof drainage system as required by Section 1502 and the *International Plumbing Code*.

1511.9.6 Access and Egress.
Access to the *raised-deck system* shall be in accordance with Chapter 11 and egress shall be in accordance with Chapter 10.

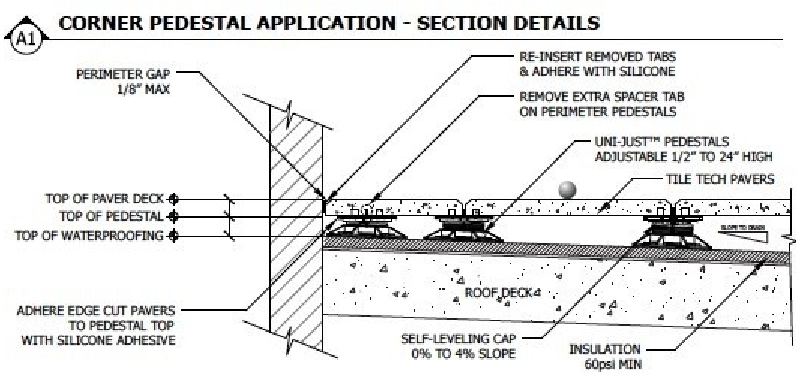
Reason: Currently the IBC does not have any specific provisions for the design and installation of raised-deck systems. These provisions should be a subsection to Section 1511 because these systems are a roof structure over a roof assembly. A definition of "raised deck systems" is needed to ensure correct application of new requirements for these systems. This term is applicable only to Chapter 15 (same "Chapter 15 restriction" as the definition for roof assembly).
Fire test requirements for the raised deck systems are based on research studies performed for PV panels on low and steep-sloped roofs; which have general applicability to Raised Deck Systems. The following is a link to the reports for those studies: http://www.solarabcs.org/about/publications/reports/flammability-testing/index.html. These studies showed that when fire was able to enter the

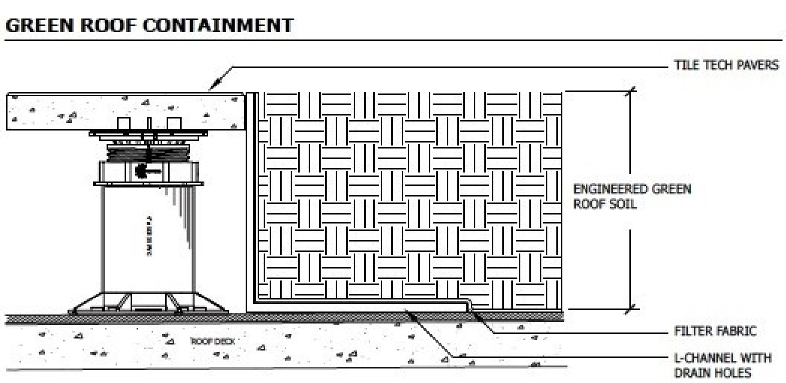
space between the roof assembly and the panel above, it could significantly alter the original test results for the fire classification of the roof assembly. By providing a protective barrier at the perimeter such as a parapet wall, roof curb or intersection with vegetative roof to prevent fire intrusion into the space, there would not be any concern with affects to the fire classification of the roof assembly underneath.

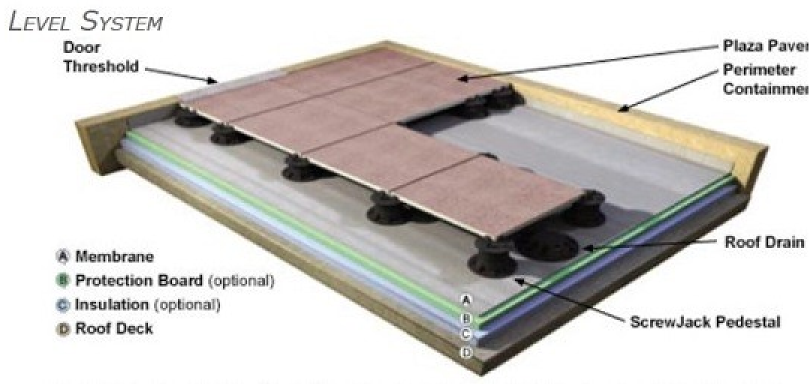
The manufacturer's installation instructions cover how the pedestals and supports are to be installed for these systems.

Three pointers (code references) for structural; roof water drainage; and access and egress are provided to ensure that these other safety and performance requirements essential for roofs are applied to Raised Deck Systems. The pictures included with this code change illustrate examples of what a typical raised deck system consists of, including a photograph of an actual rooftop pool deck, two cross-sections of a typical raised deck system, and an isometric view of the typical components.

This proposal is submitted by the ICC Building Code Action Committee (BCAC). BCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2020 the BCAC has held several virtual meetings open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the BCAC website at BCAC.







Cost Impact: The code change proposal will increase the cost of construction
The code change will increase the cost of construction, for those who decide to install these types of systems. However, this provides clarity on what requirements are to be applied for these installations.

S10-21

Public Hearing Results

Committee Action: **As Modified**

Committee Modification:

1511.9.1 Installation. The installation of a *raised-deck system* shall comply with all of the following:

1. The perimeter of the *raised-deck system* shall be surrounded on all sides by parapet walls or by a noncombustible enclosure approved to prevent fire intrusion below the *raised-deck system*. The parapet wall or enclosure shall extend ~~above the plane of~~ at least to the top surface of the *raised deck system*.
2. A *raised-deck system* shall be installed above a listed roof assembly.

   Exception:
   Where the roof assembly is not required to have a fire classification in accordance with Section 1505.2.
3. A *raised-deck system* shall be installed in accordance with the manufacturer's installation instructions.
4. A *raised-deck system* shall not obstruct or block plumbing or mechanical vents, exhaust, or air inlets.

1511.9.2 Fire classification. The *raised-deck system* shall be ~~tested,~~ listed and ~~labeled~~ identified with a fire classification in accordance with Section 1505 and shall be tested in accordance with either Section 1511.9.2.1 or Section 1511.9.2.2.. ~~The fire classification of the *raised deck system* shall be not less than the fire classification for the *roof covering* over which it is installed.~~

~~**Exception:** Where the top surface of the raised deck system consists of brick, masonry or concrete materials, a fire classification is not required.~~

1511.9.2.1 Fire testing of the raised deck system installed over a classified roof assembly. The raised deck system shall be tested separately from the roof assembly over which it is installed. The fire classification of the raised deck system shall be not less than the fire classification for the roof assembly over which it is installed.
Exception: Where the top surface of the raised deck system consists of brick, masonry or concrete materials, fire testing of the raised deck system is not required.

1511.9.2.2 Fire testing of the raised deck system together with the roof assembly. The roof assembly and the raised deck system shall be tested together.

1511.9.4 Structural requirements. The *raised-deck system* shall be designed for ~~wind~~ all applicable loads in accordance with Chapter 16 and performance requirements in Section 1504.5. T~~he *raised-deck system* shall be designed for seismic loads in accordance with Chapter 16.~~

Committee Reason: The committee determined the modification corrects terminology problems, identified multiple test path methods, and corrects wind and seismic load requirements. The proposal provides design options and reduces the potential hazard. One of the committee members asked

the proponent to address the following in the public comment phase:
1) Identify parapet.
2) Section 1511.9.5 needs to address the snow accumulation issue.
3) Section 1511.9.1, #4 needs to address obstruction of roof drainage.
4) Section 1511.9.2 exception could include a material standard for thickness.
5) Section 1511.9.3 needs to address the load distribution of the intersect between roof membrane with foam plastic underneath.
6) Consider the dead load of this system on the roof structure.
For the group B hearing, one of the committee members suggested that the proponent consider introducing more details for Ballasted photovoltaic panel systems. The only reference for those systems is in section 1607.14.4.5, Ballasted photovoltaic panel systems).(Vote: 12-1)

S10-21

Individual Consideration Agenda

Public Comment 1:

IBC: 1511.9.1, 1511.9.2.1, 1511.9.5, 1511.9.6

Proponents: Mike Nugent, representing ICC Building Code Action Committee (bcac@iccsafe.org); Michael O'Brian, representing FCAC (fcac@iccsafe.org) requests As Modified by Public Comment

Further modify as follows:

2021 International Building Code

1511.9.1 Installation . The installation of a *raised-deck system* shall comply with all of the following:

1. The perimeter of the *raised-deck system* shall be surrounded on all sides by ~~parapet~~ walls or by a noncombustible enclosure approved to prevent fire intrusion below the *raised-deck system*. The ~~parapet~~ wall or enclosure shall extend at least <u>from the roof assembly</u> to the top surface of the *raised deck system*. <u>The enclosure shall not impede roof drainage in accordance with Section 1511.9.5.</u>
2. A *raised-deck system* shall be installed above a listed roof assembly.

   Exception: Where the roof assembly is not required to have a fire classification in accordance with Section 1505.2.
3. A *raised-deck system* shall be installed in accordance with the manufacturer's installation instructions.
4. A *raised-deck system* shall not ~~obstruct or block~~ <u>impede the operation of</u> plumbing or mechanical vents, exhaust, ~~or~~ air inlets<u>, or roof drains</u>. <u>Where required, access for inspection, cleaning or maintenance shall be provided .</u>

1511.9.2.1 Fire testing of the raised deck system installed over a classified roof assembly . The raised deck system shall be tested separately from the roof assembly over which it is installed. The fire classification of the raised deck system shall be not less than the fire classification for the roof assembly over which it is installed.

> **Exception:** Where the ~~top surface~~ <u>decking or pavers</u> of the raised deck system consists of brick, masonry<u>,</u> ~~or~~ concrete ~~materials~~, <u>or other noncombustible materials,</u> fire testing of the raised deck system is not required.

1511.9.5 Roof drainage . The raised-deck system<u>, including the wall or enclosure between the roof assembly and the raised deck,</u> shall <u>be designed and installed to</u> ~~not impede~~ <u>allow for</u> the operation of the roof drainage system as required by Section 1502 and the International Plumbing Code. <u>The roof structure shall be designed to support any standing water resulting from the installation of the raised-deck system.</u>

1511.9.6 ~~Access~~ <u>Accessibility</u> and Egress . ~~Access to the the~~ <u>The</u> raised-deck system shall be <u>accessible</u> in accordance with Chapter 11 and <u>means of</u> egress shall be <u>provided</u> in accordance with Chapter 10.

Commenter's Reason: This Public Comment is in response to the request from the Code Development Committee (CDC) to further refine the proposed new section for raised deck systems. The BCAC worked with the CDC member to make sure the specific concerns were properly addressed.
Fundamentally, the concerns were to clarify necessary roof drainage and roof structure support, while not adversely impacting fire safety, which were specifically addressed as follows:

1) Identify parapet. – The term "parapet" is proposed to be removed from Section 1511.9.1. This action re-focuses the purpose of the enclosure surrounding the raised deck system. The "enclosure" is intended to serve as a flame "shield" to prevent flame propagation underneath the raised deck.

2) Section 1511.9.5 needs to address the snow accumulation issue. – Snow accumulation varies depending on the location. Proposed change requires the registered design professional and the installer to appropriately design and install to address for local conditions to ensure roof drainage. The design shall consider water migration through the deck system and for water flow to drains from other portions of the roof.

3) Section 1511.9.1, #4 needs to address obstruction of roof drainage. – Roof drains have been added to the list of what shall not be obstructed. Requirement for access to be provided for inspection, cleaning, and maintenance have been added to provide suitable means to address any field issues.

4) Section 1511.9.2 exception could include a material standard for thickness. – The concern raised was to address the potential of a thin superstrate of noncombustible material, backed with combustible material, being accepted without appropriate fire testing. Instead of specifying a thickness of the top surface, where decking or pavers are noncombustible, the system is not required to be fire tested, even in those situations where the support structure underneath utilizes combustible materials.

5) Section 1511.9.3 needs to address the load distribution of the intersect between roof membrane with foam plastic underneath. – This is addressed through both the manufacturer's installation instructions, and also the requirements in Section 1511.9.4 for addressing all structural loading.

6) Consider the dead load of this system on the roof structure. – The floor modification at the Code Action Hearing (Thai 12), which was part of the modifications approved by the Committee addressed this in Section 1511.9.4 already.

Additional editorial cleanup is proposed for Section 1511.9.6 for clarification and consistency with G1-21.

Cost Impact: The net effect of the public comment and code change proposal will increase the cost of construction
The code change will increase the cost of construction, for those who decide to install these types of systems. However, this provides clarity on what requirements are to be applied for these installations.

Public Comment# 2656

G1-21 Part I

Proposed Change as Submitted

Proponents: Mike Nugent, Chair, representing ICC Building Code Action Committee (bcac@iccsafe.org); Michael O'Brian, representing FCAC (fcac@iccsafe.org); Joseph J Summers, Chair, representing Plumbing, Mechanical and Fuel Gas Code Action Committee (pmgcac@iccsafe.org)

THIS IS AN 6 PART CODE CHANGE. PART I WILL BE HEARD BY THE GENERAL CODE COMMITTEE. PART II WILL BE HEARD BY THE FIRE CODE COMMITTEE. PART III WILL BE HEARD BY THE FUEL GAS CODE COMMITTEE. PART IV WILL BE HEARD BY THE PLUMBING CODE COMMITTEE. PART V WILL BE HEARD BY THE MECHANICAL CODE COMMITTEE. PART VI WILL BE HEARD BY THE SWIMMING POOL AND SPA CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THESE COMMITTEES.

2021 International Building Code

Add new definition as follows:

ACCESS (TO). . That which enables a device, appliance or equipment to be reached by ready access or by a means that first requires the removal or movement of a panel or similar obstruction [see also Ready access (to)].

READY ACCESS (TO). . That which enables a device, appliance or equipment to be directly reached, without requiring the removal or movement of any panel or similar obstruction [see Access (to)].

Revise as follows:

703.5 Marking and identification. Where there is ~~an accessible~~ access to a concealed floor, floor-ceiling or *attic* space, *fire walls*, *fire barriers*, *fire partitions*, *smoke barriers* and *smoke partitions* or any other wall required to have protected openings or penetrations shall be effectively and permanently identified with signs or stenciling in the concealed space. Such identification shall:

1. Be located within 15 feet (4572 mm) of the end of each wall and at intervals not exceeding 30 feet (9144 mm) measured horizontally along the wall or partition.
2. Include lettering not less than 3 inches (76 mm) in height with a minimum $^3/_8$-inch (9.5 mm) stroke in a contrasting color incorporating the suggested wording, “FIRE AND/OR SMOKE BARRIER—PROTECT ALL OPENINGS,” or other wording.

1607.9.1 Handrails and guards. *Handrails* and *guards* shall be designed to resist a linear *load* of 50 pounds per linear foot (plf) (0.73 kN/m) in accordance with Section 4.5.1.1 of ASCE 7. Glass *handrail* assemblies and *guards* shall comply with Section 2407.

Exceptions:

1. For one- and two-family dwellings, only the single concentrated *load* required by Section 1607.9.1.1 shall be applied.
2. In Group I-3, F, H and S occupancies, for areas that are not ~~accessible to~~ for use by the general public and that have an *occupant load* less than 50, the minimum *load* shall be 20 pounds per foot (0.29 kN/m).

1607.14.4.4 Ground-mounted photovoltaic (PV) panel systems. or modules installed as an independent structure. Ground-mounted photovoltaic (PV) panel systems that are independent structures and do not have ~~accessible/~~ an easily accessed or occupied space underneath are not required to accommodate a roof photovoltaic *live load*. Other *loads* and combinations in accordance with Section 1605 shall be accommodated.

1704.2.2 Access for special inspection. The construction or work for which *special inspection* or testing is required shall remain ~~accessible and~~ exposed and with access for *special inspection* or testing purposes until completion of the required *special inspections* or tests.

2111.3.1 Ash dump cleanout. Cleanout openings, located within foundation walls below fireboxes, where provided, shall be equipped with ferrous metal or masonry doors and frames constructed to remain tightly closed, except when in use. Provide access to cleanouts ~~Cleanouts shall be accessible~~ and located the clean outs so that ash removal will not create a hazard to combustible materials.

2113.9.2 Spark arrestors. Where a spark arrestor is installed on a masonry chimney, the spark arrestor shall meet all of the following requirements:

1. The net free area of the arrestor shall be not less than four times the net free area of the outlet of the chimney flue it serves.
2. The arrestor screen shall have heat and *corrosion resistance* equivalent to 19-gage galvanized steel or 24-gage stainless steel.
3. Openings shall not permit the passage of spheres having a diameter greater than $^1/_2$ inch (12.7 mm) nor block the passage of spheres having a diameter less than $^3/_8$ inch (9.5 mm).
4. The spark arrestor shall ~~be accessible~~ provide access for cleaning and the screen or chimney cap shall be removable to allow for cleaning of the chimney flue.

2405.3 Screening. Where used in monolithic glazing systems, annealed, heat-strengthened, fully tempered and wired glass shall have broken glass retention screens installed below the glazing material. The screens and their fastenings shall be: capable of supporting twice the weight of the glazing; firmly and substantially fastened to the framing members; and installed within 4 inches (102 mm) of the glass. The screens shall be constructed of a noncombustible material not thinner than No. 12 B&S gage (0.0808 inch) with mesh not larger than 1 inch by 1 inch (25 mm by 25 mm). In a corrosive atmosphere, structurally equivalent noncorrosive screen materials shall be used. Annealed, heat-strengthened, fully tempered and wired glass, where used in multiple-layer glazing systems as the bottom glass layer over the walking surface, shall be equipped with screening that conforms to the requirements for monolithic glazing systems.

Exception: In monolithic and multiple-layer sloped glazing systems, the following applies:

1. Fully tempered glass installed without protective screens where glazed between intervening floors at a slope of 30 degrees (0.52 rad) or less from the vertical plane shall have the highest point of the glass 10 feet (3048 mm) or less above the walking surface.
2. Screens are not required below any glazing material, including annealed glass, where the walking surface below the glazing material is permanently protected from the risk of falling glass or the area below the glazing material is not a walking surface.
3. Any glazing material, including annealed glass, is permitted to be installed without screens in the sloped glazing systems of commercial or detached noncombustible *greenhouses* used exclusively for growing plants and not open to the public, provided that the height of the *greenhouse* at the ridge does not exceed 30 feet (9144 mm) above grade.
4. Screens shall not be required in individual *dwelling units* in Groups R-2, R-3 and R-4 where fully tempered glass is used as single glazing or as both panes in an insulating glass unit, and the following conditions are met:
   4.1. Each pane of the glass is 16 square feet (1.5 m^2) or less in area.
   4.2. The highest point of the glass is 12 feet (3658 mm) or less above any walking surface ~~or other accessible area~~.
   4.3. The glass thickness is $^3/_{16}$ inch (4.8 mm) or less.
5. Screens shall not be required for laminated glass with a 15-mil (0.38 mm) polyvinyl butyral (or equivalent) interlayer used in individual *dwelling units* in Groups R-2, R-3 and R-4 within the following limits:
   5.1. Each pane of glass is 16 square feet (1.5 m^2) or less in area.
   5.2. The highest point of the glass is 12 feet (3658 mm) or less above a walking surface ~~or other accessible area~~.

2406.4.3 Glazing in windows. Glazing in an individual fixed or operable panel that meets all of the following conditions shall be considered to be a hazardous location:

1. The exposed area of an individual pane is greater than 9 square feet (0.84 m^2).
2. The bottom edge of the glazing is less than 18 inches (457 mm) above the floor.
3. The top edge of the glazing is greater than 36 inches (914 mm) above the floor.
4. One or more walking surface(s) are within 36 inches (914 mm), measured horizontally and in a straight line, of the plane of the glazing.

Exceptions:

1. Decorative glazing.
2. Where a horizontal rail is installed on the ~~accessible~~ walking surface side(s) of the glazing adjacent to and 34 to 38 inches (864 to 965 mm) above the walking surface. The rail shall be capable of withstanding a horizontal *load* of 50 pounds per linear foot (730 N/m) without contacting the glass and be not less than $1^1/_2$ inches (38 mm) in cross-sectional height.
3. Outboard panes in insulating glass units or multiple glazing where the bottom exposed edge of the glass is 25 feet (7620 mm) or more above any grade, roof, walking surface or other horizontal or sloped (within 45 degrees of horizontal) (0.79 rad) surface adjacent to the glass exterior.

3008.9 Emergency voice/alarm communication system. The building shall be provided with an *emergency voice/alarm communication system*. The *emergency voice/alarm communication system* shall ~~be accessible to~~ allow access for the fire department. The system shall be provided in accordance with Section 907.5.2.2.

F101.5.1 Rodent ~~accessible~~ attainable openings. Windows and other openings for the purpose of light and ventilation in the *exterior walls* not covered in this chapter, ~~accessible~~ attainable to rodents by way of exposed pipes, wires, conduits and other appurtenances, shall be covered with wire cloth of at least 0.035-inch (0.89 mm) wire. In lieu of wire cloth covering, said pipes, wires, conduits and other appurtenances shall be blocked from rodent usage by installing solid sheet metal guards 0.024 inch (0.61 mm) thick or heavier. Guards shall be fitted around pipes, wires, conduits or other appurtenances. In addition, they shall be fastened securely to and shall extend perpendicularly from the *exterior wall* for not less than 12 inches (305 mm) beyond and on either side of pipes, wires, conduits or appurtenances.

H110.1 General. Roof signs shall be constructed entirely of metal or other approved noncombustible material except as provided for in Sections H106.1.1 and H107.1. Provisions shall be made for electric grounding of metallic parts. Where combustible materials are permitted in letters or other ornamental features, wiring and tubing shall be kept free and insulated therefrom. Roof signs shall be so constructed as to leave a clear space of not less than 6 feet (1829 mm) between the roof level and the lowest part of the sign and shall have not less than 5 feet (1524 mm) clearance between the vertical supports thereof. Roof sign structures shall not project beyond an *exterior wall*.

Exception: Signs on flat roofs with every part of the roof ~~accessible~~ allowing access.

2021 International Property Maintenance Code

Revise as follows:

[BF] 703.3 Maintenance. The required fire-resistance rating of fire-resistance-rated construction, including walls, firestops, shaft enclosures, partitions, smoke barriers, floors, fire-resistive coatings and sprayed fire-resistant materials applied to structural members and joint systems, shall be maintained. Such elements shall be visually inspected annually by the *owner* and repaired, restored or replaced where damaged, altered, breached or penetrated. Records of inspections and repairs shall be maintained. Where concealed, such elements shall not be required to be visually inspected by the *owner* unless the concealed space ~~is accessible~~ has access by the removal or movement of a panel, access door, ceiling tile or entry to the space. Openings made therein for the passage of pipes, electrical conduit, wires, ducts, air transfer and any other reason shall be protected with *approved* methods capable of resisting the passage of smoke and fire. Openings through fire-resistance-rated assemblies shall be protected by self- or automatic-closing doors of *approved* construction meeting the fire protection requirements for the assembly.

Reason: This effort was started by the CACs in 2015/16 code change cycle, and continued in 2018/19. This proposal is to provide coordination with the action taken with -P84-15, M2-15, RB2-16, F12-16, CE137-16 Part 1, CE29-19 Part 1 and 2 . Because the term 'accessible' is most commonly understood as requiring access for persons with disabilities we are making the changes to delete the word accessible from the remaining codes and replace it with other words, defined terms or phrases that are not attributed to requiring access for the physically disabled. Many of the codes use the defined term 'access (to)' or 'ready access (to)' for access by maintenance and service personnel or fire departments. This proposal provides clarity and consistency in the remaining codes where those coordination modifications missed or came in as part of new code changes.

Similar proposals will be submitted for the Group B cycle for IRC, IECC and IEBC.

This proposal is submitted by the ICC Building Code Action Committee (BCAC), ICC Fire Code Action Committee (BCAC), and ICC Plumbing/Mechanical/Gas Code Action Committee (PMGCAC).
BCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2020 the BCAC has held several virtual meetings open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the BCAC website at BCAC.

The PMG CAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2020, the PMG CAC has held several virtual meetings open to any interested party. Numerous interested parties attended the committee meetings and offered their input. Related documentation and reports are posted on the PMG CAC website at: PMGCAC.

The FCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance assigned International Codes with regard to fire and life safety in new and existing buildings and facilities as well as the protection of life and property in wildland urban interface areas. In 2020 and 2021 the Fire-CAC held multiple virtual meetings that were open to any interested party. In addition, there were numerous virtual specific working group meetings that were also open to any interested parties, to develop, discuss and debate the proposed changes. Related documentation and reports are posted on the FCAC website at: FCAC.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
There is no change to any of the requirements. This is only a clarification in terminology.

G1-21 Part I

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: This proposal was disapproved due to the following concerns:
Section 703.5 - the term 'access to' only includes mechanical equipment, so if a ceiling space did not include mechanical equipment could a contractor argue that stenciling for fire rated walls was not required?

Section 1607.14.4.4 - "easily accessed" is not a defined term

Section 3008.9 - It was not clear what was meant by "allow access" for the fire department to the emergency/voice alarm communication systems. (Vote: 13-1)

G1-21 Part I

Individual Consideration Agenda

Public Comment 1:

IBC: 202

Proponents: Mike Nugent, representing ICC Building Code Action Committee (bcac@iccsafe.org) requests As Modified by Public Comment

Replace as follows:

2021 International Building Code

ACCESS (TO) . That which enables a device, appliance or equipment to be reached by ready access or by a means that first requires the removal or movement of a panel or similar obstruction [see also Ready access (to)].

READY ACCESS (TO) . That which enables a device, appliance or equipment to be directly reached, without requiring the removal or movement of any panel or similar obstruction [see Access (to)].

Commenter's Reason: The defined terms are used in the IBC and copied from the IMC. The Egress committee requested that the defined terms be entered as a separate proposal.

Cost Impact: The net effect of the public comment and code change proposal will not increase or decrease the cost of construction
There is no change to any of the requirements. This is only a clarification in terminology.

Public Comment# 2639

Public Comment 2:

IBC: 703.5, 1607.9.1, 1607.14.4.4, 1704.2.2, 2111.3.1, 2113.9.2, 2405.3, 2406.4.3, 3008.9, F101.5.1, H110.1; IPMC: [BF] 703.3

Proponents: Mike Nugent, representing ICC Building Code Action Committee (bcac@iccsafe.org) requests As Modified by Public Comment

Replace as follows:

2021 International Building Code

703.5 Marking and identification . Where there is an opening provided into ~~accessible~~ a concealed floor, floor-ceiling or *attic* space, *fire walls*, *fire barriers*, *fire partitions*, *smoke barriers* and *smoke partitions* or any other wall required to have protected openings or penetrations shall be effectively and permanently identified with signs or stenciling in the concealed space. Such identification shall:

1. Be located within 15 feet (4572 mm) of the end of each wall and at intervals not exceeding 30 feet (9144 mm) measured horizontally along the wall or partition.
2. Include lettering not less than 3 inches (76 mm) in height with a minimum $^3/_8$-inch (9.5 mm) stroke in a contrasting color incorporating the suggested wording, “FIRE AND/OR SMOKE BARRIER—PROTECT ALL OPENINGS,” or other wording.

1607.9.1 Handrails and guards . *Handrails* and *guards* shall be designed to resist a linear *load* of 50 pounds per linear foot (plf) (0.73 kN/m) in accordance with Section 4.5.1.1 of ASCE 7. Glass *handrail* assemblies and *guards* shall comply with Section 2407.

Exceptions:

1. For one- and two-family dwellings, only the single concentrated *load* required by Section 1607.9.1.1 shall be applied.
2. In Group I-3, F, H and S occupancies, for areas that are not ~~accessible to the general~~ for public use and that have an *occupant load* less than 50, the minimum *load* shall be 20 pounds per foot (0.29 kN/m).

1607.14.4.4 Ground-mounted photovoltaic (PV) panel systems or modules installed as an independent structure . Ground-mounted photovoltaic (PV) panel systems that are independent structures and do not have ~~accessible/~~ an occupied space underneath are not required to accommodate a roof photovoltaic *live load*. Other *loads* and combinations in accordance with Section 1605 shall be accommodated.

1704.2.2 Access for special inspection . The construction or work for which *special inspection* or testing is required shall remain ~~accessible and~~ exposed and with access for *special inspection* or testing purposes until completion of the required *special inspections* or tests.

2111.3.1 Ash dump cleanout . Cleanout openings, located within foundation walls below fireboxes, where provided, shall be equipped with ferrous metal or masonry doors and frames constructed to remain tightly closed, except when in use. Cleanouts shall be provided with access ~~accessible~~ and located so that ash removal will not create a hazard to combustible materials.

2113.9.2 Spark arrestors . Where a spark arrestor is installed on a masonry chimney, the spark arrestor shall meet all of the following requirements:

1. The net free area of the arrestor shall be not less than four times the net free area of the outlet of the chimney flue it serves.
2. The arrestor screen shall have heat and *corrosion resistance* equivalent to 19-gage galvanized steel or 24-gage stainless steel.
3. Openings shall not permit the passage of spheres having a diameter greater than $^1/_2$ inch (12.7 mm) nor block the passage of spheres having a diameter less than $^3/_8$ inch (9.5 mm).
4. The spark arrestor shall be ~~accessible~~ provided with access for cleaning and the screen or chimney cap shall be removable to allow for cleaning of the chimney flue.

2405.3 Screening . Where used in monolithic glazing systems, annealed, heat-strengthened, fully tempered and wired glass shall have broken glass retention screens installed below the glazing material. The screens and their fastenings shall be: capable of supporting twice the weight of the glazing; firmly and substantially fastened to the framing members; and installed within 4 inches (102 mm) of the glass. The screens shall be constructed of a noncombustible material not thinner than No. 12 B&S gage (0.0808 inch) with mesh not larger than 1 inch by 1 inch (25 mm by 25 mm). In a corrosive atmosphere, structurally equivalent noncorrosive screen materials shall be used. Annealed, heat-strengthened, fully tempered and wired glass, where used in multiple-layer glazing systems as the bottom glass layer over the walking surface, shall be equipped with screening that conforms to the requirements for monolithic glazing systems.

Exception: In monolithic and multiple-layer sloped glazing systems, the following applies:

1. Fully tempered glass installed without protective screens where glazed between intervening floors at a slope of 30 degrees (0.52 rad) or less from the vertical plane shall have the highest point of the glass 10 feet (3048 mm) or less above the walking surface.
2. Screens are not required below any glazing material, including annealed glass, where the walking surface below the glazing material is permanently protected from the risk of falling glass or the area below the glazing material is not a walking surface.
3. Any glazing material, including annealed glass, is permitted to be installed without screens in the sloped glazing systems of commercial or detached noncombustible *greenhouses* used exclusively for growing plants and not open to the public, provided that the height of the *greenhouse* at the ridge does not exceed 30 feet (9144 mm) above grade.
4. Screens shall not be required in individual *dwelling units* in Groups R-2, R-3 and R-4 where fully tempered glass is used as single glazing or as both panes in an insulating glass unit, and the following conditions are met:
   - 4.1. Each pane of the glass is 16 square feet (1.5 m^2) or less in area.
   - 4.2. The highest point of the glass is 12 feet (3658 mm) or less above any walking surface ~~or other accessible area~~.
   - 4.3. The glass thickness is $^3/_{16}$ inch (4.8 mm) or less.
5. Screens shall not be required for laminated glass with a 15-mil (0.38 mm) polyvinyl butyral (or equivalent) interlayer used in individual *dwelling units* in Groups R-2, R-3 and R-4 within the following limits:
   - 5.1. Each pane of glass is 16 square feet (1.5 m^2) or less in area.
   - 5.2. The highest point of the glass is 12 feet (3658 mm) or less above a walking surface ~~or other accessible area~~.

2406.4.3 Glazing in windows . Glazing in an individual fixed or operable panel that meets all of the following conditions shall be considered to be a hazardous location:

1. The exposed area of an individual pane is greater than 9 square feet (0.84 m^2).
2. The bottom edge of the glazing is less than 18 inches (457 mm) above the floor.
3. The top edge of the glazing is greater than 36 inches (914 mm) above the floor.

4. One or more walking surface(s) are within 36 inches (914 mm), measured horizontally and in a straight line, of the plane of the glazing.

Exceptions:

1. Decorative glazing.
2. Where a horizontal rail is installed on the ~~accessible~~ walking surface side(s) of the glazing adjacent to and 34 to 38 inches (864 to 965 mm) above the walking surface. The rail shall be capable of withstanding a horizontal *load* of 50 pounds per linear foot (730 N/m) without contacting the glass and be not less than $1^1/_2$ inches (38 mm) in cross-sectional height.
3. Outboard panes in insulating glass units or multiple glazing where the bottom exposed edge of the glass is 25 feet (7620 mm) or more above any grade, roof, walking surface or other horizontal or sloped (within 45 degrees of horizontal) (0.79 rad) surface adjacent to the glass exterior.

3008.9 Emergency voice/alarm communication system . The building shall be provided with an *emergency voice/alarm communication system*. The fire department shall be provided with access to the ~~The~~ *emergency voice/alarm communication system* ~~shall be accessible to the fire department~~. The system shall be provided in accordance with Section 907.5.2.2.

F101.5.1 Rodent-~~accessible~~ attainable openings . Windows and other openings for the purpose of light and ventilation in the *exterior walls* not covered in this chapter, ~~accessible~~ attainable to rodents by way of exposed pipes, wires, conduits and other appurtenances, shall be covered with wire cloth of at least 0.035-inch (0.89 mm) wire. In lieu of wire cloth covering, said pipes, wires, conduits and other appurtenances shall be blocked from rodent usage by installing solid sheet metal guards 0.024 inch (0.61 mm) thick or heavier. Guards shall be fitted around pipes, wires, conduits or other appurtenances. In addition, they shall be fastened securely to and shall extend perpendicularly from the *exterior wall* for not less than 12 inches (305 mm) beyond and on either side of pipes, wires, conduits or appurtenances.

H110.1 General . Roof signs shall be constructed entirely of metal or other approved noncombustible material except as provided for in Sections H106.1.1 and H107.1. Provisions shall be made for electric grounding of metallic parts. Where combustible materials are permitted in letters or other ornamental features, wiring and tubing shall be kept free and insulated therefrom. Roof signs shall be so constructed as to leave a clear space of not less than 6 feet (1829 mm) between the roof level and the lowest part of the sign and shall have not less than 5 feet (1524 mm) clearance between the vertical supports thereof. Roof sign structures shall not project beyond an *exterior wall*.

Exception: Signs on flat roofs ~~with~~ where every part of the roof ~~accessible~~ allows for access to the sign .

2021 International Property Maintenance Code

[BF] 703.3 Maintenance . The required fire-resistance rating of fire-resistance-rated construction, including walls, firestops, shaft enclosures, partitions, smoke barriers, floors, fire-resistive coatings and sprayed fire-resistant materials applied to structural members and joint systems, shall be maintained. Such elements shall be visually inspected annually by the *owner* and repaired, restored or replaced where damaged, altered, breached or penetrated. Records of inspections and repairs shall be maintained. Where concealed, such elements shall not be required to be visually inspected by the *owner* unless the concealed space ~~is accessible~~ has access by the removal or movement of a panel, access door, ceiling tile or entry to the space. Openings made therein for the passage of pipes, electrical conduit, wires, ducts, air transfer and any other reason shall be protected with *approved* methods capable of resisting the passage of smoke and fire. Openings through fire-resistance-rated assemblies shall be protected by self- or automatic-closing doors of *approved* construction meeting the fire protection requirements for the assembly.

Commenter's Reason: This proposal continues the committee work to remove ‘accessible’ where the context is not about accessibility for persons with disabilities. The defined terms ‘access to’ and ‘ready access’ is used where appropriate. The modifications were to address concerns expressed during the testimony and expressed by the Egress committee.
This effort was started by the CACs in 2015/16 code change cycle, and continued in 2018/19. This proposal is to provide coordination with the action taken with -P84-15, M2-15, RB2-16, F12-16, CE137-16 Part 1, CE29-19 Part 1 and 2 as well at G1-21 Parts 2, 3, 5 and 6.

Cost Impact: The net effect of the public comment and code change proposal will not increase or decrease the cost of construction
There is no change to any of the requirements. This is only a clarification in terminology.

Public Comment# 2640

NOTE: G1-21 PART II DID NOT RECEIVE A PUBLIC COMMENT AND IS REPRODUCED FOR INFORMATIONAL PURPOSES ONLY

G1-21 Part II

Proposed Change as Submitted

Proponents: Mike Nugent, Chair, representing ICC Building Code Action Committee (bcac@iccsafe.org); Michael O'Brian, representing FCAC (fcac@iccsafe.org); Joseph J. Summers, representing Plumbing, Mechanical and Fuel Gas Code Action Committee (pmgcac@iccsafe.org)

2021 International Fire Code

Revise as follows:

MULTIPLE-LEVEL BOOTH. An exhibit that has a second level or tier constructed on top of the exhibit or portion of the exhibit that is ~~accessible~~ <u>open</u> to the public, or includes a live load above the exhibit area floor level.

504.1 Required access. Exterior doors and openings required by this code or the *International Building Code* shall be maintained ~~readily accessible~~ <u>with ready access</u> for emergency access by the fire department. An *approved* access walkway leading from fire apparatus access roads to exterior openings shall be provided where required by the *fire code official*.

509.2 Equipment access. *Approved* access shall be provided and maintained for all *fire protection system* equipment to permit immediate safe operation and maintenance of such equipment. Storage, trash and other materials or objects shall not be placed or kept in such a manner that would prevent such equipment from ~~being readily accessible~~ <u>ready access</u>.

701.6 Owner's responsibility. The *owner* shall maintain an inventory of all required *fire-resistance-rated* construction, construction installed to resist the passage of smoke and the construction included in Sections 703 through 707 and Sections 602.4.1 and 602.4.2 of the *International Building Code*. Such construction shall be visually inspected by the *owner* annually and properly repaired, restored or replaced where damaged, altered, breached or penetrated. Records of inspections and repairs shall be maintained. Where concealed, such elements shall not be required to be visually inspected by the *owner* unless the concealed space is ~~accessible~~ <u>available</u> by the removal or movement of a panel, access door, ceiling tile or similar movable entry to the space.

2309.5.2.1 Identification. Manual emergency shutoff valves shall be identified and the location shall be clearly visible, ~~accessible~~ <u>have access</u> and <u>be</u> indicated by means of a sign.

3206.10.1.1 Sprinklered buildings. Aisles in sprinklered buildings shall be not less than 44 inches (1118 mm) wide. Aisles shall be not less than 96 inches (2438 mm) wide in *high-piled storage areas* exceeding 2,500 square feet (232 m^2) in area, that are ~~accessible~~ <u>open</u> to the public and designated to contain high-hazard commodities.
Aisles shall be not less than 96 inches (2438 mm) wide in areas open to the public where mechanical stocking methods are used.

Exceptions:

1. Aisles in *high-piled storage areas* exceeding 2,500 square feet (232 m^2) in area, that are open to the public and designated to contain high-hazard commodities, and that are protected by a sprinkler system designed for multiple-row racks of high-hazard commodities, shall be not less than 44 inches (1118 mm) wide.
2. Aisles that are in *high-piled storage areas* exceeding 2,500 square feet (232 m^2) in area, not open to the public and protected by a sprinkler system designed for multiple-row racks, shall be not less than 24 inches (610 mm) wide.

D102.1 Access and loading. Facilities, buildings or portions of buildings hereafter constructed shall ~~be accessible to~~ <u>allow access for the</u> fire department apparatus by way of an *approved* fire apparatus access road with an asphalt, concrete or other *approved* driving surface capable of supporting the imposed load of fire apparatus weighing up to 75,000 pounds (34 050 kg).

L104.6 Isolation valves. System isolation valves that ~~are accessible to~~ <u>have access for</u> the fire department shall be installed on the system riser to allow piping beyond any air cylinder refill panel to be blocked.

L104.14.1 Location. The location of the external mobile air connection shall ~~be accessible to~~ <u>have access for</u> mobile air apparatus and *approved* by the *fire code official*.

2021 International Building Code

Revise as follows:

[F] 415.11.7.4 Installations in corridors and above other occupancies. The installation of HPM piping and tubing within the space defined by the walls of corridors and the floor or roof above, or in concealed spaces above other occupancies, shall be in accordance with Sections 415.11.7.1 through 415.11.7.3 and the following conditions:

1. Automatic sprinklers shall be installed within the space unless the space is less than 6 inches (152 mm) in the least dimension.
2. *Ventilation* not less than six air changes per hour shall be provided. The space shall not be used to convey air from any other area.
3. Where the piping or tubing is used to transport HPM liquids, a receptor shall be installed below such piping or tubing. The receptor shall be designed to collect any discharge or leakage and drain it to an *approved* location. The 1-hour enclosure shall not be used as part of the receptor.
4. HPM supply piping and tubing and nonmetallic waste lines shall be separated from the corridor and from occupancies other than Group H-5 by *fire barriers* or by an approved method or assembly that has a *fire-resistance rating* of not less than 1 hour. Access openings into the enclosure shall be protected by approved fire-protection-rated assemblies.
5. ~~Readily accessible manual~~ Ready access to manual or automatic remotely activated fail-safe emergency shutoff valves shall be installed on piping and tubing other than waste lines at the following locations:

   5.1. At branch connections into the *fabrication area*.

   5.2. At entries into *corridors*.

Exception: Transverse crossings of the *corridors* by supply piping that is enclosed within a ferrous pipe or tube for the width of the *corridor* need not comply with Items 1 through 5.

[F] 914.1.1 Exterior access to shaftways. Outside openings ~~accessible~~ with access to the fire department and that open directly on a hoistway or shaftway communicating between two or more floors in a building shall be plainly marked with the word "SHAFTWAY" in red letters not less than 6 inches (152 mm) high on a white background. Such warning signs shall be placed so as to be readily discernible from the outside of the building.

2021 International Code Council Performance Code

Revise as follows:

[F] 2001.3.6 Water supply. Water supply for fire department operations shall be from a reliable~~, readily accessible~~ source with ready access acceptable to the fire department and capable of supporting fire-fighting operations.

Reason: This effort was started by the CACs in 2015/16 code change cycle, and continued in 2018/19. This proposal is to provide coordination with the action taken with -P84-15, M2-15, RB2-16, F12-16, CE137-16 Part 1, CE29-19 Part 1 and 2 . Because the term 'accessible' is most commonly understood as requiring access for persons with disabilities we are making the changes to delete the word accessible from the remaining codes and replace it with other words, defined terms or phrases that are not attributed to requiring access for the physically disabled. Many of the codes use the defined term 'access (to)' or 'ready access (to)' for access by maintenance and service personnel or fire departments. This proposal provides clarity and consistency in the remaining codes where those coordination modifications missed or came in as part of new code changes.

Code change proposal M2-15 removed 'door' from the definitions for 'access (to)' and 'ready access (to)'. That coordination item did not happen across codes and this proposal seeks to complete that effort.

Similar proposals will be submitted for the Group B cycle for IRC, IECC and IEBC.

This proposal is submitted by the ICC Building Code Action Committee (BCAC), ICC Fire Code Action Committee (BCAC), and ICC Plumbing/Mechanical/Gas Code Action Committee (PMGCAC).
BCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2020 the BCAC has held several virtual meetings open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the BCAC website at BCAC.

The PMG CAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2020, the PMG CAC has held several virtual meetings open to any interested party. Numerous interested parties attended the committee meetings and offered their input. Related documentation and reports are posted on the PMG CAC website at: PMGCAC.

The FCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance assigned International Codes with regard to fire and life safety in new and existing buildings and facilities as well as the protection of life and property in wildland urban interface areas. In 2020 and 2021 the Fire-CAC held multiple virtual meetings that were open to any interested party. In addition, there were numerous virtual specific working group meetings that were also open to any interested parties, to develop, discuss and debate the proposed changes. Related documentation and reports are posted on the FCAC website at: FCAC.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
There is no change to any of the requirements. This is only a clarification in terminology.

G1-21 Part II

Public Hearing Results

Committee Action: **As Submitted**

Committee Reason: The committee stated that the reason for approval was that the proposal replaces an improper term with the proper term for the conditions listed. (Vote: 12-0)

G1-21 Part II

NOTE: G1-21 PART III DID NOT RECEIVE A PUBLIC COMMENT AND IS REPRODUCED FOR INFORMATIONAL PURPOSES ONLY

G1-21 Part III

Proposed Change as Submitted

Proponents: Mike Nugent, Chair, representing ICC Building Code Action Committee (bcac@iccsafe.org); Michael O'Brian, representing FCAC (fcac@iccsafe.org); Joseph J. Summers, representing Plumbing, Mechanical and Fuel Gas Code Action Committee (pmgcac@iccsafe.org)

2021 International Fuel Gas Code

Revise as follows:

403.11.7 Lapped flanges. Lapped flanges shall be used only above ground or in exposed locations ~~accessible~~ with access for inspection.

404.8.2 Conduit with both ends terminating indoors. Where the conduit originates and terminates within the same building, the conduit shall originate and terminate in ~~an accessible~~ a portion of the building with access and shall not be sealed. The conduit shall extend not less than 2 inches (51 mm) beyond the point where the pipe emerges from the floor.

404.14.2 Conduit with both ends terminating indoors. Where the conduit originates and terminates within the same building, the conduit shall originate and terminate in ~~an accessible~~ a portion of the building with access and shall not be sealed. The conduit shall extend not less than 2 inches (51 mm) beyond the point where the pipe emerges from the floor.

409.5.3 Located at manifold. Where the *appliance* shutoff valve is installed at a manifold, such shutoff valve shall be located within 50 feet (15 240 mm) of the *appliance* served and shall ~~be readily accessible~~ have ready access and be permanently identified. The *piping* from the manifold to within 6 feet (1829 mm) of the *appliance* shall be designed, sized and installed in accordance with Sections 401 through 408.

409.6 Shutoff valve for laboratories. Where provided with two or more fuel gas outlets, including table-, bench- and hood-mounted outlets, each laboratory space in educational, research, commercial and industrial *occupancies* shall be provided with a single dedicated shutoff valve through which all such gas outlets shall be supplied. The dedicated shutoff valve shall ~~be readily accessible~~ have ready access, be located within the laboratory space served, be located adjacent to the egress door from the space and shall be identified by *approved* signage stating “Gas Shutoff.”

411.1.6 Unions. A union fitting shall be provided for *appliances* connected by rigid metallic pipe. Such unions shall ~~be accessible~~ have access and be located within 6 feet (1829 mm) of the *appliance*.

501.7.3 Connection to masonry fireplace flue. A connector shall extend from the *appliance* to the flue serving a masonry *fireplace* such that the flue gases are exhausted directly into the flue. The connector shall ~~be accessible~~ have access or be removable for inspection and cleaning of both the connector and the flue. *Listed* direct connection devices shall be installed in accordance with their listing.

503.5.9 Cleanouts. Where a chimney that formerly carried flue products from liquid or solid fuel-burning appliances is used with an *appliance* using fuel gas, ~~an accessible~~ a cleanout with access shall be provided. The cleanout shall have a tight-fitting cover and shall be installed so its upper edge is not less than 6 inches (152 mm) below the lower edge of the lowest chimney inlet opening.

503.12.6 Positioning. Draft hoods and draft regulators shall be installed in the position for which they were designed with reference to the horizontal and vertical planes and shall be located so that the relief opening is not obstructed by any part of the *appliance* or adjacent construction. The *appliance* and its draft hood shall be located so that the relief opening ~~is accessible~~ has access for checking vent operation.

Reason: This effort was started by the CACs in 2015/16 code change cycle, and continued in 2018/19. This proposal is to provide coordination with the action taken with -P84-15, M2-15, RB2-16, F12-16, CE137-16 Part 1, CE29-19 Part 1 and 2 . Because the term ‘accessible’ is most commonly understood as requiring access for persons with disabilities we are making the changes to delete the word accessible from the remaining codes and replace it with other words, defined terms or phrases that are not attributed to requiring access for the physically disabled. Many of the codes use the defined term ‘access (to)’ or ‘ready access (to)’ for access by maintenance and service personnel or fire departments. This proposal provides clarity and consistency in the remaining codes where those coordination modifications missed or came in as part of new code changes.

Code change proposal M2-15 removed ‘door’ from the definitions for ‘access (to)’ and ‘ready access (to)’. That coordination item did not happen across codes and this proposal seeks to complete that effort.

Similar proposals will be submitted for the Group B cycle for IRC, IECC and IEBC.

This proposal is submitted by the ICC Building Code Action Committee (BCAC), ICC Fire Code Action Committee (BCAC), and ICC Plumbing/Mechanical/Gas Code Action Committee (PMGCAC).
BCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2020 the BCAC has held several virtual meetings open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the BCAC website at BCAC.

The PMG CAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2020, the PMG CAC has held several virtual meetings open to any interested party. Numerous interested parties attended the committee meetings and offered their input. Related documentation and reports are posted on the PMG CAC website at: PMGCAC.

The FCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance assigned International Codes with regard to fire and life safety in new and existing buildings and facilities as well as the protection of life and property in wildland urban interface areas. In 2020 and 2021 the Fire-CAC held multiple virtual meetings that were open to any interested party. In addition, there were numerous virtual specific working group meetings that were also open to any interested parties, to develop, discuss and debate the proposed changes. Related documentation and reports are posted on the FCAC website at: FCAC.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
There is no change to any of the requirements. This is only a clarification in terminology.

G1-21 Part III

Public Hearing Results

Committee Action: **As Submitted**

Committee Reason: The Committee agreed with the published reason statement. (11-0)

G1-21 Part III

G1-21 Part IV

Proposed Change as Submitted

Proponents: Mike Nugent, Chair, representing ICC Building Code Action Committee (bcac@iccsafe.org); Michael O'Brian, representing FCAC (fcac@iccsafe.org); Joseph J. Summers, representing Plumbing, Mechanical and Fuel Gas Code Action Committee (pmgcac@iccsafe.org)

2021 International Plumbing Code

Revise as follows:

1302.9 Pumping and control system. Mechanical equipment including pumps, valves and filters shall be ~~easily accessible~~ have easy access and removable in order to perform repair, maintenance and cleaning. The minimum flow rate and flow pressure delivered by the pumping system shall be appropriate for the application and in accordance with Section 604 .

2021 International Building Code

Revise as follows:

[P] 1210.2.2 Walls and partitions. Walls and partitions within 2 feet (610 mm) of service sinks, urinals and water closets shall have a smooth, hard, nonabsorbent surface, to a height of not less than 4 feet (1219 mm) above the floor, and except for structural elements, the materials used in such walls shall be of a type that is not adversely affected by moisture.

Exception: This section does not apply to the following buildings and spaces:

1. Dwelling units and *sleeping units*.
2. Toilet rooms that are not ~~accessible to the~~ for use by the general public and that have not more than one water closet.

Accessories such as grab bars, towel bars, paper dispensers and soap dishes, provided on or within walls, shall be installed and sealed to protect structural elements from moisture.

2021 International Code Council Performance Code

Revise as follows:

[P] 1204.3.3 ~~Accessibility~~ Access. The drainage system shall ~~be accessible~~ have access for maintenance and clearing of blockages.

Reason: This effort was started by the CACs in 2015/16 code change cycle, and continued in 2018/19. This proposal is to provide coordination with the action taken with -P84-15, M2-15, RB2-16, F12-16, CE137-16 Part 1, CE29-19 Part 1 and 2 . Because the term ‘accessible’ is most commonly understood as requiring access for persons with disabilities we are making the changes to delete the word accessible from the remaining codes and replace it with other words, defined terms or phrases that are not attributed to requiring access for the physically disabled. Many of the codes use the defined term ‘access (to)’ or ‘ready access (to)’ for access by maintenance and service personnel or fire departments. This proposal provides clarity and consistency in the remaining codes where those coordination modifications missed or came in as part of new code changes.

Code change proposal M2-15 removed ‘door’ from the definitions for ‘access (to)’ and ‘ready access (to)’. That coordination item did not happen across codes and this proposal seeks to complete that effort.

Similar proposals will be submitted for the Group B cycle for IRC, IECC and IEBC.

This proposal is submitted by the ICC Building Code Action Committee (BCAC), ICC Fire Code Action Committee (BCAC), and ICC Plumbing/Mechanical/Gas Code Action Committee (PMGCAC).
BCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2020 the BCAC has held several virtual meetings open to any interested party. In addition, there were numerous virtual Working

Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the BCAC website at BCAC.

The PMG CAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2020, the PMG CAC has held several virtual meetings open to any interested party. Numerous interested parties attended the committee meetings and offered their input. Related documentation and reports are posted on the PMG CAC website at: PMGCAC.

The FCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance assigned International Codes with regard to fire and life safety in new and existing buildings and facilities as well as the protection of life and property in wildland urban interface areas. In 2020 and 2021 the Fire-CAC held multiple virtual meetings that were open to any interested party. In addition, there were numerous virtual specific working group meetings that were also open to any interested parties, to develop, discuss and debate the proposed changes. Related documentation and reports are posted on the FCAC website at: FCAC.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
There is no change to any of the requirements. This is only a clarification in terminology.

G1-21 Part IV

Public Hearing Results

This proposal includes the following errata
In Section 1210.2.2 Item 2, "for use by the general" should be underlined.

Committee Action: **Disapproved**

Committee Reason: Although the intent of the proposal is understood, including the word "easy" continues a poor code text practice. Either something has access (see defined term) or it doesn't. (14-0)

G1-21 Part IV

Individual Consideration Agenda

Public Comment 1:

IPC: 1302.9

Proponents: Mike Nugent, representing ICC Building Code Action Committee (bcac@iccsafe.org) requests As Modified by Public Comment

Modify as follows:

2021 International Plumbing Code

1302.9 Pumping and control system . Mechanical equipment including pumps, valves and filters shall ~~be~~ have ~~easy~~ access and be removable in order to perform repair, maintenance and cleaning. The minimum flow rate and flow pressure delivered by the pumping system shall be appropriate for the application and in accordance with Section 604 .

Commenter's Reason: The Plumbing committee felt that this was an appropriate change, but did not like the word 'easy' in Section 1302.9 as this is not uniformly enforceable. The BCAC used the word only because the original language was 'easily accessible'. However, we agree with the committee and are proposing to delete that word. We ask the membership to approve this proposal with that revision.
This effort was started by the CACs in 2015/16 code change cycle, and continued in 2018/19. This proposal is to provide coordination with the action taken with -P84-15, M2-15, RB2-16, F12-16, CE137-16 Part 1, CE29-19 Part 1 and 2 as well at G1-21 Parts 2, 3, 5 and 6.

Cost Impact: The net effect of the public comment and code change proposal will not increase or decrease the cost of construction
This proposal continues the committee work to remove 'accessible' where the context is not about accessibility for persons with disabilities. The defined terms 'access to' and 'ready access' is used where appropriate. The modifications were to address concerns expressed during the testimony and expressed by the Egress committee.

NOTE: G1-21 PART V DID NOT RECEIVE A PUBLIC COMMENT AND IS REPRODUCED FOR INFORMATIONAL PURPOSES ONLY

G1-21 Part V

Proposed Change as Submitted

Proponents: Mike Nugent, Chair, representing ICC Building Code Action Committee (bcac@iccsafe.org); Michael O'Brian, representing FCAC (fcac@iccsafe.org); Joseph J. Summers, representing Plumbing, Mechanical and Fuel Gas Code Action Committee (pmgcac@iccsafe.org)

2021 International Mechanical Code

Revise as follows:

306.1 Access. *Appliances*, controls devices, heat exchangers and HVAC system components that utilize energy shall ~~be accessible~~ provide access for inspection, service, repair and replacement without disabling the function of a fire-resistance-rated assembly or removing permanent construction, other appliances, venting systems or any other piping or ducts not connected to the *appliance* being inspected, serviced, repaired or replaced. A level working space not less than 30 inches deep and 30 inches wide (762 mm by 762 mm) shall be provided in front of the control side to service an *appliance*.

506.3.2.2 Duct-to-hood joints. Duct-to-hood joints shall be made with continuous internal or external liquid-tight welded or brazed joints. Such joints shall be smooth, ~~accessible~~ available for inspection, and without grease traps.

Exceptions: This section shall not apply to:

1. A vertical duct-to-hood collar connection made in the top plane of the hood in accordance with all of the following:
   - 1.1. The hood duct opening shall have a 1-inch-deep (25 mm), full perimeter, welded flange turned down into the hood interior at an angle of 90 degrees (1.57 rad) from the plane of the opening.
   - 1.2. The duct shall have a 1-inch-deep (25 mm) flange made by a 1-inch by 1-inch (25 mm by 25 mm) angle iron welded to the full perimeter of the duct not less than 1 inch (25 mm) above the bottom end of the duct.
   - 1.3. A gasket rated for use at not less than 1,500ºF (816ºC) is installed between the duct flange and the top of the hood.
   - 1.4. The duct-to-hood joint shall be secured by stud bolts not less than $^{1}/_{4}$ inch (6.4 mm) in diameter welded to the hood with a spacing not greater than 4 inches (102 mm) on center for the full perimeter of the opening. The bolts and nuts shall be secured with lockwashers.
2. *Listed* and *labeled* duct-to-hood collar connections installed in accordance with Section 304.1.

2021 International Fuel Gas Code

Revise as follows:

[M] 306.1 Access for maintenance and replacement. Appliances, control devices, heat exchangers and HVAC components that utilize energy shall~~be accessible~~ have access for inspection, service, repair and replacement without disabling the function of a fire-resistance-rated assembly or removing permanent construction, other appliances, or any other *piping* or ducts not connected to the *appliance* being inspected, serviced, repaired or replaced. A level working space not less than 30 inches (762 mm) deep and 30 inches (762 mm) wide shall be provided in front of the control side to service an *appliance*.

2021 International Code Council Performance Code

Add new definition as follows:

ACCESS (TO). That which enables a device, appliance or equipment to be reached by ready access or by a means that first requires the removal or movement of a panel or similar obstruction [see also Ready access (to)].

READY ACCESS (TO). . That which enables a device, appliance or equipment to be directly reached, without requiring the removal or movement of any panel or similar obstruction [see Access (to)].

Reason: This effort was started by the CACs in 2015/16 code change cycle, and continued in 2018/19. This proposal is to provide coordination with the action taken with -P84-15, M2-15, RB2-16, F12-16, CE137-16 Part 1, CE29-19 Part 1 and 2 . Because the term 'accessible' is most commonly understood as requiring access for persons with disabilities we are making the changes to delete the word accessible from the remaining codes and replace it with other words, defined terms or phrases that are not attributed to requiring access for the physically disabled. Many of the codes use the defined term ‘access (to)’ or ‘ready access (to)’ for access by maintenance and service personnel or fire departments. This proposal provides clarity and consistency in the remaining codes where those coordination modifications missed or came in as part of new code changes.

Code change proposal M2-15 removed ‘door’ from the definitions for ‘access (to)’ and ‘ready access (to)’. That coordination item did not happen across codes and this proposal seeks to complete that effort.

Similar proposals will be submitted for the Group B cycle for IRC, IECC and IEBC.

This proposal is submitted by the ICC Building Code Action Committee (BCAC), ICC Fire Code Action Committee (BCAC), and ICC Plumbing/Mechanical/Gas Code Action Committee (PMGCAC).
BCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2020 the BCAC has held several virtual meetings open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the BCAC website at BCAC.

The PMG CAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2020, the PMG CAC has held several virtual meetings open to any interested party. Numerous interested parties attended the committee meetings and offered their input. Related documentation and reports are posted on the PMG CAC website at: PMGCAC.

The FCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance assigned International Codes with regard to fire and life safety in new and existing buildings and facilities as well as the protection of life and property in wildland urban interface areas. In 2020 and 2021 the Fire-CAC held multiple virtual meetings that were open to any interested party. In addition, there were numerous virtual specific working group meetings that were also open to any interested parties, to develop, discuss and debate the proposed changes. Related documentation and reports are posted on the FCAC website at: FCAC.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
There is no change to any of the requirements. This is only a clarification in terminology.

G1-21 Part V

Public Hearing Results

Committee Action: **As Submitted**

Committee Reason: The proposal was approved as submitted because it provides coordination with the action taken with -P84-15, M2-15, RB2-16, F12-16, CE137-16 Part 1, CE29-19 Part 1 and 2 . Because the term ‘accessible’ is most commonly understood as requiring access for persons with disabilities, the proposal deletes the word accessible from the code and replaces it with other words, defined terms or phrases that are not attributed to requiring access for the physically disabled. This proposal provides clarity and consistency in the remaining codes where those coordination modifications missed or came in as part of new code changes. (Vote: 11-0)

G1-21 Part V

NOTE: G1-21 PART VI DID NOT RECEIVE A PUBLIC COMMENT AND IS REPRODUCED FOR INFORMATIONAL PURPOSES ONLY

G1-21 Part VI

Proposed Change as Submitted

Proponents: Mike Nugent, Chair, representing ICC Building Code Action Committee (bcac@iccsafe.org); Michael O'Brian, representing FCAC (fcac@iccsafe.org); Joseph J. Summers, representing Plumbing, Mechanical and Fuel Gas Code Action Committee (pmgcac@iccsafe.org)

2021 International Swimming Pool and Spa Code

Add new definition as follows:

ACCESS (TO). . That which enables a device, appliance or equipment to be reached by ready access or by a means that first requires the removal or movement of a panel or similar obstruction [see also Ready access (to)].

Delete without substitution:

~~**ACCESSIBLE.** Signifies access that requires the removal of an access panel or similar removable obstruction.~~

Add new definition as follows:

READY ACCESS (TO). . That which enables a device, appliance or equipment to be directly reached, without requiring the removal or movement of any panel or similar obstruction [see Access (to)].

Revise as follows:

[A] 110.1 General. Construction or work for which a permit is required shall be subject to inspection by the *code official* and such construction or work shall remain visible and able to be accessed for inspection purposes until *approved*. Approval as a result of an inspection shall not be construed to be an approval of a violation of the provisions of this code or of other ordinances of the jurisdiction. Inspections presuming to give authority to violate or cancel the provisions of this code or of other ordinances of the jurisdiction shall not be valid. It shall be the duty of the permit applicant to cause the work to remain ~~accessible~~ available and exposed for inspection purposes. Neither the *code official* nor the jurisdiction shall be liable for expense entailed in the removal or replacement of any material required to allow inspection.

303.1.1 Heaters. The electric power to heaters shall be controlled by ~~a readily accessible~~ an on-off switch with ready access that is an integral part of the heater, mounted on the exterior of the heater or external to and within 3 feet (914 mm) of the heater. Operation of such switch shall not change the setting of the heater thermostat. Such switches shall be in addition to a circuit breaker for the power to the heater. Gas-fired heaters shall not be equipped with continuously burning ignition pilots.

306.9 Valves under decks. Valves installed in or under decks shall be ~~accessible~~ provided access or operation, service, and maintenance. Where access through the deck walking surface is required, an access cover shall be provided for the opening in the deck. Such access covers shall be slip resistant and secured.

313.4 Location. Provide access to pumps
~~Pumps~~ and motors ~~shall be accessible~~ for inspection and service in accordance with the manufacturer’s specifications.

314.5 Vacuum fittings. Where installed, provide access to *submerged vacuum fittings* ~~shall be accessible~~ and such fittings shall be located not greater than 12 inches (305 mm) below the water level.

324.2 Requirements. The equipment area or room floor shall be of concrete or other suitable material having a smooth slip-resistant finish and have positive drainage, including a sump drain pump, if necessary. Floors shall have a slope toward the floor drain or sump drain pump adequate to prevent standing water at all times. The opening to the equipment room or area shall be designed to provide access for all anticipated equipment. At least one hose bibb with backflow preventer shall be located in the equipment room or ~~be accessible~~ allow for access within an adequate distance of the equipment room so that a hose can service the entire room.

409.4.3 Emergency response units. Pools covered by this chapter shall be provided with first aid equipment, including a first aid kit. First aid equipment and kits shall be located in ~~an accessible location~~ to allow access.

504.1 Emergency shutoff switch. One emergency shutoff switch shall be provided to disconnect power to circulation and jet system pumps and air blowers. Provide access to emergency ~~Emergency~~ shutoff switches ~~shall be accessible~~. Such switches shall be located within sight of the spa and shall be located not less than 5 feet (1524 mm) but not greater than 10 feet (3048 mm) horizontally from the inside walls of the spa.

603.2 Class D-2 pools. Where a Class D-2 pool has a bather-~~accessible~~ depth greater than $4^1/_2$ feet (1372 mm), the floor shall have a distinctive marking at the $4^1/_2$ feet (1372 mm) water depth.

612.5.1 Water collection and treatment tank. Interactive water play features shall drain to a collection and treatment tank. The inside of the tank shall ~~be accessible~~ provide access for cleaning and inspection. The access hatch or lid shall be locked or require a tool to open.
The tank capacity shall be not less than 1000 gallons or ten times the number of gallons in a minute when all nozzles are operating simultaneously, whichever is greater. The volume water in the tank, at the design water level, shall not decrease more than 15% of that volume when all pumps and discharge piping fill with water to the discharge points of all nozzles.
Tanks shall be provided with a means to empty all water in the tank for the purposes of servicing or cleaning.

704.7.2 ~~Accessible~~ Access to pumps and motors. Pumps and motors shall be ~~accessible~~ provided access for inspection and service in accordance with the pump and motor manufacturer's instructions.

704.7.3 Pump shutoff valves. An ~~*accessible*~~ available means of ~~shut~~ shutting off ~~of~~ the suction and discharge piping for the pump shall be provided for maintenance and removal of the pump and be located with access.

1001.6 Access. Electrical components that require placement or servicing shall be ~~accessible~~ located with access.

Reason: This effort was started by the CACs in 2015/16 code change cycle, and continued in 2018/19. This proposal is to provide coordination with the action taken with -P84-15, M2-15, RB2-16, F12-16, CE137-16 Part 1, CE29-19 Part 1 and 2 . Because the term 'accessible' is most commonly understood as requiring access for persons with disabilities we are making the changes to delete the word accessible from the remaining codes and replace it with other words, defined terms or phrases that are not attributed to requiring access for the physically disabled. Many of the codes use the defined term 'access (to)' or 'ready access (to)' for access by maintenance and service personnel or fire departments. This proposal provides clarity and consistency in the remaining codes where those coordination modifications missed or came in as part of new code changes.

Code change proposal M2-15 removed 'door' from the definitions for 'access (to)' and 'ready access (to)'. That coordination item did not happen across codes and this proposal seeks to complete that effort.

Similar proposals will be submitted for the Group B cycle for IRC, IECC and IEBC.

This proposal is submitted by the ICC Building Code Action Committee (BCAC), ICC Fire Code Action Committee (BCAC), and ICC Plumbing/Mechanical/Gas Code Action Committee (PMGCAC).
BCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2020 the BCAC has held several virtual meetings open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the BCAC website at BCAC.

The PMG CAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2020, the PMG CAC has held several virtual meetings open to any interested party. Numerous interested parties attended the committee meetings and offered their input. Related documentation and reports are posted on the PMG CAC website at: PMGCAC.

The FCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance assigned International Codes with regard to fire and life safety in new and existing buildings and facilities as well as the protection of life and property in wildland urban interface areas. In 2020 and 2021 the Fire-CAC held multiple virtual meetings that were open to any interested party. In addition, there were numerous virtual specific working group meetings that were also open to any interested parties, to develop, discuss and debate the proposed changes. Related documentation and reports are posted on the FCAC website at: FCAC.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
There is no change to any of the requirements. This is only a clarification in terminology.

G1-21 Part VI

Public Hearing Results

Committee Action: **As Submitted**

Committee Reason: The Committee agreed with the published reason statement. (11-0)

G1-21 Part VI

G7-21 Part I

Proposed Change as Submitted

Proponents: Marcelo Hirschler, GBH International, representing self (mmh@gbhint.com)

THIS IS A 2 PART CODE CHANGE. PART I WILL BE HEARD BY THE FIRE SAFETY CODE COMMITTEE. PART II WILL BE HEARD BY THE FIRE CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THESE COMMITTEES.

2021 International Building Code

Add new definition as follows:

FIRE PERFORMANCE. Manner in which a material, product, or assembly responds to a particular fire exposure, including, but not limited to, ease of ignition, flame spread, heat release, mass loss, smoke generation, and fire resistance.

Reason: The term "fire performance" is used multiple times in the I codes, but it is not defined. It is an important concept that must not be confused with "fire resistance, which is one aspect of fire performance. This proposal recommends adding the same definition into the IBC and into the IFC. The term fire performance combines the concept of "fire resistance", which is defined in the IBC, and the concept of "reaction to fire", which is not defined in the I-codes, but the concept is used frequently. Fire resistance is defined in the IBC as: "That property of materials or their assemblies that prevents or retards the passage of excessive heat, hot gases or flames under conditions of use." In other words, fire resistance is the property of a material that prevents or retards fire from penetrating from one compartment to another. "Reaction to fire" is a term defined by the ASTM committee on fire standards as: "response of a material in contributing by its own decomposition to a fire to which it is exposed, under specified conditions." In other words, reaction to fire is what a material does when it is exposed to fire, in terms of igniting, spreading flame, releasing heat or smoke, or otherwise causing potential harm to people or products.

The term "fire resistance", which is associated with fire resistance ratings (typically determined by testing in accordance with ASTM E119 or UL 263) is used often in the codes and may be confused with "fire performance", and that is why this definition is needed.

Uses of the term "fire performance" in I-codes:

In the IBC: 802.1, 802.2, 802.3, 803.1, 806., and in the discussion about chapter 7.

In the IRC: 302.13,

In the IFC: 803.1, 805.3.2.2, 807.3

In the IEBC: Resource A

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This simply adds a definition.

G7-21 Part I

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The committee indicated that the definition is not needed, and the reason statement references chapter 8, which does not address fire resistance. The committee mentioned that fire performance is a broad concept, and the definition does not address it. (Vote: 11-2)

G7-21 Part I

Individual Consideration Agenda

Public Comment 1:

IBC: SECTION 202, 202 (New)

Proponents: Marcelo Hirschler, representing self (mmh@gbhint.com) requests As Modified by Public Comment

Modify as follows:

2021 International Building Code

FIRE PERFORMANCE . ~~Manner in which a material, product, or assembly responds to a particular fire exposure, including, but not limited to, ease of ignition, flame spread, heat release, mass loss, smoke generation, and fire resistance.~~Generic term incorporating fire resistance and reaction-to-fire.

REACTION-TO-FIRE . Contribution of a material or product as a result of exposure to a fire, in terms of heat or smoke.

Commenter's Reason: The term "fire performance" is used in both the IBC and IFC but it is not defined. It is used primarily associated with flame spread and heat release or smoke release, which are reaction to fire properties (one of the components of fire performance). The term "fire resistance" is defined in the IBC, correctly, as: "That property of materials or their assemblies that prevents or retards the passage of excessive heat, hot gases or flames under conditions of use." That means that fire resistance is associated with fire-resistance ratings (e.g. 1 hour ratings). However, the term "fire resistance" is used in both the IBC and the IFC in section 104.11, on "Alternative materials, design and methods of construction and equipment" but it does not really relate to fire resistance but to fire safety. The code says as follows:

"The material, method or work offered is, for the purpose intended, not less than the equivalent of that prescribed in this code as it pertains to the following:

2.1. Quality.

2.2. Strength.

2.3. Effectiveness.

2.4. Fire resistance.

2.5. Durability.

2.6. Safety."
Clearly if a material burns twice as fast but does not change the fire resistance rating (because both the original material and the proposed replacement exhibit no hourly resistance rating, for example), the proposed replacement has poorer reaction-to-fire properties and it should not be accepted but section 104.11 says you only need to consider the fire resistance. That is wrong and needs to be fixed.

The ASTM committee on fire standards defines both terms and make the distinction. ICC should do so also.

Cost Impact: The net effect of the public comment and code change proposal will not increase or decrease the cost of construction
This simply adds a definition.

Public Comment# 2277

G7-21 Part II

Proposed Change as Submitted

Proponents: Marcelo Hirschler, GBH International, representing self (mmh@gbhint.com)

2021 International Fire Code

Add new definition as follows:

FIRE PERFORMANCE. Manner in which a material, product, or assembly responds to a particular fire exposure, including, but not limited to, ease of ignition, flame spread, heat release, mass loss, smoke generation, and fire resistance.

Reason: The term "fire performance" is used multiple times in the I codes, but it is not defined. It is an important concept that must not be confused with "fire resistance, which is one aspect of fire performance. This proposal recommends adding the same definition into the IBC and into the IFC. The term fire performance combines the concept of "fire resistance", which is defined in the IBC, and the concept of "reaction to fire", which is not defined in the I-codes, but the concept is used frequently. Fire resistance is defined in the IBC as: "That property of materials or their assemblies that prevents or retards the passage of excessive heat, hot gases or flames under conditions of use." In other words, fire resistance is the property of a material that prevents or retards fire from penetrating from one compartment to another. "Reaction to fire" is a term defined by the ASTM committee on fire standards as: "response of a material in contributing by its own decomposition to a fire to which it is exposed, under specified conditions." In other words, reaction to fire is what a material does when it is exposed to fire, in terms of igniting, spreading flame, releasing heat or smoke, or otherwise causing potential harm to people or products.

The term "fire resistance", which is associated with fire resistance ratings (typically determined by testing in accordance with ASTM E119 or UL 263) is used often in the codes and may be confused with "fire performance", and that is why this definition is needed.

Uses of the term "fire performance" in I-codes:

In the IBC: 802.1, 802.2, 802.3, 803.1, 806., and in the discussion about chapter 7.

In the IRC: 302.13,

In the IFC: 803.1, 805.3.2.2, 807.3

In the IEBC: Resource A

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This simply adds a definition.

G7-21 Part II

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The committee stated that the reasons for disapproval were based on the disapproval of Part I by the IBC FS committee and the lack of demonstrated need in the IFC. (Vote: 13-0)

G7-21 Part II

Individual Consideration Agenda

Public Comment 1:

IFC: SECTION 202, (New)

Proponents: Marcelo Hirschler, representing self (mmh@gbhint.com) requests As Modified by Public Comment

Modify as follows:

2021 International Fire Code

FIRE PERFORMANCE . ~~Manner in which a material, product, or assembly responds to a particular fire exposure, including, but not limited to, ease of ignition, flame spread, heat release, mass loss, smoke generation, and fire resistance. resistance.~~ Generic term incorporating fire resistance and reaction-to-fire.

REACTION-TO-FIRE . Contribution of a material or product as a result of exposure to a fire, in terms of heat or smoke.

Commenter's Reason: The term "fire performance" is used in both the IBC and IFC but it is not defined. It is used primarily associated with flame spread and heat release or smoke release, which are reaction to fire properties (one of the components of fire performance). The term "fire resistance" is defined in the IBC, correctly, as: "That property of materials or their assemblies that prevents or retards the passage of excessive heat, hot gases or flames under conditions of use." That means that fire resistance is associated with fire-resistance ratings (e.g. 1 hour ratings). However, the term "fire resistance" is used in both the IBC and the IFC in section 104.11, on "Alternative materials, design and methods of construction and equipment" but it does not really relate to fire resistance but to fire safety. The code says as follows:

"The material, method or work offered is, for the purpose intended, not less than the equivalent of that prescribed in this code as it pertains to the following:

2.1. Quality.

2.2. Strength.

2.3. Effectiveness.

2.4. Fire resistance.

2.5. Durability.

2.6. Safety."
Clearly if a material burns twice as fast but does not change the fire resistance rating (because both the original material and the proposed replacement exhibit no hourly resistance rating, for example), the proposed replacement has poorer reaction-to-fire properties and it should not be accepted but section 104.11 says you only need to consider the fire resistance. That is wrong and needs to be fixed.

The ASTM committee on fire standards defines both terms and make the distinction. ICC should do so also.

Cost Impact: The net effect of the public comment and code change proposal will not increase or decrease the cost of construction
This simply adds a definition.

Public Comment# 2307

G10-21

Proposed Change as Submitted

Proponents: Jeffrey S. Grove, P.E. FSFPE, Jensen Hughes, representing Jensen Hughes (jgrove@jensenhughes.com)

THIS CODE CHANGE WILL BE HEARD BY THE MEANS OF EGRESS CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THAT COMMITTEE.

2021 International Building Code

Revise as follows:

[BE] FLOOR AREA, NET. The actual occupied area not including unoccupied accessory areas such as *corridors*, *stairways*, *ramps*, toilet rooms, <u>elevator lobbies,</u> mechanical rooms and closets.

Reason: Elevator lobbies are used in some buildings to provide the hoistway protection required by 3006.2. Additionally, fire service access elevator lobbies are required in certain high-rise buildings by IBC 403.6.1 and 3007.6. Occupant evacuation elevator lobbies may be provided in accordance with IBC 403.5.2 (exception 1) and 3008.6.
In uses for which the occupant load is calculated using the gross floor area (such as business or residential), the area of elevator lobbies must be included in the gross floor area. However, in uses for which the occupant load is calculated using the net floor area (such as assembly), it is not necessary to include the area of elevator lobbies in the net floor area. Elevator lobbies are only occupied on a transient basis as people move to or from their destination As such, the area of elevator lobbies should not be included in the net floor area, just like the area of stairs, corridors and bathrooms are currently excluded from the net floor area.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This code change proposal is submitted to clarify requirements. No cost impact is anticipated.

G10-21

Public Hearing Results

Committee Action: **As Submitted**

Committee Reason: The proposal was approved because an elevator lobby is typically part of the corridor and should not be part of a net floor area calculation. This will help with determination of the occupant load for a floor. (Vote: 8-6)

G10-21

Individual Consideration Agenda

Public Comment 1:

Proponents: Micah Chappell, representing Washington Association of Building Officials (micah.chappell@seattle.gov) requests Disapprove

Commenter's Reason: This public comment is to disapprove the proposal adding elevator lobbies to the net floor area definition. This proposal does not clarify requirements, it creates vague and unenforceable language, while providing a giant loophole when determining net floor area. While "some" elevator lobbies serve a transient purpose and are reasonable to exclude from net area when calculating occupant load, the boundary of the lobby may not be clear based on the lobby's relationship to adjacent spaces that should be assigned an occupant load.

At the committee action hearings, an example was given of the elevators opening directly onto an assembly pre-function space. For the purpose of assigning occupant load, where does the elevator lobby end and where does the assembly area begin? Another example given was the lobby that contains an assembly seating area, i.e. greater than 750 sf. Yet another example is the first-floor lobby to a mixed-use building. The elevator lobby can serve multiple occupancies, including assembly.

Elevator lobbies are not defined within the building code and the proponent does not provide direction on what extent of floor area can or cannot be included as part of an elevator lobby when excluding it from the net area calculation. Adding elevator lobbies to the definition of net area leaves the door open to the applicant on what areas to include. Leaving it out of the definition gives more flexibility to the code official.

Additionally, the committee's statement for approving this proposal was "an elevator lobby is typically part of the corridor and should not be part of a net floor area calculation." While for many buildings that may be the case, assembly areas in a sprinklered building do not require a corridor system.

The following images show examples of elevators that open to spaces where a clear delineation of what could be an elevator lobby does not exist. The images also show that many elevators do not open to a corridor as indicated as the reason for approval by the committee.

FIGURE 1

FIGURE 2

FIGURE 3

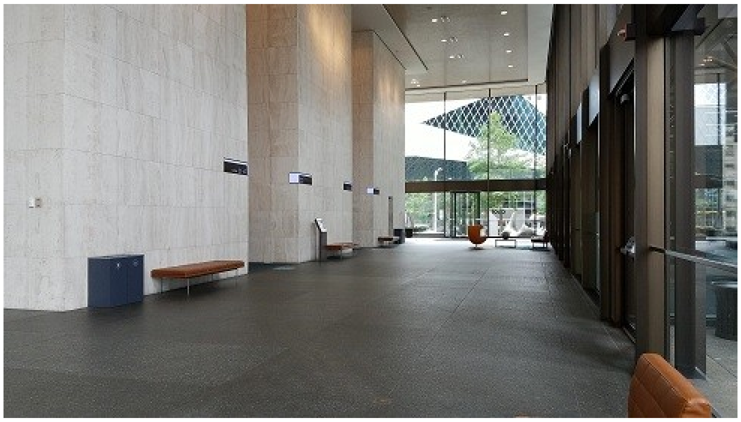


FIGURE 4

Cost Impact: The net effect of the public comment and code change proposal will not increase or decrease the cost of construction
No change to code.

Public Comment# 2388

G12-21

Proposed Change as Submitted

Proponents: Mike Nugent, Chair, representing ICC Building Code Action Committee (bcac@iccsafe.org)

2021 International Building Code

Revise as follows:

[BG] HIGH-RISE BUILDING. A building with the floor of an occupied ~~floor~~ story located more than 75 feet (22 860 mm) above the lowest level of fire department vehicle access.

Reason: The intent of this proposal is to clarify that an occupied roof that is over 75' where the floor is below 75' does not make this building a high-rise. Also thinking into the future, changing an unoccupied roof to an occupied roof should not change the building requirements to this extent. An open to the air occupied roof does not increase the hazard the same as a story.
If you make this a high-rise what could be added is additional alarm systems requirements, additional requirements for sprinklers, additional special inspections, luminous egress markings in the stairways, a fire command center, standpipes, secondary water supply, smoke detection systems, separation between stairway enclosures, smokeproof enclosures, etc. A justification or need for these systems for just an occupied roof has not been demonstrated.

This would be consistent with the change to Section 503.1.4 –

503.1.4 Occupied roofs. A roof level or portion thereof shall be permitted to be used as an occupied roof provided the occupancy of the roof is an occupancy that is permitted by Table 504.4 for the story immediately below the roof. The area of the occupied roofs shall not be included in the building area as regulated by Section 506. An occupied roof shall not be included in the building height or number of stories as regulated by Section 504, provided the penthouses and other enclosed roof structures comply with Section 1511.

Exceptions:

1. The occupancy located on an occupied roof shall not be limited to the occupancies allowed on the story immediately below the roof where the building is equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1 or 903.3.1.2 and occupant notification in accordance with Section 907.5 Sections 907.5.2.1 and 907.5.2.3 is provided in the area of the occupied roof. Emergency voice/alarm communication system notification per Section 907.5.2.2 shall also be provided in the area of the occupied roof where such system is required elsewhere in the building.

2. (no change to this exception)

A floor is a floor & a roof is a roof. Just because a roof is an "occupied" roof, does not make it a floor. The code has had provisions related to adequate egress from "occupied" roofs for years without classifying the roof as an occupancy for purposes of other code issues including height/area limitations, mixed uses, sprinklers, or type of construction.

The IBC currently requires a minimum of one standpipe hose connection needs to be extended to the roof (Section 905.4 – 2021 IBC).

It should be noted that there are new provisions in the 2015 IBC (Section 903.2.1.6) which addresses sprinkler protection due to an occupied roof and in the 2018 IBC (Section 503.1.4) which address occupied roofs based on the floor immediately below the roof. In both cases, if sprinkler protection is provided throughout the building, whether the roof is an occupied roof has no bearing on height/area limitations, occupancy separation requirements or the classification of the building as a high-rise.

This proposal is submitted by the ICC Building Code Action Committee (BCAC). BCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2020 the BCAC has held several virtual meetings open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the BCAC website at BCAC.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The technical criteria for high-rises would not change. This is a clarification. The opposite interpretation could have a significant increase in building costs because of the additional system indicated in the reason.

Staff note: G12-21, G14-21, G15-21, G16-21 addresses requirements in a different or contradicting manner. G14-21, G15-21 and G16-21 addresses similar requirements in a different manner to those found in current IBC Section 503.1.4. The committee is urged to make their intentions clear with their actions on these proposals.

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: This proposal was disapproved because some committee members felt that not including the occupied roof in the definition of high rise ignored the issue of the potential occupant load on the occupied roof. Some of the committee members felt that the safety for persons on the roof was addressed through other sections in the codes. See also the committee reason for G14, G15 and G16. (Vote: 10-4)

Staff Analysis: G12-21, G14-21, G15-21, G16-21 addresses requirements in a different or contradicting manner. G14-21, G15-21 and G16-21 addresses similar requirements in a different manner to those found in current IBC Section 503.1.4. The committee is urged to make their intentions clear with their actions on these proposals.

Individual Consideration Agenda

Public Comment 1:

Proponents: Mike Nugent, representing ICC Building Code Action Committee (bcac@iccsafe.org); Marcin Pazera, representing PIMA (mpazera@pima.org); David Tyree, representing AWC (dtyree@awc.org) requests As Submitted

Commenter's Reason: NUGENT REASON:
This code change, along with G15-21 and G16-21, seeked to clarify an issue that remains unclear even with an ICC interpretation. That is that when using the definition of “HIG-RISE BUILDING,” just WHERE is the 75 foot dimension to be measured to? The current definition of a high-rise building is:

HIGH-RISE BUILDING *- A building with an occupied floor located more than 75 feet (22 860 mm) above the lowest level of fire department vehicle access.*

There is no dissention on where the 75 foot measurement is to start – the lowest level of fire department access, e.g., the lowest point where the fire service can part a vehicle. But where TO STOP measuring the 75 feet appears to be the big question? The definition states that the distance is measured to an “occupiable floor.” It seems to come down to - just what is a “floor?” While the term “floor” appears 1,062 time and the term “floors” appears 209 times, there is no definition of “floor” in the IBC.. That is what this code change is attempting to do. To revise the language within the definition to clearly state where the 75 foot dimension is measured to – replacing the ambiguous term “floor” to “story,” which is a defined term in the IBC.

In the committee’s reason statement for disapproval it states “… some committee members felt that not including the occupied roof in the definition of high rise ignored the issue of the potential occupant load on the occupied roof.” We disagree with that statement, as was presented during the testimony for not only this code change but also for G15-21 and G16-21, over the past couple of code development cycles there has been a concerted effort to put in place numerous revisions to the IBC and IFC to address the whole “occupied roof” topic, with the majority geared to life safety, fire protection features and construction materials/methods.

In regard to the issue of building construction the IBC now in Section 503.1.4 states:

503.1.4 Occupied roofs*. A roof level or portion thereof shall be permitted to be used as an occupied roof provided the occupancy of the roof is an occupancy that is permitted by Table 504.4 for the story immediately below the roof. The area of the occupied roofs shall not be included in the building area as regulated by Section 506. An occupied roof shall not be included in the building height or number of stories as regulated by Section 504, provided that the penthouses and other enclosed rooftop structures comply with Section 1511.*

The definition of “high-rise buildings” first appeared in each of the early 1980’s and was based on the work done at the 1971 *International Symposium on Fire Safety in High-Rise Buildings* which was sponsored by the General Services Administration (GSA) with participants from not only the US but England, France, Canada and Sweden. They had to arrive at a term that all recognized, thus they used “floor.” It was and is a term that is defined around the country in very similar terms.

In the IBC Section 201.4 specifically address terms that are not defined in an I-Code, it states "Where terms are not defined through the methods authorized by this section, such terms shall have ordinarily accepted meanings such as the context implies." In looking at the Merriam-Webster website (https://www.merriam-webster.com/dictionary/floor), the word "floor" is defined as:

Definition of *floor* (Entry 1 of 2)

1 **:** the level base of a room

2 **a** **:** the lower inside surface of a hollow structure (such as a cave or bodily part)

b **:** a ground surface
// the ocean floor

3 **a** **:** a structure dividing a building into stories
also **:** STORY

b **:** the occupants of such a floor

4 **:** the surface of a structure on which one travels
// the *floor* of a bridge

5 **a** **:** a main level space (as in a stock exchange or legislative chamber) distinguished from a platform or gallery

b **:** the specially prepared or marked area on which indoor sports events take place

c **:** the members of an assembly
// took questions from the *floor*

d **:** the right to address an assembly
// the senator from Utah has the *floor*

6 **:** a lower limit **:** BASE

from the floor
: in field goals as opposed to free throws
// made 16 of 18 shots *from the floor*

— see also TAKE THE FLOOR

This code change just seeks to clarify that the term "floor" as used in the definition of high-rise building and in a multitude of other places in the IBC is referring to a horizontal plane that is located WITHIN the walls of a story of a building – not to a structure that is on the roof of a building. We are proposing to replace an undefined term with one that has an IBC definition – Story. Section 202 defines it as:***STORY.*** *That portion of a building included between the upper surface of a floor and the upper surface of the floor or roof next above (see "Basement," "Building height," "Grade plane" and "Mezzanine"). A story is measured as the vertical distance from top to top of two successive tiers of beams or finished floor surfaces and, for the topmost story, from the top of the floor finish to the top of the ceiling joists or, where there is not a ceiling, to the top of the roof rafters.* We wish to point out that the committee in its acceptance of G15-21 actually confirms that "story" would be the appropriate term for the definition. It is our opinion that through the committee's action for Approved as Modified, to have there be 2 separate thresholds that in fact they answered the question - the term "floor" is really a horizontal surface located WITHIN an interior space. The term by itself doesn't include an occupied roof. We do not believe that it was ever the intent that an occupied roof be used as the threshold for the determination of a high-rise building. The hazards associated with occupants within the exterior walls of a building are significantly different than those in spaces that outside of the exterior walls where hot gasses will not be confined.

PAZERA REASON:

Polyisocyanurate Insulation Manufacturers Association (PIMA) is generally supportive of improved fire safety provisions and requirements in the building code. This proposal provides an important clarification to the definition of "high-rise building" in Section 202 of the International Building Code (IBC). This change to "floor of an occupied story" provides a clear distinction between occupied floor and occupied roof. In the current definition (2021 IBC) it could be inferred that occupied roofs (located above an occupied space) could trigger reclassification of a building to a high-rise building, and thus trigger unnecessary or unwarranted upgrades. In our opinion, occupied roofs (open to the outdoor environment) do not carry the same fire safety risks as occupied spaces. This proposal aims to clarify this concept while maintaining current building code requirements. The opponents of this proposal argued that increased fire safety is necessary, however, they have failed to provide substantiating evidence to support such a request. PIMA requests approval as submitted of proposal number G12-21.

TYREE REASON:

This proposal by the BCAC is the correct way to best clarify the definition of HIGH-RISE BUILDING without creating such a distinctly different and contrary intent created by the definition change as was approved by G15. Disapproval of G15-21 is also recommended.

The modification spelled out in this proposal aligns with the language provided for in IBC Section 503.1.4 which states:**503.1.4 Occupied roofs.** A roof level or portion thereof shall be permitted to be used as an occupied roof provided the occupancy of the roof is an occupancy that is permitted by Table 504.4 for the story immediately below the roof. The area of the occupied roofs shall not be included in the building area as regulated by Section 506. An occupied roof shall not be included in the building height or number of stories as regulated by Section 504, provided that the penthouses and other enclosed rooftop structures comply with Section 1511.By changing the definition of HIGH-RISE BUILDING as approved by G15-21 the intent that occupying roofs should not trigger code provisions attributed to building height or number of stories has been circumvented. The change to the definition will now put into place requirements for sprinkler protection that were already covered by exception 1 from Section 503.1.4, as well as triggering the 8 Emergency Systems (Smoke detection, Fire alarm system, Standpipe system, Emergency voice/alarm communication system, Emergency communication coverage, Fire command center, Smoke removal, and Standby and emergency power) required by Section 403.4 without providing any justification that those systems are needed simply because one is adding as few as a couple of occupants to an area of the roof.

Cost Impact: The net effect of the public comment and code change proposal will not increase or decrease the cost of construction
The technical criteria for high-rises would not change. This is a clarification. The opposite interpretation could have a significant increase in building costs because of the additional system indicated in the reason.

Public Comment# 2643

G15-21

Proposed Change as Submitted

Proponents: Stephen Thomas, Colorado Code Consulting, a Shums Coda Assoc Company, representing Colorado Chapter ICC (sthomas@coloradocode.net); Timothy Pate, representing Colorado Chapter Code Change Committee (tpate@broomfield.org)

2021 International Building Code

Revise as follows:

[BG] HIGH-RISE BUILDING. A building with an occupied floor <u>or occupied roof</u> located more than 75 feet (22 860 mm) above the lowest level of fire department vehicle access.

Reason: The existing language refers to a floor that is more than 75 feet above the lowest level of fire department vehicle access. It is our opinion that an occupied roof is also a floor. A floor is something you walk on and people walk on an occupied floor. Therefore, we are proposing to provide clarifying language to include occupied roofs above 75 feet to classify the building as a high-rise building. The presence of occupants and combustible furnishings add to the difficulty of performing ground-based fire fighting. It also limits the ability of the firefighters to perform rescue operations from the ground. By classifying an occupied roof over 57 feet, additional safety provisions are required in the building.
This proposal will have an impact on the application of the Existing Building Code. If someone wants to convert an existing roof to an occupied roof and the roof is more than 75 feet above the lowest level of fire department vehicle access, the building will need to be upgraded to comply with the high rise building provisions in IBC Section 403. The addition of floor area would make the building less code complying that it was prior to constructing the occupied roof.

Cost Impact: The code change proposal will increase the cost of construction
If a jurisdiction did not previously classify an occupied roof as a floor, the increased safety requirements for high-rise buildings will increase the cost of construction. However, if they are already looking at the occupied roof as an occupied floor, the cost of construction would not increase.

Staff note: G12-21, G14-21, G15-21, G16-21 addresses requirements in a different or contradicting manner. G14-21, G15-21 and G16-21 addresses similar requirements in a different manner to those found in current IBC Section 503.1.4. The committee is urged to make their intentions clear with their actions on these proposals.

G15-21

Public Hearing Results

Committee Action: **As Submitted**

Committee Reason: The proposal to add 'occupied roofs' to the definition of 'highrise' was approved due to the concern that occupants on the occupied roof need to be protected with elements other than just being open to the outside air. Fire department access to the roof is important for life safety. Concerns were raised that protection for occupied roofs were already addressed in other portions of the code, so having an occupied roof above the 75 foot height should not add the entire 'highrise' package of requirements - especially if the occupied roof was only a small portion of the overall roof. The proposal did not address the issue if a 'floor' is the floor of the story below the roof, a mezzanine in the top story, or what would be required for an occupied roof with elevated platforms on portions of the occupied roof. There was also a concern about the impact on existing building that wanted to add amenities on the roof. See also the Committee Action to G12, G14 and G16. (Vote: 10-4)

Staff Analysis: G12-21, G14-21, G15-21, G16-21 addresses requirements in a different or contradicting manner. G14-21, G15-21 and G16-21 addresses similar requirements in a different manner to those found in current IBC Section 503.1.4. The committee is urged to make their intentions clear with their actions on these proposals.

G15-21

Individual Consideration Agenda

Public Comment 1:

IBC: SECTION 202

Proponents: Lee Kranz, representing Washington Association of Building Officials Technical Code Development Committee (lkranz@bellevuewa.gov); Micah Chappell, representing Washington Association of Building Officials (micah.chappell@seattle.gov) requests As Modified by Public Comment

Modify as follows:

2021 International Building Code

[BG] HIGH-RISE BUILDING . A building ~~with an occupied floor or occupied roof~~ <u>where either of the following are </u>located more than 75 feet (22 860 mm) above the lowest level of fire department vehicle access:<u>1. An occupied floor.2. An occupied roof with an occupant load of 50 or more.</u>

Commenter's Reason: G15-21 is intended to clarify whether an occupied roof can be considered an occupied floor for the purposes of triggering high rise provisions in Section 403. However, as written, **any** occupied roof located above the 75-foot threshold, regardless of size or occupant load, will trigger those requirements.
This public comment would provide the option to have smaller occupied roofs on tall buildings without the need to comply with high-rise regulations in Section 403by establishing an occupant load of 50 or more people on the occupied roof before a building would become a high rise.

At the Committee Action Hearings, several testifiers spoke in favor of G16-21, which would have established an occupant load trigger of 50. There was also testimony at the hearings that suggested an occupant load of 100 should be allowed. In our judgment, 50 occupants (which equates to a 750 square foot roof deck) is a good compromise between 1 occupant (too few) and 100 occupants (too many). A trigger of 50 occupants also corresponds to the threshold for determining assembly occupancies (Section 303.1.2, Item 1). We feel that once an assembly occupancy is on the occupied roof, that is a large enough number of people to justify treating the occupied roof the same as an occupied floor.

Occupants on smaller occupied roofs are at lower risk than those on the floor below because smoke will not accumulate on an occupied roof as it does inside of the building. Mid-rise buildings that are close to meeting the definition of a high rise building, will have the same level of notification and sprinkler protection (see Section 503.1.4, exception 1) as those inside the building and will only have 1 additional level of stairs to traverse than those on the floor below.

An example of where smaller occupied roofs could trigger high rise compliance is on a 7 story multi-family building with 6 units per floor. The elevation of the occupied roof slightly exceeds 75 feet to the lowest fire truck access. In this case, the occupants on the highest level of the building have access to 400 Sq. Ft. occupied roofs accessible only by the tenants of each dwelling unit. Each occupied roof will have an occupant load of 2 (400 Sq. Ft. divided by a 200 Sq. Ft. OLF) X 6 = 12 people. As approved, this building would have to comply with the high-rise provisions. If this public comment is approved, it would not be considered to be a high rise, because the total occupant load is less than 50. The building would still be protected by approved sprinkler and a fire alarm systems.

This public comment does not compromise the safety of building occupants and establishes a reasonable threshold for when to apply high rise provisions for occupied roofs.

Cost Impact: The net effect of the public comment and code change proposal will increase the cost of construction
The current definition of High-Rise Building is measured from the lowest level of fire department vehicle access to the highest occupied floor. If approved, this code change will define some buildings with an occupied roof as High-Rise which under the current definition, would be considered to be mid-rise. High-Rise buildings are more expensive to build because of the added life safety systems required in Section 403.

If this is approved as modified, it will cause more buildings to have to comply with high-rise provisions which will in fact increase the cost of construction.

Public Comment# 2377

Public Comment 2:

Proponents: Mike Nugent, representing ICC Building Code Action Committee (bcac@iccsafe.org); Marcin Pazera, representing PIMA (mpazera@pima.org); David Tyree, representing AWC (dtyree@awc.org) requests Disapprove

Commenter's Reason: NUGENT:
This proposal seeks to dramatically change the threshold for when a building would become classified as a “high-rise.” The current definition of a high-rise building has a single threshold - A building <u>with an occupied floor located more than 75 feet</u> (22 860 mm) above the lowest level of fire department vehicle access.

This proposal seeks to change the definition to have 2 thresholds – buildings with:

- an occupied floor located more than 75 feet above the lowest level of fire department vehicle access.

· an occupied roof located more than 75 feet above the lowest level of fire department vehicle access.

We do wish to address the comments made by the proponents made during the public testimony. As reflected in the testimony and in the 2021 REPORT OF THE COMMITTEE ACTION HEARINGS, they stated this change was needed for the following reasons:

1. There are mixed interpretations on how to apply the definition as currently written – the biggest question is what constitutes an "occupied floor?"

It is our opinion that through the committee's action for Approved as Modified (10-4), the committee in fact answered that question by an overwhelming margin by expanding the definition of "high-rise building" to have 2 separate thresholds. To retain the term "occupied floor" and add "occupied roof" the committee made it clear that an "occupied floor" is going to be a horizontal element that is WITHIN the exterior walls of a building (aka – floor surface within a story), and that an "occupied roof" is going to be a horizontal element that is on top of the roof of a building.

Through their action, the committee essentially supports what is being proposed in Code Change G12-21 being put forth by the BCAC in which "floor" is proposed to be replaced by "story."

2. Concern that occupants on the occupied roof need to be protected with elements other than just being open to the outside air.

The logic appears to be that IF a building with an occupied roof is put into the high-rise category that the building will be provided with some heighten level of "protection" (aka – fire rated construction). But without a lot of other changes to the code – that is not true.

Take a fully sprinklered building with an occupied roof where the "height" of the building is 75 feet (measured from grade plane to the ROOF) – but where the distance from the lowest level of fire department access to the occupied roof is 78 ft. Yes the building would be a high-rise BUT given the building complies with the area limits, for many occupancies IBC Table 504.3 would allow the building to be of an unprotected construction - Type IIIB or IIB construction – which means there would no fire ratings on the structural elements per Table 601. And note that this allowable height even applies to buildings with Group A occupancies.

TABLE 504.3
ALLOWABLE BUILDING HEIGHT IN FEET ABOVE GRADE PLANE[a]

OCCUPANCY CLASSIFICATION	See Footnotes	TYPE OF CONSTRUCTION									
		Type I		Type II		Type III		Type IV			
		A	B	A	B	A	B	A	B	C	HT
A, B, E, F, M, S, U	NS[b]	UL	160	65	55	65	55	65	65	65	65
	S	UL	180	85	75	85	75	270	180	85	85
H-1, H-2, H-3, H-5	NS[c, d]	UL	160	65	55	65	55	120	90	65	65
	S										
H-4	NS[c, d]	UL	160	65	55	65	55	65	65	65	65
	S	UL	180	85	75	85	75	140	100	85	85
I-1 Condition 1, I-3	NS[d, e]	UL	160	65	55	65	55	65	65	65	65
	S	UL	180	85	75	85	75	180	120	85	85
I-1 Condition 2, I-2	NS[d, e, f]	UL	160	65	55	65	55	65	65	65	65
	S	UL	180	85							
I-4	NS[d, g]	UL	160	65	55	65	55	65	65	65	65
	S	UL	180	85	75	85	75	180	120	85	85
R[h]	NS[d]	UL	160	65	55	65	55	65	65	65	65
	S13D	60	60	60	60	60	60	60	60	60	60
	S13R	60	60	60	60	60	60	60	60	60	60
	S	UL	180	85	75	85	75	270	180	85	85

IS THIS BUILDING REALLY MORE PROTECTED???

No one will take the reduction for Type of Construction fire ratings allowed in 403.2.1 because there are no fire ratings to reduce. Because of this, sprinkler control valves won't be equipped with supervisory initiating devices or water-flow initiating devices.

The threshold for an occupied floor being 75' above fire department access fundamentally put in place a back-stop for buildings that had a "height" of more than 75 feet, which typically saw a high-rise building being of a "protected" type of construction. But if this code change is successful that will not be the case.

1.

Fire department access to the roof is important for life safety.

The logic associated with this comment appears to be that IF a building with an occupied roof is put into the high-rise category, there will then be improved fire department access that is not provided in a non-high-rise building. But that is not true. Just by putting a building with an occupied roof into the high-rise category, increased fire department access to the roof will not automatically improve. Other provisions of the code currently dictate that there must be exits from the roof, the number of exits, and the size/capacity of exits – all of which are used by the fire service for access. There is a general thinking that IF you have a high-rise building there will be fire service access elevators - but that is not true. Fire service access elevators are ONLY required when "… the occupied floor is more than 120 feet above the occupied floor more than 120 feet (36 576 mm) above the lowest level of fire department vehicle access." So, a building having an occupied roof located 76 feet above the lowest level of fire department vehicle access will be a high-rise building but will not be required to have fire service access elevators.

In addition, we want to emphasize the comments that were made/raised by opponents to this code change during the code action hearing – these included:

· The fact that over the past couple of code development there has been a concerted effort to put in place numerous revisions made to the IBC and IFC to address the whole "occupied roof" topic, including many geared to life safety, fire protection features and construction materials/methods. And in fact, this proposal is contrary to the intent of the language provided for in the current IBC in Section 503.1.4 (to which there were no code changes) which states:

503.1.4 Occupied roofs*. A roof level or portion thereof shall be permitted to be used as an occupied roof provided the occupancy of the roof is an occupancy that is permitted by Table 504.4 for the story immediately below the roof. The area of the occupied roofs shall not be included in the building area as regulated by Section 506. An occupied roof shall not be included in the building height or number of stories as regulated by Section 504, provided that the penthouses and other enclosed rooftop structures comply with Section 1511.*

· NO statistics or technical data was provided to show that the current regulations do not already adequately address the hazards that an occupied roof presents when placed on a building that is not a high-rise building.

· NO WHERE in the proponent's reason statement nor in testimony was there a real discussion of the cost impact this will have if successful – new or/and existing construction. Just how much more will it cost to build a building that has an occupied roof (@75ft Above Fire Department Vehicle Access) as a high-rise than one that is not a high-rise? I think we all know that it would be significant. When asked specifically about the impact on existing building the commentors indicated that the issue can be addressed through revisions to the IEBC in Group B. BUT no one has presented the beginnings of what this would look like. Without fully understanding how this change will affect both new and existing building and the costs involved, moving forward with a stand-alone change for only new buildings totally ignores the full impact this change could have.

· The proposed code change treats a very small area of occupied roof the same as a very large, occupied roof, nor does it provide any differentiation based on how that occupied roof is being used. What if a 1,000sf occupied roof were constructed on a building that has roof with an area of 30,000 sf? Does the placement of a space that is 10% of the roof area warrant the pushing the whole building into a high-rise category? This logic totally flies in the face of the mixed occupancy philosophy in IBC Section 508 where a space that is 10% or less of the floor area is NOT considered a separate occupancy for applying the code provisions.

· And how about the question – just exactly WHERE do you measure the 75 foot dimension to? Is this now to the top of the "roof" or the top of the floor system that sits on top of the roof? What if there are multiple occupied roofs on a single roof – all at different elevations?

· And please note that in this code development cycle there is a code change (S10-21) - which was Approved as Modified (12-1) – that introduced some much-needed regulations on the constructability of occupied roof. It included restrictions on the types of materials that can be used for the construction of occupied roofs, and restrictions on the voids that are created between the roof and the occupied roof.

The committee erred by recommending As Submitted when the proponent provided no justification for triggering so many additional systems when only a single person may be occupying a roof. There are real costs that should have been more closely scrutinized considering the proponent did not speak to the significant costs associated with providing the additional emergency systems.

In summary, by changing the definition of HIGH-RISE BUILDING, as approved in this proposal, the intent that occupying roofs should not trigger code provisions attributed to building height or number of stories has been circumvented. The change to the definition by G15-21 will now put into place requirements for sprinkler protection that were already covered by exception 1 from Section 503.1.4, as well as triggering the following emergency systems: smoke detection, fire alarm system, standpipe system, emergency voice/alarm communication system, emergency communication coverage, fire command center, smoke removal, and standby and emergency power required by Section 403.4. These additional features will be triggered by providing an occupied roof that is designed for an occupant load as low as a single person. Instead of changing the definition, the proponent should have identified and substantiated the specific provisions that were lacking and then proposed those specific changes within IBC Section 503.1.4.

PAZERA:

This proposal adds “occupied roofs” to the definition for “high-rise building”, and thus unnecessarily expands the code requirements applicable to occupied roofs of all types and uses. Polyisocyanurate Insulation Manufacturers Association (PIMA) has number of concerns regarding the impacts this proposal will have on new but more importantly on existing buildings since this proposal significantly increases fire safety requirements for occupied roofs. The proposal impacts existing buildings and will likely require upgrades to comply with high-rise building provisions when the existing building is reclassified as a high-rise. This provision will be highly disruptive to building owners who will be burdened with extensive renovations in order to comply with high-rise building provisions. Fire safety concerns and fire safety risks for occupied roofs (open to the outdoor environment) are not equivalent to those in the occupied space (enclosed space). Enclosed spaces pose a more significant fire risk. Fire safety concerns for occupied roofs should be addressed through specific proposals that established requirements that are proportional to the fire safety risk. Treating any occupied roof as an occupied space ignores important differences in interior and exterior building locations and conditions. PIMA requests disapproval of proposal number G15-21.

TYREE:

This proposal is contrary to the intent of the language provided for in IBC Section 503.1.4 which states:

503.1.4 Occupied roofs. A roof level or portion thereof shall be permitted to be used as an occupied roof provided the occupancy of the roof is an occupancy that is permitted by Table 504.4 for the story immediately below the roof. The area of the occupied roofs shall not be included in the building area as regulated by Section 506. An occupied roof shall not be included in the building height or number of stories as regulated by Section 504, provided that the penthouses and other enclosed rooftop structures comply with Section 1511.

By changing the definition of HIGH-RISE BUILDING as approved in this proposal, the intent that occupying roofs should not trigger code provisions attributed to building height or number of stories has been circumvented. The change to the definition by G15-21 will now put into place requirements for sprinkler protection that were already covered by exception 1 from Section 503.1.4, as well as triggering the following emergency systems: smoke detection, fire alarm system, standpipe system, emergency voice/alarm communication system, emergency communication coverage, fire command center, smoke removal, and standby and emergency power) required by Section 403.4. These additional features will be triggered for a building designed to provide an occupied roof area to be used by just a single person. This interpretation will also throw many other questions into the mix. How do you classify the occupancy of occupied roof decks? Does the roof deck contribute to the building area? Does the height and area table (IBC Table 503) apply to the outdoor area? This is just the beginning.

If ever a evacuation of a high-rise roof built to modern codes has been hampered by the occupants or other fixtures on the roof, please identify those cases. The committee erred by recommending As Submitted when the proponent provided no justification for triggering so many additional systems when only a single person may be occupying a roof. There are real costs that should have been more closely scrutinized considering the proponent did not identify the significant costs associated with providing the additional systems.

Cost Impact: The net effect of the public comment and code change proposal will not increase or decrease the cost of construction
The original proposal AS could have a significant increase in building costs because of the additional system indicated in the reason.

The disapproval of the original proposal as requested in this public comment will result in that the technical criteria for high-rises would not change.

Public Comment# 2669

G16-21

Proposed Change as Submitted

Proponents: Lee Kranz, City of Bellevue, WA, representing Washington Association of Building Officials Technical Code Development Committee (lkranz@bellevuewa.gov)

2021 International Building Code

Revise as follows:

[BG] HIGH-RISE BUILDING. A building with an <u>occupied roof having an occupant load of 50 or more, or an</u> occupied floor, located more than 75 feet (22 860 mm) above the lowest level of fire department vehicle access.

Reason: In an October, 2019 article titled 'Through the roof: Occupied roofs in the 2018 IBC', Kim Paarlberg writes that “What has not been clarified is if an occupied roof is considered an occupied floor when determining does or does not have to meet the high-rise provisions in the code (definition of “high-rise building” and Section 403)”. This code change is intended to address this lack of clarity.
High-rise buildings utilizing the new regulations in the 2021 IBC for occupied roofs are gaining in popularity with building owners and designers. In the current definition of *High-rise building*, we measure from the lowest level of fire department vehicle access to the highest ‘occupied floor’ and if located more than 75 feet above this point then it is considered a *high-rise building.* What is not clear is if an occupied roof is considered the same as an occupied floor. This code change corrects this ambiguity by adding an occupied roof with an occupant load of 50 or more to the definition. The proposal includes a threshold of 50 people before the occupied roof is applicable to the definition because it was felt that less than 50 is not considered to be assembly and with less than 50 people, it would be manageable in terms of meeting a timed egress analysis to get the occupants to a safe location.

The standard for determining if a building should be provided with all the additional safety measures required for a high-rise building has historically been based on the location of the highest occupied floor. This is due to the limitations of most fire department ladder trucks to reach occupants on the upper portions of the building. Occupied roofs are not considered to be a ‘Story’ for determining the maximum height of a building but regardless, these areas are occupied and would not be within the reach limitations of a fire department ladder truck if located more than 75 feet above the lowest level of fire department vehicle access. Based on this concept, occupied roofs should be considered the same as any other occupied floor of a building.

Cost Impact: The code change proposal will increase the cost of construction
The current definition of High-Rise Building is measured from the lowest level of fire department vehicle access to the highest occupied floor. If approved, this code change will define some buildings with an occupied roof as High-Rise which under the current definition, would be considered to be mid-rise. High-Rise buildings are more expensive to build because of the added life safety systems required in Section 403.

Staff note: G12-21, G14-21, G15-21, G16-21 addresses requirements in a different or contradicting manner. G14-21, G15-21 and G16-21 addresses similar requirements in a different manner to those found in current IBC Section 503.1.4. The committee is urged to make their intentions clear with their actions on these proposals.

G16-21

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: This proposal was disapproved as it could be read to apply to occupied roofs on any height building. There was also the question if someone could post an occupant load to limit the occupant load on the roof or if this needed to be the calculated occupant load. Concerns were raised that protection for occupied roofs were already addressed in other portions of the code, so having an occupied roof above the 75 foot height should not add the entire 'highrise' package of requirements - especially if the occupied roof was only a small portion of the overall roof. The proposal did not address the issue if a 'floor' is the floor of the story below the roof, a mezzanine in the top story, or what would be required for an occupied roof with elevated platforms on portions of the occupied roof. There was also a concern about the impact on existing building that wanted to add amenities on the roof. See also the Committee Action to G12, G14 and G15. (Vote: 9-4)

Staff Analysis: G12-21, G14-21, G15-21, G16-21 addresses requirements in a different or contradicting manner. G14-21, G15-21 and G16-21 addresses similar requirements in a different manner to those found in current IBC Section 503.1.4. The committee is urged to make their intentions clear with their actions on these proposals.

G16-21

Individual Consideration Agenda

Public Comment 1:

Proponents: David Tyree, representing AWC (dtyree@awc.org) requests As Submitted

Commenter's Reason: We are urging approval as submitted as proposed by WABO. G16-21 represents a common sense approach to handing issues related to occupants using the roof for other purposes and is the stated intent in Section 503.1.4. This proposal only goes further to clarify the intent of the language specified in IBC Section 503.1.4 which states:
503.1.4 Occupied roofs. A roof level or portion thereof shall be permitted to be used as an occupied roof provided the occupancy of the roof is an occupancy that is permitted by Table 504.4 for the story immediately below the roof. The area of the occupied roofs shall not be included in the building area as regulated by Section 506. An occupied roof shall not be included in the building height or number of stories as regulated by Section 504, provided that the penthouses and other enclosed rooftop structures comply with Section 1511.

By establishing an occupant load threshold of 50 occupants as specified in this proposal, it will clarify any misconceptions that this section would allow unsafe conditions to occur and specify a very limited number of occupants on the roof and providing the necessary fire safety requirements to safely protect those occupants.

Cost Impact: The net effect of the public comment and code change proposal will not increase or decrease the cost of construction
Establishing a low threshold of occupants on the roof does not increase or decrease any costs associated with this clarification.

Public Comment# 2317

G20-21 Part I

Proposed Change as Submitted

Proponents: Mike Nugent, Chair, representing ICC Building Code Action Committee (bcac@iccsafe.org); Michael O'Brian, representing FCAC (fcac@iccsafe.org)

THIS IS A 2 PART CODE CHANGE. PART I WILL BE HEARD BY THE GENERAL CODE COMMITTEE. PART II WILL BE HEARD BY THE FIRE CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THESE COMMITTEES.

2021 International Building Code

Add new definition as follows:

OCCUPIABLE ROOF. An exterior space on a roof that is designed for human occupancy, other than maintenance, and which is equipped with a means of egress system meeting the requirements of this code.

Revise as follows:

[BG] PENTHOUSE. An enclosed, unoccupiable ~~unoccupied~~ rooftop structure used for sheltering mechanical and electrical equipment, tanks, elevators and related machinery, *stairways,* and vertical *shaft* openings.

302.1 Occupancy classification. Occupancy classification is the formal designation of the primary purpose of the building, structure or portion thereof. Structures shall be classified into one or more of the occupancy groups specified in this section based on the nature of the hazards and risks to building occupants generally associated with the intended purpose of the building or structure. An area, room or space that is intended to be occupied at different times for different purposes shall comply with all applicable requirements associated with such potential multipurpose. Structures containing multiple occupancy groups shall comply with Section 508 . Where a structure is proposed for a purpose that is not specified in this section, such structure shall be classified in the occupancy it most nearly resembles based on the fire safety and relative hazard. Occupiable ~~Occupied~~ roofs shall be classified in the group that the occupancy most nearly resembles, according to the fire safety and relative hazard, and shall comply with Section 503.1.4 .

1. Assembly (see Section 303): Groups A-1, A-2, A-3, A-4 and A-5.
2. Business (see Section 304): Group B.
3. Educational (see Section 305): Group E.
4. Factory and Industrial (see Section 306): Groups F-1 and F-2.
5. High Hazard (see Section 307): Groups H-1, H-2, H-3, H-4 and H-5.
6. Institutional (see Section 308): Groups I-1, I-2, I-3 and I-4.
7. Mercantile (see Section 309): Group M.
8. Residential (see Section 310): Groups R-1, R-2, R-3 and R-4.
9. Storage (see Section 311): Groups S-1 and S-2.
10. Utility and Miscellaneous (see Section 312): Group U.

503.1.4 Occupiable~~Occupied~~ roofs. A roof level or portion thereof shall be permitted to be used as an occupiable ~~occupied~~ roof provided the occupancy of the roof is an occupancy that is permitted by Table 504.4 for the *story* immediately below the roof. The area of the occupiable ~~occupied~~ roofs shall not be included in the *building area* as regulated by Section 506. An occupiable ~~occupied~~ roof shall not be included in the *building height* or number of *stories* as regulated by Section 504, provided that the *penthouses* and other enclosed *rooftop structures* comply with Section 1511.

Exceptions:

1. The occupancy located on an occupiable ~~occupied~~ roof shall not be limited to the occupancies allowed on the *story* immediately below the roof where the building is equipped throughout with an *automatic sprinker system* in accordance with Section 903.3.1.1 or 903.3.1.2 and occupant notification in accordance with Sections 907.5.2.1 and 907.5.2.3 is provided in the area of the occupiable ~~occupied~~ roof. *Emergency voice/alarm communication* system notification per Section 907.5.2.2 shall also be provided in the area of the occupiable ~~occupied~~ roof where such system is required elsewhere in the building.
2. Assembly occupancies shall be permitted on roofs of open parking spaces of Type I or Type II construction, in accordance with the exception to Section 903.2.1.6.

503.1.4.1 Enclosures over occupiable ~~occupied~~ roof areas. Elements or structures enclosing the occupiable ~~occupied~~ roof areas shall not extend more than 48 inches (1220 mm) above the surface of the occupiable ~~occupied~~ roof.

Exception: *Penthouses* constructed in accordance with Section 1511.2 and towers, domes, spires and cupolas constructed in accordance with Section 1511.5.

1004.7 Outdoor areas. *Yards*, patios, occupiable ~~occupied~~ roofs, *courts* and similar outdoor areas accessible to and usable by the building occupants shall be provided with *means of egress* as required by this chapter. The *occupant load* of such outdoor areas shall be assigned by the *building official* in accordance with the anticipated use. Where outdoor areas are to be used by persons in addition to the occupants of the building, and the path of egress travel from the outdoor areas passes through the building, *means of egress* requirements for the building shall be based on the sum of the *occupant loads* of the building plus the outdoor areas.

Exceptions:

1. Outdoor areas used exclusively for service of the building need only have one *means of egress*.
2. Both outdoor areas associated with Group R-3 and individual dwelling units of Group R-2.

1006.1 General. The number of *exits* or *exit access doorways* required within the *means of egress* system shall comply with the provisions of Section 1006.2 for spaces, including *mezzanines*, and Section 1006.3 for *stories* or occupiable ~~occupied~~ roofs.

1006.3 Egress from stories or occupiable ~~occupied~~ roofs. The *means of egress* system serving any *story* or occupiable ~~occupied~~ roof shall be provided with the number of separate and distinct *exits* or access to *exits* based on the aggregate *occupant load* served in accordance with this section.

1006.3.1 Occupant load. Where *stairways* serve more than one *story*, or more than one *story* and an occupiable ~~occupied~~ roof, only the *occupant load* of each *story* or occupiable ~~occupied~~ roof, considered individually, shall be used when calculating the required number of *exits* or access to *exits* serving that *story*.

1006.3.2 Path of egress travel. The path of egress travel to an *exit* shall not pass through more than one adjacent *story*.

Exception: The path of egress travel to an *exit* shall be permitted to pass through more than one adjacent *story* in any of the following:

1. In Group R-1, R-2 or R-3 occupancies, *exit access stairways* and *ramps* connecting four stories or less serving and contained within an individual dwelling unit, sleeping unit or live/work unit.
2. *Exit access stairways* serving and contained within a Group R-3 congregate residence or a Group R-4 facility.
3. *Exit access stairways* and *ramps* within an *atrium* complying with Section 404.
4. *Exit access stairways* and *ramps* in *open parking garages* that serve only the parking garage.
5. *Exit access stairways* and *ramps* serving *open-air assembly seating* complying with the exit access travel distance requirements of Section 1030.7.
6. *Exit access stairways* and *ramps* between the balcony, gallery or press box and the main assembly floor in occupancies such as theaters, *places of religious worship*, auditoriums and sports facilities.
7. Exterior *exit access stairways* and *ramps* between occupiable ~~occupied~~ roofs.

1006.3.3 Egress based on occupant load. Each *story* and occupiable ~~occupied~~ roof shall have the minimum number of separate and distinct *exits*, or access to *exits*, as specified in Table 1006.3.3. A single *exit* or access to a single *exit* shall be permitted in accordance with Section 1006.3.4. The required number of *exits*, or *exit access stairways* or *ramps* providing access to *exits*, from any *story* or occupiable ~~occupied~~ roof shall be maintained until arrival at the *exit discharge* or a *public way*.

1006.3.4 Single exits. A single *exit* or access to a single *exit* shall be permitted from any *story* or occupiable ~~occupied~~ roof where one of the following conditions exists:

1. The *occupant load*, number of *dwelling units* and exit access travel distance do not exceed the values in Table 1006.3.4(1) or 1006.3.4(2).
2. Rooms, areas and spaces complying with Section 1006.2.1 with *exits* that discharge directly to the exterior at the *level of exit discharge*, are permitted to have one *exit* or access to a single *exit*.
3. Parking garages where vehicles are mechanically parked shall be permitted to have one *exit* or access to a single *exit*.
4. Group R-3 and R-4 occupancies shall be permitted to have one *exit* or access to a single *exit*.
5. Individual single-story or multistory *dwelling units* shall be permitted to have a single *exit* or access to a single *exit* from the *dwelling unit* provided that both of the following criteria are met:

   5.1. The *dwelling unit* complies with Section 1006.2.1 as a space with one *means of egress*.

5.2. Either the exit from the *dwelling unit* discharges directly to the exterior at the *level of exit discharge*, or the *exit access* outside the *dwelling unit's* entrance door provides access to not less than two *approved* independent *exits*.

1009.2.1 Elevators required. In buildings where a required accessible floor or occupiable ~~occupied~~ roof is four or more stories above or below a *level of exit discharge*, not less than one required *accessible means of egress* shall be an elevator complying with Section 1009.4.

Exceptions:

1. In buildings equipped throughout with an *automatic sprinkler system* installed in accordance with Section 903.3.1.1 or 903.3.1.2, the elevator shall not be required on floors provided with a *horizontal exit* and located at or above the *levels of exit discharge*.
2. In buildings equipped throughout with an *automatic sprinkler system* installed in accordance with Section 903.3.1.1 or 903.3.1.2, the elevator shall not be required on floors provided with a *ramp* conforming to the provisions of Section 1012.

1011.12 Stairway to roof. In buildings four or more stories above grade plane, one *stairway* shall extend to the roof surface unless the roof has a slope steeper than four units vertical in 12 units horizontal (33-percent slope).

Exception: Other than where required by Section 1011.12.1, in buildings without an occupiable ~~occupied~~ roof access to the roof from the top *story* shall be permitted to be by an *alternating tread device*, a ships ladder or a permanent ladder.

1011.12.2 Roof access. Where a *stairway* is provided to a roof, access to the roof shall be provided through a *penthouse* complying with Section 1511.2.

Exception: In buildings without an occupiable ~~occupied~~ roof, access to the roof shall be permitted to be a roof hatch or trap door not less than 16 square feet (1.5 m^2) in area and having a minimum dimension of 2 feet (610 mm).

1011.14 Alternating tread devices. *Alternating tread devices* are limited to an element of a *means of egress* in buildings of Groups F, H and S from a *mezzanine* not more than 250 square feet (23 m^2) in area and that serves not more than five occupants; in buildings of Group I-3 from a guard tower, observation station or control room not more than 250 square feet (23 m^2) in area and for access to unoccupiable ~~unoccupied~~ roofs. *Alternating tread devices* used as a *means of egress* shall not have a rise greater than 20 feet (6096 mm) between floor levels or landings.

1011.15 Ship's ladders. Ship's ladders are permitted to be used in Group I-3 as a component of a *means of egress* to and from control rooms or elevated facility observation stations not more than 250 square feet (23 m^2) with not more than three occupants and for access to unoccupiable ~~unoccupied~~ roofs. The minimum clear width at and below the *handrails* shall be 20 inches (508 mm). Ship's ladders shall be designed for the live loads indicated in Section 1607.17.

1011.16 Ladders. Permanent ladders shall not serve as a part of the *means of egress* from occupied spaces within a building. Permanent ladders shall be constructed in accordance with Section 306.5 of the International Mechanical Code and designed for the live loads indicated in Section 1607.17. Permanent ladders shall be permitted to provide access to the following areas:

1. Spaces frequented only by personnel for maintenance, repair or monitoring of equipment.
2. Nonoccupiable spaces accessed only by catwalks, crawl spaces, freight elevators or very narrow passageways.
3. Raised areas used primarily for purposes of security, life safety or fire safety including, but not limited to, observation galleries, prison guard towers, fire towers or lifeguard stands.
4. Elevated levels in Group U not open to the general public.
5. Nonoccupiable ~~Nonoccupied~~ roofs that are not required to have *stairway* access in accordance with Section 1011.12.1.
6. Where permitted to access equipment and appliances in accordance with Section 306.5 of the International Mechanical Code.

1019.3 Occupancies other than Groups I-2 and I-3. In other than Group I-2 and I-3 occupancies, floor openings containing *exit access stairways* or *ramps* shall be enclosed with a shaft enclosure constructed in accordance with Section 713.

Exceptions:

1. *Exit access stairways* and *ramps* that serve or atmospherically communicate between only two adjacent stories. Such interconnected stories shall not be open to other stories.
2. In Group R-1, R-2 or R-3 occupancies, *exit access stairways* and *ramps* connecting four stories or less serving and contained within an individual dwelling unit or sleeping unit or live/work unit.
3. *Exit access stairways* serving and contained within a Group R-3 congregate residence or a Group R-4 facility are not required to be enclosed.
4. *Exit access stairways* and *ramps* in buildings equipped throughout with an automatic sprinkler system in accordance with Section

903.3.1.1, where the area of the vertical opening between stories does not exceed twice the horizontal projected area of the stairway or *ramp* and the opening is protected by a draft curtain and closely spaced sprinklers in accordance with NFPA 13. In other than Group B and M occupancies, this provision is limited to openings that do not connect more than four stories.

5. *Exit access stairways* and *ramps* within an *atrium* complying with the provisions of Section 404.
6. *Exit access stairways* and *ramps* in *open parking garages* that serve only the parking garage.
7. *Exit access stairways* and *ramps* serving smoke-protected or *open-air assembly seating* complying with the exit access travel distance requirements of Section 1030.7.
8. *Exit access stairways* and *ramps* between the balcony, gallery or press box and the main assembly floor in occupancies such as theaters, *places of religious worship*, auditoriums and sports facilities.
9. Exterior *exit access stairways* or *ramps* between occupiable ~~occupied~~ roofs.

1104.4 Multistory buildings and facilities. At least one *accessible* route shall connect each accessible *story, mezzanine* and occupiable ~~occupied~~ roofs in multilevel buildings and *facilities*.

Exceptions:

1. An *accessible* route is not required to *stories, mezzanines* and occupiable ~~occupied~~ roofs that have an aggregate area of not more than 3,000 square feet (278.7 m^2) and are located above and below accessible levels. This exception shall not apply to:

   1.1. Multiple tenant facilities of Group M occupancies containing five or more tenant spaces used for the sales or rental of goods and where at least one such tenant space is located on a floor level above or below the accessible levels.

   1.2. *Stories* or *mezzanines* containing offices of health care providers (Group B or I).

   1.3. Passenger transportation facilities and airports (Group A-3 or B).

   1.4. Government buildings.

   1.5. Structures with four or more dwelling units.

2. *Stories*, *mezzanines* or occupiable ~~occupied~~ roofs that do not contain accessible elements or other spaces as determined by Section 1108 or 1109 are not required to be served by an accessible route from an *accessible* level.
3. In air traffic control towers, an *accessible route* is not required to serve the cab and the floor immediately below the cab.
4. Where a two-story building or facility has one *story* or *mezzanine* with an *occupant load* of five or fewer persons that does not contain *public use* space, that *story* or *mezzanine* shall not be required to be connected by an *accessible route* to the *story* above or below.

Reason: Over the last several cycles, code provisions have been added to address issues related to occupied/occupiable, vegetative and landscaped roofs. In some cases, the terms have been used interchangeably, in others applying to specific types of roof systems. With the increasing number of provisions, a definition is needed. A proposal last cycle (G7-19) attempted to add a definition for occupiable roof but was disapproved for several reasons including the fact it did not correlate with the fact the code uses “occupied roof” in some sections and “occupiable roof” in others.
This code proposal both adds a definition for “occupiable roof”and. changes terminology throughout the code to be consistent with use of “occupiable roof” rather than “occupied roof”. The definition is intended to parallel the existing code definition for occupiable space:

[BG] OCCUPIABLE SPACE. A room or enclosed space designed for human occupancy in which individuals congregate for amusement, educational or similar purposes or in which occupants are engaged at labor, and which is equipped with means of egress and light and ventilation facilities meeting the requirements of this code.

The proposed definition is different in a few key ways: The laundry list of uses is left out, and the one clarification made that access for maintenance of rooftop mechanical equipment or other maintenance does not trigger assembly live load requirements or other provisions related to occupiable roofs. The references to light and ventilation are left out as occupiable roofs are exterior spaces. No mechanical ventilation is necessary, and the code does not require lighting for exterior spaces other than portions of the means of egress.

This proposal is submitted by the ICC Fire Code Action Committee (FCAC) and the ICC Building Code Action Committee (BCAC).

BCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2020 the BCAC has held several virtual meetings open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the BCAC website at BCAC.

The FCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance assigned International Codes with regard to fire and life safety in new and existing buildings and facilities as well as the protection of life and property in wildland urban interface areas. In 2020 and 2021 the Fire-CAC held multiple virtual meetings that were open to any interested party. In addition, there were numerous virtual specific working group meetings that were also open to any interested parties, to develop, discuss and debate the proposed changes. Related documentation and reports are posted on the FCAC website at: FCAC.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The code change is purely editorial and does not affect how occupiable roofs are designed or constructed.

Staff Note: G20-21, G21-21 and G22-21 addresses requirements in a different or contradicting manner. The committee is urged to make their intentions clear with their actions on these proposals.

G20-21 Part I

Public Hearing Results

Committee Action: **As Modified**

Committee Modification:

OCCUPIABLE ROOF. An exterior space on a roof that is designed for human occupancy, other than maintenance or repair, and which is equipped with a means of egress system meeting the requirements of this code.

Committee Reason: The modification added 'repair' to the definition, which is consistent with other sections in the codes related to roof requirements. The definition was approved because it clarifies a 'occupiable roof' is for roofs for human occupancy on a regular basis. The term was also coordinated throughout the code. (Vote: 12-2)

Staff Analysis: G20-21, G21-21 and G22-21 addresses requirements in a different or contradicting manner. The committee is urged to make their intentions clear with their actions on these proposals.

G20-21 Part I

Individual Consideration Agenda

Public Comment 1:

IBC: SECTION 202

Proponents: Jonathan Siu, representing Washington Association of Building Officials Technical Code Development Committee; Micah Chappell, representing Washington Association of Building Officials (micah.chappell@seattle.gov) requests As Modified by Public Comment

Modify as follows:

2021 International Building Code

OCCUPIABLE ROOF . An ~~exterior~~ uncovered space on a roof that is designed for human occupancy, other than maintenance or repair, and which is equipped with a means of egress system meeting the requirements of this code.

Commenter's Reason: This public comment is intended to address an ambiguity that is introduced by the proposed definition for occupiable roofs by clarifying that the main feature of an occupiable roof is that it is uncovered--no roof overhead. The same public comment is being submitted for Part II.
As proposed, "exterior" is very open to interpretation, which will lead to inconsistent application. For example, if an occupiable roof has some sort of roof or roof-like structure completely covering it but there are no walls, is that space "exterior?" Does it include areas under a pergola, a gazebo, or a patio cover? Does being inside or under these structures mean that you are still "exterior" to the roof? The City of Seattle has seen projects where the architect argued a "shade structure" is not a roof, and therefore, is allowed to cover the roof deck entirely and not create an additional story. This certainly violates the intent, if not the letter, of what an occupiable roof is supposed to be.

For this public comment, "uncovered" was chosen to replace "exterior" because that is the term used in the definition of "court" in Chapter 2. Essentially, a court is supposed to be open to the sky. When proposals to change the provisions for occupiable roofs are discussed, much of the discussion is about how open the space is, and how smoke does not accumulate. This seems to indicate the image people have of an occupiable roof is that it, like a court, is open to the sky.

The question then, is what about building elements or structures (guards, parapets, rooftop structures, wind screens, fences, etc.)--can they be placed around an occupiable roof? Our answer would be, yes, as long as they comply with the maximum height criteria in Section 503.1.4.1. These elements will not impede the flow of smoke upward and away from the occupiable roof.

A contributing factor to confusion is the current title of Section 503.1.4.1, "Enclosures **over** occupied roofs" [emphasis ours]. This again implies that a roof or roof-like structure can be placed above an occupiable roof. When the requirements for occupied roofs were first introduced into the code, two of the members of WABO's Technical Code Development Committee were involved in the discussions/negotiations. Our recollection is Section 503.1.4.1 was clearly intended to refer to vertical elements (walls or parapets) surrounding the occupied roofs, not roofs above the occupied roof, since the 48-inch height restriction was added to provide firefighters an escape route off the roof. Recognizing that section titles are editorial and determined by ICC Staff, we would recommend that Staff change the title to "Enclosure of occupiable roofs" or "Enclosures around occupiable roofs," to avoid confusion. No changes to the text of the section are necessary.

We believe this public comment provides an important clarification of the definition, and will lead to more consistent application of the code.

Cost Impact: The net effect of the public comment and code change proposal will not increase or decrease the cost of construction
The original cost impact statement indicated the change is editorial, and therefore, there is no change in the cost of construction. This public comment is a clarification of the original proposal, and does not change the cost impact.

Public Comment# 2445

G20-21 Part II

Proposed Change as Submitted

Proponents: Mike Nugent, Chair, representing ICC Building Code Action Committee (bcac@iccsafe.org); Michael O'Brian, representing FCAC (fcac@iccsafe.org)

2021 International Fire Code

Add new definition as follows:

OCCUPIABLE ROOF. An exterior space on a roof that is designed for human occupancy, other than maintenance, and which is equipped with a means of egress system meeting the requirements of this code.

Revise as follows:

903.2.1.6 Assembly occupancies on roofs. Where an ~~occupied~~ occupiable roof has an assembly occupancy with an *occupant load* exceeding 100 for Group A-2 and 300 for other Group A occupancies, all floors between the ~~occupied~~ occupiable roof and the *level of exit discharge* shall be equipped with an *automatic sprinkler system* in accordance with Section 903.3.1.1 or 903.3.1.2.

Exception: Open parking garages of Type I or Type II construction.

Reason: Over the last several cycles, code provisions have been added to address issues related to occupied/occupiable, vegetative and landscaped roofs. In some cases, the terms have been used interchangeably, in others applying to specific types of roof systems. With the increasing number of provisions, a definition is needed. A proposal last cycle (G7-19) attempted to add a definition for occupiable roof but was disapproved for several reasons including the fact it did not correlate with the fact the code uses "occupied roof" in some sections and "occupiable roof" in others.
This code proposal both adds a definition for "occupiable roof"and. changes terminology throughout the code to be consistent with use of "occupiable roof" rather than "occupied roof". The definition is intended to parallel the existing code definition for occupiable space:

[BG] OCCUPIABLE SPACE. A room or enclosed space designed for human occupancy in which individuals congregate for amusement, educational or similar purposes or in which occupants are engaged at labor, and which is equipped with means of egress and light and ventilation facilities meeting the requirements of this code.

The proposed definition is different in a few key ways: The laundry list of uses is left out, and the one clarification made that access for maintenance of rooftop mechanical equipment or other maintenance does not trigger assembly live load requirements or other provisions related to occupiable roofs. The references to light and ventilation are left out as occupiable roofs are exterior spaces. No mechanical ventilation is necessary, and the code does not require lighting for exterior spaces other than portions of the means of egress.

This proposal is submitted by the ICC Fire Code Action Committee (FCAC) and the ICC Building Code Action Committee (BCAC).

BCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2020 the BCAC has held several virtual meetings open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the BCAC website at BCAC.

The FCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance assigned International Codes with regard to fire and life safety in new and existing buildings and facilities as well as the protection of life and property in wildland urban interface areas. In 2020 and 2021 the Fire-CAC held multiple virtual meetings that were open to any interested party. In addition, there were numerous virtual specific working group meetings that were also open to any interested parties, to develop, discuss and debate the proposed changes. Related documentation and reports are posted on the FCAC website at: FCAC.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The code change is purely editorial and does not affect how occupiable roofs are designed or constructed.

Staff Note: G20-21, G21-21 and G22-21 addresses requirements in a different or contradicting manner. The committee is urged to make their intentions clear with their actions on these proposals.

G20-21 Part II

Public Hearing Results

Committee Action: **As Modified**

Committee Modification:

OCCUPIABLE ROOF. An exterior space on a roof that is designed for human occupancy, other than maintenance<u> or repair</u>, and which is equipped with a means of egress system meeting the requirements of this code.

Committee Reason: The committee stated that the reason for the approval of the modification was that the inclusion of the term repairs is important to the language of the definition. The reason for the approval of the proposal is that it provides a definition for a needed clarification of an occupiable roof. (Vote: 11-0)

Staff Analysis: G20-21, G21-21 and G22-21 addresses requirements in a different or contradicting manner. The committee is urged to make their intentions clear with their actions on these proposals.

G20-21 Part II

Individual Consideration Agenda

Public Comment 1:

IFC: SECTION 202

Proponents: Jonathan Siu, representing Washington Association of Building Officials Technical Code Development Committee; Micah Chappell, representing Washington Association of Building Officials (micah.chappell@seattle.gov) requests As Modified by Public Comment

Modify as follows:

2021 International Fire Code

OCCUPIABLE ROOF . An ~~exterior~~<u> uncovered </u>space on a roof that is designed for human occupancy, other than maintenance or repair, and which is equipped with a means of egress system meeting the requirements of this code.

Commenter's Reason: This public comment is intended to address an ambiguity that is introduced by the proposed definition for occupiable roofs by clarifying that the main feature of an occupiable roof is that it is uncovered--no roof overhead. The same public comment is being submitted for Part I.
As proposed, "exterior" is very open to interpretation, which will lead to inconsistent application. For example, if an occupiable roof has some sort of roof or roof-like structure completely covering it but there are no walls, is that space "exterior?" Does it include areas under a pergola, a gazebo, or a patio cover? Does being inside or under these structures mean that you are still "exterior" to the roof? The City of Seattle has seen projects where the architect argued a "shade structure" is not a roof, and therefore, is allowed to cover the roof deck entirely and not create an additional story. This certainly violates the intent, if not the letter, of what an occupiable roof is supposed to be.

For this public comment, "uncovered" was chosen to replace "exterior" because that is the term used in the definition of "court" in Chapter 2. Essentially, a court is supposed to be open to the sky. When proposals to change the provisions for occupiable roofs are discussed, much of the discussion is about how open the space is, and how smoke does not accumulate. This seems to indicate the image people have of an occupiable roof is that it, like a court, is open to the sky.

The question then, is what about building elements or structures (guards, parapets, rooftop structures, wind screens, fences, etc.)--can they be placed around an occupiable roof? Our answer would be, yes, as long as they comply with the maximum height criteria in Section 503.1.4.1. These elements will not impede the flow of smoke upward and away from the occupiable roof. We would note that the current title of Section 503.1.4.1 is "Enclosures over occupied roofs," which introduces confusion as to what is intended. In our reason statement for Part I, we have suggested ICC Staff change the title to "Enclosure of occupiable roofs" or "Enclosures around occupiable roofs."

We believe this public comment provides an important clarification of the definition, and will lead to more consistent application of the code.

Cost Impact: The net effect of the public comment and code change proposal will not increase or decrease the cost of construction
The original cost impact statement indicated the change is editorial, and therefore, there is no change in the cost of construction. This public comment is a clarification of the original proposal, and does not change the cost impact.

Public Comment# 2449

G34-21

Proposed Change as Submitted

Proponents: Mike Nugent, Chair, representing ICC Building Code Action Committee (bcac@iccsafe.org)

2021 International Building Code

SECTION 305
EDUCATIONAL GROUP E

305.2 Group E, day care facilities. This group includes buildings and structures or portions thereof occupied by more than five children older than $2^1/_2$ years of age who receive educational, supervision or *personal care services* for fewer than 24 hours per day.

305.2.1 Within places of religious worship. Rooms and spaces within *places of religious worship* providing such day care during religious functions shall be classified as part of the primary occupancy.

Revise as follows:

305.2.2 Five or fewer children. A facility having five or fewer children receiving such day care shall be classified as part of the primary occupancy. Such a facility, located within a dwelling unit that is within the scope of the International Residential Code, shall be permitted to be constructed in accordance with this code or the International Residential Code.

Delete without substitution:

~~**305.2.3 Five or fewer children in a dwelling unit.** A facility such as the above within a *dwelling unit* and having five or fewer children receiving such day care shall be classified as a Group R-3 occupancy or shall comply with the *International Residential Code*.~~

SECTION 308
INSTITUTIONAL GROUP I

308.5 Institutional Group I-4, day care facilities. Institutional Group I-4 occupancy shall include buildings and structures occupied by more than five persons of any age who receive *custodial care* for fewer than 24 hours per day by persons other than parents or guardians; relatives by blood, marriage or adoption; and in a place other than the home of the person cared for. This group shall include, but not be limited to, the following:

- Adult day care
- Child day care

308.5.1 Classification as Group E. A child day care facility that provides care for more than five but not more than 100 children $2^1/_2$ years or less of age, where the rooms in which the children are cared for are located on a *level of exit discharge* serving such rooms and each of these child care rooms has an *exit* door directly to the exterior, shall be classified as Group E.

308.5.2 Within a place of religious worship. Rooms and spaces within *places of religious worship* providing such care during religious functions shall be classified as part of the primary occupancy.

Revise as follows:

308.5.3 Five or fewer persons receiving care. A facility having five or fewer persons receiving *custodial care* shall be classified as part of the primary occupancy. Such a facility, located within a dwelling unit that is within the scope of the International Residential Code, shall be permitted to be constructed in accordance with this code or the International Residential Code.

Delete without substitution:

~~**308.5.4 Five or fewer persons receiving care in a dwelling unit.** A facility such as the above within a *dwelling unit* and having five or fewer persons receiving *custodial care* shall be classified as a Group R-3 occupancy or shall comply with the *International Residential Code*.~~

SECTION 310
RESIDENTIAL GROUP R

Revise as follows:

~~310.4.1~~ 310.1.1 Care facilities within a dwelling. Care facilities for five or fewer persons receiving careor a day care that are located within a ~~single-family~~ dwelling unit ~~are permitted to comply~~ that is within the scope of the *International Residential Code*, shall be permitted to be constructed in accordance with this code or with the *International Residential Code*. ~~provided~~ Facilities constructed using the *International Residential Code* shall be protected by an *automatic sprinkler system* ~~is~~ installed in accordance with Section 903.3.1.3 or Section P2904 of the *International Residential*

Code.

Reason: The purpose of this change is to remove a technical glitch for where Group R-2 townhouses or apartments may also have a small day care facility. Day care facilities can occur in apartments, townhouses and single family homes. By allowing for 5 or fewer to match the main occupancy, this would still allow for those Group R-3 as a classification in single-family, duplex and Group R-3 townhouses – which is permitted in the current text. This change will also allow for similar facilities in apartments or Group R-2 townhouses. The literal text in 305.2.3 and 308.5.4 says a day care in a dwelling unit make this an R-3 even though the building may be Group R-2.
For facilities that meet the scoping of the IRC (single family, duplex and townhouse), the day care and small care facilities can continue to be constructed under the IRC.

The move of 310.4.1 is because this is no longer just a Group R-3 consideration.

This is one of a group of proposals intended to coordinate the scoping items in IBC Section 101.2 and IRC 101.2. While the proposals work together, then also work separately. The proposal for coordination will be in Group B.

This proposal is submitted by the ICC Building Code Action Committee (BCAC).

BCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2020 the BCAC has held several virtual meetings open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the BCAC website at BCAC.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This is basically a coordination item for what facilities can use IRC. This should not change construction requirements.

G34-21

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: This proposal was disapproved by the committee, however, they felt that the general intent for coordination with the IRC scoping was good, but some testifiers were confused on the limits. There was a concern that this could be read to allow for multiple care facilities in an apartment building, or dwelling units in a school. (Vote: 14-0)

G34-21

Individual Consideration Agenda

Public Comment 1:

IBC: 305.2.2, 308.5.3, 310.1.1

Proponents: Mike Nugent, representing ICC Building Code Action Committee (bcac@iccsafe.org) requests As Modified by Public Comment

Modify as follows:

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305.2.2 Five or fewer children . A facility having five or fewer children receiving such day care shall be classified as part of the primary occupancy. Such a facility, located within a ~~dwelling unit~~ detached one- or two- family dwelling or townhouse that is within the scope of the International Residential Code, shall be permitted to be constructed in accordance with this code or the International Residential Code.

308.5.3 Five or fewer persons receiving care . A facility having five or fewer persons receiving *custodial care* shall be classified as part of the primary occupancy. Such a facility, located within a ~~dwelling unit~~ detached one- or two- family dwelling or townhouse that is within the scope of the International Residential Code, shall be permitted to be constructed in accordance with this code or the International Residential Code.

310.1.1 Care facilities within a dwelling . Care facilities for five or fewer persons receiving careor a day care that are located within a ~~dwelling unit~~ detached one- or two- family dwelling or townhouse that is within the scope of the *International Residential Code*, shall be permitted to be constructed in accordance with this code or with the *International Residential Code.* Care facilities ~~Facilities~~ constructed in accordance with ~~using~~

the *International Residential Code* shall be protected by an *automatic sprinkler system* installed in accordance with ~~Section 903.3.1.3 or~~ Section P2904 of the *International Residential Code*.

Commenter's Reason: The original proposal intended to allow small daycare, adult care or custodial care facilities serving five or fewer persons to be classified as part of the primary occupancy of a building housing such a facility, and to note that where they are contained in buildings falling within the scope of the International Residential Code they are permitted to be constructed either per the IBC or IRC.
The concern from the IBC-General Committee, and those in opposition, was the lack of clarity in how the proposal language was structured. As written, the proposal caused some confusion. Some felt the proposal expanded the scope of IRC to include apartment buildings, and that it could be argued a dwelling unit in an apartment building is within the scope of the IRC. Also, some felt the proposal language implied that dwelling units can be included in Group E facilities.
The revised language for this public comment aims to address the concerns of the committee and clarify the original intent of the proposal by explicitly referring to care facilities located within detached one and two-family dwellings or townhouses, which are the types of residential buildings covered by the IRC.

Cost Impact: The net effect of the public comment and code change proposal will not increase or decrease the cost of construction
This is basically a coordination item for what facilities can use IRC. This should not change construction requirements.

Public Comment# 2671

G36-21

Proposed Change as Submitted

Proponents: Jeffrey Shapiro, representing Self (jeff.shapiro@intlcodeconsultants.com)

THIS CODE CHANGE WILL BE HEARD BY THE FIRE CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THAT COMMITTEE.

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Revise as follows:

[F] TABLE 307.1(1) MAXIMUM ALLOWABLE QUANTITY PER CONTROL AREA OF HAZARDOUS MATERIALS POSING A PHYSICAL HAZARD[a, c j, m, n]~~[, p]~~

MATERIAL	CLASS	GROUP WHEN THE MAXIMUM ALLOWABLE QUANTITY IS EXCEEDED	STORAGE[b]			USE-CLOSED SYSTEMS[b]			USE-OPEN SYSTEMS[b]	
			Solid pounds(cubic feet)	Liquid gallons (pounds)	Gas (cubic feet at NTP)	Solid pounds(cubic feet)	Liquid gallons (pounds)	Gas (cubic feet at NTP)	Solid pounds(cubic feet)	Liquid gallons (pounds)
Combustible dust	NA	H-2	SeeNote q	NA	NA	See Note q	NA	NA	See Note q	NA
Combustible fiber[q]	Loose	H-3	(100)	NA	NA	(100)	NA	NA	(20)	NA
	Baled~~[e]~~		(1,000)			(1,000)			(200)	
Combustible liquid~~[c, i]~~	II	H-2 or H-3		120[d, e]			120[d]			30[d]
	IIIA	H-2 or H-3	NA	330[d, e]	NA	NA	330[d]	NA	NA	80[d]
	IIIB	NA		13,200[e, f]			13,200[f]			3,300[f]
Cryogenic flammable	NA	H-2	NA	45[d]	NA	NA	45[d]	NA	NA	10[d]
Cryogenic inert	NA	NA	NA	NA	NL	NA	NA	NL	NA	NA
Cryogenic oxidizing	NA	H-3	NA	45[d]	NA	NA	45[d]	NA	NA	10[d]
Explosives	Division 1.1	H-1	1[e, g]	(1)[e, g]		0.25[g]	(0.25)[g]		0.25[g]	(0.25)[g]
	Division 1.2	H-1	1[e, g]	(1)[e, g]		0.25[g]	(0.25)[g]		0.25[g]	(0.25)[g]
	Division 1.3	H-1 or H-2	5[e, g]	(5)[e, g]		1[g]	(1)[g]		1[g]	(1)[g]
	Division 1.4	H-3	50[e, g]	(50)[e, g]	NA	50[g]	(50)[g]	NA	NA	NA
	Division 1.4G	H-3	125[e, l]	NA		NA	NA		NA	NA
	Division 1.5	H-1	1[e, g]	(1)[e, g]		0.25[g]	(0.25)[g]		0.25[g]	(0.25)[g]
	Division 1.6	H-1	1[e, g]	NA		NA	NA		NA	NA
Flammable gas	Gaseous	H-2	NA	NA	1,000[d,e]	NA	NA	1,000[d,e]	NA	NA
	Liquefied			(150)[d,e]	NA		(150)[d,e]	NA		
Flammable liquid~~[e]~~[,o]	IA	H-2 or H-3	NA	30[d, e]	NA	NA	30[d]	NA	NA	10[d]
	IB and IC			120[d, e]			120[d]			30[d]
Flammable liquid, combination (IA, IB, IC)~~[e,]~~[o]	NA	H-2 or H-3	NA	120[d, e, h]	NA	NA	120[d, h]	NA	NA	30[d, h]
Flammable solid	NA	H-3	125[d, e]	NA	NA	125[d]	NA	NA	25[d]	NA
Inert gas	Gaseous	NA	NA	NA	NL	NA	NA	NL	NA	NA
	Liquefied	NA	NA	NA	NL	NA	NA	NL	NA	NA
Organic peroxide	UD	H-1	1[e, g]	(1)[e, g]		0.25[g]	(0.25)[g]		0.25[g]	(0.25)[g]
	I	H-2	5[d, e]	(5)[d, e]		1[d]	(1)[d]		1[d]	(1)[d]
	II	H-3	50[d, e]	(50)[d, e]	NA	50[d]	(50)[d]	NA	10[d]	(10)[d]
	III	H-3	125[d, e]	(125)[d, e]		125[d]	(125)[d]		25[d]	(25)[d]
	IV	NA	NL	NL		NL	NL		NL	NL

MATERIAL	CLASS	GROUP WHEN THE MAXIMUM ALLOWABLE QUANTITY IS EXCEEDED	STORAGE			USE-CLOSED SYSTEMS			USE-OPEN SYSTEMS	
			Solid pounds(cubic feet)	Liquid gallons (pounds)	Gas (cubic feet at NTP)	Solid pounds(cubic feet)	Liquid gallons (pounds)	Gas (cubic feet at NTP)	Solid pounds(cubic feet)	Liquid gallons (pounds)
	V	NA	NL	NL		NL	NL		NL	NL
Oxidizer	4	H-1	1^{g}	$(1)^{e,\ g}$	NA	0.25^{g}	$(0.25)^{g}$	NA	0.25^{g}	$(0.25)^{g}$
	3^{k}	H-2 or H-3	$10^{d,\ e}$	$(10)^{d,\ e}$		2^{d}	$(2)^{d}$		2^{d}	$(2)^{d}$
	2	H-3	$250^{d,\ e}$	$(250)^{d,\ e}$		250^{d}	$(250)^{d}$		50^{d}	$(50)^{d}$
	1	NA	$4{,}000^{e,\ f}$	$(4{,}000)^{e,\ f}$		$4{,}000^{f}$	$(4{,}000)^{f}$		$1{,}000^{f}$	$(1{,}000)^{f}$
Oxidizing gas	Gaseous	H-3	NA	NA	$1{,}500^{d,e}$	NA	NA	$1{,}500^{d,e}$	NA	NA
	Liquefied			$(150)^{d,\ e}$	NA		$(150)^{d,e}$	NA		
Pyrophoric	NA	H-2	$4^{e,\ g}$	$(4)^{e,\ g}$	$50^{e,\ g}$	1^{g}	$(1)^{g}$	$10^{e,\ g}$	0	0
Unstable (reactive)	4	H-1	$1^{e,\ g}$	$(1)^{e,\ g}$	$10^{e,\ g}$	0.25^{g}	$(0.25)^{g}$	$2^{e,\ g}$	0.25^{g}	$(0.25)^{g}$
	3	H-1 or H-2	$5^{d,\ e}$	$(5)^{d,\ e}$	$50^{d,\ e}$	1^{d}	$(1)^{d}$	$10^{d,\ e}$	1^{d}	$(1)^{d}$
	2	H-3	$50^{d,\ e}$	$(50)^{d,\ e}$	$750^{d,\ e}$	50^{d}	$(50)^{d}$	$750^{d,\ e}$	10^{d}	$(10)^{d}$
	1	NA	NL	NL	NL	NL	NL	NL	NL	NL
Water reactive	3	H-2	$5^{d,\ e}$	$(5)^{d,\ e}$	NA	5^{d}	$(5)^{d}$	NA	1^{d}	$(1)^{d}$
	2	H-3	$50^{d,\ e}$	$(50)^{d,\ e}$		50^{d}	$(50)^{d}$		10^{d}	$(10)^{d}$
	1	NA	NL	NL		NL	NL		NL	NL

For SI: 1 cubic foot = 0.028 m^3, 1 pound = 0.454 kg, 1 gallon = 3.785 L.

NL = Not Limited; NA = Not Applicable; UD = Unclassified Detonable.

a. For use of control areas, see Section 414.2.

b. The aggregate quantity in use and storage shall not exceed the quantity specified for storage.

c. For hazardous materials in Group B higher education laboratory occupancies, See Section 428 and Chapter 38 of the International Fire Code.
~~The quantities of alcoholic beverages in retail and wholesale sales occupancies shall not be limited provided the liquids are packaged in individual containers not exceeding 1.3 gallons. In retail and wholesale sales occupancies, the quantities of medicines, foodstuffs or consumer products, and cosmetics containing not more than 50 percent by volume of water-miscible liquids with the remainder of the solutions not being flammable, shall not be limited, provided that such materials are packaged in individual containers not exceeding 1.3 gallons.~~

d. Maximum allowable quantities shall be increased 100 percent in buildings equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1. Where Note e also applies, the increase for both notes shall be applied accumulatively.

e. Maximum allowable quantities shall be increased 100 percent when stored in approved storage cabinets, day boxes, gas cabinets, gas rooms or exhausted enclosures or in listed safety cans in accordance with Section 5003.9.10 of the International Fire Code. Where Note d also applies, the increase for both notes shall be applied accumulatively.

f. Quantities shall not be limited in a building equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1.

g. Allowed only in buildings equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1.

h. Containing not more than the maximum allowable quantity per control area of Class IA, IB or IC flammable liquids.

~~i. The maximum allowable quantity shall not apply to fuel oil storage complying with Section 605.4.2 of the International Fire Code.~~

j. Quantities in parentheses indicate quantity units in parentheses at the head of each column.

k. A maximum quantity of 220 pounds of solid or 22 gallons of liquid Class 3 oxidizers is allowed when such materials are necessary for maintenance purposes, operation or sanitation of equipment when the storage containers and the manner of storage are approved.

l. Net weight of the pyrotechnic composition of the fireworks. Where the net weight of the pyrotechnic composition of the fireworks is not known, 25 percent of the gross weight of the fireworks, including packaging, shall be used.

m. For gallons of liquids, divide the amount in pounds by 10 in accordance with Section 5003.1.2 of the International Fire Code.

n. For ~~storage and display quantities~~ oxidizers, unstable (reactive) materials, and water reactive materials stored or displayed in Group M occupancies ~~and storage quantities~~ or stored in Group S occupancies, see section 414.2.5.1 ~~complying with Section 414.2.5, see Tables 414.2.5(1) and 414.2.5(2)~~.

o. For flammable and combustible liquid storage in Group M occupancy wholesale and retail sales uses, see Section 414.2.5.2.~~Densely packed baled cotton that complies with the packing requirements of ISO 8115 shall not be included in this material class.~~

~~p. The following shall not be included in determining the maximum allowable quantities:~~

~~1. Liquid or gaseous fuel in fuel tanks on vehicles.~~

2. ~~Liquid or gaseous fuel in fuel tanks on motorized equipment operated in accordance with the *International Fire Code*.~~

3. ~~Gaseous fuels in piping systems and fixed appliances regulated by the *International Fuel Gas Code*.~~

4. ~~Liquid fuels in piping systems and fixed appliances regulated by the *International Mechanical Code*.~~

5. ~~Alcohol-based hand rubs classified as Class I or II liquids in dispensers that are installed in accordance with Sections 5705.5 and 5705.5.1 of the International Fire Code. The location of the alcohol-based hand rub (ABHR) dispensers shall be provided in the construction documents.~~

q. Where manufactured, generated or used in such a manner that the concentration and conditions create a fire or explosion hazard based on information prepared in accordance with Section 414.1.3.

[F] TABLE 307.1(2)
MAXIMUM ALLOWABLE QUANTITY PER CONTROL AREA OF HAZARDOUS MATERIALS POSING A HEALTH HAZARD[a, c, ~~f,~~ h, i]

MATERIAL	STORAGE[b]			USE-CLOSED SYSTEMS[b]			USE-OPEN SYSTEMS[b]	
	Solid pounds[d, e, f]	Liquid gallons (pounds)[d, e, f]	Gas cubic feet at NTP (pounds)[d]	Solid pounds[d]	Liquid gallons (pounds)[d]	Gas cubic feet at NTP (pounds)[d]	Solid pounds[d]	Liquid gallons (pounds)[d]
Corrosives	5,000	500	Gaseous 810[e]	5,000	500	Gaseous 810[e]	1,000	100
			Liquefied (150)			Liquefied (150)		
Highly Toxic	10	(10)	Gaseous 20[g]	10	(10)	Gaseous 20[g]	3	(3)
			Liquefied (4)[g]			Liquefied (4)[g]		
Toxic	500	(500)	Gaseous 810[e]	500	(500)	Gaseous 810[e]	125	(125)
			Liquefied (150)[e]			Liquefied (150)[e]		

For SI: 1 cubic foot = 0.028 m^3, 1 pound = 0.454 kg, 1 gallon = 3.785 L.

a. For use of control areas, see Section 414.2.

b. The aggregate quantity in use and storage shall not exceed the quantity specified for storage.

c. For hazardous materials in Group B higher education laboratory occupancies, See Section 428 and Chapter 38 of the International Fire Code.
~~In retail and wholesale sales occupancies, the quantities of medicines, foodstuffs or consumer products, and cosmetics containing not more than 50 percent by volume of water-miscible liquids and with the remainder of the solutions not being flammable, shall not be limited, provided that such materials are packaged in individual containers not exceeding 1.3 gallons.~~

d. Maximum allowable quantities shall be increased 100 percent in buildings equipped throughout with an approved automatic sprinkler system in accordance with Section 903.3.1.1. Where Note e also applies, the increase for both notes shall be applied accumulatively.

e. Maximum allowable quantities shall be increased 100 percent where stored in approved storage cabinets, gas cabinets or exhausted enclosures as specified in the *International Fire Code*. Where Note d also applies, the increase for both notes shall be applied accumulatively.

f. For corrosive, highly toxic and toxic materials, stored or displayed in Group M occupancies or stored in Group S occupancies, see Section 414.2.5.1.
~~For storage and display quantities in Group M and storage quantities in Group S occupancies complying with Section 414.2.5, see Tables 414.2.5(1) and 414.2.5(2).~~

g. Allowed only where stored in approved exhausted gas cabinets or exhausted enclosures as specified in the *International Fire Code*.

h. Quantities in parentheses indicate quantity units in parentheses at the head of each column.

i. For gallons of liquids, divide the amount in pounds by 10 in accordance with Section 5003.1.2 of the International Fire Code.

[F] 307.1.1 Occupancy Exemptions~~Uses other than Group H~~. Storage, use and handling of hazardous materials in accordance with Table 307.1.1 shall not be counted as contributing to Maximum Allowable Quantities and shall not cause classification of an occupancy to be Group H. Such storage, use and handling shall comply with applicable provisions of the International Fire Code.
~~An occupancy that stores, uses or handles *hazardous materials* as described in one or more of the following items shall not be classified as Group H, but shall be classified as the occupancy that it most nearly resembles.~~

1. ~~Buildings and structures occupied for the application of flammable finishes, provided that such buildings or areas conform to the requirements of Section 416 and the *International Fire Code*.~~
2. ~~Wholesale and retail sales and storage of flammable and combustible liquids in mercantile occupancies conforming to the *International Fire Code*.~~
3. ~~Closed piping system containing *flammable or combustible liquids* or gases utilized for the operation of machinery or equipment.~~
4. ~~Cleaning establishments that utilize *combustible liquid* solvents having a *flash point* of 140°F (60°C) or higher in closed systems employing equipment *listed* by an *approved* testing agency, provided that this occupancy is separated from all other areas of the building by 1-hour *fire barriers* constructed in accordance with Section 707 or 1-hour *horizontal assemblies* constructed in accordance with Section 711, or both.~~
5. ~~Cleaning establishments that utilize a liquid solvent having a *flash point* at or above 200°F (93°C).~~
6. ~~Liquor stores and distributors without bulk storage.~~
7. ~~Refrigeration systems.~~

8. ~~The storage or utilization of materials for agricultural purposes on the premises.~~
9. ~~Stationary storage battery systems installed in accordance with the *International Fire Code.*~~
10. ~~*Corrosive* personal or household products in their original packaging used in retail display.~~
11. ~~Commonly used *corrosive* building materials.~~
12. ~~Buildings and structures occupied for *aerosol product* storage, aerosol cooking spray products or plastic aerosol 3 products shall be classified as Group S-1, provided that such buildings conform to the requirements of the *International Fire Code.*~~
13. ~~Display and storage of nonflammable solid and nonflammable or noncombustible liquid *hazardous materials* in quantities not exceeding the maximum allowable quantity per *control area* in Group M or S occupancies complying with Section 414.2.5.~~
14. ~~The storage of black powder, smokeless propellant and small arms primers in Groups M and R-3 and special industrial *explosive* devices in Groups B, F, M and S, provided such storage conforms to the quantity limits and requirements prescribed in the *International Fire Code*.~~
15. ~~Stationary fuel cell power systems installed in accordance with the *International Fire Code*.~~
16. ~~Capacitor energy storage systems in accordance with the *International Fire Code.*~~
17. ~~Group B *higher education laboratory* occupancies complying with Section 428 and Chapter 38 of the International Fire Code.~~
18. ~~Distilling or brewing of beverages conforming to the requirements of the *International Fire Code.*~~
19. ~~The storage of beer, distilled spirits and wines in barrels and casks conforming to the requirements of the *International Fire Code.*~~

Add new text as follows:

TABLE 307.1.1 HAZARDOUS MATERIAL EXEMPTIONS[a]

Material Classification	Occupancy or Application	Exemption
Combustible fiber	Baled Cotton	Densely packed baled cotton shall not be classified as combustible fiber, provided that the bales comply with the packing requirements of ISO 8115
Corrosive	Building materials	The quantity of commonly used building materials that are classified as corrosive materials is not limited
	Personal and household products	The quantity of personal and household products that are classified as corrosive materials is not limited in retail displays, provided that the products are in original packaging
	Retail and wholesale sales occupancies	The quantity of medicines, foodstuffs or consumer products, and cosmetics containing not more than 50 percent by volume of water-miscible liquids with the remainder of the solutions not being flammable, is not limited. To qualify for this allowance, such materials shall be packaged in individual containers not exceeding 1.3 gallons.
Explosives	Groups B, F, M and S	Storage of special industrial explosive devices are not limited
	Groups M and R-3	Storage of black powder, smokeless propellant, and small arms primers are not limited
Flammable and combustible liquids and gases	Aerosols	Buildings and structures occupied for aerosol product storage, aerosol cooking spray products or plastic aerosol 3 products shall be classified as Group S-1
	Alcoholic beverages	The quantity of alcoholic beverages in liquor stores and distributors without bulk storage is not limited
		The quantity of alcoholic beverages in distilling or brewing of beverages is not limited
		The storage quantity of beer, distilled spirits and wines in barrels and casks is not limited
		The quantity of alcoholic beverages in retail and wholesale sales occupancies is not limited. To qualify for this allowance, beverages shall be packaged in individual containers not exceeding 1.3 gallons
	Cleaning establishments with combustible liquid solvents	The quantity of combustible liquid solvents used in closed systems and having a flash point at or above 140°F (60°C) is not limited. To qualify for this allowance, equipment shall be listed by an approved testing agency and the occupancy shall be separated from all other areas of the building by 1-hour fire barriers constructed in accordance with Section 707 or 1-hour horizontal assemblies constructed in accordance with Section 711, or both
		The quantity of combustible liquid solvents having a flash point at or above 200°F (93°C) is not limited
	Closed piping systems	The quantity of flammable and combustible liquids and gases utilized for the operation of machinery or equipment is not limited
	Fuel	The quantity of liquid or gaseous fuel in fuel tanks on vehicles or motorized equipment is not limited
		The quantity of gaseous fuels in piping systems and fixed appliances regulated by the International Fuel Gas Code is not limited
		The quantity of liquid fuels in piping systems and fixed appliances regulated by the International Mechanical Code is not limited
	Fuel oil	The quantity of fuel oil storage complying with Section 603.3.2 of the International Fire Code is not limited
	Flammable finishing operations using flammable and combustible liquids	Buildings and structures occupied for the application of flammable finishes. Such buildings and areas shall comply with Section 416
	Hand sanitizer	The quantity of alcohol-based hand rubs classified as Class I or II liquids in dispensers installed in accordance with Sections 5705.5 and 5705.5.1 of the International Fire Code is not limited. The location of the alcohol-based hand rub (ABHR) dispensers shall be provided in the construction documents
	Retail and wholesale sales occupancies with flammable and combustible liquids	The quantity of medicines, foodstuffs or consumer products, and cosmetics containing not more than 50 percent by volume of water-miscible liquids with the remainder of the solutions not being flammable, is not limited To qualify for this allowance, such materials shall be packaged in individual containers not exceeding 1.3 gallons.
		The quantity of medicines, foodstuffs or consumer products, and cosmetics containing not more than 50

Highly toxic and toxic materials	Retail and wholesale sales occupancies	percent by volume of water-miscible liquids with the remainder of the solutions not being flammable, is not limited. To qualify for this allowance, such materials shall be packaged in individual containers not exceeding 1.3 gallons.
Any	Agricultural materials	The quantity of agricultural materials stored or utilizated for agricultural purposes on the premises is not limited
	Energy storage	The quantity of hazardous materials in stationary storage battery systems is not limited
		The quantity of hazardous materials in stationary fuel cell power systems is not limited
		The quantity of hazardous materials in capacitor energy storage systems is not limited
	Refrigeration systems	The quantity of refrigerants in refrigeration systems is not limited. To qualify for this allowance, such systems shall comply with Section 608 of the International Fire Code and Chapter 11 of the International Mechanical Code

a. Exempted materials and conditions listed in this table are required to comply with applicable provisions of the *International Fire Code*.

Revise as follows:

[F] 414.1 General. ~~The provisions of Sections 414.1 through 414.6 shall apply to buildings~~ Buildings and structures occupied for the manufacturing, processing, dispensing, use or storage of *hazardous materials* shall comply with Sections 414.1 through 414.6.

Exception: Exemptions listed in Table 307.1.1 shall not be required to comply with Section 414.

[F] 415.1 General. Occupancies classified as Group H-1, H-2, H-3, H-4 and H-5 in accordance with Section 307 shall comply with ~~The provisions of~~ Sections 415.1 through 415.11 ~~shall apply to the storage and use of hazardous materials in excess of the maximum allowable quantities per *control area* listed in Section 307.1~~.

2021 International Fire Code

Revise as follows:

5001.1 Scope.
Prevention, control and mitigation of dangerous conditions related to storage, dispensing, use and handling of hazardous materials shall be in accordance with this chapter.

This chapter shall apply to all hazardous materials, other than those materials and conditions listed in Table 5001.1, including those materials regulated elsewhere in this code, except that where specific requirements are provided in other chapters, those specific requirements shall apply in accordance with the applicable chapter. Where a material has multiple hazards, all hazards shall be addressed.

Exceptions:

1. In retail or wholesale sales occupancies, medicines, foodstuff, cosmetics and commercial or institutional products containing not more than 50 percent by volume of water-miscible liquids and with the remainder of the solutions not being flammable, provided that such materials are packaged in individual containers not exceeding 1.3 gallons (5 L).
2. Alcoholic beverages in retail or wholesale sales occupancies, provided that the liquids are packaged in individual containers not exceeding 1.3 gallons (5 L).
3. Application and release of pesticide and agricultural products and materials intended for use in weed abatement, erosion control, soil amendment or similar applications where applied in accordance with the manufacturer's instructions and label directions.
4. The off-site transportation of hazardous materials where in accordance with Department of Transportation (DOTn) regulations.
5. Building materials not otherwise regulated by this code.
6. Refrigeration systems (see Section 608).
7. Stationary storage battery systems regulated by Section 1207.
8. The display, storage, sale or use of fireworks and *explosives* in accordance with Chapter 56.
9. *Corrosives* utilized in personal and household products in the manufacturer's original consumer packaging in Group M occupancies.
10. The storage of beer, distilled spirits and wines in barrels and casks.
11. The use of wall-mounted dispensers containing alcohol-based hand rubs classified as Class I or II liquids where in accordance with

Section 5705.5.

12. Specific provisions for flammble liquids in motor fuel-dispensing facilities, repair garages, airports and marinas in Chapter 23.
13. Storage and use of fuel oil in tanks and containers connected to oil-burning equipment. Such storage and use shall be in accordance with Section 605. For abandonment of fuel oil tanks, Chapter 57 applies.
14. Storage and display of aerosol products complying with Chapter 51.
15. Storage and use of *flammable* or *combustible liquids* that do not have a fire point when tested in accordance with ASTM D92, not otherwise regulated by this code.
16. *Flammable* or *combustible liquids* with a *flash point* greater than 95°F (35°C) in a water-miscible solution or dispersion with a water and inert (noncombustible) solids content of more than 80 percent by weight, which do not sustain combustion, not otherwise regulated by this code.
17. Commercial cooking oil storage tank systems located within a building and designed and installed in accordance with Section 607 and NFPA 30.

Add new text as follows:

TABLE 5001.1 HAZARDOUS MATERIAL EXEMPTIONS[a]

Material Classification	Occupancy or Application	Exemption
Combustible fiber	Baled Cotton	Densely packed baled cotton shall not be classified as combustible fiber, provided that the bales comply with the packing requirements of ISO 8115
Corrosive	Building materials	The quantity of commonly used building materials that are classified as corrosive materials is not limited
	Personal and household products	The quantity of personal and household products that are classified as corrosive materials is not limited in retail displays, provided that the products are in original packaging
	Retail and wholesale sales occupancies	The quantity of medicines, foodstuffs or consumer products, and cosmetics containing not more than 50 percent by volume of water-miscible liquids with the remainder of the solutions not being flammable, is not limited. To qualify for this allowance, such materials shall be packaged in individual containers not exceeding 1.3 gallons.
Explosives	Groups B, F, M and S	Storage of special industrial explosive devices are not limited
	Groups M and R-3	Storage of black powder, smokeless propellant, and small arms primers are not limited
Flammable and combustible liquids and gases	Aerosols	Buildings and structures occupied for aerosol product storage, aerosol cooking spray products or plastic aerosol 3 products shall be classified as Group S-1
	Alcoholic beverages	The quantity of alcoholic beverages in liquor stores and distributors without bulk storage is not limited
		The quantity of alcoholic beverages in distilling or brewing of beverages is not limited
		The storage quantity of beer, distilled spirits and wines in barrels and casks is not limited
		The quantity of alcoholic beverages in retail and wholesale sales occupancies is not limited. To qualify for this allowance, beverages shall be packaged in individual containers not exceeding 1.3 gallons
	Cleaning establishments with combustible liquid solvents	The quantity of combustible liquid solvents used in closed systems and having a flash point at or above 140°F (60°C) is not limited. To qualify for this allowance, equipment shall be listed by an approved testing agency and the occupancy shall be separated from all other areas of the building by 1-hour fire barriers constructed in accordance with Section 707 or 1-hour horizontal assemblies constructed in accordance with Section 711, or both
		The quantity of combustible liquid solvents having a flash point at or above 200°F (93°C) is not limited
	Closed piping systems	The quantity of flammable and combustible liquids and gases utilized for the operation of machinery or equipment is not limited
	Fuel	The quantity of liquid or gaseous fuel in fuel tanks on vehicles or motorized equipment is not limited
		The quantity of gaseous fuels in piping systems and fixed appliances regulated by the International Fuel Gas Code is not limited
		The quantity of liquid fuels in piping systems and fixed appliances regulated by the International Mechanical Code is not limited
	Fuel oil	The quantity of fuel oil storage complying with Section 603.3.2 of the International Fire Code is not limited
	Flammable finishing operations using flammable and combustible liquids	Buildings and structures occupied for the application of flammable finishes. Such buildings and areas shall comply with Section 416
	Hand sanitizer	The quantity of alcohol-based hand rubs classified as Class I or II liquids in dispensers installed in accordance with Sections 5705.5 and 5705.5.1 of the International Fire Code is not limited. The location of the alcohol-based hand rub (ABHR) dispensers shall be provided in the construction documents
	Retail and wholesale sales occupancies with flammable and combustible liquids	The quantity of medicines, foodstuffs or consumer products, and cosmetics containing not more than 50 percent by volume of water-miscible liquids with the remainder of the solutions not being flammable, is not limited To qualify for this allowance, such materials shall be packaged in individual containers not exceeding 1.3 gallons.
		The quantity of medicines, foodstuffs or consumer products, and cosmetics containing not more than 50

Highly toxic and toxic materials	Retail and wholesale sales occupancies	percent by volume of water-miscible liquids with the remainder of the solutions not being flammable, is not limited. To qualify for this allowance, such materials shall be packaged in individual containers not exceeding 1.3 gallons.
Any	Agricultural materials	The quantity of agricultural materials stored or utilizated for agricultural purposes on the premises is not limited
	Energy storage	The quantity of hazardous materials in stationary storage battery systems is not limited
		The quantity of hazardous materials in stationary fuel cell power systems is not limited
		The quantity of hazardous materials in capacitor energy storage systems is not limited
	Refrigeration systems	The quantity of refrigerants in refrigeration systems is not limited. To qualify for this allowance, such systems shall comply with Section 608 of the International Fire Code and Chapter 11 of the International Mechanical Code

a. Exempted materials and conditions listed in this table are required to comply with applicable provisions of the *International Fire Code*.

Revise as follows:

TABLE 5003.1.1(1)
MAXIMUM ALLOWABLE QUANTITY PER CONTROL AREA OF HAZARDOUS MATERIALS POSING A PHYSICAL HAZARD[a, c, j, m, n, ~~p~~]

MATERIAL	CLASS	GROUP WHEN THE MAXIMUM ALLOWABLE QUANTITY IS EXCEEDED	STORAGE[b]			USE-CLOSED SYSTEMS[b]			USE-OPEN SYSTEMS[b]	
			Solid pounds (cubic feet)	Liquid gallons (pounds)	Gas (cubic feet at NTP)	Solid pounds (cubic feet)	Liquid gallons (pounds)	Gas (cubic feet at NTP)	Solid pounds (cubic feet)	Liquid gallons (pounds)
Combustible dust	NA	H-2	See Note q	NA	NA	See Note q	NA	NA	See Note q	NA
Combustible fibers[q]	Loose	H-3	(100)	NA	NA	(100)	NA	NA	(20)	NA
	Baled[o]		(1,000)			(1,000)			(200)	
Combustible liquid[c, ~~i~~]	II	H-2 or H-3	NA	120[d, e]	NA	NA	120[d]	NA	NA	30[d]
	IIIA	H-2 or H-3		330[d, e]			330[d]			80[d]
	IIIB	NA		13,200[e, f]			13,200[f]			3,300[f]
CryogenicFlammable	NA	H-2	NA	45[d]	NA	NA	45[d]	NA	NA	10[d]
CryogenicInert	NA	NA	NA	NA	NL	NA	NA	NL	NA	NA
CryogenicOxidizing	NA	H-3	NA	45[d]	NA	NA	45[d]	NA	NA	10[d]
Explosives	Division 1.1	H-1	1[e, g]	(1)[e, g]	NA	0.25[g]	(0.25)[g]	NA	0.25[g]	(0.25)[g]
	Division 1.2	H-1	1[e, g]	(1)[e, g]		0.25[g]	(0.25)[g]		0.25[g]	(0.25)[g]
	Division 1.3	H-1 or H-2	5[e, g]	(5)[e, g]		1[g]	(1)[g]		1[g]	(1)[g]
	Division 1.4	H-3	50[e, g]	(50)[e, g]		50[g]	(50)[g]		NA	NA
	Division 1.4G	H-3	125[e, l]	NA		NA	NA		NA	NA
	Division 1.5	H-1	1[e, g]	(1)[e, g]		0.25[g]	(0.25)[g]		0.25[g]	(0.25)[g]
	Division 1.6	H-1	1[e, g]	NA		NA	NA		NA	NA
Flammable gas	Gaseous	H-2	NA	NA	1,000[d, e]	NA	NA	1,000[d, e]	NA	NA
	Liquefied			(150)[d, e]	NA		(150)[d, e]	NA		
Flammable liquid~~e~~ _[o]	IA	H-2 or H-3	NA	30[d, e]	NA	NA	30[d]	NA	NA	10d
	IB and IC			120[d, e]			120[d]			30d
Flammable liquid, combination (IA, IB, IC)[o]	NA	H-2 or H-3	NA	120[d, e, h]	NA	NA	120[d, h]	NA	NA	30[d, h]
Flammable solid	NA	H-3	125[d, e]	NA	NA	125[d]	NA	NA	25[d]	NA
Inert gas	Gaseous	NA	NA	NA	NL	NA	NA	NL	NA	NA
	Liquefied	NA	NA	NA	NL	NA	NA	NL	NA	NA
Organic peroxide	UD	H-1	1[e, g]	(1)[e, g]	NA	0.25[g]	(0.25)[g]	NA	0.25[g]	(0.25)[g]
	I	H-2	5[d, e]	(5)[d, e]		1[d]	(1)[d]		1[d]	(1)[d]
	II	H-3	50[d, e]	(50)[d, e]		50[d]	(50)[d]		10[d]	(10)[d]
	III	H-3	125[d, e]	(125)[d, e]		125[d]	(125)[d]		25[d]	(25)[d]
	IV	NA	NL	NL		NL	NL		NL	NL
	V	NA	NL	NL		NL	NL		NL	NL

MATERIAL	CLASS	GROUP WHEN THE MAXIMUM ALLOWABLE QUANTITY IS EXCEEDED	STORAGE Solid pounds (cubic feet)	STORAGE Liquid gallons (pounds)	STORAGE Gas (cubic feet at NTP)	USE-CLOSED SYSTEMS Solid pounds (cubic feet)	USE-CLOSED SYSTEMS Liquid gallons (pounds)	USE-CLOSED SYSTEMS Gas (cubic feet at NTP)	USE-OPEN SYSTEMS Solid pounds (cubic feet)	USE-OPEN SYSTEMS Liquid gallons (pounds)
Oxidizer	4	H-1	1^{g}	$(1)^{e, g}$	NA	0.25^{g}	$(0.25)^{g}$	NA	0.25^{g}	$(0.25)^{g}$
	3^{k}	H-2 or H-3	$10^{d, e}$	$(10)^{d, e}$		2^{d}	$(2)^{d}$		2^{d}	$(2)^{d}$
	2	H-3	$250^{d, e}$	$(250)^{d, e}$		250^{d}	$(250)^{d}$		50^{d}	$(50)^{d}$
	1	NA	$4{,}000^{e, f}$	$(4{,}000)^{e, f}$		$4{,}000^{f}$	$(4{,}000)^{f}$		$1{,}000^{f}$	$(1{,}000)^{f}$
Oxidizing gas	Gaseous	H-3	NA	NA	$1{,}500^{d,e}$	NA	NA	$1{,}500^{d,e}$	NA	NA
	Liquefied			$(150)^{d, e}$	NA		$(150)^{d, e}$	NA		
Pyrophoric	NA	H-2	$4^{e, g}$	$(4)^{e, g}$	$50^{e, g}$	1^{g}	$(1)^{g}$	$10^{e, g}$	0	0
Unstable (reactive)	4	H-1	$1^{e, g}$	$(1)^{e, g}$	$10^{e, g}$	0.25^{g}	$(0.25)^{g}$	$2^{e, g}$	0.25^{g}	$(0.25)^{g}$
	3	H-1 or H-2	$5^{d, e}$	$(5)^{d, e}$	$50^{d, e}$	1^{d}	$(1)^{d}$	$10^{d, e}$	1^{d}	$(1)^{d}$
	2	H-3	$50^{d, e}$	$(50)^{d, e}$	$750^{d, e}$	50^{d}	$(50)^{d}$	$750^{d, e}$	10^{d}	$(10)^{d}$
	1	NA	NL	NL	NL	NL	NL	NL	NL	NL
Water reactive	3	H-2	$5^{d, e}$	$(5)^{d, e}$	NA	5^{d}	$(5)^{d}$	NA	1^{d}	$(1)^{d}$
	2	H-3	$50^{d, e}$	$(50)^{d, e}$		50^{d}	$(50)^{d}$		10^{d}	$(10)^{d}$
	1	NA	NL	NL		NL	NL		NL	NL

For SI: 1 cubic foot = 0.02832 m^3, 1 pound = 0.454 kg, 1 gallon = 3.785 L.

NA = Not Applicable, NL = Not Limited, UD = Unclassified Detonable.

a. For use of control areas, see Section 5003.8.3.

b. The aggregate quantity in use and storage shall not exceed the quantity listed for storage.

c. For hazardous materials in Group B higher education laboratory occupancies, See Section 428 of the International Building Code and Chapter 38.
~~The quantities of alcoholic beverages in retail and wholesale sales occupancies shall not be limited providing the liquids are packaged in individual containers not exceeding 1.3 gallons. In retail and wholesale sales occupancies, the quantities of medicines, foodstuff or consumer products and cosmetics containing not more than 50 percent by volume of water-miscible liquids with the remainder of the solutions not being flammable shall not be limited, provided that such materials are packaged in individual containers not exceeding 1.3 gallons.~~

d. Maximum allowable quantities shall be increased 100 percent in buildings equipped throughout with an approved automatic sprinkler system in accordance with Section 903.3.1.1. Where Note e applies, the increase for both notes shall be applied accumulatively.

e. Maximum allowable quantities shall be increased 100 percent where stored in approved storage cabinets, day boxes, gas cabinets, gas rooms, exhausted enclosures or in listed safety cans in accordance with Section 5003.9.10. Where Note d applies, the increase for both notes shall be applied accumulatively.

f. Quantities shall not be limited in a building equipped throughout with an approved automatic sprinkler system in accordance with Section 903.3.1.1.

g. Allowed only in buildings equipped throughout with an approved automatic sprinkler system.

h. Containing not more than the maximum allowable quantity per control area of Class IA, Class IB or Class IC flammable liquids.

~~i. The maximum allowable quantity shall not apply to fuel oil storage complying with Section 605.4.2.~~

j. Quantities in parenthesis indicate quantity units in parenthesis at the head of each column.

k. A maximum quantity of 220 pounds of solid or 22 gallons of liquid Class 3 oxidizers is allowed where such materials are necessary for maintenance purposes, operation or sanitation of equipment where the storage containers and the manner of storage are approved.

l. Net weight of pyrotechnic composition of the fireworks. Where the net weight of the pyrotechnic composition of the fireworks is not known, 25 percent of the gross weight of the fireworks including packaging shall be used.

m. For gallons of liquids, divide the amount in pounds by 10 in accordance with Section 5003.1.2.

n. For ~~storage and display quantities~~ oxidizers, unstable (reactive) materials, and water reactive materials stored or displayed in Group M occupancies ~~and storage quantities~~ or stored in Group S occupancies , see Section ~~complying with~~ Section 5003.11~~, see Table 5003.11.1~~.

o. For flammable and combustible liquid storage in Group M occupancy wholesale and retail sales uses, see Section 5704.3.6

~~Densely-packed baled cotton that complies with the packing requirements of ISO 8115 shall not be included in this material class.~~

~~p. The following shall not be included in determining the maximum allowable quantities:~~

~~1. Liquid or gaseous fuel in fuel tanks on vehicles.~~

2. ~~Liquid or gaseous fuel in fuel tanks on motorized equipment operated in accordance with this code.~~
3. ~~Gaseous fuels in piping systems and fixed appliances regulated by the *International Fuel Gas Code*.~~
4. ~~Liquid fuels in piping systems and fixed appliances regulated by the *International Mechanical Code*.~~
5. ~~Alcohol-based hand rubs classified as Class I or II liquids in dispensers that are installed in accordance with Sections 5705.5 and 5705.5.1. The location of the alcohol-based hand rub (ABHR) dispensers shall be provided in the construction documents.~~

q. Where manufactured, generated or used in such a manner that the concentration and conditions create a fire or explosion hazard based on information prepared in accordance with Section 104.8.2.

TABLE 5003.1.1(2)
MAXIMUM ALLOWABLE QUANTITY PER CONTROL AREA OF HAZARDOUS MATERIALS POSING A HEALTH HAZARD[a, ~~e, f~~, h, i]

MATERIAL	STORAGE[b]			USE-CLOSED SYSTEMS[b]			USE-OPEN SYSTEMS[b]	
	Solid pounds[d, e, f]	Liquid gallons (pounds)[d, e, f]	Gas cubic feet at NTP (pounds)[d]	Solid pounds[d]	Liquid gallons (pounds)[d]	Gas cubic feet at NTP (pounds)[d]	Solid pounds[d]	Liquid gallons (pounds)[d]
Corrosives	5,000	500	Gaseous 810[e] Liquefied (150)	5,000	500	Gaseous 810[e] Liquefied (150)	1,000	100
Highly toxics	10	(10)	Gaseous 20[g] Liquefied (4)[g]	10	(10)	Gaseous 20[g] Liquefied (4)[g]	3	(3)
Toxics	500	(500)	Gaseous 810[e] Liquefied (150)[e]	500	(500)	Gaseous 810[e] Liquefied (150)[e]	125	(125)

For SI: 1 cubic foot = 0.02832 m^3, 1 pound = 0.454 kg, 1 gallon = 3.785 L.

a. For use of control areas, see Section 5003.8.3.

b. The aggregate quantity in use and storage shall not exceed the quantity listed for storage.

~~c. In retail and wholesale sales occupancies, the quantities of medicines, foodstuff or consumer products and cosmetics, containing not more than 50 percent by volume of water-miscible liquids and with the remainder of the solutions not being flammable, shall not be limited, provided that such materials are packaged in individual containers not exceeding 1.3 gallons.~~

d. Maximum allowable quantities shall be increased 100 percent in buildings equipped throughout with an approved automatic sprinkler system in accordance with Section 903.3.1.1. Where Note e also applies, the increase for both notes shall be applied accumulatively.

e. Maximum allowable quantities shall be increased 100 percent where stored in approved storage cabinets, gas cabinets or exhausted enclosures. Where Note d applies, the increase for both notes shall be applied accumulatively.

f. For corrosive, highly toxic and toxic materials stored or displayed in Group M occupancies or stored in Group S occupancies, See Section 5003.11.1.

~~For storage and display quantities in Group M and storage quantities in Group S occupancies complying with Section 5003.11, see Table 5003.11.1.~~

g. Allowed only where stored in approved exhausted gas cabinets or exhausted enclosures.

h. Quantities in parentheses indicate quantity units in parentheses at the head of each column.

i. For gallons of liquids, divide the amount in pounds by 10 in accordance with Section 5003.1.2.

Reason: This proposal attempts to clean up what has become a colossal mess of special exceptions to hazardous materials regulations and Group H occupancy classification and clarify that the special exceptions generally fall into two categories: 1) Outright exclusions to Group H with no quantity limit, or 2) Major increases of MAQ amounts beyond what is provided in the general application MAQ tables. The first group has appeared in a list of exceptions to Group H in IBC Section 307.1.1, and these materials/conditions were generally considered to be exempt from ever being Group H or having to comply with any of the general hazardous materials regulations in the IBC or IFC. The second group clearly gets its own MAQ allowances, but were not specifically exempted from having to follow general hazardous materials safety requirements that are otherwise applicable to quantities that do not exceed MAQ amounts.
Even in the original Group H requirements, and particularly footnotes to the MAQ tables, the "special conditions" were somewhat haphazardly organized, and the situation has only gotten worse over the past three-plus decades.

Trying to pull all of this information together into a more organized presentation was a massive undertaking and in some cases involved interpreting intent of provisions for which application wasn't 100-percent clearly conveyed by existing text. Being involved in this topic for more than 30 years, I feel reasonably confident that my understanding of how the provisions apply is accurate, and certainly, there was no intent to deliberately gore someone's ox. My advice to anyone who is impacted by these portions of the codes is to read the rewrite closely to make sure that there were no unintended consequences from the work that was done. Given the scope of this project and less 3rd party review of the proposal prior to submittal than I would have preferred, it is certainly possible that mistakes may have been made, and in such cases, I will be happy to work on a floor modification for committee consideration to fix these. Note that, for the new Table 307.1.1 and the companion IFC table, I included an extra column showing the original source location for each row/exemption to assist reviewers. It is intended that this information will not be carried into the final version that appears in the code, but may be useful for staff to retain for inclusion in the commentary books.

TABLE 307.1.1

HAZARDOUS MATERIAL EXEMPTIONS[a]

Material Classification	Occupancy or Application	Exemption	2021 Source (column to be deleted prior to publication)
Combustible fiber	Baled Cotton	Densely packed baled cotton shall not be classified as combustible fiber, provided that the bales comply with the packing requirements of ISO 8115	Table 307.1(1) note "o"
Corrosive	Building materials	The quantity of commonly used building materials that are classified as corrosive materials is not limited	Section 307.1.1 Item 11
	Personal and household products	The quantity of personal and household products that are classified as corrosive materials is not limited in retail displays, provided that the products are in original packaging	Section 307.1.1 Item 10
	Retail and wholesale sales occupancies	The quantity of medicines, foodstuffs or consumer products, and cosmetics containing not more than 50 percent by volume of water-miscible liquids with the remainder of the solutions not being flammable, is not limited. To qualify for this allowance, such materials shall be packaged in individual containers not exceeding 1.3 gallons.	Table 307.1(2) note "c"
Explosives	Groups B, F, M and S	Storage of special industrial explosive devices are not limited	Section 307.1.1 Item 14
	Groups M and R-3	Storage of black powder, smokeless propellant, and small arms primers are not limited	Section 307.1.1 Item 14
Flammable and combustible liquids and gases	Aerosols	Buildings and structures occupied for aerosol product storage, aerosol cooking spray products or plastic aerosol 3 products shall be classified as Group S-1	Section 307.1.1 Item 12
	Alcoholic beverages	The quantity of alcoholic beverages in liquor stores and distributors without bulk storage is not limited	Section 307.1.1 Item 6
		The quantity of alcoholic beverages in distilling or brewing of beverages is not limited	Section 307.1.1 Item 18
		The storage quantity of beer, distilled spirits and wines in barrels and casks is not limited	Section 307.1.1 Item 19
		The quantity of alcoholic beverages in retail and wholesale sales occupancies is not limited. To qualify for this allowance, beverages shall be packaged in individual containers not exceeding 1.3 gallons	Table 307.1(1) note "c"

	Cleaning establishments with combustible liquid solvents	The quantity of combustible liquid solvents used in closed systems and having a flash point at or above 140°F (60°C) is not limited. To qualify for this allowance, equipment shall be listed by an approved testing agency and the occupancy shall be separated from all other areas of the building by 1-hour fire barriers constructed in accordance with Section 707 or 1-hour horizontal assemblies constructed in accordance with Section 711, or both	Section 307.1.1 Item 4
		The quantity of combustible liquid solvents having a flash point at or above 200°F (93°C) is not limited	Section 307.1.1 Item 5
	Closed piping systems	The quantity of flammable and combustible liquids and gases utilized for the operation of machinery or equipment is not limited	Section 307.1.1 Item 3
	Fuel	The quantity of liquid or gaseous fuel in fuel tanks on vehicles or motorized equipment is not limited	Table 307.1(1) note "p" #1 & 2
		The quantity of gaseous fuels in piping systems and fixed appliances regulated by the International Fuel Gas Code is not limited	Table 307.1(1) note "p" #3
		The quantity of liquid fuels in piping systems and fixed appliances regulated by the International Mechanical Code is not limited	Table 307.1(1) note "p" #4
	Fuel oil	The quantity of fuel oil storage complying with Section 603.3.2 of the International Fire Code is not limited	Table 307.1(1) note "I"
	Flammable finishing operations using flammable and combustible liquids	Buildings and structures occupied for the application of flammable finishes. Such buildings and areas shall comply with Section 416	Section 307.1.1 Item 1
	Hand sanitizer	The quantity of alcohol-based hand rubs classified as Class I or II liquids in dispensers installed in accordance with Sections 5705.5 and 5705.5.1 of the International Fire Code is not limited. The location of the alcohol-based hand rub (ABHR) dispensers shall be provided in the construction documents	Table 307.1(1) note "p" #5
	Retail and wholesale sales occupancies with flammable and combustible liquids	The quantity of medicines, foodstuffs or consumer products, and cosmetics containing not more than 50 percent by volume of water-miscible liquids with the remainder of the solutions not being flammable, is not limited To qualify for this allowance, such materials shall be packaged in individual containers not exceeding 1.3 gallons.	Table 307.1(1) note "c"
Highly toxic and toxic materials	Retail and wholesale sales occupancies	The quantity of medicines, foodstuffs or consumer products, and cosmetics containing not more than 50 percent by volume of water-	Table 307.1(2) note "c"

		miscible liquids with the remainder of the solutions not being flammable, is not limited. To qualify for this allowance, such materials shall be packaged in individual containers not exceeding 1.3 gallons.	
Any	Agricultural materials	The quantity of agricultural materials stored or utilizated for agricultural purposes on the premises is not limited	Section 307.1.1 Item 8
	Energy storage	The quantity of hazardous materials in stationary storage battery systems is not limited	Section 307.1.1 Item 9
		The quantity of hazardous materials in stationary fuel cell power systems is not limited	Section 307.1.1 Item 15
		The quantity of hazardous materials in capacitor energy storage systems is not limited	Section 307.1.1 Item 16
	Refrigeration systems	The quantity of refrigerants in refrigeration systems is not limited. To qualify for this allowance, such systems shall comply with Section 608 of the International Fire Code and Chapter 11 of the International Mechanical Code	Section 307.1.1 Item 7

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The revision is intended to be a reorganization and edit that should not affect the cost of construction.

G36-21

Public Hearing Results

Committee Action: **As Modified**

Committee Modification:

2021 International Building Code

[F] TABLE 307.1(1) MAXIMUM ALLOWABLE QUANTITY PER CONTROL AREA OF HAZARDOUS MATERIALS POSING A PHYSICAL HAZARD[a, c j, m, n]

Portions of table not shown remain unchanged.

MATERIAL	CLASS	GROUP WHEN THE MAXIMUM ALLOWABLE QUANTITY IS EXCEEDED	Solid pounds(cubic feet)	Liquid gallons (pounds)	Gas (cubic feet at NTP)	Solid pounds(cubic feet)	Liquid gallons (pounds)	Gas (cubic feet at NTP)	Solid pounds(cubic feet)	Liquid gallons (pounds)
Combustible liquid [o]	II	H-2 or H-3	NA	120[d, e]	NA	NA	120[d]	NA	NA	30[d]
	IIIA	H-2 or H-3		330[d, e]			330[d]			80[d]
	IIIB	NA		13,200[e, f]			13,200[f]			3,300[f]

TABLE 307.1.1 HAZARDOUS MATERIAL EXEMPTIONS[a]

Portions of table not shown remain unchanged.

Material Classification	Occupancy or Application	Exemption
Explosives	Groups B, F, M and S	Storage of special industrial explosive devices is ~~are~~ not limited
	Groups M and R-3	Storage of black powder, smokeless propellant, and small arms primers is ~~are~~ not limited
Flammable and combustible liquids and gases	Fuel oil	The quantity of fuel oil storage complying with Section 605.4.2 ~~603.3.2~~ of the International Fire Code is not limited
Any	Refrigeration systems	The quantity of refrigerants in refrigeration systems is not limited. ~~To qualify for this allowance, such systems shall comply with Section 608 of the International Fire Code and Chapter 11 of the International Mechanical Code~~

2021 International Fire Code

5001.1 Scope. Prevention, control and mitigation of dangerous conditions related to storage, dispensing, use and handling of hazardous materials shall be in accordance with this chapter. This chapter shall apply to all hazardous materials~~, other than those materials and conditions listed in Table 5001.1,~~ including those materials regulated elsewhere in this code, except that where specific requirements are provided in other chapters, those specific requirements shall apply in accordance with the applicable chapter. Where a material has multiple hazards, all hazards shall be addressed. *(balance unchanged)*

TABLE 5003.1.1(1)
MAXIMUM ALLOWABLE QUANTITY PER CONTROL AREA OF HAZARDOUS MATERIALS POSING A PHYSICAL HAZARD [a, c, j, m, n, p]
Portions of table not shown remain unchanged.

MATERIAL	CLASS	GROUP WHEN THE MAXIMUM ALLOWABLE QUANTITY IS EXCEEDED	Solid pounds (cubic feet)	Liquid gallons (pounds)	Gas (cubic feet at NTP)	Solid pounds (cubic feet)	Liquid gallons (pounds)	Gas (cubic feet at NTP)	Solid pounds (cubic feet)	Liquid gallons (pounds)
Combustible fibers[q]	Loose	H-3	(100)	NA	NA	(100)	NA	NA	(20)	NA
	Baled~~[e]~~		(1,000)			(1,000)			(200)	
Combustible liquid~~[e]~~ [o]	II	H-2 or H-3	NA	120[d, e]	NA	NA	120[d]	NA	NA	30[d]
	IIIA	H-2 or H-3		330[d, e]			330[d]			80[d]
	IIIB	NA		13,200[e, f]			13,200[f]			3,300[f]

p. Quantities in this table shall be modified in accordance with Table 5003.1.1(5).

TABLE 5003.1.1(2)
MAXIMUM ALLOWABLE QUANTITY PER CONTROL AREA OF HAZARDOUS MATERIALS POSING A HEALTH HAZARD[a, c, h, i, j]

Portions of table not shown remain unchanged.

c. For hazardous materials in Group B higher education laboratory occupancies, See Section 428 of the International Building Code and Chapter 38.

j. Quantities in this table shall be modified in accordance with Table 5003.1.1(5).

TABLE ~~5001.1~~ 5003.1.1(5) HAZARDOUS MATERIAL EXEMPTIONS[a]

Portions of table not shown remain unchanged.

Material Classification	Occupancy or Application	Exemption
Explosives	Groups B, F, M and S	Storage of special industrial explosive devices is ~~are~~ not limited
	Groups M and R-3	Storage of black powder, smokeless propellant, and small arms primers is ~~are~~ not limited
Flammable and combustible liquids and gases	Cleaning establishments with combustible liquid solvents	The quantity of combustible liquid solvents used in closed systems and having a flash point at or above 140°F (60°C) is not limited. To qualify for this allowance, equipment shall be listed by an approved testing agency and the occupancy shall be separated from all other areas of the building by 1-hour fire barriers ~~constructed in accordance with Section 707~~ or 1-hour horizontal assemblies , or both, constructed in accordance with ~~Section 711, or both~~ the International Building Code
		The quantity of combustible liquid solvents having a flash point at or above 200°F (93°C) is not limited
	Fuel oil	The quantity of fuel oil storage complying with Section 605.4.2 ~~603.3.2 of the International Fire Code~~ is not limited
	Flammable finishing operations using flammable and combustible liquids	Buildings and structures occupied for the application of flammable finishes. Such buildings and areas shall comply with Chapter 24~~Section 416~~
	Hand sanitizer	The quantity of alcohol-based hand rubs classified as Class I or II liquids in dispensers installed in accordance with Sections 5705.5 and 5705.5.1 ~~of the International Fire Code~~ is not limited. The location of the alcohol-based hand rub (ABHR) dispensers shall be provided in the construction documents
Any	Refrigeration systems	The quantity of refrigerants in refrigeration systems is not limited.~~To qualify for this allowance, such systems shall comply with Section 608 of the International Fire Code and Chapter 11 of the International Mechanical Code~~

a. Exempted materials and conditions listed in this table are required to comply with ~~applicable~~ provisions of ~~the *International Fire Code*~~ this code that are not based on exceeding maximum allowable quantities in Section 5003.

Committee Reason: This proposal clarifies and cleans up the group H occupancy exemptions and applicability of the hazardous materials provisions of the IFC. The new IBC Table 307.1.1 is a better and more comprehensive approach than the current list found in IBC Section 307.1.1. This proposal along with the F197-21 revising roof top storage are necessary fixes to better clarify the application of the hazardous materials requirements. The modifications further coordinate footnotes amongst the tables, clarifies references and fixes redundant text. Additionally, the proposed table explaining the exceptions to requirements for IFC Chapter 50 has been more appropriately placed within Section 5003 as Table 5003.1.1(5). Section 5003 is the more appropriate location as that is where the maximum allowable quantity (MAQ) information is found. Appropriate references were made in Tables 5003.1.1(1) and 5003.1.1(2) through footnotes. (Vote: 13-0)

G36-21

Individual Consideration Agenda

Public Comment 1:

IBC: TABLE 307.1.1; IFC: TABLE 5003.1.1(5)

Proponents: Michael O'Brian, representing FCAC (fcac@iccsafe.org); Mike Nugent, representing ICC Building Code Action Committee (bcac@iccsafe.org) requests As Modified by Public Comment

Modify as follows:

2021 International Building Code

TABLE 307.1.1 HAZARDOUS MATERIAL EXEMPTIONS[a]

Portions of table not shown remain unchanged.

Material Classification	Occupancy or Application	Exemption
Flammable and combustible liquids and gases	Alcoholic beverages	The storage quantity of beer~~, distilled spirits and wines in barrels and casks~~ is not limited.
		The storage quantity of distilled spirits and wines in barrels and casks when such storage is in compliance with Chapter 40 of the International Fire Code is not limited
Any	Energy storage	~~The quantity of hazardous materials in stationary storage battery~~ Energy storage systems ~~is not limited~~ installed and maintained in accordance with Chapter 12 of the International Fire Code.

a. Exempted materials and conditions listed in this table are required to comply with applicable provisions of the *International Fire Code*.

2021 International Fire Code

TABLE 5003.1.1(5) HAZARDOUS MATERIAL EXEMPTIONS[a]

Portions of table not shown remain unchanged.

Material Classification	Occupancy or Application	Exemption
Flammable and combustible liquids and gases	Alcoholic beverages	The storage quantity of beer~~, distilled spirits and wines in barrels and casks~~ is not limited.
		The storage quantity of distilled spirits and wines in barrels and casks when such storage is in compliance with Chapter 40 is not limited
Any	Energy storage	~~The quantity of hazardous materials in stationary storage battery~~ Energy storage systems ~~is not limited~~ installed and maintained in accordance with Chapter 12

a. Exempted materials and conditions listed in this table are required to comply with provisions of this code that are not based on exceeding maximum allowable quantities in Section 5003.

Commenter's Reason: The purpose of this modification is to replace "battery storage" with "energy storage" in both the IBC and IFC tables to correlate with the new terminology current utilized in the codes and to eliminate a reference to "is not limited" which does not apply. The proposal also correlates the storage of distilled spirits and wines exemption with the applicable Chapter. There are no technical changes.
This Public Comment is submitted by the ICC Fire Code Action Committee (FCAC) and the Building Code Action Committee (BCAC)

The FCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance assigned International Codes with regard to fire and life safety in new and existing buildings and facilities as well as the protection of life and property in wildland urban interface areas. In 2020 and 2021 the Fire-CAC held multiple virtual meetings that were open to any interested party. In addition, there were numerous virtual specific working group meetings that were also open to any interested parties, to develop, discuss and debate the proposed changes. Related documentation and reports are posted on the FCAC website at: FCAC https://www.iccsafe.org/products-and-services/i-codes/code-development/cs/fire-code-action-committee-fcac/.

BCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2020 the BCAC has held several virtual meetings open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the BCAC website at BCAC https://www.iccsafe.org/content/building-code-action-committee-bcac/.

Cost Impact: The net effect of the public comment and code change proposal will not increase or decrease the cost of construction
There is no cost impact since this is just an editorial modification.

Public Comment# 2516

G38-21

Proposed Change as Submitted

Proponents: Stephen Thomas, Colorado Code Consulting, a Shums Coda Assoc Company, representing Colorado Chapter ICC (sthomas@coloradocode.net)

THIS CODE CHANGE WILL BE HEARD BY THE FIRE CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THAT COMMITTEE.

2021 International Building Code

Revise as follows:

[F] 307.1.1 Uses other than Group H. An occupancy that stores, uses or handles *hazardous materials* as described in one or more of the following items shall not be classified as Group H, but shall be classified as the occupancy that it most nearly resembles.

1. Buildings and structures occupied for the application of flammable finishes, provided that such buildings or areas conform to the requirements of Section 416 and the *International Fire Code*.
2. Wholesale and retail sales and storage of flammable and combustible liquids in mercantile occupancies conforming to the *International Fire Code*.

3. Closed piping system containing *flammable or combustible liquids* or gases utilized for the operation of machinery or equipment.
4. Cleaning establishments that utilize *combustible liquid* solvents having a *flash point* of 140°F (60°C) or higher in closed systems employing equipment *listed* by an *approved* testing agency, provided that this occupancy is separated from all other areas of the building by 1-hour *fire barriers* constructed in accordance with Section 707 or 1-hour *horizontal assemblies* constructed in accordance with Section 711, or both.
5. Cleaning establishments that utilize a liquid solvent having a *flash point* at or above 200°F (93°C).
6. Liquor stores and distributors without bulk storage.
7. Refrigeration systems.
8. The storage or utilization of materials for agricultural purposes on the premises.
9. Stationary storage battery systems installed in accordance with the *International Fire Code*.
10. *Corrosive* personal or household products in their original packaging used in retail display.
11. Commonly used *corrosive* building materials.
12. Buildings and structures occupied for *aerosol product* storage, aerosol cooking spray products or plastic aerosol 3 products shall be classified as Group S-1, provided that such buildings conform to the requirements of the *International Fire Code*.
13. Display and storage of nonflammable solid and nonflammable or noncombustible liquid *hazardous materials* in quantities not exceeding the maximum allowable quantity per *control area* in Group M or S occupancies complying with Section 414.2.5.
14. The storage of black powder, smokeless propellant and small arms primers in Groups M and R-3 and special industrial *explosive* devices in Groups B, F, M and S, provided such storage conforms to the quantity limits and requirements prescribed in the *International Fire Code*.
15. Stationary fuel cell power systems installed in accordance with the *International Fire Code*.
16. Capacitor energy storage systems in accordance with the *International Fire Code*.
17. Group B *higher education laboratory*occupancies complying with Section 428 and Chapter 38 of the International Fire Code.

~~18. Distilling or brewing of beverages conforming to the requirements of the *International Fire Code*.~~

~~19.~~ 18. The storage of beer~~, distilled spirits~~ and wines in barrels and casks conforming to the requirements of the *International Fire Code*.

Reason: These two items were added to the 2021 IFC and IBC by the Fire Code Committee. We believe that the classification of occupancies should have been heard by the IBC General Committee. Distilleries can be a very hazardous occupancy depending on the size of the facility. We would agree that a small craft distillery may not be a major hazard. However, the change did not address that. It just lumped all these types of facilities in the same group. Therefore, a major manufacturer of distilled spirits with hundreds of thousands of gallons of flammable liquids would not be classified as a Group H occupancy. There have been fires at these facilities that have had a major impact on the local community and the owners. We believe that facilities that have amounts of flammable liquids in excess of the maximum allowable quantities.

Cost Impact: The code change proposal will increase the cost of construction
A facility classified as a Group H occupancy has higher levels of life-safety provisions that will increase the cost of construction when not classified as a Group F-1 & S-1 occupancies.

G38-21

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: This proposal was disapproved based upon the specific decision in 2018 to permit these exceptions to Group H Occupancy classifications within the IBC for the 2021 code. The IFC would still apply from an operational standpoint. (Vote: 10-4)

G38-21

Individual Consideration Agenda

Public Comment 1:

Proponents: Brad Emerick, representing Colorado Chapter of the ICC and City and County of Denver requests As Submitted

Commenter's Reason: SUMMARY

The rationale for this proposal is simply that a Maximum Allowable Quantity (MAQ) needs to be re-established for distilleries at which they will be classified as "H" Occupancies and comply with the corresponding construction and separation requirements in the IBC. Alcohol distilleries produce, dispense and store (in bulk) Flammable Liquids; i.e., alcohol beverages with a Closed Cup Flash Point equal to or less than 100° F (corresponds to an alcohol concentration of 17.74% or more in water). There have been many fires and explosions at distilleries resulting in death, severe body burns and extensive property damage (partial list provided in detailed discussion below). The language adopted in 2018 erased the long-standing MAQ threshold and now <u>prevents</u> distilleries from being classified as an "H" occupancy <u>regardless</u> of the <u>quantity</u> and <u>type</u> of HazMat.

Please vote to overturn the committee and approve this proposal as submitted.

HISTORY

A series of code changes meant to provide consistent interpretation and regulation of small distilleries was adopted in 2018 for the 2021 codes. Unfortunately the language codified an incorrect code interpretation. The facilities and facility-operations listed under moderate- and low-hazard factory (F) and storage (S) occupancies [2021 IBC Sections 306 and 311] are supposed to be classified as F or S when they are not classified as "H" (this is stated in those sections and confirmed by ICC staff interpretation). The 2018 code proposal was based on the misinterpretation that the listed facilities are required to be classified as F or S regardless of the quantity and type of HazMat. Though it appears the intent was to help regulate small craft distilleries, the language did not distinguish between them and very large ones producing and storing tens of thousands of gallons of alcohol.

If you're interested in researching the history further, the 2018 code proposal that removed HazMat quantity thresholds for all distilleries was F276-18. The reason statement clearly states the misinterpretation. It's clear from the testimony video of the 2018 Committee Action Hearing (CAH) there was confusion between distilleries and breweries, and between distilleries in general and storage of spirits in wooden barrels and casks. Only four public comments were published by ICC in 2018. They were submitted by fire protection engineers and architects extremely familiar with distilleries and all of them requested the 2018 proposal be overturned. It's clear from the testimony video of the 2018 Public Comment Hearing that the building code ramifications - especially separation - were not recognized. Please also review the recording of the 2021 CAH related to this proposal. This was the first time any of the building code ripple effects were mentioned - and they still were not discussed.

DISCUSSION

First, distilleries are different from breweries and wineries. The hazards are very different. Ethyl alcohol (ethanol) is created by fermentation in breweries (beer) and wineries (wine). Alcohol beverages in these facilities rarely exceed concentrations of 17.7% alcohol by volume (ABV). Distilleries remove water from beer and wine to concentrate the ethanol. Alcohol beverages in distilleries get as high as 95% ABV. As the concentration of alcohol increases the Closed Cup Flash Point of the alcohol-water mixture decreases. Flammable Liquids are defined as having a Flash Point below 100° F. An ethanol-water mixture with an ABV of 17.7% has a Flash Point of 100° F so all concentrations higher than 17.7% are Flammable Liquids.

There have been a several points made in the 2018 CAH, 2018 PCH and 2021 CAH listed below with their counter points:

[1]

Separation is still required [between areas producing, storing, handling and dispensing flammable liquids and other occupancies].

Actually because the code (that this proposal is trying to correct) mandates all distilleries be classified as S1's and F1's, and prevents classification as H, IBC Section 508.3 Nonseparated Occupancies specifically allows for no physical separation. This means active flammable liquid distilling areas and bulk storage areas do not have to be physically separated from assembly, mercantile, office, etc., areas no matter how much flammable liquid is present or its state (distilling vaporizes flammable liquids - way above their flash point temperatures). This is probably the most serious unintended consequence of precluding all distilleries from being classified as H occupancies.

[2]

Distilleries with materials having hazards other than Flammable Liquid still have to comply with IBC for those materials.

Actually because the code (that this proposal is trying to correct) mandates all distilleries be classified as S1's and F1's, and prevents classification as H, and there is no language stating what HazMat is or is not to be regulated in a distillery, there are no applicable H regulations in the IBC. The IFC does not assign Occupancy Groups. So what happens when the quantities of condensed cleaning solutions classified as Corrosives exceed the MAQ per control area? The fire code has no provision for this and without being classified as an H, neither does the building code.

[3]

The new criteria is more conservative because it requires all distilleries to be sprinklered.

Actually this is a red herring. The MAQ for Class 1B and Class 1C Flammable Liquids in a nonsprinklered building is 120 gallons. There are a hundred distilleries in Colorado and only a tiny fraction of them produce, handle and store less than 120 gallons. The vast majority have to be sprinklered already.

[4]

All of the impacts of the 2018 code changes affecting distilleries were discussed.

Actually none of the building code impacts were discussed and it's clear many of them were not even known.

[5]

What is the risk - have there even been any accidents in distilleries?

Dalkita Architecture is a leading educator on distillery regulations and put together a partial list of small-distillery accidents that have occurred over the last ten years (following list includes two in 2021). There are many more major fires at large facilities - listed in appendix to DISCUS Recommended Fire Code Protection Practices for Distilled Spirits Beverage Facilities (please Google Heaven Hills Fire, Jim Beam Fire, Oldbury Gin Fire):

Wigle distillery, Pittsburgh - 1 hospitalized

BJ Hookers Distillery, Harris County TX - 1 air lifted to hospital

Island Beach Distillery, Lacey Township, NJ - 1 taken to burn center

Silver Trails Distillery, Marshal County KY - 1 dead, 1 with over a year in recovery

Full Throttle Saloon, Sturgis SD - burned to the ground

Twister Distillery, Moore, OK - 1 hospitalized

Alchemical Solutions, Ashland OR - Neighboring residents experienced smoke related health problems

Tuthilltown Spirits, Gardiner, NY - Destroyed building, no injuries

Elkins Park Distillery, Estes Park, CO - 3 injured, 1 air lifted to burn center, 1 taken by ambulance; 3 months later one is learning to walk again; severe building damageNOCO Distillery, Ft. Collins, CO - flashed over when FD arrived; "thank god our tasting room was closed"

[6]

Homemade stills would not be permitted under the fire code.

Actually there is no listing for stills and many of the small craft distillers start out with versions made at home from other containers like stainless steel milk storage tanks. A couple of these are included in the accidents listed above. One saving grace is none of these failed in a crowded room as would be allowed now in the 2021 code with nonseparated occupancies.

[7]

No regulations were reduced or lost with the code changes that now prohibit distilleries from being classified as an H occupancy.

Actually the 17 items listed below in the building code were directly affected by precluding distilleries from being classified as H occupancies. <u>None of them</u> were ever discussed in the 2018 CAH or PCH. This list was introduced in testimony in the 2021 CAH but no discussion took place. In addition it's not clear how distilleries with quantities of HazMat exceeding the MAQ per Control Area are supposed to be regulated in the fire code. It used to be that a room, space or building was either a Control Area or an H Occupancy. What are the regulations for rooms, spaces and buildings now if they exceed the MAQ and cannot be classified as H? It also used to be in the fire code that only distilled spirits stored in wooden barrels were exempt from IFC Chapters 50 (HazMat) and 57 (Flammable/Combustible Liquids) - now all spirit-storage containers of any material (270 gallon plastic totes?) are exempt in direct conflict with NFPA 30.

== Distilleries with any quantity of HazMat in excess of the MAQ per Control Area can now be anchor buildings attached to covered mall buildings [IBC 202].

== The open space around covered mall buildings can now be reduced for any quantity of HazMat in excess of the MAQ per Control Area [IBC 402.2].

== Atriums are now permitted in distilleries with any quantity of HazMat in excess of the MAQ per Control Area [IBC 404.1 & 712.1.7].

== A manual emergency alarm was required for storage in distilleries with any quantity of HazMat in excess of the MAQ per Control Area – now unlimited quantities of HazMat can be stored in a distillery without one because they're required to be classified as S1's [IBC 415.5].

== 25% of the perimeter wall of distilleries with any quantity of HazMat in excess of the MAQ per Control Area larger than 1,000 sf were required to be an exterior wall to facilitate fire department breaching if necessary – this is no longer required [IBC 415.6].

== distilleries with any quantity of HazMat in excess of the MAQ per Control Area had to be separated from every other occupancy; not true for S1's and F1's [IBC 508.3]

== distillery production areas with any quantity of HazMat in excess of the MAQ per Control Area were not permitted in Live/Work units – now unlimited quantities of Flammable Liquids can be in production in a Live Work unit (direct contradiction to TTB requirements) [IBC 508.5.2].

== distilleries with any quantity of HazMat in excess of the MAQ per Control Area were prohibited above horizontal building separations – now an unlimited quantity of distillery HazMat storage is allowed [IBC 510.2].

== The fire resistance rating of the exterior walls of distilleries with any quantity of HazMat in excess of the MAQ per Control Area was required to be increased one hour higher than for S1's and F1's [IBC 705.5].

== The area of exterior openings were limited for distilleries with any quantity of HazMat in excess of the MAQ per Control Area - now it is unlimited [IBC 705.8].

== Openings were required to be protected in distilleries with any quantity of HazMat in excess of the MAQ per Control Area with a fire separation distance less than 15'; unprotected openings are permitted for S1's and F1's down to a fire separation distance of 3' regardless of the quantity or type of HazMat [IBC 705.8].

== Fire dampers on duct penetrations of fire barriers and fire partitions was required for all distilleries with any quantity of HazMat in excess of the MAQ per Control Area but not all S1's and F1's [IBC 717.5.2 & 717.5.4].

== The width of stairways in S1's and F1's can be 33% narrower than was permitted for distilleries with any quantity of HazMat in excess of the MAQ per Control Area [IBC 1005.3.1].

== The width of other egress components in S1's and F1's is 25% narrower than was permitted for distilleries with any quantity of HazMat in excess of the MAQ per Control Area [IBC 1005.3.2].

== Doors were required to be side-hinged, pivoted or balanced, and swing in the direction of egress in distilleries with any quantity of HazMat in excess of the MAQ per Control Area – not so for F1's and S1's [IBC 1010.1.2 & 1010.1.2.1].

== Doors had to have panic hardware in distilleries with any quantity of HazMat in excess of the MAQ per Control Area [IBC 1010.2.9].

== Access to two exits is required at a lower occupant load was required in distilleries with any quantity of HazMat in excess of the MAQ per Control Area [IBC 1006.2.1].

== Maximum exit access travel distance was reduced in distilleries with any quantity of HazMat in excess of the MAQ per Control Area [IBC 1017.2].

So rolling all this up, an open flame, homemade still with hundreds of gallons of a Class 1B Flammable Liquid heated above its flashpoint can be displayed in the middle of an open nightclub, with an atrium, attached to a covered mall building with none of the additional fire separation distance limitations, exterior wall ratings and egress requirements required for H occupancies. Prohibiting an entire industry from being classified as an H occupancy regardless of the quantities of HazMat is dangerous – and contradicts longstanding building code intent and precedent.

Please support this proposal to at least allow very large distilleries to be regulated as H occupancies until the building code provisions can be discussed and modified as appropriate.

Cost Impact: The net effect of the public comment and code change proposal will increase the cost of construction
This proposal allows distilleries to be classified in correct Occupancy Classification when warranted (reestablishes longstanding precedent prior to the 2021 codes).

G40-21

Proposed Change as Submitted

Proponents: William Koffel, representing Self (wkoffel@koffel.com)

THIS CODE CHANGE WILL BE HEARD BY THE FIRE CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THAT COMMITTEE.

2021 International Building Code

Revise as follows:

[F] 307.3.1 Occupancies containing explosives not classified as H-1. The following occupancies containing *explosive* materials shall be classified as follows:

1. Division 1.3 *explosive* materials that are used and maintained in a form where either confinement or configuration will not elevate the hazard from a mass fire to mass *explosion* hazard shall be allowed in H-2 occupancies.
2. Division 1.4 explosive materials that are used and maintained in a form that only pose a minor explosion hazard shall be allowed in H-3 occupancies.

~~2~~ 3. Articles, including articles packaged for shipment, that are not regulated as a Division 1.4 *explosive* under Bureau of Alcohol, Tobacco, Firearms and Explosives regulations, or unpackaged articles used in process operations that do not propagate a detonation or deflagration between articles shall be allowed in H-3 occupancies.

Reason: The FCAC Working Group 6.1 on Hazardous Materials discussed that Table 307.1(1) identified the occupancy for Division 1.4 explosive materials as Group H-3. However the language within Section 307.3 and the exceptions in Section 307.3.1 do not clearly link to that occupancy classification.
The IFC Commentary states that:
There are certain explosive materials that pose a hazard level less than that anticipated for a Group H-1 occupancy. A Group H-2 classification is permitted for Division 1.3 explosive materials used or maintained under conditions where the hazard level will not rise from that of a mass fire hazard to a mass explosion hazard. A Group H-3 occupancy classification is permitted for packaged and unpackaged articles not regulated as Division 1.4 explosives by the Bureau of Alcohol, Tobacco and Firearms, as well as unpackaged articles used in process operations, provided there is no concern regarding the propagation of a detonation or deflagration between the articles during process operations.

The proposed Item 2 is intended to correlate Table 307.1(1) with this section consistent with guidance provided in the IFC Commentary.

It should be noted that while Koffel Associates provides consulting services to the American Pyrotechnics Association, the proposal was not submitted on their behalf. The proposal was prepared based upon a commitment made to the Working Group to proposal a solution to the conflict.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
Whereas the proposal clarifies the intent of the Code, there should be no impact on the cost of construction.

G40-21

Public Hearing Results

Committee Action: **As Submitted**

Committee Reason: The proposal was approved as it appropriately correlates with the occupancy classifications for explosives. The language is consistent with the definition for 1.4 explosives but could be simplified to remove the duplicative language. (Vote: 14-0)

G40-21

Individual Consideration Agenda

Public Comment 1:

IBC: [F] 307.3.1

Proponents: Jeffrey Shapiro, representing Self (jeff.shapiro@intlcodeconsultants.com) requests As Modified by Public Comment

Further modify as follows:

2021 International Building Code

[F] 307.3.1 Occupancies containing explosives not classified as H-1 . The following occupancies containing *explosive* materials shall be classified as follows:

1. Division 1.3 *explosive* materials that are used and maintained in a form where either confinement or configuration will not elevate the hazard from a mass fire to mass *explosion* hazard shall be allowed in H-2 occupancies.
2. Division 1.4 explosive materials ~~that are used and maintained in a form that only pose a minor explosion hazard~~ shall be allowed in H-3 occupancies.
3. Articles, including articles packaged for shipment, that are not regulated as a Division 1.4 *explosive* under Bureau of Alcohol, Tobacco, Firearms and Explosives regulations, or unpackaged articles used in process operations that do not propagate a detonation or deflagration between articles shall be allowed in H-3 occupancies.

Commenter's Reason: The added text was not necessary since Division 1.4 explosives are always considered to be a minor explosion hazard, by definition. From IBC Chapter 2, Explosives 1.4 are "Explosives that pose a minor explosion hazard. The explosive effects are largely confined to the package and no projection of fragments of appreciable size or range is to be expected. An external fire must not cause virtually instantaneous explosion of almost the entire contents of the package." The added text suggests that Division 1.4 explosives might be used or maintained in such a way that they are not a minor explosion hazard, which does not appear to be possible for a material classified in 1.4.

Cost Impact: The net effect of the public comment and code change proposal will not increase or decrease the cost of construction
Editorial clarification.

Public Comment# 2979

G42-21

Proposed Change as Submitted

Proponents: Mike Nugent, Chair, representing ICC Building Code Action Committee (bcac@iccsafe.org)

2021 International Building Code

SECTION 308
INSTITUTIONAL GROUP I

Revise as follows:

308.2.4 Five or fewer persons receiving custodial care. A facility with five or fewer persons receiving *custodial care* shall be classified as Group R-2 or Group R-3 based on the primary occupancy of the building. ~~or shall comply~~ Such a facility, located within a dwelling unit that is within the scope of the *International Residential Code*, shall be permitted to be constructed in accordance with this code or with the *International Residential Code*. ~~provided~~ Facilities constructed using the International Residential Code shall be protected by an *automatic sprinkler system* ~~is~~ installed in accordance with Section 903.3.1.3 or Section P2904 of the International Residential Code.

308.3.2 Five or fewer persons receiving medical care. A facility with five or fewer persons receiving *medical care* shall be classified as Group R-2 or Group R-3 , based on the primary occupancy of the building. ~~or shall comply~~ Such a facility, located within a dwelling unit that is within the scope of the I*nternational Residential Code*, shall be permitted to be constructed in accordance with this code or with the *International Residential Code*. ~~provided~~ Facilities constructed using the *International Residential Code* shall be protected by an automatic sprinkler system ~~is~~ installed in accordance with Section 903.3.1.3 or Section P2904 of the International Residential Code.

SECTION 310
RESIDENTIAL GROUP R

Revise as follows:

~~310.4.1~~ 310.1.1 Care facilities within a dwelling. Care facilities for five or fewer persons receiving medical care or custodial care that are located within a ~~single-family~~ dwelling unit ~~are permitted to comply~~ that is within the scope of the *International Residential Code*, shall be permitted to be constructed in accordance with this code or with the *International Residential Code*. ~~provided~~ Facilities constructed using the International Residential Code shall be protected by an *automatic sprinkler system* ~~is~~ installed in accordance with Section 903.3.1.3 or Section P2904 of the International Residential Code.

Reason: The intent of this proposal is to clarify the allowance for when a care facility fits into the residential requirements in the IBC or IRC. Sticking with the current intent in the codes, these facilities should be permitted in a home environment – be it detached single family, townhouse or apartment – thus the reference to Group R-3 and R-2. The IRC reference allows for the facility to use IRC if the dwelling unit it is in is scoped to the IRC.

The relocation of Section 310.4.1 is because this is no longer just a Group R-3 consideration.

This proposal does not change what facilities can currently be constructed under the IRC, however, in the past there has been arguments that these facilities should not be permitted under the IRC. A facility of 5 or fewer persons could be in a detached dwelling, a townhouse or an apartment building. The Fair Housing Act does not allow for family to be defined by blood or marriage. Multiple court cases have confirmed that people have the right to live in a home environment instead of an institutional facility if they so choose. If this is a business, this small group home is most likely operating as a family; and would fall below the licensure rules of most states. However, in most cases, this will be couple with foster children or someone taking care of a friend who needs assistance - not a business. The IBC does not typically go into issues on licensure or who is paying what – we look at the use of the space.

This is one of a group of proposals intended to coordinate the scoping items in IBC Section 101.2 and IRC 101.2. While the proposals work together, then also work separately. The proposal for coordination will be in Group B.

This proposal is submitted by the ICC Building Code Action Committee (BCAC).

BCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2020 the BCAC has held several virtual meetings open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the BCAC website at BCAC.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This is a clarification of use group, not a change to construction requirements.

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: This proposal was disapproved by the committee, however, they felt that the general intent for coordination with the IRC scoping was good, but some testifiers were confused on the limits. There was a concern that this could be read to allow for a large assisted living or nursing home to be constructed as individual dwelling units under the IRC. (Vote: 14-0)

G42-21

Individual Consideration Agenda

Public Comment 1:

IBC: 308.2.4, 308.3.2, 310.1.1

Proponents: Mike Nugent, representing ICC Building Code Action Committee (bcac@iccsafe.org) requests As Modified by Public Comment

Modify as follows:

2021 International Building Code

308.2.4 Five or fewer persons receiving custodial care . A facility with five or fewer persons receiving *custodial care* shall be classified as Group R-2 or Group R-3 based on the primary occupancy of the building. Such a facility, located within a ~~dwelling unit~~ detached one- or two- family dwelling or townhouse that is within the scope of the *International Residential Code*, shall be permitted to be constructed in accordance with this code or with the *International Residential Code.* Facilities constructed in accordance with ~~using~~ the International Residential Code shall be protected by an *automatic sprinkler system* installed in accordance with ~~Section 903.3.1.3 or~~ Section P2904 of the International Residential Code.

308.3.2 Five or fewer persons receiving medical care . A facility with five or fewer persons receiving *medical care* shall be classified as Group R-2 or Group R-3, based on the primary occupancy of the building. Such a facility, located within a ~~dwelling unit~~ detached one- or two- family dwelling or townhouse that is within the scope of the I*nternational Residential Code*, shall be permitted to be constructed in accordance with this code or with the *International Residential Code*. Facilities constructed in accordance with~~using~~ the *International Residential Code* shall be protected by an automatic sprinkler system installed in accordance with ~~Section 903.3.1.3 or~~ Section P2904 of the International Residential Code.

310.1.1 Care facilities within a dwelling . Care facilities for five or fewer persons receiving medical care or custodial care that are located within a ~~dwelling unit~~ detached one- or two- family dwelling or townhouse that is within the scope of the *International Residential Code*, shall be permitted to be constructed in accordance with this code or with the *International Residential Code.* Facilities constructed in accordance with ~~using~~ the International Residential Code shall be protected by an *automatic sprinkler system* installed in accordance with ~~Section 903.3.1.3 or~~ Section P2904 of the International Residential Code.

Commenter's Reason: The original proposal intended to allow small daycare, adult care or custodial care facilities serving five or fewer persons to be classified as part of the primary occupancy of a building housing such a facility, and to note that where they are contained in buildings falling within the scope of the International Residential Code they are permitted to be constructed either per the IBC or IRC.
The concern from the IBC-General Committee, and those in opposition, was the lack of clarity in how the proposal language was structured. As written, the proposal caused some confusion. Some felt the proposal expanded the scope of IRC to include apartment buildings, and that it could be argued a dwelling unit in an apartment building is within the scope of the IRC. Also, some felt the proposal language implied that dwelling units can be included in Group-I facilities.
The revised language for this public comment aims to address the concerns of the committee and clarify the original intent of the proposal by explicitly referring to care facilities located within detached one and two-family dwellings or townhouses, which are the types of residential buildings covered by the IRC.

Cost Impact: The net effect of the public comment and code change proposal will not increase or decrease the cost of construction
This is a clarification of use group, not a change to construction requirements.

Public Comment# 2675

G44-21 Part I

Proposed Change as Submitted

Proponents: Dan Willham, Fairfax County, representing Fairfax County (daniel.willham@fairfaxcounty.gov)

THIS IS A 4 PART CODE CHANGE. PART I WILL BE HEARD BY THE GENERAL CODE COMMITTEE. PART II WILL BE HEARD BY THE FIRE CODE COMMITTEE. PART III WILL BE HEARD BY THE PLUMBING CODE COMMITTEE. PART IV WILL BE HEARD BY THE PROPERTY MAINTENANCE/ZONING CODE COMMITTEE.SEE THE TENTATIVE HEARING ORDER FOR THESE COMMITTEES.

2021 International Building Code

Revise as follows:

310.2 Residential Group R-1. Residential Group R-1 occupancies containing *sleeping units* or more than two *dwelling units* where the occupants are primarily *transient* in nature, including:

- *Boarding houses* (*transient*) with more than 10 occupants
- *Congregate living facilities* (*transient*) with more than 10 occupants
- Hotels (*transient*)
- Motels (*transient*)

420.2 Separation walls. Walls separating *dwelling units* in the same building, walls separating *sleeping units* in the same building , walls separating *dwelling units* from sleeping units in the same building, and walls separating *dwelling* or *sleeping units* from other occupancies contiguous to them in the same building shall be constructed as *fire partitions* in accordance with Section 708.

420.3 Horizontal separation. Floor assemblies separating *dwelling units* in the same buildings, floor assemblies separating *sleeping units* in the same building , floor assemblies separating *dwelling units* from sleeping units in the same building, and floor assemblies separating dwelling or *sleeping units* from other occupancies contiguous to them in the same building shall be constructed as *horizontal assemblies* in accordance with Section 711.

716.2.6.1 Door closing. *Fire doors* shall be latching and self- or automatic-closing in accordance with this section.

Exceptions:

1. *Fire doors* located in common walls separating *dwelling units* or *sleeping units* in Group R-1 shall be permitted without automatic- or *self-closing* devices.
2. The elevator car doors and the associated hoistway enclosure doors at the floor level designated for recall in accordance with Section 3003.2 shall be permitted to remain open during Phase I emergency recall operation.

1010.1.2 Egress door types. Egress doors shall be of the side-hinged swinging door, pivoted door, or *balanced door* types.

Exceptions:

1. *Private garages*, office areas, factory and storage areas with an *occupant load* of 10 or less.
2. Group I-3 occupancies used as a place of detention.
3. Critical or intensive care patient rooms within suites of health care facilities.
4. Doors within or serving a single *dwelling unit* in Groups R-2 and R-3.
5. In other than Group H occupancies, revolving doors complying with Section 1010.3.1.
6. In other than Group H occupancies, special purpose horizontal sliding, accordion or folding door assemblies complying with Section 1010.3.3.
7. *Power-operated* doors in accordance with Section 1010.3.2.
8. Doors serving a bathroom within an individual *dwelling unit* or *sleeping unit* in Group R-1.
9. In other than Group H occupancies, manually operated horizontal sliding doors are permitted in a *means of egress* from spaces with an *occupant load* of 10 or less.

1103.2.11 Residential Group R-1. Buildings of Group R-1 containing not more than five *dwelling units* and *sleeping units* in aggregate for rent or hire that are also occupied as the residence of the proprietor are not required to comply with this chapter.

E104.2.1 Transient lodging. In *transient lodging* facilities, *dwelliing units* or *sleeping units* with accessible communication features shall be provided in accordance with Table E104.2.1. Units required to comply with Table E104.2.1 shall be dispersed among the various classes of units.

Reason: This change corrects discrepancies inadvertently created by past code changes. The description for R-1 occupancies used to only read "R-1 Residential occupancies where the occupants are primarily transient in nature ..." It did not mention sleeping units. The definition for *sleeping units* was added to the code to coordinate with the Fair Housing Act Guidelines (see code change E70-00) and did not involve the descriptions for residential occupancies in Chapter 3. Sleeping units was added to the descriptions of R-1 (2006 IBC) and R-2 (2003 IBC), in changes that do not appear in any code change proposal; these changes are also not marked as changes by bars in the margins. They appear to possibly have been made by the code correlation committee. However, no correction was made to the description of R-1, which, like R-2 occupancies, can also include both dwelling and sleeping units. This has left an apparent gap in the code for transient residential occupancies with dwelling units. This change resolves that by adding "or more than two dwelling units" to the description of R-1. Similar to the wording for the description for R-2, " or more than two dwelling units" avoids including R-3 residential occupancies and one- and two-family dwellings regulated under the IRC. This change also coordinates the references to sleeping units throughout the codes for R-1 occupancies to also include dwelling units. While doing this, a couple of instances of dwelling units for R-2 (without the mention of sleeping units) were found and also corrected to include sleeping units to coordinate with the description of R-2 occupancies.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This is a clarification and coordination of the code which will not affect construction cost.

G44-21 Part I

Public Hearing Results

Committee Action: **As Submitted**

Committee Reason: This proposal was approved because it would address in the code requirements the extended stay hotels that include dwelling units, not just sleeping units. (Vote: 14-0)

G44-21 Part I

Individual Consideration Agenda

Public Comment 1:

IBC: 202 (New), 310.2, 310.3

Proponents: Andrew Klein, representing Airbnb (andrew@asklein.com); John Catlett, representing BOMA International (catlettcodeconsulting@gmail.com) requests Disapprove

Commenter's Reason: The stated reason for the proposal is “an apparent gap in the code for transient residential occupancies with dwelling units.” However, as noted during debate over an identical proposal in 2018, it threatens to have the unintended consequence of undermining the growing popularity of the short-term rental (STR) economy – including short-term rentals offered by individuals in their primary or secondary residences. This use has proven to be a boon to property owners, local businesses, and communities (in the form of tax revenue). Where desired, jurisdictions have imposed STR-specific regulations—such as registration and insurance requirements—and/or applied existing codes to STR activity.
There are many forms of short-term rental activity that could be affected by this proposal. For example, “managed home sharing” has emerged where primary residents offer their home to STR guests, with permission and operational support of the landlord. This model provides tenants with more affordable rent, while embracing flexibility for a generation of renters that have increasingly variable work and travel lifestyles, particularly in the wake of the COVID-19 pandemic. Depending on the program, managed models can also provide landlords with oversight, transparency, insurance, and even a cut of the STR revenue that they can use to improve the community for all residents. In such cases, a majority of primary tenants may leverage short-term rentals to augment their income and the code should support this and other responsible short-term rental activity.

In addition, it is worth reiterating that the IBC has traditionally distinguished R-1 occupancies, like hotels, from vacation timeshare properties, which are categorized as R-2, and lodging houses with 5 or fewer guest rooms and boarding houses with 10 or fewer occupants, which are classified as R-3.

For these reasons and others, the ICC overwhelmingly decided at the last cycle in Richmond that a building which essentially looks and functions as a multifamily Group R-2 occupancy does not warrant a change of occupancy.

The proposal seeks to solve the problem stated by the proponent but in the process creates ambiguity for code officials regarding multifamily buildings where short term rental activity takes place, but is not the primary use. Furthermore, Part 4 modified definitions so that they are no longer unique—a traditional apartment complex would now be defined as both an apartment and motel/hotel.

Airbnb is committed to work with stakeholders to solve the stated problem. In fact, we attempted to propose an alternative that would address the gap cited by the proponent while avoiding any unintended consequences. However, this alternative was deemed out of scope by the ICC. As a result, we are willing to work to address the proponent's concern in the next cycle.

Cost Impact: The net effect of the public comment and code change proposal will not increase or decrease the cost of construction
No change to code.

Public Comment# 2705

G44-21 Part II

Proposed Change as Submitted

Proponents: Daniel Willham, Fairfax County, representing Fairfax County (daniel.willham@fairfaxcounty.gov)

2021 International Fire Code

Revise as follows:

308.4.1 Group R-2 dormitories. Candles, incense and similar open-flame-producing items shall not be allowed in *dwelling units* or *sleeping units* in Group R-2 dormitory occupancies.

403.9.1.1 Evacuation diagrams. A diagram depicting two evacuation routes shall be posted on or immediately adjacent to every required egress door from each hotel or motel *dwelling unit* or *sleeping unit*.

907.2.8.1 Manual fire alarm system. A manual fire alarm system that activates the occupant notification system in accordance with Section 907.5 shall be installed in Group R-1 occupancies.

Exceptions:

1. A manual fire alarm system is not required in buildings not more than two stories in height where all individual *dwelling units*, *sleeping units*, and contiguous attic and crawl spaces to those units are separated from each other and public or common areas by not less than 1-hour *fire partitions* and each individual *dwelling unit* and *sleeping unit* has an *exit* directly to a *public way*, *egress court* or yard.
2. Manual fire alarm boxes are not required throughout the building where all of the following conditions are met:
   - 2.1. The building is equipped throughout with an *automatic sprinkler system* installed in accordance with Section 903.3.1.1 or 903.3.1.2.
   - 2.2. The notification appliances will activate upon sprinkler water flow.
   - 2.3. Not fewer than one manual fire alarm box is installed at an *approved* location.

907.2.8.2 Automatic smoke detection system. An automatic smoke detection system that activates the occupant notification system in accordance with Section 907.5 shall be installed throughout all interior *corridors* serving *dwelling units* or *sleeping units*.

Exception: An automatic smoke detection system is not required in buildings that do not have interior *corridors* serving *dwelling units* or *sleeping units* and where each *dwelling unit* or *sleeping unit* has a *means of egress* door opening directly to an *exit* or to an exterior *exit access* that leads directly to an *exit*.

907.2.11.1 Group R-1. Single- or multiple-station smoke alarms shall be installed in all of the following locations in Group R-1:

1. In sleeping areas.
2. In every room in the path of the *means of egress* from the sleeping area to the door leading from the *dwelling unit* or *sleeping unit*.
3. In each story within the *dwelling unit* or *sleeping unit*, including *basements*. For *dwelling units* or *sleeping units* with split levels and without an intervening door between the adjacent levels, a smoke alarm installed on the upper level shall suffice for the adjacent lower level provided that the lower level is less than one full story below the upper level.

TABLE 907.5.2.3.2 VISIBLE ALARMS

AGGREGATE NUMBER OF DWELLING UNITS AND SLEEPING UNITS	SLEEPING ACCOMMODATIONS WITH VISIBLE ALARMS
6 to 25	2
26 to 50	4
51 to 75	7
76 to 100	9
101 to 150	12
151 to 200	14
201 to 300	17
301 to 400	20
401 to 500	22
501 to 1,000	5% of total
1,001 and over	50 plus 3 for each 100 over 1,000

1103.7.5.1 Group R-1 hotel and motel manual fire alarm system. A manual fire alarm system that activates the occupant notification system in accordance with Section 907.5 shall be installed in existing Group R-1 hotels and motels more than one story in height or with more than 20 *dwelling units* or *sleeping units* in aggregate.

Exceptions:

1. A manual fire alarm system is not required in buildings less than two stories in height where all *dwelling units*, *sleeping units*, attics and crawl spaces are separated by 1-hour *fire-resistance-rated* construction and each *sleeping unit* has direct access to a *public way*, *egress court* or yard.
2. A manual fire alarm system is not required in buildings not more than three stories in height with not more than 20 *dwelling units or sleeping units* in aggregate and equipped throughout with an *automatic sprinkler system* installed in accordance with Section 903.3.1.1 or 903.3.1.2.
3. Manual fire alarm boxes are not required throughout the building where the following conditions are met:

   3.1. The building is equipped throughout with an *automatic sprinkler system* installed in accordance with Section 903.3.1.1 or 903.3.1.2.

   3.2. The notification appliances will activate upon sprinkler water flow.

   3.3. Not less than one manual fire alarm box is installed at an *approved* location.

1103.7.5.1.1 Group R-1 hotel and motel automatic smoke detection system. An automatic smoke detection system that activates the occupant notification system in accordance with Section 907.5 shall be installed in existing Group R-1 hotels and motels throughout all interior *corridors* serving sleeping rooms not equipped with an *approved*, supervised *automatic sprinkler system* installed in accordance with Section 903.

Exception: An automatic smoke detection system is not required in buildings that do not have interior *corridors* serving *dwelling units* or *sleeping units* and where each *dwelling unit* or *sleeping unit* has a *means of egress* door opening directly to an *exit* or to an exterior *exit access* that leads directly to an *exit*.

1103.7.5.2 Group R-1 boarding and rooming houses manual fire alarm system. A manual fire alarm system that activates the occupant notification system in accordance with Section 907.5 shall be installed in existing Group R-1 boarding and rooming houses.

Exception: Buildings less than two stories in height where all *dwelling units*, *sleeping units*, attics and crawl spaces are separated by 1-hour *fire-resistance-rated* construction and each *dwelling unit* or *sleeping unit* has direct access to a *public way*, *egress court* or yard.

1103.7.5.2.1 Group R-1 boarding and rooming houses automatic smoke detection system. An automatic smoke detection system that activates the occupant notification system in accordance with Section 907.5 shall be installed in existing Group R-1 boarding and rooming houses throughout all interior *corridors* serving *dwelling units* or *sleeping units* not equipped with an *approved*, supervised sprinkler system installed in accordance with Section 903.

Exception: Buildings equipped with single-station smoke alarms meeting or exceeding the requirements of Section 907.2.11.1 and where the fire alarm system includes not less than one manual fire alarm box per floor arranged to initiate the alarm.

1104.5 Illumination emergency power. Where *means of egress* illumination is provided, the power supply for *means of egress* illumination shall normally be provided by the premises' electrical supply. In the event of power supply failure, illumination shall be automatically provided from an emergency system for the following occupancies where such occupancies require two or more *means of egress*:

1. Group A having 50 or more occupants.

   Exception: Assembly occupancies used exclusively as a place of worship and having an *occupant load* of less than 300.

2. Group B buildings three or more stories in height, buildings with 100 or more occupants above or below a *level of exit discharge* serving the occupants or buildings with 1,000 or more total occupants.
3. Group E in interior *exit access* and *exit stairways* and *ramps*, *corridors*, windowless areas with student occupancy, shops and laboratories.
4. Group F having more than 100 occupants.

   Exception: Buildings used only during daylight hours and that are provided with windows for natural light in accordance with the *International Building Code*.

5. Group I.
6. Group M.

   Exception: Buildings less than 3,000 square feet (279 m^2) in gross sales area on one story only, excluding mezzanines.

~~7. Group R-1.~~

~~**Exception:** Where each *sleeping unit* has direct access to the outside of the building at grade.~~

~~8.~~ 7. Groups R-1 and R-2.

Exception: Where each *dwelling unit* or *sleeping unit* has direct access to the outside of the building at grade.

2021 International Property Maintenance Code

Revise as follows:

[F] 704.6.1.1 Group R-1. Single- or multiple-station smoke alarms shall be installed in all of the following locations in Group R-1:

1. In sleeping areas.
2. In every room in the path of the means of egress from the sleeping area to the door leading from the *dwelling unit* or *sleeping unit*.
3. In each story within the *dwelling unit* or *sleeping unit*, including *basements*. For *dwelling units* or *sleeping units* with split levels and without an intervening door between the adjacent levels, a smoke alarm installed on the upper level shall suffice for the adjacent lower level provided that the lower level is less than one full story below the upper level.

2021 International Building Code

Revise as follows:

[F] 403.4.7 Smoke removal. To facilitate smoke removal in post-fire salvage and overhaul operations, buildings and structures shall be equipped with natural or mechanical *ventilation* for removal of products of combustion in accordance with one of the following:

1. Easily identifiable, manually operable windows or panels shall be distributed around the perimeter of each floor at not more than 50-foot (15 240 mm) intervals. The area of operable windows or panels shall be not less than 40 square feet (3.7 m^2) per 50 linear feet (15 240 mm) of perimeter.

   Exceptions:

   1. In Group R-1 occupancies, each *dwelling unit, sleeping unit* or suite having an *exterior wall* shall be permitted to be provided with 2 square feet (0.19 m^2) of venting area in lieu of the area specified in Item 1.
   2. Windows shall be permitted to be fixed provided that glazing can be cleared by fire fighters.

2. Mechanical air-handling equipment providing one exhaust air change every 15 minutes for the area involved. Return and exhaust air shall be moved directly to the outside without recirculation to other portions of the building.
3. Any other *approved* design that will produce equivalent results.

Reason: This change corrects discrepancies inadvertently created by past code changes. The description for R-1 occupancies used to only read "R-1 Residential occupancies where the occupants are primarily transient in nature ..." It did not mention sleeping units. The definition for *sleeping units* was added to the code to coordinate with the Fair Housing Act Guidelines (see code change E70-00) and did not involve the descriptions for residential occupancies in Chapter 3. Sleeping units was added to the descriptions of R-1 (2006 IBC) and R-2 (2003 IBC), in changes that do not appear in any code change proposal; these changes are also not marked as changes by bars in the margins. They appear to possibly have been made by the code correlation committee. However, no correction was made to the description of R-1, which, like R-2 occupancies, can also include both dwelling and sleeping units. This has left an apparent gap in the code for transient residential occupancies with dwelling units. This change resolves that by adding "or more than two dwelling units" to the description of R-1. Similar to the wording for the description for R-2, "or more than two dwelling units" avoids including R-3 residential occupancies and one- and two-family dwellings regulated under the IRC. This change also coordinates the references to sleeping units throughout the codes for R-1 occupancies to also include dwelling units. While doing this, a couple of instances of dwelling units for R-2 (without the mention of sleeping units) were found and also corrected to include sleeping units to coordinate with the description of R-2 occupancies.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This is a clarification and coordination of the code which will not affect construction cost.

G44-21 Part II

Public Hearing Results

Committee Action: **As Submitted**

Committee Reason: The committee stated that the reason for the approval was that it closes a gap in the requirements by including the proposed terms in various sections throughout the code. (Vote: 13-0)

G44-21 Part II

Individual Consideration Agenda

Public Comment 1:

Proponents: Andrew Klein, representing Airbnb (andrew@asklein.com) requests Disapprove

Commenter's Reason: The stated reason for the proposal is “an apparent gap in the code for transient residential occupancies with dwelling units.” However, as noted during debate over an identical proposal in 2018, it threatens to have the unintended consequence of undermining the growing popularity of the short-term rental (STR) economy – including short-term rentals offered by individuals in their primary or secondary residences. This use has proven to be a boon to property owners, local businesses, and communities (in the form of tax revenue). Where desired, jurisdictions have imposed STR-specific regulations—such as registration and insurance requirements—and/or applied existing codes to STR activity.
There are many forms of short-term rental activity that could be affected by this proposal. For example, “managed home sharing” has emerged where primary residents offer their home to STR guests, with permission and operational support of the landlord. This model provides tenants with more affordable rent, while embracing flexibility for a generation of renters that have increasingly variable work and travel lifestyles, particularly in the wake of the COVID-19 pandemic. Depending on the program, managed models can also provide landlords with oversight, transparency, insurance, and even a cut of the STR revenue that they can use to improve the community for all residents. In such cases, a majority of primary tenants may leverage short-term rentals to augment their income and the code should support this and other responsible short-term rental activity.

In addition, it is worth reiterating that the IBC has traditionally distinguished R-1 occupancies, like hotels, from vacation timeshare properties, which are categorized as R-2, and lodging houses with 5 or fewer guest rooms and boarding houses with 10 or fewer occupants, which are classified as R-3.

For these reasons and others, the ICC overwhelmingly decided at the last cycle in Richmond that a building which essentially looks and functions as a multifamily Group R-2 occupancy does not warrant a change of occupancy.

The proposal seeks to solve the problem stated by the proponent but in the process creates ambiguity for code officials regarding multifamily buildings where short term rental activity takes place, but is not the primary use. Furthermore, Part 4 modified definitions so that they are no longer unique—a traditional apartment complex would now be defined as both an apartment and motel/hotel.

Airbnb is committed to work with stakeholders to solve the stated problem. In fact, we attempted to propose an alternative that would address the gap cited by the proponent while avoiding any unintended consequences. However, this alternative was deemed out of scope by the ICC. As a result, we are willing to work to address the proponent’s concern in the next cycle.

Cost Impact: The net effect of the public comment and code change proposal will not increase or decrease the cost of construction

No change to code.

Public Comment# 2987

G44-21 Part III

Proposed Change as Submitted

Proponents: Daniel Willham, Fairfax County, representing Fairfax County (daniel.willham@fairfaxcounty.gov)

2021 International Plumbing Code

Revise as follows:

TABLE 403.1 MINIMUM NUMBER OF REQUIRED PLUMBING FIXTURES[a] (See Sections 403.1.1 and 403.2)
Portions of table not shown remain unchanged.

NO.	CLASSIFICATION	DESCRIPTION	WATER CLOSETS (URINALS: SEE SECTION 424.2)		LAVATORIES		BATHTUBS/ SHOWERS	DRINKING FOUNTAIN (SEE SECTION 410)	OTHER
			MALE	FEMALE	MALE	FEMALE			
7	Residential	Hotels, motels, boarding houses (transient)	1 per *dwelling* or sleeping unit		1 per *dwelling* or sleeping unit		1 per *dwelling* or sleeping unit	—	1 service sink
		Dormitories, fraternities, sororities and boarding houses (not transient)	1 per 10		1 per 10		1 per 8	1 per 100	1 service sink
		Apartment house	1 per dwelling or *sleeping* unit		1 per dwelling or *sleeping* unit		1 per dwelling or *sleeping* unit	—	1 kitchen sink per dwelling unit; 1 automatic clothes washer connection per 20 dwelling units
		Congregate living facilities with 16 or fewer persons	1 per 10		1 per 10		1 per 8	1 per 100	1 service sink
		One- and two-family dwellings and lodging houses with five or fewer guestrooms	1 per dwelling unit		1 per dwelling unit		1 per dwelling unit	—	1 kitchen sink per dwelling unit; 1 automatic clothes washer connection per dwelling unit
		Congregate living facilities with 16 or fewer persons	1 per 10		1 per 10		1 per 8	1 per 100	1 service sink

a. The fixtures shown are based on one fixture being the minimum required for the number of persons indicated or any fraction of the number of persons indicated. The number of occupants shall be determined by the *International Building Code*.

b. Toilet facilities for employees shall be separate from facilities for inmates or care recipients.

c. A single-occupant toilet room with one water closet and one lavatory serving not more than two adjacent patient sleeping units shall be permitted provided that each patient sleeping unit has direct access to the toilet room and provision for privacy for the toilet room user is provided.

d. The occupant load for seasonal outdoor seating and entertainment areas shall be included when determining the minimum number of facilities required.

e. For business and mercantile classifications with an occupant load of 15 or fewer, service sinks shall not be required.

f. The required number and type of plumbing fixtures for outdoor public swimming pools shall be in accordance with Section 609 of the International Swimming Pool and Spa Code.

606.2 Location of shutoff valves. Shutoff valves shall be installed in the following locations:

1. On the fixture supply to each plumbing fixture other than bathtubs and showers in one- and two-family residential *occupancies*, and other than in individual dwelling or sleeping units that are provided with unit shutoff valves in hotels, motels, boarding houses and similar *occupancies*.
2. On the water supply pipe to each sillcock.
3. On the water supply pipe to each appliance or mechanical equipment.

Reason: This change corrects discrepancies inadvertently created by past code changes. The description for R-1 occupancies used to only read "R-1 Residential occupancies where the occupants are primarily transient in nature ..." It did not mention sleeping units. The definition for *sleeping units* was added to the code to coordinate with the Fair Housing Act Guidelines (see code change E70-00) and did not involve the descriptions for residential occupancies in Chapter 3. Sleeping units was added to the descriptions of R-1 (2006 IBC) and R-2 (2003 IBC), in changes that do not appear in any code change proposal; these changes are also not marked as changes by bars in the margins. They appear to possibly have been made by the code correlation committee. However, no correction was made to the description of R-1, which, like R-2 occupancies, can also include both dwelling and sleeping units. This has left an apparent gap in the code for transient residential occupancies with dwelling units. This change resolves that by adding "or more than two dwelling units" to the description of R-1. Similar to the wording for the description for R-2, " or more than two dwelling units" avoids including R-3 residential occupancies and one- and two-family dwellings regulated under the IRC. This change also coordinates the references to sleeping units throughout the codes for R-1 occupancies to also include dwelling units. While doing this, a couple of instances of dwelling units for R-2 (without the mention of sleeping units) were found and also corrected to include sleeping units to coordinate with the description of R-2 occupancies.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This is a clarification and coordination of the code which will not affect construction cost.

G44-21 Part III

Public Hearing Results

Committee Action: **As Submitted**

Committee Reason: The Committee agreed with the published reason statement. (14-0)

G44-21 Part III

Individual Consideration Agenda

Public Comment 1:

Proponents: Andrew Klein, representing Airbnb (andrew@asklein.com) requests Disapprove

Commenter's Reason: The stated reason for the proposal is “an apparent gap in the code for transient residential occupancies with dwelling units.” However, as noted during debate over an identical proposal in 2018, it threatens to have the unintended consequence of undermining the growing popularity of the short-term rental (STR) economy – including short-term rentals offered by individuals in their primary or secondary residences. This use has proven to be a boon to property owners, local businesses, and communities (in the form of tax revenue). Where desired, jurisdictions have imposed STR-specific regulations—such as registration and insurance requirements—and/or applied existing codes to STR activity.
There are many forms of short-term rental activity that could be affected by this proposal. For example, “managed home sharing” has emerged where primary residents offer their home to STR guests, with permission and operational support of the landlord. This model provides tenants with more affordable rent, while embracing flexibility for a generation of renters that have increasingly variable work and travel lifestyles, particularly in the wake of the COVID-19 pandemic. Depending on the program, managed models can also provide landlords with oversight, transparency, insurance, and even a cut of the STR revenue that they can use to improve the community for all residents. In such cases, a majority of primary tenants may leverage short-term rentals to augment their income and the code should support this and other responsible short-term rental activity.

In addition, it is worth reiterating that the IBC has traditionally distinguished R-1 occupancies, like hotels, from vacation timeshare properties, which are categorized as R-2, and lodging houses with 5 or fewer guest rooms and boarding houses with 10 or fewer occupants, which are classified as R-3.

For these reasons and others, the ICC overwhelmingly decided at the last cycle in Richmond that a building which essentially looks and functions as a multifamily Group R-2 occupancy does not warrant a change of occupancy.

The proposal seeks to solve the problem stated by the proponent but in the process creates ambiguity for code officials regarding multifamily buildings where short term rental activity takes place, but is not the primary use. Furthermore, Part 4 modified definitions so that they are no longer unique—a traditional apartment complex would now be defined as both an apartment and motel/hotel.

Airbnb is committed to work with stakeholders to solve the stated problem. In fact, we attempted to propose an alternative that would address the gap cited by the proponent while avoiding any unintended consequences. However, this alternative was deemed out of scope by the ICC. As a result, we are willing to work to address the proponent’s concern in the next cycle.

Cost Impact: The net effect of the public comment and code change proposal will not increase or decrease the cost of construction
No change to code.

Public Comment# 2988

G44-21 Part IV

Proposed Change as Submitted

Proponents: Daniel Willham, Fairfax County, representing Fairfax County (daniel.willham@fairfaxcounty.gov)

2021 International Zoning Code

Revise as follows:

MOTEL, HOTEL. Any building containing six or more *dwelling units* or *sleeping* units in aggregate intended or designed to be used, or that are used, rented or hired out to be occupied, or that are occupied for sleeping purposes by guests.

TABLE 801.2.1 OFF-STREET PARKING SCHEDULE

USE	NUMBER OF PARKING SPACES REQUIRED
Assembly	1 per 300 gross square feet
Dwelling unit	2 per dwelling unit
Health club	1 per 100 gross square feet
Hotel/motel	1 per dwelling or sleeping unit plus1 per 500 square feet of common area
Industry	1 per 500 square feet
Medical office	1 per 200 gross square feet
Office	1 per 300 gross square feet
Restaurant	1 per 100 gross square feet
Retail	1 per 200 gross square feet
School	1 per 3.5 seats in assembly rooms plus1 per faculty member
Warehouse	1 per 500 gross square feet

For SI: 1 square foot = 0.0929 m^2.

Reason: This change corrects discrepancies inadvertently created by past code changes. The description for R-1 occupancies used to only read "R-1 Residential occupancies where the occupants are primarily transient in nature ..." It did not mention sleeping units. The definition for *sleeping units* was added to the code to coordinate with the Fair Housing Act Guidelines (see code change E70-00) and did not involve the descriptions for residential occupancies in Chapter 3. Sleeping units was added to the descriptions of R-1 (2006 IBC) and R-2 (2003 IBC), in changes that do not appear in any code change proposal; these changes are also not marked as changes by bars in the margins. They appear to possibly have been made by the code correlation committee. However, no correction was made to the description of R-1, which, like R-2 occupancies, can also include both dwelling and sleeping units. This has left an apparent gap in the code for transient residential occupancies with dwelling units. This change resolves that by adding "or more than two dwelling units" to the description of R-1. Similar to the wording for the description for R-2, " or more than two dwelling units" avoids including R-3 residential occupancies and one- and two-family dwellings regulated under the IRC. This change also coordinates the references to sleeping units throughout the codes for R-1 occupancies to also include dwelling units. While doing this, a couple of instances of dwelling units for R-2 (without the mention of sleeping units) were found and also corrected to include sleeping units to coordinate with the description of R-2 occupancies.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This is a clarification and coordination of the code which will not affect construction cost.

G44-21 Part IV

Public Hearing Results

Committee Action: **As Submitted**

Committee Reason: The committee agreed that adding "dwelling unit" to the definition of hotel (R-1) and related table in the IZC, which like R-2 occupancies can also include both dwelling and sleeping units, appropriately correlated the requirements between I-codes. (Vote: 11-0)

G44-21 Part IV

Individual Consideration Agenda

Public Comment 1:

IZC: SECTION 202, TABLE 801.2.1

Proponents: Andrew Klein, representing Airbnb (andrew@asklein.com); John Catlett, representing BOMA International (catlettcodeconsulting@gmail.com) requests Disapprove

Commenter's Reason: The stated reason for the proposal is “an apparent gap in the code for transient residential occupancies with dwelling units.” However, as noted during debate over an identical proposal in 2018, it threatens to have the unintended consequence of undermining the growing

popularity of the short-term rental (STR) economy – including short-term rentals offered by individuals in their primary or secondary residences. This use has proven to be a boon to property owners, local businesses, and communities (in the form of tax revenue). Where desired, jurisdictions have imposed STR-specific regulations—such as registration and insurance requirements—and/or applied existing codes to STR activity.
There are many forms of short-term rental activity that could be affected by this proposal. For example, “managed home sharing” has emerged where primary residents offer their home to STR guests, with permission and operational support of the landlord. This model provides tenants with more affordable rent, while embracing flexibility for a generation of renters that have increasingly variable work and travel lifestyles, particularly in the wake of the COVID-19 pandemic. Depending on the program, managed models can also provide landlords with oversight, transparency, insurance, and even a cut of the STR revenue that they can use to improve the community for all residents. In such cases, a majority of primary tenants may leverage short-term rentals to augment their income and the code should support this and other responsible short-term rental activity.

In addition, it is worth reiterating that the IBC has traditionally distinguished R-1 occupancies, like hotels, from vacation timeshare properties, which are categorized as R-2, and lodging houses with 5 or fewer guest rooms and boarding houses with 10 or fewer occupants, which are classified as R-3.

For these reasons and others, the ICC overwhelmingly decided at the last cycle in Richmond that a building which essentially looks and functions as a multifamily Group R-2 occupancy does not warrant a change of occupancy.

The proposal seeks to solve the problem stated by the proponent but in the process creates ambiguity for code officials regarding multifamily buildings where short term rental activity takes place, but is not the primary use. Furthermore, Part 4 modified definitions so that they are no longer unique—a traditional apartment complex would now be defined as both an apartment and motel/hotel. It also creates a conflict in the number of parking spaces required.

Airbnb is committed to work with stakeholders to solve the stated problem. In fact, we attempted to propose an alternative that would address the gap cited by the proponent while avoiding any unintended consequences. However, this alternative was deemed out of scope by the ICC. As a result, we are willing to work to address the proponent’s concern in the next cycle.

Cost Impact: The net effect of the public comment and code change proposal will not increase or decrease the cost of construction
No change to code.

Public Comment# 2707

G47-21

Proposed Change as Submitted

Proponents: Paul Armstrong, representing IFAI

2021 International Building Code

Revise as follows:

3105.3 Awnings and canopy materials. *Awnings* and *canopies* shall be provided with an *approved* covering that complies with one of the following:

1. The fire propagation performance criteria of Test Method 1 or Test Method 2, as appropriate, of NFPA 701.
2. Has a *flame spread index* not greater than 25 when tested in accordance with ASTM E84 or UL 723.
3. Meets all of the following criteria when tested in accordance with NFPA 286:

   3.1. During the 40 kW exposure, flames shall not spread to the ceiling.

   3.2. Flashover, as defined in NFPA 286, shall not occur.

   3.3. The flame shall not spread to the outer extremity of the sample on any wall or ceiling.

   3.4. The peak heat release rate throughout the test shall not exceed 800 kW.

4. <u>All fabric shall be flame -resistant in accordance with the provisions set forth in SFM 19 CCR 1237. Tops and sidewalls shall be made from either fabric that has been treated with an approved exterior chemical process by an approved applicator, or from approved inherently flame-resistant fabric.</u>

Exception: The fire propagation performance and *flame spread index* requirements shall not apply to awnings installed on detached one- and two-family dwellings.

SECTION D105
EXCEPTIONS TO RESTRICTIONS IN FIRE DISTRICT

Revise as follows:

D105.1 General. The preceding provisions of this appendix shall not apply in the following instances:

1. Temporary buildings used in connection with duly authorized construction.
2. A *private garage* used exclusively as such, not more than one *story* in height, nor more than 650 square feet (60 m^2) in area, located on the same lot with a *dwelling*.
3. Fences not over 8 feet (2438 mm) high.
4. Coal tipples, material bins and trestles of Type IV construction.
5. Water tanks and cooling towers conforming to Sections 1510.3 and 1510.4.
6. *Greenhouses* less than 15 feet (4572 mm) high.
7. Porches on dwellings not over one *story* in height, and not over 10 feet (3048 mm) wide from the face of the building, provided that such porch does not come within 5 feet (1524 mm) of any property line.
8. Sheds open on a long side not over 15 feet (4572 mm) high and 500 square feet (46 m^2) in area.
9. One- and two-family *dwellings* where of a type of construction not permitted in the fire district can be extended 25 percent of the floor area existing at the time of inclusion in the fire district by any type of construction permitted by this code.
10. Wood decks less than 600 square feet (56 m^2) where constructed of 2-inch (51 mm) nominal wood, pressure treated for exterior use.
11. Wood *veneers* on *exterior walls* conforming to Section 1404.5.
12. Exterior plastic *veneer* complying with Section 2605.2 where installed on *exterior walls* required to have a *fire-resistance rating* not less than 1 hour, provided that the exterior plastic *veneer* does not exhibit sustained flaming as defined in NFPA 268.
13. <u>Awnings complying with Section 3105.</u>

Add new standard(s) as follows:

SFM

California State Fire Marshal
1131 S Street
Sacramento , CA 95814
USA

SFM 19 CCR 1237
Awning Fabric Flame Testing

Reason: This code change proposal is really in two parts. In the first part, the Industrial Fabric Association International membership has found that most of it's members use either NFPA 701 or the California State Fire Marshal's provisions for flame-resistance testing for awning materials. While many of the new fabric materials are inherently flame-resistance, it is time to recognize those materials that have already been tested and approved by the California State Fire Marshal's office.
The second part is to clarify the application of Appendix D Fire Districts in regards to awnings vs canopies. The provisions of Appendix D are intended to be applied to Canopies only in Section D102.2.8. Awnings have been included in many jurisdictions and this proposal will clarify that awnings that comply with IBC Section 3105 are allowed in identified Fire Districts. There is no change intended in the current application of the provisions of Appendix D.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal recognizes existing practice as such would not be an increase or decrease in cost of construction.

Staff Analysis: A review of the standard proposed for inclusion in the code, SFM 19 CCR 1237, with regard to the ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before April 2, 2021.

G47-21

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The proposal was disapproved for the following reasons. The proposed standard is not extensive enough to ensure proper testing for awing materials. The proponent should compare this option to the other three to see if this is truly another option. It was not clear how the applicators would be approved. (Vote: 12-2)

G47-21

Individual Consideration Agenda

Public Comment 1:

IBC: D102.2.8, D105.1

Proponents: Paul Armstrong, representing IFAI (paul@7arms.com) requests As Modified by Public Comment

Replace as follows:

2021 International Building Code

D102.2.8 Permanent canopies . Permanent canopies are permitted to extend over adjacent open spaces provided that all of the following are met:

1. The canopy frame and its supports shall be of noncombustible material, *fire-retardant-treated wood*, Type IV construction or of 1-hour fire-resistance-rated construction.

   ~~**Exception:** Any textile covering for the canopy shall be flame resistant as determined by tests conducted in accordance with NFPA 701 after both accelerated water leaching and accelerated weathering.~~

2. Textile canopy coverings shall be tested in accordance with NFPA 701.

~~2.~~ 3. Any canopy covering, other than textiles, shall have a *flame spread index* not greater than 25 when tested in accordance with ASTM E84 or UL 723 in the form intended for use.

~~3.~~ 4. The canopy shall have one long side open.

~~4.~~ 5. The maximum horizontal width of the canopy shall be not greater than 15 feet (4572 mm).

~~5.~~ 6. The *fire resistance* of *exterior walls* shall not be reduced.

D105.1 General . The preceding provisions of this appendix shall not apply in the following instances:

1. Temporary buildings used in connection with duly authorized construction.
2. A *private garage* used exclusively as such, not more than one *story* in height, nor more than 650 square feet (60 m^2) in area, located on the same lot with a *dwelling*.
3. Fences not over 8 feet (2438 mm) high.
4. Coal tipples, material bins and trestles of Type IV construction.
5. Water tanks and cooling towers conforming to Sections 1510.3 and 1510.4.
6. *Greenhouses* less than 15 feet (4572 mm) high.
7. Porches on dwellings not over one *story* in height, and not over 10 feet (3048 mm) wide from the face of the building, provided that such porch does not come within 5 feet (1524 mm) of any property line.
8. Sheds open on a long side not over 15 feet (4572 mm) high and 500 square feet (46 m^2) in area.
9. One- and two-family *dwellings* where of a type of construction not permitted in the fire district can be extended 25 percent of the floor area existing at the time of inclusion in the fire district by any type of construction permitted by this code.
10. Wood decks less than 600 square feet (56 m^2) where constructed of 2-inch (51 mm) nominal wood, pressure treated for exterior use.
11. Wood *veneers* on *exterior walls* conforming to Section 1404.5.
12. Exterior plastic *veneer* complying with Section 2605.2 where installed on *exterior walls* required to have a *fire-resistance rating* not less than 1 hour, provided that the exterior plastic *veneer* does not exhibit sustained flaming as defined in NFPA 268.
13. Awnings complying with Section 3105.

Commenter's Reason: The revision to Appendix Chapter D, Section D102.2.8 is intended to clarify the application of Item 1 to apply to the supporting canopy frame and supports specifically. Then the exception is deleted and moved in part to a new item 2 for textile coverings. The removal of the added conditions of testing after the accelerated water leaching and weathering is due to the increased protection of NFPA 701 and the fact that there are very few testing agencies that can test a full sized sample after both conditions are met.
The revision adding new item 13 to Section D105.1 recognizes that there is a misperception that the provisions apply to awnings.

Cost Impact: The net effect of the public comment and code change proposal will decrease the cost of construction
Fabric companies will be able to find many more testing agencies who can provide NFPA 701 testing.

Public Comment# 2870

G50-21

Proposed Change as Submitted

Proponents: Alex Miear, representing Code Consultants, Inc. (CCI) (alexm@codeconsultants.com)

THIS CODE CHANGE WILL BE HEARD BY THE FIRE CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THAT COMMITTEE.

2021 International Building Code

SECTION 402
COVERED MALL AND OPEN MALL BUILDINGS

Revise as follows:

[F] 402.5 Automatic sprinkler system. *Covered* and *open mall buildings* and buildings connected shall be equipped throughout with an *automatic sprinkler system* in accordance with Section 903.3.1.1, which shall comply with all of the following:

1. The *automatic sprinkler system* shall be complete and operative throughout occupied space in the *mall building* prior to occupancy of any of the tenant spaces. Unoccupied tenant spaces shall be similarly protected unless provided with *approved* alternative protection.
2. Sprinkler protection for the *mall* of a *covered mall building* shall be independent from that provided for tenant spaces or *anchor buildings*.
3. Sprinkler protection for the tenant spaces of an *open mall building* shall be independent from that provided for *anchor buildings*.
4. Sprinkler protection shall be provided beneath exterior circulation balconies located adjacent to an *open mall*.
5. Where tenant spaces are supplied by the mall ~~same~~ system, they shall be independently controlled.

    Exception: An *automatic sprinkler system* shall not be required in spaces or areas of *open parking garages* separated from the covered or *open mall building* in accordance with Section 402.4.2.3 and constructed in accordance with Section 406.5.

2021 International Fire Code

Revise as follows:

914.2.1 Automatic sprinkler system. Covered and open mall buildings and buildings connected shall be equipped throughout with an *automatic sprinkler system* in accordance with Section 903.3.1.1, which shall comply with the all of the following:

1. The *automatic sprinkler system* shall be complete and operative throughout occupied space in the mall building prior to occupancy of any of the tenant spaces. Unoccupied tenant spaces shall be similarly protected unless provided with *approved* alternative protection.
2. Sprinkler protection for the mall of a covered mall building shall be independent from that provided for tenant spaces or anchor buildings.
3. Sprinkler protection for the tenant spaces of an open mall building shall be independent from that provided for anchor buildings.
4. Sprinkler protection shall be provided beneath exterior circulation balconies located adjacent to an open mall.
5. Where tenant spaces are supplied by the ~~same~~ mall system, they shall be independently controlled.

Exception: An *automatic sprinkler system* shall not be required in spaces or areas of open parking garages separated from the covered or open mall in accordance with Section 402.4.2.3 of the International Building Code and constructed in accordance with Section 406.5 of the International Building Code.

Reason: Prior to the 2012 IBC (where the code was expanded to provide more distinction between the covered mall building requirements and the open mall building requirements), the mall sprinkler requirements read as follows:

-402.9 (2) - Sprinkler protection for the mall shall be independent from that provided for tenant spaces or anchors. Where tenant spaces are supplied by the same system, they shall be independently controlled.
Item 5 in the 2018 IBC (which originated in the 2012 IBC) is the last sentence of Item 2 in the 2009 IBC.

The 2012 Code change resulted in this sentence becoming its own line item, but when it’s not coupled with the preceding sentence in Item 2 of the 2009 IBC, the meaning of the requirement changes (i.e. Item 5 read on its own could be interpreted to require individual control valves for tenants supplied by a common system). However, this was never the intent of this requirement.

As is evident by the 2009 IBC language, the intent of the requirement is to mandate tenant control valves if the tenant sprinkler system supplied by the mall system. Further, the 2009 IBC / 2012 IBC code change documentation does not present this as a technical change (tenant control valves for tenants supplied by a common tenant system is not mentioned anywhere in the code change reasoning for the change). The 2012 IBC Item 5 is not identified with a black line in the margin, which indicates this change was intended to simply be a formatting change and not a technical change to the 2009 IBC requirements. In summary, when Item 5 was formatted in the 2012 IBC as an independent statement, the logic of the 2009 IBC statement was lost.

Replacing the word “same” with “mall” in Item 5 corrects the inadvertent technical change.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This code change does not alter the technical requirements and does not impact the cost of construction.

G50-21

Public Hearing Results

Committee Action: **As Submitted**

Committee Reason: The committee stated that the reason for the approval was based on the improvement of the code language and intent with the replacement of the word "same" with "mall" in the proposal. (Vote: 14-0)

G50-21

Individual Consideration Agenda

Public Comment 1:

Proponents: Jeffrey Shapiro, representing Self (jeff.shapiro@intlcodeconsultants.com) requests Disapprove

Commenter's Reason: There is apparently a discrepancy in the intended application of this section. In contrast to the proponent's reason statement, it is my recollection that the intent of the code has always been to disallow the use of the mall system to supply tenant spaces as a measure of ensuring that either the tenant or mall system could be serviced without losing protection throughout the entire structure, which would result from a single system supplying both spaces. I believe that this redundancy was part of the original BCMC mall protection recommendations as a condition of allowing mall structures into the code with a variety of relaxations vs. what would have otherwise been required (I'll look into verifying this before the public comment hearing). The reference to tenant spaces being supplied by the same system was, as I recall, intended to allow for systems in individual tenant spaces to be serviced independently based on each space having a separate control valve, but still, only having supply piping in common with other tenant spaces and not the mall system.
In summary, I believe that this proposal changes the code in a way that is not consistent with the code's intent, and it results in diminished safety.

Although I am a consultant to NFSA, this proposal was developed on my own, and it is not submitted on NFSA's behalf.

Cost Impact: The net effect of the public comment and code change proposal will not increase or decrease the cost of construction
No change to code.

Public Comment# 2980

G54-21

Proposed Change as Submitted

Proponents: Jeff Perras, representing Code Red Consultants, LLC (jeffp@crcfire.com)

2021 International Building Code

SECTION 403
HIGH-RISE BUILDINGS

Revise as follows:

403.2.1.1 Type of construction. The following reductions in the minimum *fire-resistance rating* of the *building elements* in Table 601 shall be permitted as follows:

1. For buildings not greater than 420 feet (128 m) in *building height*, the *fire-resistance rating* of the *building elements* in Type IA construction shall be permitted to be reduced to the minimum *fire-resistance ratings* for the *building elements* in Type IB.

   Exception: The required *fire-resistance rating* of columns supporting floors shall not be reduced.

2. In other than <u>portions of a building containing</u> Group F-1, H-2, H-3, H-5, M and S-1 occupancies, the *fire-resistance rating* of the *building elements*in Type IB construction shall be permitted to be reduced to the *fire-resistance ratings* in Type IIA.
3. The *building height* and *building area* limitations of a building containing *building elements* with reduced *fire-resistance ratings* shall be permitted to be the same as the building without such reductions.

Reason: It is common place for a high-rise building to have retail spaces on the First Floor. Simply having these spaces in limited areas of the building should not preclude the entire building from taking this reduction. The commentary for this section, which has remained consistent since at least the 1993 BOCA commentary, states that this reduction is not permitted for moderate-hazard buildings because of their customary higher fuel loads. This proposed change maintains the intent of the code by requiring areas of the building containing these moderate hazards to be constructed of Type IB and allowing other areas to utilize the reduction.

Cost Impact: The code change proposal will decrease the cost of construction
The cost of construction will be reduced by allowing more buildings, or portions thereof, to qualify for this construction type reduction.

G54-21

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The proposal was disapproved because the proposal could be read to allow for different ratings in parts of the building, including a reduction of supporting construction. The result could be a random mix of construction types in a building. (Vote: 14-0)

G54-21

Individual Consideration Agenda

Public Comment 1:

IBC: SECTION 403, 403.2.1.1

Proponents: Jeff Perras, representing Code Red Consultants, LLC (jeffp@crcfire.com) requests As Modified by Public Comment

Modify as follows:

2021 International Building Code

SECTION 403
HIGH-RISE BUILDINGS

403.2.1.1 Type of construction . The following reductions in the minimum *fire-resistance rating* of the *building elements* in Table 601 shall be permitted as follows:

1. For buildings not greater than 420 feet (128 m) in *building height*, the *fire-resistance rating* of the *building elements* in Type IA construction shall be permitted to be reduced to the minimum *fire-resistance ratings* for the *building elements* in Type IB.

   Exception: The required *fire-resistance rating* of columns supporting floors shall not be reduced.

2. In other than ~~portions of a building~~ stories containing and located below Group F-1, H-2, H-3, H-5, M and S-1 occupancies, the *fire-resistance rating* of the *building elements* in Type IB construction shall be permitted to be reduced to the *fire-resistance ratings* in Type IIA.
3. The *building height* and *building area* limitations of a building containing *building elements* with reduced *fire-resistance ratings* shall be permitted to be the same as the building without such reductions.

Commenter's Reason: Multiple concerns were raised during the hearing regarding the complexity of only requiring portions of a building to be of Type IB construction. This modification will require the entire story containing these occupancies, as well as all stories below, to be of Type IB construction. This concept is similar to the podium building allowance in Section 510.2.

Cost Impact: The net effect of the public comment and code change proposal will decrease the cost of construction
The cost of construction will be reduced by allowing more buildings, or portions thereof, to qualify for this construction type reduction.

Public Comment# 2845

G64-21

Proposed Change as Submitted

Proponents: Jeffrey S. Grove, P.E. FSFPE, Jensen Hughes, representing Jensen Hughes (jgrove@jensenhughes.com)

2021 International Building Code

SECTION 405
UNDERGROUND BUILDINGS

Revise as follows:

405.5.1 Control system. A smoke control system is required <u>on all floor levels for human occupancy located more than 30 feet below the lowest level of exit discharge. The smoke control system is required </u>to control the migration of products of combustion in accordance with Section 909 and the provisions of this section. ~~Smoke control shall restrict movement of smoke to the general area of fire origin and maintain~~ ~~*means of egress*~~ ~~in a usable condition.~~

Reason: For underground buildings required to comply with Section 405, the provisions of Section 405.5.1 do not clearly indicate whether smoke control is required to be provided on individual floor levels located 30 feet or less below the finished floor of the lowest level of exit discharge. As currently worded, this section could be interpreted to require all levels below the finished floor of the lowest level of exit discharge be provided with floor level smoke control whenever any one or more levels is located more than 30 feet below the finished floor of the lowest level of exit discharge. The proposed change is to clarify that smoke control is only required on the specific level(s) that are located more than 30 feet below the finished floor of the lowest level of exit discharge. Floors that are less than that do not require smoke control.

The existing text requires the “means of egress” be maintained in a usable condition. By definition, “means of egress” includes the “exit access.” As the majority of a given floor level is would be considered exit access (e.g., rooms, open spaces, corridors, etc.), the current language is not feasible in many cases. Essentially, it requires all rooms/spaces to be maintained in a usable condition since they are all part of the exit access.

The purpose of Section 909, as identified in Section 909.1, is to establish minimum requirements for the design, installation and acceptance testing of smoke control systems that are intended to provide a tenable environment for the evacuation or relocation of occupants. As such, the last line in the code section has been deleted.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This is a clarification for existing code language.

G64-21

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The proposal was disapproved because of the deletion of the last sentence. This sentence provides guidance for smoke control systems in underground buildings. (Vote: 14-0)

G64-21

Individual Consideration Agenda

Public Comment 1:

IBC: 405.5.1

Proponents: Jeffrey Grove, representing Jensen Hughes (jgrove@jensenhughes.com) requests As Modified by Public Comment

Replace as follows:

2021 International Building Code

405.5.1 Control system . A smoke control system is required <u>on all floor levels for human occupancy located below the lowest level of exit discharge. The smoke control system is required </u>to control the migration of products of combustion in accordance with Section 909 and the provisions of this section. Smoke control shall restrict movement of smoke to the general area of fire origin ~~and maintain *means of egress* in a usable condition~~.

Commenter's Reason: For underground buildings required to comply with Section 405, the provisions of Section 405.5.1 do not clearly indicate whether smoke control is required to be provided on individual floor levels located 30 feet or less below the finished floor of the lowest level of exit discharge. The Committee indicated that, where the Underground Building provisions are applicable and at least one story is located more than 30 feet below the lowest level of exit discharge, the intent is for smoke control to be provided on all floor levels located below the lowest level of exit discharge. As currently worded, this section could be interpreted to only require levels located more than 30 feet below the finished floor of the lowest level of exit discharge to be provided with floor level smoke control.
The proposed change is to clarify that for Underground Buildings with one or more floor levels located more than 30 feet below the lowest level of exit discharge, smoke control is required on all levels located below the finished floor of the lowest level of exit discharge.

For example, if Levels B1, B2, and B3 are all below the finished floor of the lowest level of exit discharge, but only Level B3 is more than 30 feet below, floor level smoke control is required to be provided on Levels B1, B2, and B3.

The existing text requires the “means of egress” be maintained in a usable condition. By definition, “means of egress” includes the “exit access.” As the majority of a given floor level would be considered exit access (e.g., rooms, open spaces, corridors, etc.), the current language is not feasible in many cases. Essentially, it requires all rooms/spaces to be maintained in a usable condition since they are all part of the exit access. This proposal deletes the latter portion of the last sentence of Section 405.5.1, as the section still requires compliance with Section 909, whose purpose, as identified in Section 909.1, is to establish minimum requirements for the design, installation and acceptance testing of smoke control systems that are intended to provide a tenable environment for the evacuation or relocation of occupants.

Cost Impact: The net effect of the public comment and code change proposal will not increase or decrease the cost of construction
This is a clarification for existing code language.

Public Comment# 2787

G66-21

Proposed Change as Submitted

Proponents: Matt Frommer, Southwest Energy Efficiency Project, representing Southwest Energy Efficiency Project (mfrommer@swenergy.org)

2021 International Building Code

Add new definition as follows:

ELECTRIC VEHICLE (EV). An automotive-type vehicle for on-road use, such as passenger automobiles, buses, trucks, vans, neighborhood electric vehicles, and electric motorcycles, primarily powered by an electric motor that draws current from a building electrical service, *EVSE*, a rechargeable storage battery, a fuel cell, a photovoltaic array, or another source of electric current.

ELECTRIC VEHICLE SUPPLY EQUIPMENT (EVSE). The conductors, including the ungrounded, grounded, and equipment grounding conductors, and the *electric vehicle* connectors, attachment plugs, and all other fittings, devices, power outlets, or apparatus installed specifically for the purpose of transferring energy between the premises wiring and the *electric vehicle*.

ELECTIC VEHICLE (EV)-CAPABLE SPACE. A designated parking space that is provided with conduit sized for a minimum 40-amp, 208/240-Volt dedicated branch circuit from a building electrical panelboard to within 3' of the parking space and with sufficient physical space in the same building electrical panelboard to accommodate a 40-amp, dual-pole circuit breaker.

ELECTIC VEHICLE (EV)-READY SPACE. A parking space that is provided with one minimum 40-amp, 208/240-Volt dedicated branch circuit for *electric vehicle supply equipment* that is terminated at a receptacle, junction box or *electric vehicle supply equipment* located within 3 feet (915 mm) of the parking space.

ELECTRIC VEHICLE SUPPLY EQUIPMENT (EVSE)-INSTALLED SPACE. A designated parking space with dedicated *electric vehicle supply equipment* located within 3 feet (915 mm) of the parking space.

ELECTRIC VEHICLE (EV) FAST-CHARGER. *Electric vehicle supply equipment* with a minimum power output of 25 kW.

SECTION 406
MOTOR-VEHICLE-RELATED OCCUPANCIES

Delete and substitute as follows:

~~**406.2.7 Electric vehicle charging stations and systems.** Where provided, electric vehicle charging systems shall be installed in accordance with NFPA 70. Electric vehicle charging system equipment shall be *listed* and labeled in accordance with UL 2202. Electric vehicle supply equipment shall be *listed* and labeled in accordance with UL 2594. Accessibility to *electric vehicle charging stations* shall be provided in accordance with Section 1108.~~

406.2.7 Electric Vehicle (EV) Charging Infrastructure. Where parking is provided, *EV* charging infrastructure shall be provided in accordance with this section and installed in accordance with the National Electrical Code (NFPA 70). Where more than one parking facility is provided on a *site*, the number of *EV-capable, EV-ready*, and *EVSE-installed spaces* shall be calculated separately for each parking facility. When more than 10 parking spaces are added to an existing building, only the new parking spaces are subject to these requirements. *EVSE-installed spaces* may be used to meet requirements for *EV-ready* and *EV-capable spaces. EV-ready spaces* are permitted to be used to meet requirements for *EV-capable spaces.*

> **Exception:** Parking facilities with fewer than 10 spaces.

Add new text as follows:

406.2.7.1 New Parking Facilities for Commercial Buildings.
New parking facilities shall be provided with *EV* charging infrastructure in accordance with Table 406.2.7.1. Calculations for the number of spaces shall be rounded up to the nearest whole number. *EVSE* serving *EVSE-installed spaces* shall be capable of supplying current at a minimum of 6.2 kW. All *EV-capable, EV-ready*, and *EVSE-installed spaces* are to be included in the calculation for the number of minimum vehicle spaces required.

> **Exception:** The number of *EVSE-installed spaces* serving occupancies other than Group R-2 shall be permitted to be reduced by up to five for each parking space equipped with an *electric vehicle fast-charger* .

TABLE 406.2.7.1 EV CHARGING INFRASTRUCTURE

OCCUPANCY	EVSE-INSTALLED SPACES	EV-READY SPACES	EV-CAPABLE SPACES
Group R-2	2%	18%	N/A
All other occupancies	2%	N/A	8%

406.2.7.2 Identification.

Construction documents shall designate all *EV-capable, EV-ready*, and *EVSE-installed spaces* and indicate the locations of conduit and termination points serving them. The circuit breakers or circuit breaker spaces reserved for the *EV-capable, EV-ready*, and *EVSE-installed spaces* shall be clearly identified in the panelboard. The conduit for *EV-capable spaces* shall be clearly identified at both the panelboard and the termination point at the parking space.

Reason: Electric Vehicles (EVs) have emerged as a key climate strategy to reduce greenhouse gas (GHG) emissions from the transportation sector, the largest source of carbon pollution in the U.S. Interest in EVs has grown alongside greater model availability and increased vehicle range, and there are now well over 1.5 million EVs on the road in the U.S. Most industry experts agree that we are entering a big market transformation from gas-powered vehicles to electric.

This transformation is being accelerated by state and federal policy – over a dozen countries plus California and Massachusetts have announced plans to ban the sale of gasoline and diesel vehicles by 2035 or 2040. Twelve other states have adopted California's Zero-Emission Vehicle (ZEV) Standards requiring an increasing percentage of new vehicle sales to be electric each year and at least 3 others – Nevada, New Mexico, and Minnesota – plan to adopt the ZEV Standards in 2021. New buildings constructed with the 2024 IBC will only be 10 years old by the time all new vehicle sales are electric in these states. These government commitments have encouraged the biggest global auto manufacturers to electrify their vehicle models. By 2022, the U.S. market will have a selection of over 100 electric models including over 20 electric SUV and pickup truck models. The auto industry is investing $435 billion in electric transportation over the next decade. **Figure 1: Automaker Commitments to Electric Vehicles.**

Automaker	Electrification Commitment
Audi	20 new EV models by 2025. 800,000 EV sales annually (1/3 of all sales).
BMW	25 electrified vehicle models by 2025. 15 - 25% of annual sales are electric.
Ford	40 EVs by 2022: 16 BEVs, 24 PHEVs
General Motors	20 electric cars by 2023
Honda	2/3 of all sales to be electric by 2030. Every model to have EV option by 2022.
Hyundai Motor Group	44 EV models by 2025
Nissan	8 new EVs by 2022. EVs make up 20-30% of US sales by 2025.
Tesla	Sold 500,000 EVs in 2020.
Toyota	Half of sales are electric by 2025. Every model to have electric or hybrid option.
Volkwagen Group	70 new electric models by 2028. 1 million EVs sold by end of 2023.
Volvo	50% of sales are electric by 2025 (5 new BEVs by 2021)

Based on a 2019 survey, 63% of Americans are interested in EVs and 31% would consider one for their next vehicle purchase. However, the lack of access to EV charging stations continues to be a critical barrier to EV adoption. More specifically, there are significant financial and logistical hurdles for residents of multi-family dwellings and commercial building tenants to install EV charging stations.

A lack of pre-existing EV charging infrastructure, such as electrical panel capacity, raceways, and pre-wiring can make the installation of a new charging station cost-prohibitive for a potential EV-owner, so it's essential this equipment be included in building codes. The installation of an EV charging station is up to six times less expensive when the infrastructure is installed during the initial construction phase as opposed to retrofitting existing buildings to accommodate the new electrical equipment. In the absence of safe and convenient EV charging infrastructure, EV drivers are forced to improvise, running extension cords across sidewalks and parking lots to recharge their vehicles. By requiring EV charging infrastructure near the parking space, the IBC will address a critical safety hazard while giving consumers more choice of which vehicle they drive.

Over 40 municipalities around the country have already adopted EV infrastructure requirements for new residential and commercial buildings including Atlanta, Seattle, Denver, Boston, Fort Collins, New York, Sedona, Honolulu, Chicago, and Tucson. The absence of EV infrastructure requirements in the ICC model has created a patchwork of definitions and requirements with no common standards. For this reason, a group of EV advocates and energy efficiency experts proposed a set of residential and commercial EV infrastructure requirements (CE-217 Parts 1 and 2) in the 2021 IECC code development process.

At the ICC hearings in Albuquerque in 2019, the Commercial IECC Committee voted 8-3 to include CE-217 Part 2, EV infrastructure requirements for new commercial buildings, in the 2021 IECC model code. CE-217 Part 2 was later approved by 82% of the ICC governmental voting members. These governmental members are adopting and implementing the model codes in their communities and the 2021 IECC vote demonstrated overwhelming support for EV charging infrastructure requirements in the code.

After the vote, the National Association of Homebuilders and the American Gas Association appealed the decision on the grounds that the proposal was outside the scope and intent of the IECC. Ultimately, the ICC Appeals Board sided with the appellants and encouraged the ICC and the code proponents to find a more appropriate location for these requirements in the code. The IBC is a better location for EV charging infrastructure and many local governments have chosen to put EV requirements in this section of the code.

New residential and commercial buildings are constructed to last for 100 years or more, and so it is critical that charging infrastructure is incorporated at the pre-construction stage to ensure that new buildings can accommodate the charging needs of future EV-owners. Governments and automakers around the world have announced plans to move toward 100% electric transportation over the next two decades. It's time for the 2024 IBC model code to support the transition by including EV charging infrastructure requirements for new commercial buildings.

Bibliography:

1. SWEEP's EV Infrastructure Building Codes Adoption Toolkit (2020). https://www.swenergy.org/transportation/electric-vehicles/building-codes#cost
2. EV Infrastructure Building Codes Presentation (SWEEP & Denver Metro Clean Cities, 2020). docs.google.com/presentation/d/1qKQy_WWafr8tcqXzrNKDY24GxuXpLXt5PMcU0ZMD8BM/edit?usp=sharing
3. Chicago EV-Ready Building Codes Fact Sheet (2020). drive.google.com/file/d/1UTKLna78y3eSaLaWUCbE_TIpFpOwxxVl/view?usp=sharing
4. Plug-In Electric Vehicle Infrastructure Cost Analysis Report for CALGreen Nonresidential Update (Energy Solutions, 2019). caletc.com/wp-content/uploads/2019/10/CALGreen-2019-Supplement-Cost-Analysis-Final-1.pdf
5. Tesla Model Ordinance Related to EV Charging Infrastructure (2018). drive.google.com/file/d/1xRDa-oj0pyUbUgIg9mRUEjO2sSJxZW5M/view?usp=sharing
6. SWEEP blog: Cracking the Code on EV-Ready Building Codes (2018). www.swenergy.org/cracking-the-code-on-ev-ready-building-codes

Cost Impact: The code change proposal will increase the cost of construction
The code change proposal will increase the cost of initial construction, but provide long-term savings for EV owners and commercial building owners through the avoided costs of installing EV charging infrastructure during a stand-alone retrofit.

The installation of EV charging infrastructure is four to six times less expensive when included during the initial construction phase as opposed to a retrofit. Several factors contribute to higher costs:

Demolition and repair of surface parking.
Breaking and repairing walls.
Longer conduit runs (also referred to as raceways) – Removing and repairing 100 - 300 linear feet of surface parking to add conduit can cost $11,500 to $32,000 in demolition and repair costs.
Upgrading electric service panels.
Soft costs: permits, plans, inspections, and project management.

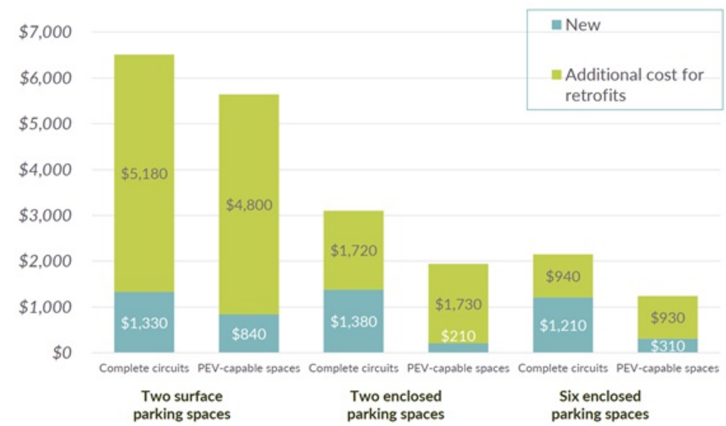
Given the momentum toward widespread EV adoption, the cost to pre-wire new buildings with EV charging infrastructure should be compared to the cost of installing the same equipment at a later date during a retrofit, rather than the cost of avoiding such equipment altogether.One study analyzed the cost implications of California's EV infrastructure building codes, which have been in place for 5 years, and found that each EV-Capable parking space installed in a multi-unit dwelling during new construction saves $2,040 - $4,635 over the retrofit scenario. Multiply those savings by the number of new EV charging stations required to provide charging access for millions of MUD residents and the potential savings amounts to billions of dollars that can be spent elsewhere in the economy.
Denver's EV infrastructure building code proposal included the following cost estimates for EV-Capable and EV-Ready parking spaces during new construction and stand-alone retrofit:

EV Infrastructure Requirement	During New Construction	During Retrofit	Savings
EV-Capable (panel capacity + raceway)	$300 per space	$2,500 per space	$2,200 per space
EV-Ready (full circuit)	$1,300 per space	$6,300 per space	$5,000 per space

These costs are highly dependent on the parking lot configuration, design, and number of EV-Capable or EV-Ready parking spaces. For their code update, the City of Oakland developed a detailed cost- effectiveness report with a range of cost savings estimates for different parking scenarios:

Figure 4.

Cost Savings for the City of Oakland (2020)



Definitions: "Complete circuits" = EV-Ready parking space, "PEV-capable space" = EV-Capable parking space.

The cost of EV-Capable infrastructure also varies by building size. A report prepared for the California Electric Transportation Commission measured the cost impact of a 10% EV-Capable parking requirement for small, medium, and large office and retail buildings, including cost estimates for alterations and additions. Larger buildings with more parking spaces reported a lower cost per EV-Capable parking space with economies of scale, but across all building sizes, the cost to install EV-Capable infrastructure during new construction is four to six times less expensive than during a stand-alone retrofit.

Figure 5. Estimated Cost of Installing EV Capable Parking per EV Capable Parking Space. Refer to Table 7 in the report for a more detailed breakdown of the costs by type of expense.

	Potential CALGreen 2019 Supplement - 10% of parking spaces		
	New Construction	Alterations & Additions	Stand-Alone Retrofit
Small Office/ Retail Surface Parking	$905	$925 to $1,178	$5,540
Medium Office/ School Surface Parking	$901	$928 to $1,322	$4,155
Large Office/ Retail/ Hospital Enclosed Parking	$739	$741 to $1,052	$2,779

The EV infrastructure costs may seem high, but the overall impact on building costs is low. An analysis done by the California Air Resources Board in 2018, examined the costs of adding EV Ready requirements for new multi-family developments. It found that adding panel capacity and conduit during new construction would add between 0.1% and 0.2% to the total building cost.

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: This proposal was disapproved for several reasons. There are requirements in the definitions - these need to be removed. The requirement is disproportionate for EV equipment in Group R-2 facilities. There are goverment incentives to provide these systems - the proponent said there were not. Adding these systems is a business decision, and should not be a requirement. These requirements are better located in land use ordinances, Zoning or the IgCc. The proposal was not coordinated with the EV requirements in the IBC Section 1108. (Vote: 11-3)

Individual Consideration Agenda

Public Comment 1:

IBC: SECTION 202, 406.2.7, 406.2.7.1, TABLE 406.2.7.1, 406.2.7.2, 406.2.7.1 (New), 406.2.7.2 (New), 406.2.7.3 (New), 1107.1, 1107.2, 1107.2.1

Proponents: Matthew Frommer, representing Southwest Energy Efficiency Project (mfrommer@swenergy.org) requests As Modified by Public Comment

Modify as follows:

2021 International Building Code

ELECTRIC VEHICLE (EV) . An automotive-type vehicle for on-road use, such as passenger automobiles, buses, trucks, vans, neighborhood electric vehicles, and electric motorcycles, primarily powered by an electric motor that draws current from a building electrical service, *EVSE*, a rechargeable storage battery, a fuel cell, a photovoltaic array, or another source of electric current.

ELECTIC VEHICLE (EV)-CAPABLE SPACE . A vehicular ~~designated~~ parking space that is provided with the infrastructure necessary for the future installation of an *EVSE* – such as conduit, raceways, electrical capacity, or signage – or reserved physical space for such infrastructure. ~~conduit sized for a minimum 40-amp, 208/240-Volt dedicated branch circuit from a building electrical panelboard to within 3' of the parking space and with sufficient physical space in the same building electrical panelboard to accommodate a 40-amp, dual-pole circuit breaker.~~

[BG] ELECTRIC VEHICLE CHARGING STATION . One or more vehicle spaces served by an electric vehicle charging system.

~~**ELECTRIC VEHICLE (EV) FAST-CHARGER .** *Electric vehicle supply equipment* with a minimum power output of 25 kW.~~

ELECTIC VEHICLE (EV)-READY SPACE . A vehicle parking space that is provided with an electric circuit capable of supporting an installed EVSE ~~one minimum 40-amp, 208/240-Volt dedicated branch circuit for electric vehicle supply equipment that is terminated at a receptacle, junction box or electric vehicle supply equipment located within 3 feet (915 mm) of the parking space~~.

ELECTRIC VEHICLE SUPPLY EQUIPMENT (EVSE) . The conductors, including the ungrounded, grounded, and equipment grounding conductors, and the *electric vehicle* connectors, attachment plugs, and all other fittings, devices, power outlets, or apparatus installed specifically for the purpose of transferring energy between the premises wiring and the *electric vehicle*.

ELECTRIC VEHICLE SUPPLY EQUIPMENT (EVSE)-INSTALLED SPACE . A vehicle ~~designated~~ parking space that is provided with a dedicated EVSE ~~with dedicated electric vehicle supply equipment located within 3 feet (915 mm) of the parking space.~~

406.2.7 Electric Vehicle (EV) Charging Infrastructure . Where provided, electric vehicle charging infrastructure shall be installed in accordance with NFPA 70. Electric vehicle charging infrastructure shall be listed and labeled in accordance with UL 2202. *EVSE* shall be listed and labeled in accordance with UL 2594. Accessibility to *EVSE* shall be provided in accordance with Section 1108. Where parking is provided, *EV* charging infrastructure shall be provided in accordance with Sections 406.2.7.1 through 406.2.7.3. For Group R-2 occupancies, 20 percent of the total parking spaces shall be EV-ready spaces. ~~this section~~ ~~and~~ ~~installed in accordance with the National Electrical Code (NFPA 70).~~ Where more than one parking facility is provided on a *site*, the number of ~~*EV-capable,*~~ *EV-ready*~~, and~~ ~~*EVSE-installed*~~ *spaces* shall be calculated separately for each parking facility. Where ~~When more than~~ 10 or more parking spaces are added to an existing building, only the ~~new~~ parking spaces being added are subject to these requirements. *EVSE-installed spaces* ~~may~~ arepermitted to be used to meet requirements for *EV-ready* and *EV-capable* ~~spaces.~~ ~~spaces.~~ *spaces.* *EV-ready* spaces are permitted to be used to *meet requirements for EV-capable spaces.*

Exception: *Parking facilities with fewer than 10 spaces.*

~~**406.2.7.1 New Parking Facilities for Commercial Buildings.**~~ **.** ~~New parking facilities shall be provided with *EV* charging infrastructure in accordance with Table 406.2.7.1. Calculations for the number of spaces shall be rounded up to the nearest whole number. *EVSE* serving *EVSE-installed spaces* shall be capable of supplying current at a minimum of 6.2 kW. All *EV-capable, EV-ready,* and *EVSE-installed spaces* are to be included in the calculation for the number of minimum vehicle spaces required.~~

~~**Exception:** The number of *EVSE-installed spaces* serving occupancies other than Group R-2 shall be permitted to be reduced by up to five for each parking space equipped with an *electric vehicle fast-charger.*~~

~~**TABLE 406.2.7.1 EV CHARGING INFRASTRUCTURE**~~

~~OCCUPANCY~~	~~EVSE-INSTALLED SPACES~~	~~EV-READY SPACES~~	
~~Group R-2~~	~~2%~~	~~18%~~	~~N/A~~
~~All other occupancies~~	~~2%~~	~~N/A~~	~~8%~~

~~**406.2.7.2 Identification**~~ **.** ~~Construction documents shall designate all *EV-capable, EV-ready,* and *EVSE-installed spaces* and indicate the locations of conduit and termination points serving them. The circuit breakers or circuit breaker spaces reserved for the *EV-capable, EV-ready,* and *EVSE-installed spaces* shall be clearly identified in the panelboard. The conduit for *EV-capable spaces* shall be clearly identified at both the panelboard and the termination point at the parking space.~~

<u>**406.2.7.1**</u> <u>**EV-capable spaces**</u> **.** <u>Where provided, *EV-capable spaces* shall be provided with electrical infrastructure that meets the following requirements:</u>

1. <u>Conduit or approved wiring that is continuous between a junction box or outlet located within 3 feet (914 mm) of the parking space and an electrical panel serving the area of the parking space,</u>
2. <u>The electrical panel to which the conduit connects shall have sufficient dedicated physical space for a dual-pole, 40-amp breaker,</u>
3. <u>The conduit shall be sized and rated to accommodate a 40-amp, 208/240-volt branch circuit and have a minimum nominal trade size of 1 inch,</u>
4. <u>The electrical junction box and the electrical panel directory entry for the dedicated space in the electrical panel shall have labels stating “For future electric vehicle charging”.</u>

<u>**406.2.7.2**</u> <u>**EV-ready spaces**</u> **.** <u>The branch circuit serving *EV-Ready Spaces* shall meet the following requirements:</u>

1. <u>A minimum 40-amp, 208/240-Volt dedicated branch circuit that terminates at a receptacle, junction box or *EVSE* located within 3 feet (914 mm) of the parking space,</u>
2. <u>The electrical panel directory shall designate the branch circuit as “For electric vehicle charging” and the junction box or receptacle shall be labelled “For electric vehicle charging”.</u>

<u>**406.2.7.3**</u> <u>**EVSE-installed spaces**</u> **.** <u>Where provided, the *EVSE* serving *EVSE-installed spaces* shall be capable of supplying not less than 6.2 kW to an *electric vehicle* and shall be located within 3 feet (914 mm) of the parking space.</u>

1107.1 General . Electrical vehicle charging stations shall comply with Section 1107.2. Fuel-dispensing systems shall comply with Section 1107.3.

1107.2 Electrical vehicle charging stations . Electrical vehicle charging stations infrastructure shall comply with Sections 1107.2.1 and 1107.2.2.

Exception: Electrical vehicle charging stations provided to serve Group ~~R-2,~~ R-3 and R-4 occupancies are not required to comply with this section.

1107.2.1 Number of accessible vehicle spaces . Not less than 5 percent of vehicle spaces on the site served by electrical vehicle charging systems, but not fewer than one for each type of electric vehicle charging systems, shall be accessible.

Commenter's Reason: The purpose of this public comment is to address the feedback from the Committee Action Hearing and simplify the code language to provide more clarity and avoid any redundancies.
CAH Comment #1: *“There are requirements in the definitions - these need to be removed.”*

The public comment removes the requirements from the definition section and adds them to Section 406.

CAH Comment #2: *“The requirement is disproportionate for EV equipment in Group R-2 facilities.”*

The public comment removes the Electric Vehicle (EV) charging infrastructure requirements for nonresidential occupancies and focuses on multi-unit dwellings (MUDs) to address the most critical barriers to EV adoption – the exorbitant costs and logistical challenges of retrofitting MUDs with EV charging infrastructure. According to the ICCT, 92% of charging ports used in metropolitan areas across the U.S. are located at the residence, but MUD residents are often left out. Such discrepancies are appearing in the data. For example, in California, the largest EV market in the U.S., nearly 50% of residents live in MUDs, yet only 20% of all EVs in the state are located at these residences, indicating a significant gap in access to EVs depending on one’s living situation.

The public comment creates mandatory requirements for new MUD buildings to improve equity and access across all income levels and housing situations, save consumers money on installation costs, and improve safety for residents by eliminating the need for long extension cords to charge EVs. Many analysts expect the U.S. to exceed a 20% EV penetration by 2030. Our model building codes should be updated to prepare new MUD buildings for an electric transportation future with a minimum 20% EV-Ready spaces. In addition, an electrical panel sized to deliver EV-Ready service for 20% of parking spaces is sufficient future-proofing for a post-2030 scenario where builders and property owners will likely install more sophisticated load management systems to distribute the electricity across a greater number of EVs based on the vehicle charging needs. These requirements are meaningful without being too stringent or prescriptive. If implemented, they will provide the electrical infrastructure to facilitate the future installation of EV charging stations without selecting a “winning” EV charging station technology, giving the industry plenty of room to innovate in the future.

Importantly, this proposal provides standard definitions for all three infrastructure types – EV-Capable Space, EV-Ready Space, and EVSE-Installed Space – and a Table to give local jurisdictions the flexibility to add occupancies types and adjust the percentages to increase the stringency.

CAH Comment #3: *“There are government incentives to provide these systems - the proponent said there were not.”*

The public comment removes the requirements for EVSE-Installed Spaces, but maintains the definition to give local jurisdictions the option to incorporate such requirements as they see fit.

While it is true there are government incentives to support the deployment of EV charging stations, it’s important to note that most of these programs are limited to the EV charging station hardware and do not apply to the electrical infrastructure required to provide electrical service to the parking space, known in the industry as "make-ready infrastructure". For example, Green Mountain Power’s EV charger incentive program in Vermont provides $600 for a Level 2 charging station, but does not include incentives to offset the cost of infrastructure upgrades (pre-wiring, panel capacity, conduit), which in a MUD, can be up to $5,540 per parking space. Such programs are common and while they do increase access to EV charging, they do not address the exorbitant cost of installing EV infrastructure during a stand-alone retrofit versus new construction. In contrast, the modified G66 proposal requires builders to install the EV infrastructure between the electrical panel and the parking space to give future residents the option to install an EV charging station at low cost.

In addition, the majority of state-funded EV charging incentive programs are funded by the $3 billion Volkswagen Settlement from 2016, which is a finite funding source. For example, Utah received $35 million from the VW settlement fund and used about $3.8 million to build EV charging stations at public facilities, office buildings, and universities. However, as of May 2021, the state’s Department of Environmental Protection had awarded all of its VW settlement funds and does not currently have a plan or policy to replenish program funding.

CAH Comment #4: *“Adding these systems is a business decision, and should not be a requirement.”*

The public comment removes the requirements for business occupancy types and focuses on multifamily residential buildings. Local jurisdictions have the option to adjust EV infrastructure requirements for other commercial occupancy types.

CAH Comment #5: *“These requirements are better located in land use ordinances, Zoning or the IgCc.”*

While many local jurisdictions have added EV infrastructure parking requirements through local ordinance, we strongly believe this belongs in the model building code, the guiding document for designers and builders. The lack of direction on EV charging infrastructure from the ICC has resulted in a patchwork of over 50 locally-developed EV infrastructure requirements with different definitions and technical specifications, which has only confused and frustrated builders and customers, and in some cases resulted in poor code language. This proposal would provide a set of standard definitions for EV infrastructure and require 20% of parking spaces in MUDs to be EV-Ready, a minimum requirement that has been adopted by numerous local governments and states over the last 5-6 years, and exceeded by dozens of others.

While the IgCC may be a potential alternative for EV infrastructure parking requirements, relatively few jurisdictions have adopted the 2018 IgCC, limiting its impact on new buildings. In order to match EV market growth projections while improving equity and access to more residents and lowering the costs of installation for generations to come, these EV charging infrastructure requirements should be implemented in the 2024 IBC model code.

CAH Comment #6: *“The proposal was not coordinated with the EV requirements in the IBC Section 1108.”*

Section 1108 doesn’t include any reference to EV charging infrastructure, but Section 1107 does. This public comment includes modifications to Section 1107 to remove the exemption for R-2 occupancies.

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1. https://energyinnovation.org/wp-content/uploads/2020/09/Increasing-Electric-Vehicle-Charging-at-Multi-Unit-Dwellings_FINAL3.pdf
2. https://apnews.com/article/electric-vehicles-technology-business-d874b87e8b7f9e2aa25330b31040c8d4#:~:text=DETROIT%20(AP)%20%E2%80%94%20Ford%20expects,from%20this%20year%20to%20202
3. https://about.bnef.com/blog/electric-vehicle-sales-set-to-rise-faster-than-ever-but-more-policy-action-needed-to-get-on-track-for-net-zero/
4. https://greenmountainpower.com/rebates-programs/electric-vehicles/in-home-ev-charger/
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6. https://www.swenergy.org/transportation/electric-vehicles/building-codes

Cost Impact: The net effect of the public comment and code change proposal will increase the cost of construction
The public comment will reduce the cost of construction compared to the original proposal by removing EV charging infrastructure requirements for all commercial buildings and instead, focusing on multi-unit dwellings (R-2 occupancies). The public comment does not affect the cost per parking space estimates from the Cost Impact statement in the original proposal.

Public Comment 2:

IBC: SECTION 202, SECTION 406, 406.2.7 (New), 406.2.8 (New), APPENDIX P (New), SECTION P101 (New), P101.2 (New), SECTION P102 (New), P102.1 (New), SECTION P103 (New), 406.2.7, 406.2.7.1, TABLE 406.2.7.1, 406.2.7.2

Proponents: Steven Rosenstock, representing Edison Electric Institute (srosenstock@eei.org) requests As Modified by Public Comment

Modify as follows:

2021 International Building Code

ELECTRIC VEHICLE (EV) . An automotive-type vehicle for on-road use, such as passenger automobiles, buses, trucks, vans, neighborhood electric vehicles, and electric motorcycles, primarily powered by an electric motor that draws current from a building electrical service, *EVSE*, a rechargeable storage battery, a fuel cell, a photovoltaic array, or another source of electric current.

ELECTRIC VEHICLE SUPPLY EQUIPMENT (EVSE) . The conductors, including the ungrounded, grounded, and equipment grounding conductors, and the *electric vehicle* connectors, attachment plugs, and all other fittings, devices, power outlets, or apparatus installed specifically for the purpose of transferring energy between the premises wiring and the *electric vehicle*.

SECTION 406
MOTOR-VEHICLE-RELATED OCCUPANCIES

406.2.7 Electric vehicle charging stations and systems . Where provided, electric vehicle charging systems shall be installed in accordance with NFPA 70. Electric vehicle charging system equipment shall be *listed* and labeled in accordance with UL 2202. Electric vehicle supply equipment shall be *listed* and labeled in accordance with UL 2594. Accessibility to *electric vehicle charging stations* shall be provided in accordance with Section 1108.

406.2.8 EVSE-Installed spaces at buildings . Where 25 or more parking spaces and lighting for parking areas are installed at buildings, at least one parking space shall be an EVSE-installed space rated at 208 Volts or greater and 40 Amps or greater. Where more than one parking facility is provided on a *site*, the number of EVSE-installed spaces shall be calculated separately for each parking facility. Where 25 or more parking spaces and lighting are added to an existing parking area or *site*, only the new parking spaces being added are subject to these requirements.

APPENDIX P
ELECTRIC VEHICLE CHARGING INFRASTRUCTURE

SECTION P101
GENERAL

P101.2 Purpose . The purpose of this appendix is to supplement the *International Building Code* and require the installation of electric vehicle charging infrastructure.

P101.2 Scope . The provisions of this appendix shall be applicable for new construction of parking facilities where electric vehicle charging infrastructure is required.

SECTION P102
DEFINITIONS

P102.1 General . The following words and terms shall, for the purposes of this appendix, have the meanings shown herein. Refer to Chapter 2 of this code for general definitions.

ELECTIC VEHICLE (EV)-CAPABLE SPACE . A designated parking space that is provided with conduit sized for a minimum 40-amp, 208/240-Volt dedicated branch circuit from a building electrical panelboard to ~~within 3' of~~ the parking space and with sufficient physical space in the same building electrical panelboard to accommodate a 40-amp, dual-pole circuit breaker.

ELECTRIC VEHICLE (EV) FAST-CHARGER . *Electric vehicle supply equipment* with a minimum power output of not less than 25 kW.

ELECTIC VEHICLE (EV)-READY SPACE . A parking space that is provided with one minimum 40-amp, 208/240-Volt dedicated branch circuit for *electric vehicle supply equipment* that is terminated at a receptacle, junction box or *electric vehicle supply equipment* ~~located within 3 feet (915 mm) of the parking space space.~~ .

ELECTRIC VEHICLE SUPPLY EQUIPMENT (EVSE)-INSTALLED SPACE . A designated parking space with dedicated *electric vehicle* *supply equipment*. ~~located within 3 feet (915 mm) of the parking space.~~

SECTION P103
INFRASTRUCTURE

~~406.2.7~~ P103.1 Electric Vehicle (EV) Charging Infrastructure . Where parking is provided,*EV* charging infrastructure shall be provided in accordance with this section and installed in accordance with the National Electrical Code (NFPA 70). Where more than one parking facility is provided on a *site*, the number of *EV-capable, EV-ready,* and *EVSE-installed spaces* shall be calculated separately for each parking facility. ~~When more than 10 parking spaces are added to an existing building, only the new parking spaces are subject to these requirements.~~ *EVSE-installed spaces* ~~may~~ shall be permitted to be used to meet requirements for *EV-ready* and *EV-capable spaces*. *EV-ready spaces* are permitted to be used to meet requirements for *EV-capable spaces*.

Exception: Parking facilities with fewer than 10 spaces.

~~406.2.7.1~~ P103.1.1 ~~New~~ Parking Facilities for Commercial Buildings. . ~~New~~ parking facilities shall be provided with *EV* charging infrastructure in accordance with Table ~~406.2.7.1~~ P103.1.1. ~~Calculations for the number of spaces shall be rounded up to the nearest whole number.~~ *EVSE* serving *EVSE-installed spaces* shall be capable of supplying current at a minimum of 6.2 kW. ~~All *EV-capable, EV-ready,* and *EVSE-installed spaces* are to be included in the calculation for the number of minimum vehicle spaces required.~~

Exception: ~~The~~ For other than Group R-2 occupancies, the number of *EVSE-installed spaces* serving occupancies ~~other than Group R-2~~ shall be permitted to be reduced by up to five for each parking space equipped with an *electric vehicle fast-charger*.

TABLE ~~406.2.7.1~~ P103.1.1 EV CHARGING INFRASTRUCTURE

OCCUPANCY	EVSE-INSTALLED SPACES	EV-READY SPACES	EV-CAPABLE SPACES
Group R-2	2%	18%	N/A
All other occupancies	2%	N/A	8%

~~406.2.7.2~~ P103.1.2 Identification . ~~Construction documents shall designate all *EV-capable, EV-ready,* and *EVSE-installed spaces* and indicate the locations of conduit and termination points serving them.~~ The circuit breakers or circuit breaker spaces reserved for the *EV-capable, EV-ready,* and *EVSE-installed spaces* shall be ~~clearly~~ identified in the panelboard. The conduit for *EV-capable spaces* shall be ~~clearly~~ identified at both the panelboard and the termination point at the parking space.

Commenter's Reason: The revised text addresses the concerns of the committee by removing requirements from the definitions and by removing any disproportionate requirements for R-2 buildings.
In addition, the requirement is only for new buildings with a significant number of parking spaces and lighting, so that the incremental cost of installing a Level 2 (208/240 Volt) EV charging station is minimized. A parking lot or garage with lighting will already have panel space, conduits, raceways, and wiring for the lighting that is likely to be rated at 277 Volts, single phase.

The original language is moved to a new Appendix to allow jurisdictions the flexibility to adopt more stringent requirements if they choose.

Cost Impact: The net effect of the public comment and code change proposal will increase the cost of construction
At new buildings with at least 25 parking spaces and lighting for the parking area (parking lot or garage), it is estimated that the cost to install one Level 2 charging station and associated wiring will be around $1,000 to $1,500.

Public Comment# 2509

Public Comment 3:

Proponents: Sharon Bonesteel, representing salt river project (sharon.bonesteel@srpnet.com) requests As Submitted

Commenter's Reason: All of the major automakers have announced their plans for electrifying their offerings in the next 5 years, give or take. To build facilities now that we expect to last 30 years and not plan to accommodate electric vehicle charging is short sighted. If yours is a small rural community, then you can delete this in your local adoptions, but cities and towns require standard requirements, language and definitions for their EV ready communities of the not so distant future.

Cost Impact: The net effect of the public comment and code change proposal will increase the cost of construction
While the net change will increase the cost of construction, the net savings to the EV owner will be significant.

Public Comment# 2942

G67-21

Proposed Change as Submitted

Proponents: Mike Nugent, Chair, representing ICC Building Code Action Committee (bcac@iccsafe.org)

2021 International Building Code

SECTION 406
MOTOR-VEHICLE-RELATED OCCUPANCIES

Revise as follows:

406.3.1 Classification. *Private garages* and carports shall be classified as Group U occupancies. ~~Each *private garage* shall be not greater than 1,000 square feet (93 m^2) in area. Multiple *private garages* are permitted in a building where each *private garage* is separated from the other *private garages* by 1-hour *fire barriers* in accordance with Section 707, or 1-hour *horizontal assemblies* in accordance with Section 711, or both.~~

Add new text as follows:

406.3.2 Allowable Area.
Each private garage shall be not greater than 1,000 square feet (93 m^2) in area. Multiple private garages are permitted in a building where each private garage is separated from the other private garages by 1-hour fire barriers in accordance with Section 707, or 1-hour horizontal assemblies in accordance with Section 711, or both. Where located in a mixed occupancy building, the allowable area of the building shall be determined by including the area of the private garages as part of the area for one of the other occupancies.

Reason: This proposal is to re-instate a provision that G59-12 incidentally removed. Item 1 of Section 406.3.2 of the 2012 IBC provided a path to include the area of a private garage as part of the major occupancy of the building. This allowed for attached private garages in buildings where they are commonly located to not cause a significant reduction in the allowable area of the entire building. G59-12 removed that provision without providing another measure to address it. Not allowing this often creates an unnecessary and significant reduction in the allowable area of the building. For instance, where located in a Group B or M, as the private garage is classified as a U, the allowable area of the non-sprinklered building is 5,500 instead of 9,000. Section 406.3.2, which does address other occupancies, would require compliance with 508 and therefore require a 2-hour fire barrier to allow minimal additional area.
This proposal is submitted by the ICC Building Code Action Committee (BCAC). BCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2020 the BCAC has held several virtual meetings open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the BCAC website at BCAC.

Cost Impact: The code change proposal will decrease the cost of construction
This proposal will result in a reduction in cost of construction in cases where it will allow for a larger building without having to go to a more restrictive type of construction, or other method of area increase.

G67-21

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The committee felt this was a good idea to allow for private garages in small business occupancies, however the proposal was disapproved because there was a concern that someone would put multiple private garages in a mixed use building as a way to exceed the area limitations permitted for Group U or S-2. (Vote: 14-0)

G67-21

Individual Consideration Agenda

Public Comment 1:

IBC: 406.3.2

Proponents: Mike Nugent, representing ICC Building Code Action Committee (bcac@iccsafe.org) requests As Modified by Public Comment

Modify as follows:

2021 International Building Code

406.3.1 Classification . *Private garages* and carports shall be classified as Group U occupancies.

406.3.2 Allowable Area . Each private garage shall be not greater than 1,000 square feet (93 m^2) in area. Multiple private garages are permitted in a building where each private garage is separated from the other private garages by 1-hour fire barriers in accordance with Section 707, or 1-hour horizontal assemblies in accordance with Section 711, or both. Where located in a mixed occupancy building, the allowable area of the building shall be determined by including the area of the private garages as part of the area for ~~one of~~ the ~~other occupancies~~ occupancy served by the private garage.

Commenter's Reason: The proposed modification is to address the concerns of the committee. This should stop garages not related to specific occupancies from being combined into a larger building. The intent is to recognize that private garages with one-hour fire resistance rated separation every 1,000 sq.ft. offers equivalent or better protection to that provided for group separation provided by Section 508. For that reason, it is reasonable to allow for the private garage area to be included in the area limitation of the occupancy served.

Cost Impact: The net effect of the public comment and code change proposal will decrease the cost of construction
This proposal will result in a reduction in cost of construction in cases where it will allow for a larger building without having to go to a more restrictive type of construction, or other method of area increase.

Public Comment# 2682

G68-21

Proposed Change as Submitted

Proponents: Ali Fattah, City of San Diego Development Services Department, representing City of San Diego Development Services Department (afattah@sandiego.gov)

2021 International Building Code

SECTION 406
MOTOR-VEHICLE-RELATED OCCUPANCIES

Revise as follows:

406.3.1 Classification. *Private garages* and carports shall be classified as Group U occupancies. ~~Each~~ A *private garage* shall be not greater than ~~1,000~~ 3,000 square feet ~~(93 m)~~ (279 m^2) in area. ~~Multiple *private garages* are permitted in a building where each *private garage* isseparated from the other *private garages* by 1-hour *fire barriers* in accordance with Section 707, or 1-hour *horizontal assemblies* in accordance with Section 711, or both.~~ *Private garages* shall be atmospherically separated from enclosed parking garages *or open parking garages*.

Add new text as follows:

406.3.1.1 Multiple private garages.
Multiple *private garages* are permitted in a building where each *private garage* has a floor area not greater than 1,000 square feet (93 m^2) and is separated from the other parking garages or *private garages* by 1-hour *fire barriers* in accordance with Section 707, or 1-hour *horizontal assemblies* in accordance with Section 711, or both.

Revise as follows:

406.6.2 Ventilation. A mechanical *ventilation* system and exhaust system shall be provided in accordance with Chapters 4 and 5 of the International Mechanical Code.

~~Exception~~ Exceptions:

1. Mechanical *ventilation* shall not be required for enclosed parking garages that are accessory to one- and two-family *dwellings.*
2. Mechanical *ventilation* shall not be required for enclosed private garages that have a floor area of 3,000 square feet (279 m^2) or less.

Reason: The proposed code change is submitted to address what may have been an error in the adoption of a reduction to the permitted area for private garages when amendments to the 2012 IBC were debated, and ultimately approved in Portland. While not apparent then, code application for projects today reveals that what seemed to be a benign code change is placing significant burdens on small residential mixed-use projects and small non-residential projects incorporating private garages for their tenants. The code change did not consider the impacts on covered common parking areas that the IBC does not exclude from a Group U private garage classification (see figures 1, 2 below).
Reason for code change: Many urban Cities in the United States, like San Diego, are working to solve housing affordability issues and encourage infill development to eliminate blight. Frequently these projects are proposed on constrained sites and on sites that previously accommodated one or two single family dwellings with alley access from a 15 ft or 20 ft wide alley; some alleys are 10 ft wide but they are less common. Additionally, and to encourage walkable communities zoning regulations require some street frontage of non-residential space so a token office or small retail space are incorporated. The proposed code change seeks to permit small projects to incorporate private garages classified as Group U that have an area up to 3,000 sq ft as was the case prior to publication of the 2015 IBC. This code change will provide the following benefit:

- Will allow configurations with Group U private garages accessed by common driveways that are located below upper levels of the building.
- Will allow small parking garages to serve a mixed use building without classifying the garage as Group S-2 public or open garages. This will reduce the cost of construction and the need for mechanical ventilation or non-combustible construction.
- If constructed with non rated construction, this code change may lessen fire separation burdens on the alley side where FSD may be 10 feet to the center line of a 20 ft alley, since many projects are of Type VB construction.
- Will prevent gaming of the system where the common driveway is classified as Group S-2 and the private garages as Group U with separation only provided between group U private garages. Table 508.4 does not require a separation between Group S-2 and U since it does not expect both to be located in the same building or even parking area.
- Will prevent the need to divide up a small garage with fire barriers to satisfy the 1,000 sq ft area limit and require the installation of overhead rolling fire doors that will not be maintained.

Many of the proposed private garages need to exceed 1,000 sq ft to accommodate accessible parking, spaces with required electric vehicle chargers as well as residential and non-residential parking.

- We see project configurations with attached private garages in 4- or 5-unit buildings that have private vehicular entry doors and are served by drive aisles that are covered by the building above. The garage area is also about 1,800 to 3,000 sq ft. The area of the drive aisle which is under the building above is also classified as Group U and is additive to the Group U area. When designed to comply with the 2021 IBC these projects need to be divided by 1 or more fire barriers and the fire barriers require one or more roll up fire doors to accommodate drive aisles passing through or need to be placed in front of the attached private garages. An unnecessary level of complexity and a reliance on homeowners to maintain fire doors associated with unit garages make the regulations ineffective.

- When parking requirements for residential and non-residential uses are compounded with required accessible parking spaces for both residential and non-residential uses as well as spaces for electric vehicle charging systems a small project has no room for the placement of the 1-hour fire barriers and as a result another option is necessary. Vehicle stacker lifts are becoming popular to accommodate small garages however accessible and EV parking cannot be stacked and drive aisles and turning spaces are also needed to access all three types of spaces. The attached Figure 1 shows a mixed use 2 story building with two R-3 dwellings above a Group B and private garage for the use of residential and non-residential tenants.
- Consistent application of the code is not possible since a garage classified as Group S-2 does not require a separation from a private garage classified as Group U so applicant have separated private garages from one another with a 1-hour fire barrier and classified the drive aisle as Group S-2 with entry points of the drive aisle providing ventilation. The Figure 2 attached shows a garage/driveway covered by an R-2 building above.

The main reason that a Group U parking garage is desirable are the two following requirements:

1. Mechanical ventilation is not required for private garages but is required for public garages if not complying as open parking garages (IMC Section 404.1).
2. Exterior wall opening area limitations applicable to S-2 enclosed parking garages are significantly more onerous than for Group U, since the latter have no limit at FSD of 10 ft (due to IBC Table 705.5 allowance for zero fire resistance for exterior wall in zero rated type B construction per IBC 705.8.1 Exc 2). Only open parking garages get this benefit, group U private garages do not require openness to omit ventilation.

Code Change G59-12: The proposed code change provides a necessary update to the IBC to correct inadvertent issues that resulted from the adoption of G59-12 attached which was submitted by the Building Code Action Committee. The code changes revised Section 406 to complete regulations for private garages that somehow during the drafting of the 2000 IBC omitted necessary requirements for carports and the code change added definitions for private garages. Additionally, then Section 406.3.2 was deleted to not allows area increases to the then permitted 3,000 sq ft area limit. Section 406.3.1 was also revised to require a 1-hour fire barrier to separate private garages from one-another and most likely the building configuration envisioned was exterior driveways open to the sky providing access to a series of side by side double or tandem private garages that either had direct/indirect access to dwelling units.

- The code changed lowered the area threshold to 1,000 from the 3,000 sq ft that has existed since the publication of the 1967 UBC but did not provide justification for why it was necessary to reduce the area from a fire risk perspective.
- The justification also discussed the area limit in the context of natural ventilation openings and cited Section 402.2 of the International Mechanical code that requires “The minimum openable area to the outdoors shall be 4 percent of the floor area being ventilated.” exterior openings. Furthermore, an additional general requirement in the charging Section 401.2 to the chapter 4 requires that “Every occupied space shall be ventilated by natural means in accordance with Section 402 or by mechanical means in accordance with Section 403.”
- If mechanical ventilation is not present the IMC requires natural ventilation for all uses and occupancies including private garages, and as a result there was no reason to reduce the area of garages due to ventilation concerns.

The proposed code change results in an option to allow a larger private garage that has been 3,000 sq ft for more than 45 years with no known issues due CO exposure or fire hazards. Additionally, auto emissions have improved significantly over the past 50 years and the prevalence of electric vehicles and hybrid vehicles further reduces vehicle emissions. Hazards in garages due to CO occur during long term exposure and where there is a constant flow of motor vehicles like in the case for example of below ground garages in regional shopping malls. The hazards are primarily to the parking toll taker when not automated.

Mixed use residential buildings are always protected at least with an NFPA 13-R system and the garages are protected with an NFPA 13 compliant system and this code change reasonably reinstates regulations that have existed for decades without lessening fire safety even with the increased hazards due to plastics in vehicles and difficulties in fighting fire in electric and hybrid vehicles due to batteries.

We request that the General Committee vote to approve this code change.

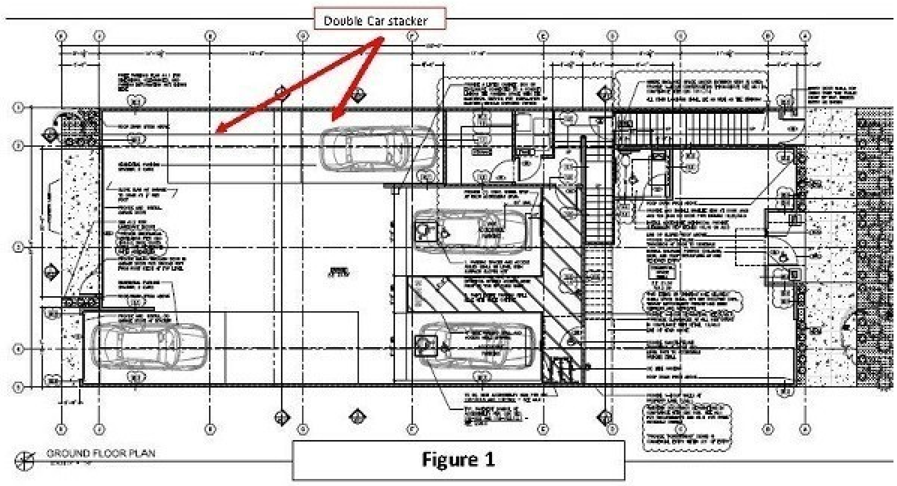

Figure 1

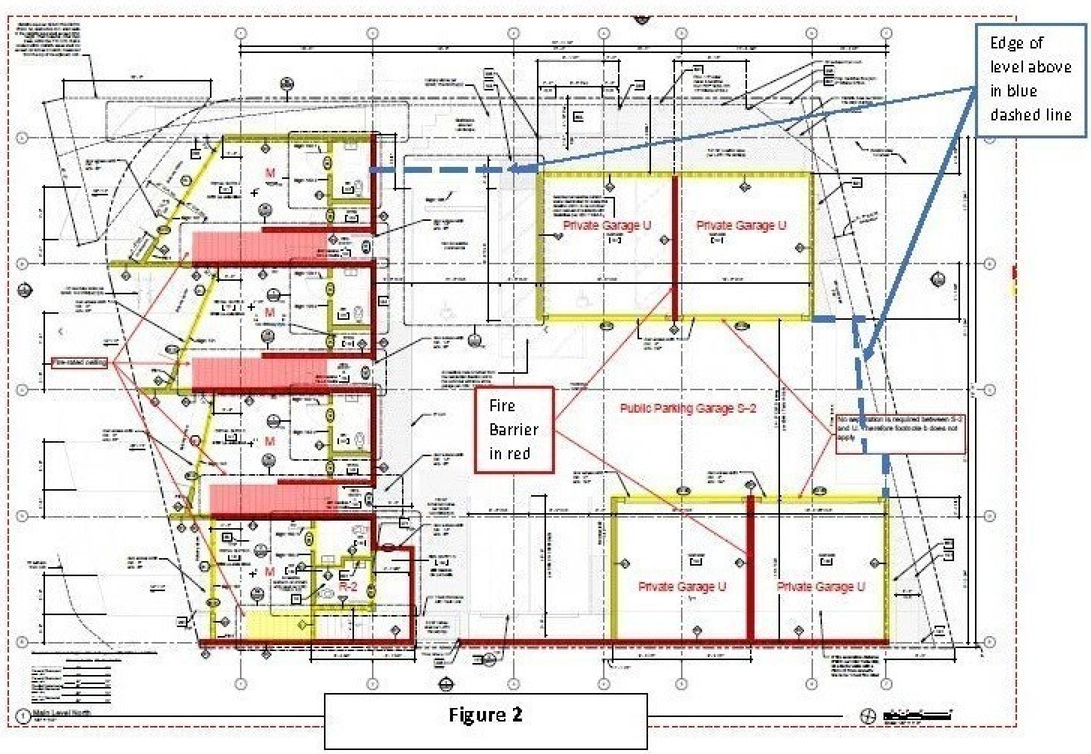

Figure 2

Cost Impact: The code change proposal will decrease the cost of construction
The proposal may reduce the need for mechanical ventilation systems in the garages and will reduce the need for fire barriers and opening protectives within them. The proposal also makes the projects more feasible.

G68-21

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The proposal was disapproved because the committee found the language confusing. The exception for ventilation is unclear - is it for when the single private garage is area up to 3,000 sq.ft. for where multiple private garages are an aggregate for up to 3,000 sq.ft.? Otherwise this seems to be a total exception for the entire requirement. The phrase "atmospherically separated" is confusing - does this require smoke tight walls or something less - specific criteria is needed. There was no technical criteria showing that these size garages do not need ventilation. (Vote: 14-0)

Individual Consideration Agenda

Public Comment 1:

IBC: 406.3.1, 406.6.2

Proponents: Ali Fattah, representing City of San Diego Development Services Department (afattah@sandiego.gov) requests As Modified by Public Comment

Modify as follows:

2021 International Building Code

406.3.1 Classification . *Private garages* and carports shall be classified as Group U occupancies. A *private garage* shall be not greater than 3,000 square feet (279 m^2) in area. ~~*Private garages* shall be atmospherically separated from enclosed parking garages *or open parking* garages.When located in a building that includes other garages, communicating openings shall not be permitted between *private garage* and other garages.~~

406.6.2 Ventilation. A mechanical *ventilation* system and exhaust system shall be provided in accordance with Chapters 4 and 5 of the International Mechanical Code.

Exceptions:

1. Mechanical *ventilation* shall not be required for enclosed parking garages that are accessory to one- and two-family *dwellings*.
2. Mechanical *ventilation* shall not be required for enclosed private garages that have a floor area of 3,000 square feet (279 m^2) or less, or within each individual *private parking garage* complying with Section 406.3.1.1.

Commenter's Reason: We request approval as modified through public comment by the Governmental Voting Members of ICC as modified through this public comment. Please overturn the committee action for disapproval to help us achieve the difficult 2/3 threshold necessary to overturn the committee decision so that this public comment can be considered. When you consider our testimony and potential opponents you can then form your opinion and vote accordingly.

This public comment is submitted after considering the insightful feedback provided by several members of the General Committee and comments made at the hearing by speakers in support and opposition to the code change. The public comment addresses the following issues raised.

- The public comment clarifies that when private garages are located in the same building as other garages, that communicating openings shall not be permitted between private garages when multiple private garages are permitted in the same building, or between private garages and enclosed garages or open parking garages. This corrects and oversight in code change G59-12.
- That mechanical ventilation is not required for private garages when one private garage is proposed or or within each garage when multiple private garages are permitted.
- To reaffirm that ventilation is required, however that it is proposed that mechanical ventilation is being exempted.
- Adequate justification was not provided in code change G59-12 (www.iccsafe.org/wp-content/uploads/02_IBC-G1.pdf) to substantiate the documented hazard that necessitated the drastic floor area reduction to 1,000 sq ft

This public comment is necessary due to a procedural error on the part of proponent to not raise a point of order when new material was added in the rebuttal phase of the CAH due to the mistaken belief that re-rebuttal was to follow. Some issues raised by the committee were reasonable and the public comment we believe addresses the issues.

- Three speakers in opposition represented the Air Movement and Control Association (AMCA), one speaker represented Broan Nutone.
- One of the speakers in opposition reminded the General Committee of their prior disapproval of of G98-15 (https://www.iccsafe.org/wp-content/uploads/IBC-General.pdf) which was somewhat out of context since that code change proposed to add an exception to increase the floor area to 3,000 sq ft for a private garage that is accessory to an R-3 occupancy;
  - The report of the committee hearing (https://www.iccsafe.org/wp-content/uploads/2015-Report-of-the-Committee-Action-Hearing-Results.pdf) stated that the CRC has no limit and that this should be regulated in the CRC. This also points to a flaw in the original code change, CO does not know it is in a house built under the IRC or IBC when accessory to an R-3 occupancy.

None of the speakers in opposition spoke in opposition to the code change due to fire protection reasons and focused mainly on the CO hazards. ASHREA and many organizations have researched the hazards in parking garages and determined that two important variables must be present: concentration and duration of exposure. A 3,000 sq ft garage will park approximately 9 or 10 motor vehicles that are associated with tenant spaces in the building. And unlike a garage with many simultaneous idling motor vehicles, like say a regional shopping center when leaving a cinema or waiting at a fast food drive through, small garages do not have all the cars moving simultaneously and the duration they are in the garage idling is short since the travel distance out may/in be about 50 to 80 feet at most. Furthermore due to the size of the garage it is not expected that a parking attendant will be present so it is very unlikely that the exposure to constant CO will be 8 or more hours in a day as was in the ASHREA study (https://www.aivc.org/sites/default/files/airbase_13671.pdf). Additionally, ASHRAE 62.1: TABLE 6.2.2.1 includes ventilation rates for when mechanical ventilation is required reflective of lower emissions in todays vehicles when compared to what the model codes addressed.

The public comment also addresses an oversight that G59-12 did not address which is to prohibit communicating openings between private garages. A fire barrier can have a held open door and can allow a large private garage with fire doors across he drive aisle bisected with fire barriers. This addresses one of the conditions highlighted in the figures provided to the committee.

The public comment also addresses a concern raised by the committee and speakers in opposition regarding the exemption from mechanical ventilation that it should apply to a single 3,000 sq ft garage and individual garages when multiple private garages are provided.

The public comment addresses communicating openings in lieu of atmospheric separation since the committee and speakers in opposition stated that the separation could be a sheet of plastic. A restriction on communicating openings is proposed in like fashion to Section 915.1.4 or similar. We request that ICC Governmental Voting members support overturning the committee decision for disapproval so that you can consider the corrections made to the proposal that are in response to their reason for disapproval. The Committee disapproval did not invalidate the concept of the code change and did not consider the qualitative technical justification presented. We have referenced an article from ASHREA to help quantitatively justify the lack of a CO exposure hazard in a small garage that is not occupied by a person working in the garage and where multiple idling motor vehicles are not likely. This is an issue in 1,000 sq ft private garages addressed the vehicular entry opening and other openings required by IBC Ch 12 as well as the movement of cars that provide for air movement. Fewer motor vehicles, fewer motor vehicles moving concurrently and shorter duration of movement will result in less concentration of CO and therefore a lesser need to mechanically introduce air movement to reduce CO concentration.

- The AMCA speakers also stated that in addition to CO that mechanical ventilation is necessary since garages also include other hazardous fumes due to fuel and oil, however IMC Section 404 only requires ventilation systems in enclosed parking to operate intermittently to reduce the concentration of CO through air movement by mechanical means.

As the original reason statement clarifies, and based on exhaustive research that spanned decades since publication of the 2015 IBC no issues were presented as to why the hazards of CO are significant in small private garages that can be 55 ft deep by 55 ft wide and will park perhaps 9 or 10 motor vehicles when accessible parking spaces and EVCS are included (unless car stackers are used) [assuming a typical 8 ft by 18 ft standard parking stalls and 20 ft backup space]. CO is a significant exposure when many cars are idling concurrently and when an occupant is exposed to the CO for 8 or more hours. This is precisely why for decades, during a period when exhaust emissions were more polluting than they are today, that legacy codes exempted private parking garages. Code editions following the 2021 IBC unnecessarily burden small projects based on no demonstrable hazard documented in the record of code change G59-12 that necessitated this code change. The reason statement for the original code change provides a detailed and comprehensive justification for the code change. The code requirements we are seeking to modify are negatively impacting the affordability of infill residential and mixed use development.

It is worth noting that G68-21 seeks to accomplish some of the same objectives in G67-21 in addition to allowing natural ventilation through openness following the rational used in G59-12 to also not require mechanical ventilation.

Bibliography:

- Code Change G59-12 (www.iccsafe.org/wp-content/uploads/02_IBC-G1.pdf)
- Code Change G98-15 (https://www.iccsafe.org/wpcontent/uploads/IBC-General.pdf)
- ASHREA Article ASHREA study (https://www.aivc.org/sites/default/files/airbase_13671.pdf)

Cost Impact: The net effect of the public comment and code change proposal will decrease the cost of construction
This code change reduces the need to classify small garages as S-2 and to not require mechanical ventilation in private garages that never required mechanical ventilation even in periods when vehicular tail emissions were worst and prior to the prevalence of alternative fuel clean vehicles.

Public Comment# 2821

G74-21

Proposed Change as Submitted

Proponents: Christopher Athari, Hoover Treated Wood Products, representing Hoover Treated Wood Products (cathari@frtw.com)

2021 International Building Code

SECTION 410
STAGES, PLATFORMS AND TECHNICAL PRODUCTION AREAS

Revise as follows:

410.2.1 Stage construction. *Stages* shall be constructed of materials as required for floors for the type of construction of the building in which such *stages* are located.

Exception: *Stages* need not be constructed of the same materials as required for the type of construction provided that the construction complies with one of the following:

1. *Stages* of Type IIB or IV construction with a nominal 2-inch (51 mm) wood deck, provided that the *stage* is separated from other areas in accordance with Section 410.2.4.
2. Stages are permitted to be constructed of fire-retardant-treated wood for Types I, II, and IV construction, provided that the stage is separated from other areas in accordance with Section 410.2.4.

~~2.~~ 3. In buildings of Type IIA, IIIA and VA construction, a fire-resistance-rated floor is not required, provided that the space below the *stage* is equipped with an *automatic sprinkler system* or *fire-extinguishing system* in accordance with Section 903 or 904.

~~3.~~ 4. In all types of construction, the finished floor shall be constructed of wood or *approved* noncombustible materials. Openings through stage floors shall be equipped with tight-fitting, solid wood trap doors with *approved* safety locks.

Reason: By allowing the use of fire-retardant-treated wood (FRTW) while maintaining the required separation, stages could provide improved fire resistance compared to the untreated wood currently permitted by Exception 1 for Types IIB and IV construction, for instance. Furthermore, FRTW is already allowed in permanent platforms for Types I, II, and IV construction (IBC Section 410.3).

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The proposal does not change the original 3 options currently available. It adds a 4th option.

G74-21

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The proposal was disapproved because the text could be read to allow for a much larger area rather than just the stage itself. This would allow for stages of fire retardant treated wood in Type 1 construction. A direct correlation for stage and platform fire hazards is not correct, so the construction requirements should not be the same. (Vote: 12-2)

G74-21

Individual Consideration Agenda

Public Comment 1:

IBC: 410.2.1

Proponents: Mike Eckhoff, representing Hoover Treated Wood Products, Inc. (meckhoff@frtw.com); Christopher Athari, representing Hoover Treated Wood Products (cathari@frtw.com) requests As Modified by Public Comment

Replace as follows:

2021 International Building Code

410.2 Stages . *Stage* construction shall comply with Sections 410.2.1 through 410.2.7.

410.2.1 Stage construction . *Stages* shall be constructed of materials as required for floors for the type of construction of the building in which such *stages* are located.

Exception: *Stages* need not be constructed of the same materials as required for the type of construction provided that the construction complies with one of the following:

1. *Stages* of Type IIB or IV construction with a nominal 2-inch (51 mm) wood deck, provided that the *stage* is separated from other areas in accordance with Section 410.2.4.
2. In buildings of Type IIA, IIIA and VA construction, a fire-resistance-rated floor is not required, provided that the space below the *stage* is equipped with an *automatic sprinkler system* or *fire-extinguishing system* in accordance with Section 903 or 904.
3. In all types of construction, the finished floor shall be constructed of wood or *approved* noncombustible materials. Openings through stage floors shall be equipped with tight-fitting, solid wood trap doors with *approved* safety locks.
4. <u>Stages constructed of fire-retardant-treated wood complying with Section 2303.2 are permitted in Type I and II construction, provided that the stage is separated from other areas in accordance with Section 410.2.4.</u>

Commenter's Reason: This new proposal language addresses the following concerns raised by the committee.
Concerning Types I and II construction: Including these types of construction is a natural extension of the exceptions already permitted in the IBC. Imagine a theater that uses steel columns as the load bearing supports for either of these two types of construction, where the floor-to-ceiling height is greater than 20 feet. The nonbearing walls and the roof could then be constructed of fire-retardant-treated wood (FRTW) per IBC 603.1#1. By disallowing this proposed language, the code would still allow the exterior nonbearing walls and the roof to be constructed of FRTW but not the stage itself. This scenario would make no sense.

Concerning the possibility of construction beyond the stage itself, one concern mentioned during testimony was fly galleries. This is not an issue. The exception in 2021 IBC 410.2.2 states that “Floors of fly galleries and catwalks shall be constructed of any *approved* material.” Also, given that the charging language in 410.2.1 mentions “floors,” it’s clear that the focus of this proposal is on the stage itself and not other elements of above-stage construction.

Cost Impact: The net effect of the public comment and code change proposal will not increase or decrease the cost of construction
This proposal does not change the original three exceptions currently available; it merely adds a fourth exception.

Public Comment# 2884

G83-21

Proposed Change as Submitted

Proponents: Andrew Bevis, National Fire Sprinkler Association, representing National Fire Sprinkler Association; Jeffrey Hugo, representing NFSA (hugo@nfsa.org)

THIS CODE CHANGE WILL BE HEARD BY THE FIRE CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THAT COMMITTEE.

2021 International Building Code

SECTION 410
STAGES, PLATFORMS AND TECHNICAL PRODUCTION AREAS

Revise as follows:

[F] 410.6 Automatic sprinkler system. Buildings and structures that contain s*tages s*hall be equipped throughout with an *automatic sprinkler system* in accordance with Section 903.3.1.1. Sprinklers shall be installed under the roof and gridiron and under all catwalks and galleries over the *stage*. Sprinklers shall be installed in dressing rooms, performer lounges, shops and storerooms accessory to such *stages*.

Exceptions:

1. Sprinklers are not required under *stage* areas less than 4 feet (1219 mm) in clear height that are utilized exclusively for storage of tables and chairs, provided that the concealed space is separated from the adjacent spaces by Type X *gypsum board* not less than $^5/_8$-inch (15.9 mm) in thickness.
2. Sprinklers are not required for *stages* 1,000 square feet (93 m^2) or less in area and 50 feet (15 240 mm) or less in height where curtains, scenery or other combustible hangings are not retractable vertically. Combustible hangings shall be limited to a single main curtain, borders, legs and a single backdrop.
3. Sprinklers are not required within portable orchestra enclosures on *stages*.

2021 International Fire Code

914.6 Stages. Stages shall comply with Sections 914.6.1 and 914.6.2.

Revise as follows:

914.6.1 Automatic sprinkler system. Buildings and structures that contain stages shall be equipped throughout with an *automatic sprinkler system* in accordance with Section 903.3.1.1. Sprinklers shall be installed under the roof and gridiron and under all catwalks and galleries over the stage. Sprinklers shall be installed in dressing rooms, performer lounges, shops and storerooms accessory to such stages.

Exceptions:

1. Sprinklers are not required under stage areas less than 4 feet (1219 mm) in clear height utilized exclusively for storage of tables and chairs, provided that the concealed space is separated from the adjacent spaces by Type X gypsum board not less than $^5/_8$ inch (15.9 mm) in thickness.
2. Sprinklers are not required for stages 1,000 square feet (93 m^2) or less in area and 50 feet (15 240 mm) or less in height where curtains, scenery or other combustible hangings are not retractable vertically. Combustible hangings shall be limited to a single main curtain, borders, legs and a single backdrop.
3. Sprinklers are not required within portable orchestra enclosures on stages.

Reason: This change clarifies Section 410.1 requirement for application, "...to all parts of the buildings and structures..." Section 410.6 leaves the user with the possibility to interpret that only requires stages to be protected and the rest of the building unprotected. The commentary supports this by allowing a limited area system for the stage. The "tradeoffs" or exceptions in Section 410.6 could not or should not apply, unless the whole building is sprinklered throughout. Sections 410.2.1 and 410.5.3.2 require the entire building to be sprinklered.

Cost Impact: The code change proposal will increase the cost of construction
Additionally, most assembly or educational occupancies where stages would be located, would normally be protected anyhow.

G83-21

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The committee stated that the reason for the disapproval was that the way it is written it is a far too reaching a requirement that would be for any occupancy that has any stage, it would then require the entire building regardless of size or occupancy to be provided with an automatic sprinkler system. (Vote: 14-0)

G83-21

Individual Consideration Agenda

Public Comment 1:

IBC: [F] 410.6; IFC: 914.6.1

Proponents: Andrew Bevis, representing National Fire Sprinkler Association requests As Modified by Public Comment

Modify as follows:

2021 International Building Code

SECTION 410
STAGES, PLATFORMS AND TECHNICAL PRODUCTION AREAS

[F] 410.6 Automatic sprinkler system . ~~Buildings and structures that contain stages~~ *Stages s*hall be equipped ~~throughout~~ with an *automatic sprinkler system* in accordance with Section 903.3.1.1. Sprinklers shall be installed under the roof and gridiron and under all catwalks and galleries over the *stage*. Sprinklers shall be installed in dressing rooms, performer lounges, shops and storerooms accessory to such *stages*.

Exceptions:

1. In buildings that are sprinklered throughout in accordance with 903.3.1.1, ~~Sprinklers~~ sprinklers are not required under *stage* areas less than 4 feet (1219 mm) in clear height that are utilized exclusively for storage of tables and chairs, provided that the concealed space is separated from the adjacent spaces by Type X *gypsum board* not less than $^5/_8$-inch (15.9 mm) in thickness.
2. In buildings that are sprinklered throughout in accordance with 903.3.1.1, ~~Sprinklers~~ sprinklers are not required for *stages* 1,000 square feet (93 m^2) or less in area and 50 feet (15 240 mm) or less in height where curtains, scenery or other combustible hangings are not retractable vertically. Combustible hangings shall be limited to a single main curtain, borders, legs and a single backdrop.
3. In buildings that are sprinklered throughout in accordance with 903.3.1.1, ~~Sprinklers~~ sprinklers are not required within portable orchestra enclosures on *stages*.

2021 International Fire Code

914.6 Stages . Stages shall comply with Sections 914.6.1 and 914.6.2.

914.6.1 Automatic sprinkler system . ~~Buildings and structures that contain contain stages~~ Stages shall be equipped ~~throughout~~ with an *automatic sprinkler system* in accordance with Section 903.3.1.1. Sprinklers shall be installed under the roof and gridiron and under all catwalks and galleries over the stage. Sprinklers shall be installed in dressing rooms, performer lounges, shops and storerooms accessory to such stages.

Exceptions:

1. In buildings that are sprinklered throughout in accordance with 903.3.1.1, ~~Sprinklers~~ sprinklers are not required under stage areas less than 4 feet (1219 mm) in clear height utilized exclusively for storage of tables and chairs, provided that the concealed space is separated from the adjacent spaces by Type X gypsum board not less than $^5/_8$ inch (15.9 mm) in thickness.
2. In buildings that are sprinklered throughout in accordance with 903.3.1.1, ~~Sprinklers~~ sprinklers are not required for stages 1,000 square feet (93 m^2) or less in area and 50 feet (15 240 mm) or less in height where curtains, scenery or other combustible hangings are not retractable vertically. Combustible hangings shall be limited to a single main curtain, borders, legs and a single backdrop.
3. In buildings that are sprinklered throughout in accordance with 903.3.1.1, ~~Sprinklers~~ sprinklers are not required within portable orchestra enclosures on stages.

Commenter's Reason: The committee stated, in its reasoning statement for disapproval, that the proposal was far too reaching in its requirement to protect the entire building when the structure contains a stage. This statement is moot, as stages are generally found in assembly and educational occupancies. This public comment was revised to address the point of being "far too reaching." Per the requirements of the Section 903.2.1 and 903.2.3, the majority of these buildings will already be protected. So, the exceptions or tradeoffs are justified when the building is fully sprinklered. Also, there is already an exception provided in the current language that exempts stages 1,000 square feet and less. These two points keep this proposal from being "far too reaching."

Proposal G85-21 was approved by the committee. This proposal removed the requirements for standpipes from stages. This provides a lower level of protection at the stage area. Additionally, as stated in the original reason statement, the "tradeoffs" or exceptions in Section 410.6 could not or should not apply, unless the whole building is sprinklered throughout. Sections 410.2.1 and 410.5.3.2 require the entire building to be sprinklered. Finally, Section 410.1 clarifies that the requirements of this section applies, "...to all parts of the buildings and structures..." Section 410.6 leaves the user with the possibility to interpret that only requires stages to be protected and the rest of the building unprotected.

Cost Impact: The net effect of the public comment and code change proposal will increase the cost of construction

While this will increase the cost of construction in the rare cases that a building would have a stage but not a sprinkler system throughout the rest of the building, most of these occupancies where stages exist will already be provided with sprinkler systems and those costs would already be factored in the construction of the building.

Public Comment# 2365

G84-21

Proposed Change as Submitted

Proponents: William Conner, representing American Society of Theatre Consultants (bill@bcaworld.com)

THIS CODE CHANGE WILL BE HEARD BY THE FIRE CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THAT COMMITTEE.

2021 International Building Code

SECTION 410
STAGES, PLATFORMS AND TECHNICAL PRODUCTION AREAS

Revise as follows:

[F] 410.6 Automatic sprinkler system. *Stages* shall be equipped with an *automatic sprinkler system* in accordance with Section 903.3.1.1. Sprinklers shall be installed under the roof and gridiron and under all catwalks and galleries over the *stage*. Sprinklers shall be installed in dressing rooms, performer lounges, shops and storerooms accessory to such *stages*.

Exceptions:

1. Sprinklers are not required under *stage* areas less than 4 feet (1219 mm) in clear height that are utilized exclusively for storage of tables and chairs, provided that the concealed space is separated from the adjacent spaces by Type X *gypsum board* not less than $^{5}/_{8}$-inch (15.9 mm) in thickness.
2. Sprinklers are not required for *stages* 1,000 square feet (93 m^2) or less in area and 50 feet (15 240 mm) or less in height where curtains, scenery or other combustible hangings are not retractable vertically. Combustible hangings shall be limited to a single main curtain, borders, legs and a single backdrop.
3. Sprinklers are not required within portable orchestra enclosures on *stages*.
4. Sprinklers are not required under catwalks and galleries under the maximum widths as permitted by NFPA 13.

2021 International Fire Code

Revise as follows:

914.6.1 Automatic sprinkler system. Stages shall be equipped with an *automatic sprinkler system* in accordance with Section 903.3.1.1. Sprinklers shall be installed under the roof and gridiron and under all catwalks and galleries over the stage. Sprinklers shall be installed in dressing rooms, performer lounges, shops and storerooms accessory to such stages.

Exceptions:

1. Sprinklers are not required under stage areas less than 4 feet (1219 mm) in clear height utilized exclusively for storage of tables and chairs, provided that the concealed space is separated from the adjacent spaces by Type X gypsum board not less than $^{5}/_{8}$ inch (15.9 mm) in thickness.
2. Sprinklers are not required for stages 1,000 square feet (93 m^2) or less in area and 50 feet (15 240 mm) or less in height where curtains, scenery or other combustible hangings are not retractable vertically. Combustible hangings shall be limited to a single main curtain, borders, legs and a single backdrop.
3. Sprinklers are not required within portable orchestra enclosures on stages.
4. Sprinklers are not required under catwalks and galleries under the maximum widths as permitted by NFPA 13.

Reason: This is common practice on most projects. Catwalks under 48" open on both sides or 36" when against a wall like ducts do not require sprinklers under them. This change clarifies that.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
No significant change.

G84-21

Public Hearing Results

Committee Action: **As Submitted**

Committee Reason: The committee stated that the reason for the approval was based on the addition of the language of the new exception. The exception helps clarify the code by placing a pointer directly to NFPA 13 for the allowance. (Vote: 13-1)

G84-21

Individual Consideration Agenda

Public Comment 1:

IBC: [F] 410.6; IFC: 914.6.1

Proponents: Andrew Bevis, representing National Fire Sprinkler Association requests As Modified by Public Comment

Modify as follows:

2021 International Building Code

SECTION 410
STAGES, PLATFORMS AND TECHNICAL PRODUCTION AREAS

[F] 410.6 Automatic sprinkler system . *Stages* shall be equipped with an *automatic sprinkler system* in accordance with Section 903.3.1.1. Sprinklers shall be installed under the roof and gridiron and under all catwalks and galleries over the *stage*. Sprinklers shall be installed in dressing rooms, performer lounges, shops and storerooms accessory to such *stages*.

Exceptions:

1. Sprinklers are not required under *stage* areas less than 4 feet (1219 mm) in clear height that are utilized exclusively for storage of tables and chairs, provided that the concealed space is separated from the adjacent spaces by Type X *gypsum board* not less than $^5/_8$-inch (15.9 mm) in thickness.
2. Sprinklers are not required for *stages* 1,000 square feet (93 m^2) or less in area and 50 feet (15 240 mm) or less in height where curtains, scenery or other combustible hangings are not retractable vertically. Combustible hangings shall be limited to a single main curtain, borders, legs and a single backdrop.
3. Sprinklers are not required within portable orchestra enclosures on *stages*.
4. Sprinklers are not required under catwalks and galleries ~~under the maximum widths as permitted by NFPA 13.~~ where they are permitted to be omitted in accordance with Section 903.3.1.1

2021 International Fire Code

914.6.1 Automatic sprinkler system . Stages shall be equipped with an *automatic sprinkler system* in accordance with Section 903.3.1.1. Sprinklers shall be installed under the roof and gridiron and under all catwalks and galleries over the stage. Sprinklers shall be installed in dressing rooms, performer lounges, shops and storerooms accessory to such stages.

Exceptions:

1. Sprinklers are not required under stage areas less than 4 feet (1219 mm) in clear height utilized exclusively for storage of tables and chairs, provided that the concealed space is separated from the adjacent spaces by Type X gypsum board not less than $^5/_8$ inch (15.9 mm) in thickness.
2. Sprinklers are not required for stages 1,000 square feet (93 m^2) or less in area and 50 feet (15 240 mm) or less in height where curtains, scenery or other combustible hangings are not retractable vertically. Combustible hangings shall be limited to a single main curtain, borders, legs and a single backdrop.
3. Sprinklers are not required within portable orchestra enclosures on stages.
4. Sprinklers are not required under catwalks and galleries ~~under the maximum widths as permitted by NFPA 13.~~ where they are permitted to be omitted in accordance with Section 903.3.1.1

Commenter's Reason: This language is misleading and confusing. Bringing installation requirements out of the standards and into the codes is a bad practice. NFPA 13 already clearly addresses when sprinklers are not required under obstructions. This proposal leaves the user with the possibility to incorrectly interpret that sprinklers may be omitted from under other similar obstructions that NFPA 13 would require to be protected.

Cost Impact: The net effect of the public comment and code change proposal will not increase or decrease the cost of construction
This is already a NFPA 13 requirement. This simply cleans up the language.

Public Comment# 2458

G92-21

Proposed Change as Submitted

Proponents: William Koffel, representing Semiconductor Industry Association (wkoffel@koffel.com)

THIS CODE CHANGE WILL BE HEARD BY THE FIRE CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THAT COMMITTEE.

2021 International Building Code

SECTION 415
GROUPS H-1, H-2, H-3, H-4 AND H-5

[F] 415.11 Group H-5. In addition to the requirements set forth elsewhere in this code, Group H-5 shall comply with the provisions of Sections 415.11.1 through 415.11.12 and the *International Fire Code*.

[F] 415.11.1.5 Shafts and openings through floors. Elevator hoistways, vent *shafts* and other openings through floors shall be enclosed where required by Sections 712 and 713. Mechanical, duct and piping penetrations within a *fabrication area* shall not extend through more than two floors. The *annular space* around penetrations for cables, cable trays, tubing, piping, conduit or ducts shall be sealed at the floor level to restrict the movement of air. The *fabrication area*, including the areas through which the ductwork and piping extend, shall be considered to be a single conditioned environment.

Add new text as follows:

<u>415.11.1.5.1</u> <u>Quantity Limits</u>.
<u>The use and storage quantity limits for hazardous materials and hazardous production materials (HPMs) for connected levels shall be aggregated based upon the overall area. The quantity in any single area shall not exceed limits stipulated in Table 415.11.1.1.1 for a single fabrication area in Group H-5.</u>

Reason: The Code is not clear how to apply the quantity limits when multiple levels of a fabrication area are connected. The proposed language allows for the areas on the different levels to be aggregated but the limits within any single area shall not exceed the requirements of Table 415.11.1.1.1. In other words, one cannot use the aggregated area to allow a higher concentration in any single area.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This language as been approved by the SIA Codes Committee and represents how the current code is being applied. As such, there should be no impact on the cost of construction.

G92-21

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: This new proposed section is basically adjusting the quantity limits which is better addressed in IBC Table 415.11.1.1.1. The language in 415.11.1.5 currently states "single conditioned environment" which does not appear to make the connection to the concept of a multi-level fabrication area. (Vote: 13-1)

G92-21

Individual Consideration Agenda

Public Comment 1:

Proponents: William Koffel, representing Semiconductor Industry Association (wkoffel@koffel.com) requests As Submitted

Commenter's Reason: Section 415.11.1.5 allows for what is commonly referred to as a "flow through Fab." The section allows for limited openings within a multi-story fabrication area extending through not more than two stories. The penetrations are limited to mechanical, duct, and piping penetrations. The annular space around such penetrations are sealed to restrict the movement of air but not necessarily by an assembly have a fire protection rating. What the section does not address is how to calculate the allowable quantities of HPM that are permitted within the flow through Fab. See Figure 1.

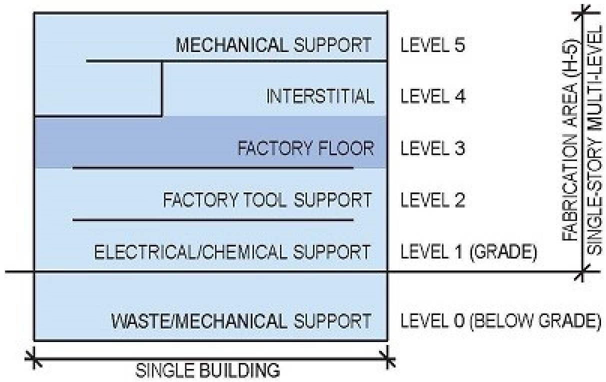

FIGURE 1: SINGLE-STORY MULTIPLE-LEVEL FABRICATION (H-5 OCCUPANCY)

Quantity limits in a fabrication area are calculated differently than most other Group H occupancies. The quantity limits are based upon the density limits in Table 415.11.1.1.1, not an absolute quantity within a control area. In this instance, if the areas shown as Level 1, Level 2 and Level 3 were distributed in a building and all at the same level, one could use the cumulative area to calculate the quantity limits within the fabrication area. However, when built as shown in Figure 1, with limited openings between the two stories, the Code is not clear as to how to calculate the quantity limits. The proposed language indicates that the quantity limits, using the appropriate density, would be calculated for each level independently. This would result in the same quantity limit as if the fabrication area were located all on one level. It should be noted, that the additional restriction for applying the quantity limits in this manner is that all three levels need to be conditioned the same and as required for a fabrication area.

Cost Impact: The net effect of the public comment and code change proposal will not increase or decrease the cost of construction
The proposal and public comment intend to clarify current code text.

Public Comment# 2843

G99-21 Part II

Proposed Change as Submitted

Proponents: Greg Johnson, representing Codes & Standards International (gjohnsonconsulting@gmail.com); Jay Peters, representing Vertiv (peters.jay@me.com); Ben Dolcich, representing Vertiv (ben.dolcich@vertiv.com); Andrew Klein, representing Building Owners and Managers Association International (andrew@asklein.com); Barry Greive, Target Corporation, representing Target Corporation (barry.greive@target.com); David Collins, representing The Preview Group, Inc. (dcollins@preview-group.com); Lee Kaiser, ORR Protection, representing NFPA 75 Technical Committee (ELT-AAA) (lkaiser@orrprotection.com)

2021 International Building Code

Add new text as follows:

SECTION 429
INFORMATION TECHNOLOGY EQUIPMENT FACILITIES (ITEF)

429.1 General.
Information technology equipment facilities (ITEF) shall be classified as industrial occupancies in accordance with Section 1103 of the *International Mechanical Code* and shall comply with Sections 429.1 through 429.9.

429.2 Refrigerants.
Refrigerants used to cool ITE processes shall be limited to Groups A1 and A2L except where *approved*.

429.3 Fire Protection.
ITEF shall comply with NFPA 75.

429.4 Design and construction.
ITEF shall comply with Sections 429.4.1 and 429.4.2.

429.4.1 Separation.
ITEF shall be separated from other occupancies by fire barriers constructed in accordance with Section 707 or horizontal assemblies constructed in accordance with Section 711, or both.

> **Exception:** Computer rooms less than 500 square feet (46 m^2) in area in buildings equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1.

429.4.2 Combustible materials in concealed spaces.
Other than combustible materials permitted for exposed use within plenums complying with Section 602 of the International Mechanical Code, combustible materials shall not be permitted in concealed spaces of ITEF.

429.5 Electrical.
All electrical equipment other than *information technology equipment* shall conform to Class 1, Division 2, of NFPA 70 where the quantity of any Group A2, B2, A3 or B3 refrigerant in a single independent circuit would exceed 25 percent of the *lower flammability limit* (LFL) upon release to the space.

429.6 Ventilation.
Ventilation in ITE spaces shall be activated by refrigerant detection systems in accordance with of Chapter 11 of the *International Mechanical Code*. *Recirculated air* sufficient to fully disperse refrigerant within the ITE space without supply or exhaust air complies with this requirement.

429.7 Refrigerant detection.
ITEF shall be provided with refrigerant detection that complies with Sections 429.7.1 and 429.7.2, and Section 608.9 of the *International Fire Code*.

429.7.1 System activation.
Activation of a refrigerant gas detection alarm shall result in the following:

1. Initiation of distinct audible and visible alarm signals both inside and outside of the ITEF.
2. Automatic activation of the mechanical ventilation system.

429.7.2 Failure of the refrigerant detection system.
Failure of the refrigerant detection system shall automatically activate the mechanical ventilation system and cause a trouble signal to sound at an approved location.

429.8 Standby power.
Mechanical ventilation and refrigerant detection systems shall be provided with a *standby power system* in accordance with Section 2702.

429.9 Common path of egress travel.
ITEF shall comply with Section 1006.2.2.3.

Add new standard(s) as follows:

NFPA

National Fire Protection Association
1 Batterymarch Park
Quincy, MA 02169-7471

NFPA 75-2020 Standard for the Fire Protection of Information Technology Equipment

Reason: General information -

This is several proposals across multiple codes and standards to propose requirements appropriate to the unique characteristics of facilities housing computer rooms and data centers or *Information technology equipment* (ITE).Computer rooms and data centers are mission critical applications. All aspects of our public infrastructure, transportation, our education system, our healthcare system, our national defense, our banking, our public safety systems, our process for writing codes - our lives - are wholly dependent on the efficient real-time processing of data. The ITE used to perform this function must be 100% reliable.
For these reasons ITE facilities are secured spaces, atmospherically and physically, with tightly controlled access.

Because access to ITE facilities is restricted, and because ITE facilities are only accessed by technicians performing periodic process maintenance, the occupant load of these spaces is intermittent or sparse.

Like many process industries, ITE facilities have specific environmental process constraints if they are to function properly:

- ITE needs to be continuously cooled to protect the data and sometimes the best way to cool the equipment is to cool the room.
- ITE is extremely sensitive to humidity and atmospheric contaminants; it can ruin equipment and thereby data. Ideally, ITE facilities bring in no outside air or moisture into ITE spaces; ventilation for refrigerants within ITE facilities is solely to reduce refrigerant concentration by fully mixing refrigerant into the atmosphere of the space.
- Alternative methods of fire suppression may be most suitable.

Until recently ITE facilities used nonflammable A1 refrigerants, but separate rule makings by the California Air Resources Board and the US Environmental Protection Agency now require refrigerants to meet Global Warming Potential (GWP) values that are much lower than currently possible with commercially available A1 refrigerants.

For this reason the ITE facilities cooling industry is adopting the use of A2L refrigerants which perform well, which are environmentally friendlier and which have much lower GWP values, but which are mildly flammable.

Adoption of A2L refrigerant necessitates ITE facility code requirements that provide the right protection for the unique industrial process being protected.

Requirements addressing ITE facilities must be flexible and performance oriented to address the many potential configurations of these spaces, from small computer rooms within much larger uses, or as one use in multiple occupancies, to unlimited area data centers that occupy millions of square feet of land, (https://www.analyticsvidhya.com/blog/2020/09/8-largest-data-centers-world-2020/).

PART I - IBC DEFINITIONS

Using common definitions for information technology equipment, data centers and computer rooms will foster uniformity of application between codes and related standards. These definitions have been proposed for use by the building, fire, and mechanical codes as well as ASHRAE 15, the *Safety Standard for Refrigeration Systems*. They are consistent with definitions used in the ASHRAE 90.4 *Energy Standard for Data Centers* as well as NFPA 75 *Standard for the Fire Protection of Information Technology Equipment*. It is likely that the definitions of data centers and computer rooms will be added to future editions of the IECC.The definitions for computer rooms and data centers are based ASHRAE Standard 90.4-2019 *Energy Standard for Data Centers* except that the definition of computer rooms was modified to clarify that computer rooms are not primarily used for any other purpose than to house *information technology equipment*. This modification is necessary to distinguish computer rooms (data processing) from rooms where occupants use computers (data entry).

PART II -IBC Section 429 (New)

See the general reason.

NFPA 75, *The Standard for the Protection of Information Technology Equipment* is proposed as the appropriate reference to assure:

- The need for appropriate fire protection is met regardless of the configuration of the ITE facility.
- The fire protection package appropriately considers the unique environmental needs of the ITE facility.

NFPA 75 benefits from the involvement of subject matter experts in the design, operation and fire protection of these unique industrial processes.

NFPA 75 is realistic and flexible; it requires a documented risk assessment of the ITE facility to serve as the basis for a fire protection approach that is "*permitted to be determined based on an evaluation of fire risks and hazards associated with the* ITE *and services provided and the business continuity planning and disaster restoration capabilities of the* ITE *specific to the* ITE."

NFPA 75 also anticipates that alternative methods of fire suppression may be most suitable to protect data processing capacity and provides references to those NFPA standards that address such systems. It sets forth *"the minimum requirements for the protection of* ITE *equipment and* ITE *areas from damage by fire or its associated effects — namely, smoke, corrosion, heat, and water*."

In addition to the reference to NFPA 75 for performance design provisions, this proposal provides simple prescriptive requirements consistent with the treatment of locations classified as controlled access, industrial occupancies by ASHRAE 15 *Safety Standard for Refrigeration Systems* and the International Mechanical and Fire Codes.

By section, this proposal does the following:

· **Sec. 429.1 General** classifies ITE facilities as industrial occupancies to align with Sec. 1103 of the IMC. Per the IMC, which is consistent with ASHRAE 15, an industrial occupancy is "*that portion of premises that is not open to the public, where access by authorized persons is controlled, and that is used to manufacture, process or store goods such as chemicals, food, ice, meat or petroleum.*" A change has been proposed for the IMC and to ASHRAE 15 to specifically include ITE facilities in this classification.

· **Sec. 429.2 Refrigerants** limits refrigerants to nonflammable or mildly flammable refrigerants, but also provides clarification that the AHJ can approve other refrigerants on an individual basis.

· **Sec. 429.3 Fire Protection** references NFPA 75.

· **Sec. 429.4 Design and construction** requires a minimum of a one-hour fire separation between the ITE facility and adjacent occupancies, but reasonably provides flexibility for small spaces in fully sprinklered buildings. It also requires materials in concealed spaces, such as below a raised floor or above a suspended ceiling to be those permissible for use in a plenum.

· **Sec. 429.5 Electrical** requires compliance for non-IT equipment with Class 1, Division 2, of NFPA 70 (Class I – Flammable gases or vapors may be present; Division 2 – Ignitable concentrations of hazards exist under abnormal operation conditions) requirements where the code official has approved a refrigerant other than a Group A1 or A2L.

· **Sec. 429.6 Ventilation** requires mechanical ventilation of the ITE space to be triggered by refrigerant detection in accordance with the IMC and its secondary reference to the IFC Sec. 608.9. It also permits required ventilation to mix leaked refrigerant in the ITE space without exhausting the space or bringing in make-up air, thereby protecting the ITE from airborne contaminants and undesirable humidity.

· **Sec. 429.7 Refrigerant detection** references the IFC for refrigerant detection provisions and assures the appropriate initiation of measures to address an unintended leak of refrigerant or failure of the detection system.

· **Sec. 429.8 Standby power** ensures that active detection and protection measures are always available.

· **Sec. 429.9 Common path of egress travel** requires ITEF to comply with the same means of egress requirements as those specified in Section 1006.2.2.3 for refrigerated rooms or spaces. All portions of an ITEF must be within 150 feet of an exit or exit access doorway where such facilities are not protected by an approved automatic sprinkler system.

PART III - IBC Section 306.3 Group F-2

It is proposed to add Information Technology Equipment Facilities (data centers and computer rooms) to the F-2 occupancy group as they are industrial applications not currently addressed by the code with any specificity.

A separate code change proposes to add a section in Chapter 4 to address Information Technology Equipment Facilities (ITEF), but the correct occupancy group should be established.

ITEFs are buildings and spaces that are not open to the public, where access by authorized persons is controlled, and that are used to store and process electronic information or data. They are accessed only by IT maintenance technicians and have low or only intermittent occupant loads

USEPA and California regulations require transition to lower global warming potential refrigerants, which in turn requires changes in provisions in model codes and standards related to the safe use of new A2L (mildly flammable) refrigerants.

PART IV - IBC Section 311.3 Group S-2

Information technology equipment facilities are unique low hazard and low occupancy uses where data is stored and processed in racked equipment. While there are some moderate hazards specific to ITE facilities under abnormal operational conditions, those hazards are anticipated and mitigated by the codes:

- ITE facilities must be cooled for ITE performance. Potential hazards from flammable refrigerants are managed by compliance with the refrigerant safety provisions of the IMC, the IFC and ASHRAE 15 thereby assuring that leaked flammable refrigerants are detected and managed appropriately.
- IMC Section 1104.2.2 requires that the electrical equipment and appliances in ITE facilities must conform to the Class I, Division 2, hazardous location classification requirements of NFPA 70 where the quantity of any Group A2, B2, A3 or B3 refrigerant in a single independent circuit would exceed 25 percent of the lower flammability limit (LFL) upon release to the space.
- Cabling in underfloor and above ceiling plenum areas of ITE facilities is required to comply with IMC Section 602.2.1.1 and electrical equipment exposed in plenums must comply with IMC Sec. 602.2.1.4.

PART V - IBC Table 509.1 Incidental Uses

Information technology equipment (ITE) facilities -data centers and computer rooms - are cooled for industrial process reasons so that the ITE can operate as needed. This means these facilities can have a significant refrigerant load, just like a refrigerant machinery room, without necessarily having a machinery room. Refrigerant machinery rooms already are identified in Table 509.1 as needing either a one-hour separation or automatic sprinkler system protection. ITE facilities should meet the same standard, except that ITE facilities may need alternative fire protection methods for ITE.

PART VI - IBC Table 1004.5 Occupant Load Factor

The original proponent of Section 1004.8 (Group A, 2015: E9-15) included the section as part of a successful effort to increase the Table 1004.5 occupant load factor (OLF) for the typical business use from 100 to 150 SF gross per occupant. Section 1004.8 was added to ensure that the newly less stringent OLF was not applied inappropriately to business use areas known to have a higher density of occupants.

Data centers and computer rooms do not have a higher density of occupants, but typically have very low or intermittent occupancy loads, being occupied by only IT staff who periodically perform equipment maintenance functions. For this proposal, 300 SF gross OLF was selected as a conservative and appropriate OLF because the footprint of racks of *information technology equipment* are comparable to footprint of the racks of shelving in storage and stock areas of mercantile uses, even though such mercantile areas would be far more frequently occupied.

Data centers and computer rooms have significant cooling needs for process purposes; keeping ITE cool enough is mission critical. USEPA and California regulations require transition to lower global warming potential refrigerants, which in turn requires changes in provisions in model codes and standards related to the safe use of new refrigerants. Using common definitions for data centers and computer rooms will foster uniformity of application between codes and related standards. These definitions have been proposed for use by the building, fire, and mechanical codes as well as ASHRAE 15, the *Safety Standard for Refrigeration Systems*.

PART VII - IBC Section 1010.2.9.2 ITEF exits

Information technology equipment (ITE) facilities (computer rooms and data centers) are cooling intensive spaces because of equipment process needs and have similar exiting concerns to refrigeration machinery rooms because of hazards related to refrigerants.

A separate code change proposal will add ITE facilities (computer rooms and data centers) to the IMC's industrial occupancy classification in recognition of the process cooling needs unique to ITE facilities. This change will permit computer rooms and data centers that comply with new IMC Section 1104.2.3 to have space cooling without requiring a refrigeration machine room per Section 1104.2.2.

PART VIII - IFC Definitions

See the commentary to IBC Definitions above.

PART IX - IFC Section 609.8.1

See the general reason above.

Separate proposals for Chapter 11 of the IMC and Chapter 4 of the IBC apply occupancy specific requirements to ITE facilities. Those proposals:

- limit refrigerants to nonflammable Group A1 and mildly flammable Group A2L refrigerants
- require electrical equipment conformance with the Class I, Division 2, hazardous location classification requirements of NFPA 70, and
- reference NFPA 75, *The Standard for the Protection of Information Technology Equipment* to assure appropriate fire protection is provided regardless of the configuration of the ITE facility and the fire protection package appropriately considers the unique environmental needs of the ITE facility.
- require ITE facilities to be separated from adjacent uses by fire barriers and horizontal assemblies.

Given the other fire safety provisions proposed to apply to ITE facilities, and in recognition that stopping the cooling of an ITE space could jeopardize the data and data processes, automatic stopping of cooling is inadvisable.

Required detection and alarms will inform the facility manager and fire officials of the potential hazard, thereby providing an opportunity for data backup and potential purging of the ITE facility atmosphere.

PART X - IMC Definitions

See the commentary to IBC Definitions above.

PART XI - IMC Occupancy classification.

This proposed change clarifies that data centers and computer rooms, which are cooled solely for the process loads associated with *information technology equipment*, are industrial occupancies.

Per Sec. 1103.2 (6), key features of an industrial occupancy are that it is that portion of a premises that is not open to the public and where access by authorized persons is controlled, both of which are characteristic of data centers and computer rooms.

Industrial occupancies also are defined by the processing of "goods." For data centers and computer rooms the 'goods' being processed is data or electronic information.

It is worth noting that no other occupancy classification specifically addresses any of the characteristics of data centers and computer rooms. The catchall provision in the Commercial occupancy classification for "*work or storage areas that do not qualify as industrial occupancies*," is not appropriate as space cooling in commercial occupancies is intended for comfort cooling, not for process cooling and occupant loads for industrial applications are very low, with restricted access, compared to commercial occupancies that may have no restrictions on access.

Data centers and computer rooms have significant cooling needs for process purposes; keeping ITE cool enough is mission critical.

USEPA and California regulations require transition to lower global warming potential refrigerants, which in turn requires changes in provisions in model codes and standards related to the safe use of new refrigerants. Using common definitions for data centers and computer rooms will foster uniformity of application between codes and related standards. These definitions have been proposed for use by the building, fire, and mechanical codes as well as ASHRAE 15, the *Safety Standard for Refrigeration Systems*.

The definitions for computer rooms and data centers are based upon ASHRAE Standard 90.4-2019 *Energy Standard for Data Centers.*

Appropriately classifying data centers and computer rooms will facilitate the drafting of requirements for the IMC that address the unique circumstances of these occupancies.

PART XII - IMC 1104.2.3 ITEF

See the general reason above.

Currently Sec 1106.3 requires that machinery rooms for Group A2L refrigerants must either conform to Class I, Division 2, hazardous location classification requirements of NFPA 70 **OR** provide provide emergency exhaust ventilation (Sec 1106.4). This proposal allows Group A2L to be used without NFPA 70 compliance and without exhaust ventilation in deference to the ITE environmental needs. A separate proposal to add requirements for ITE facilities in Chapter 4 of the building code clarifies that emergency ventilation for ITE facilities is only required to mix the atmosphere within the ITE space so that leaked refrigerant is fully dispersed.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
PART I, VIII and X - The definitions are to information only and will not add any additional construction requirements.
P ART II- In some facilities there may be an additional cost; in others there may be less cost. It will be very building specific.
PART III - This is a clarification.
PART IV- This is a clarification.
PART V - There may additional costs to provide 1 hour separation for the space where the building does not have a fire sprinkler or fire extinguishing system.
PART VI - Means of egress systems will be 'right sized' for data centers and computer rooms.
PART VII - There may be a minimal increase for exit access doors in certain circumstances.

PART IX- Manual controls for refrigeration equipment shut-off should be less expensive than automatic controls.
PART XI -This proposal will match the space use with the correct requirements which will tend to lower construction costs.

PART XII - Having use specific requirements for ITE facilities should minimize costs by avoiding requirements that do not fit the condition.

Staff Analysis: A review of the standard proposed for inclusion in the code, NFPA 75-20, with regard to the ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before March 20, 2021.

G99-21 Part II

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: This proposal was disapproved. There were 7 proposed modifications to this proposal and the testifiers did not agree on a resolution, so the interested parties should go back and work together on a clean set of requirements. The correct occupancy for these facilities needs to be defined. The requirements should work within the current parameters for fire suppression protection. How NFPA 75 is incorporated needs to be clarified. (Vote: 13-0)

G99-21 Part II

Individual Consideration Agenda

Public Comment 1:

IBC: SECTION 429, 429.1 (New), 429.2 (New), 429.3 (New), 429.4 (New), 429.5 (New), 429.6 (New), 429.7 (New), 429.8 (New), 429.9 (New), 429.9.1 (New), 429.9.2 (New), 429.10 (New)

Proponents: Greg Johnson, representing Codes & Standards International (gjohnsonconsulting@gmail.com); Jay Peters, representing Vertiv (peters.jay@me.com); Ben Dolcich, representing Vertiv (ben.dolcich@vertiv.com); Joe Hale, representing 2020 Engineering, LLC (joehale@2020mep.com); Dennis Julian, representing Digital Realty Director of Design (djulian@digitalrealty.com); Kevin Dalton, NTT Global Data Centers Americas, representing NTT Global Data Centers Americas (kdalton@ragingwire.com); Alan French, representing QTS Data Centers - Alan French (alan.french@qtsdatacenters.com); Barry Greive, representing Target Corp (barry.greive@target.com); Paul Wicoff, representing Burr Computer Environments, Inc. (paul.wicoff@bcei.com) requests As Modified by Public Comment

Replace as follows:

2021 International Building Code

SECTION 429
INFORMATION TECHNOLOGY EQUIPMENT FACILITIES (ITEF)

429.1 General . *Information technology equipment facilities* (ITEF) provided with independent air-handling systems for the cooling of *information technology equipment* shall comply with Sections 429.1 through 429.10.

429.2 Occupancy classification . ITEF with independent air-handling systems for the cooling of *information technology equipment* shall be classified as Group F-1 occupancies.

429.3 Refrigerants . Refrigerants used to cool ITE processes shall be limited to Groups A1 and A2L.

429.4 Separation . ITEF shall be separated from other occupancies by 1-hour *fire barriers* constructed in accordance with Section 707 or 1-hour *horizontal assemblies* constructed in accordance with Section 711, or both.

429.5 Combustible materials in concealed spaces . Other than combustible materials permitted for exposed use within plenums complying with Section 602 of the International Mechanical Code, combustible materials shall not be permitted in concealed spaces of ITEF.

429.6 Electrical . All electrical equipment other than *information technology equipment* shall conform to Class 1, Division 2, of NFPA 70 where the quantity of any Group A2L, refrigerant in a single independent circuit would exceed 25 percent of the lower flammability limit (LFL) upon release to the space.

429.7 Elevated Temperatures . Open flame-producing devices or continuously operating hot surfaces over 1290 °F (700 °C) shall not be permanently installed in the room where Group A2L refrigerants are used.

429.8 Circulation airflow system .
An ITEF using Group A2L refrigerants shall be provided with a circulation airflow system designed to reduce the concentration levels of released refrigerant by atmospheric mixing within the ITEF.

429.9 Refrigerant detection . Where the quantity of any Group A2L refrigerant in a single independent circuit could exceed 25 percent of the lower flammable limit (LFL) upon release to the space, the ITEF shall be provided with the following:

1. Refrigerant detection that complies with Section 608.9 of the International Fire Code.
2. Leak detection for individual refrigeration circuits activated in accordance the with manufacturer's instructions. Such leak detectors shall be permitted to control the shut-off of one or more circuits.

429.9.1 Leak detector activation . Activation of an individual refrigerant circuit leak detector shall result in the following:

1. Initiation of distinct audible and visible alarms both inside and outside each entrance to the ITEF.
2. Automatic activation of the ITEF circulation airflow system.
3. Automatic shut-off of compressors in the leaking circuit.

429.9.2 Failure of the refrigerant detection system . Failure of the refrigerant detection system shall automatically activate the ITEF circulation airflow system and activate a trouble signal to sound at an *approved* location.

429.10 Standby power . A standby power system in accordance with Section 2702 shall be provided for ITEFs, including refrigerant detection systems and circulation airflow systems, where the quantity of any Group A2L refrigerant in a single independent circuit would exceed 25 percent of the lower flammability limit (LFL) upon release to the space.

Commenter's Reason: Because of changes to US EPA and State of California environmental regulations roughly 70 percent of the data center cooling industry is transitioning to mildly flammable A2L refrigerants before year 2025 and there are **no** workable code requirements to regulate these unique building uses.
We are developing the 2024 codes. Data center uses **must** be addressed now.

Data Centers, or Information technology equipment facilities (ITEF), are critical infrastructure. Emergency services, government, aviation, transportation, electronic communications, banking, business operations - virtually all rely on dependable data processing and storage. These facilities must be capable of continuity of operations and the code must facilitate their safe operation.

When the industry begins using A2L refrigerants in ITEF cooling an additional, albeit small, hazard has been created, necessitating new code requirements for ITEFs. If these new code requirements are not adopted code officials will have no requirements or guidance to regulate ITEFs that meet the unique needs of ITEFs, including:

· No general automatic shutdown of refrigeration equipment – needed to prevent rapid temperature rise which can destroy data processing.

· No automatic exhaust ventilation - needed because of contaminants in make-up air.

· No limit on the total amount of refrigerant within the space – needed because ITEFs can be very large buildings with very intensive cooling needs. Limits are instead applied on releasable quantities of refrigerant in independent circuits.

This code change and public comment provides requirements for the safe use of ITEFs consistent with the direction of the General Code Committee. By section, those requirements are:

429.1 General: ITEFs that are cooled by extension of the building's comfort cooling system must meet the safety requirements for comfort cooling refrigeration; the size of the space will automatically be constrained by the capacity of the comfort cooling system, which is regulated by other sections of the mechanical code. This keeps smaller computer rooms accessory to other uses from having to comply with SE. 429.

Where ITEFs are cooled with an independent system only for the purpose of ITE cooling, meaning likely cooled with A2L refrigerants, proposed Sec. 429 provides requirements for the safe use of ITEF spaces.

429.2 Occupancy classification: The committee, in their discussions of Part III and Part IV of G99, indicated their preference to have ITEFs classified as F-1 occupancies. This comment adopts that position for ITEFs which are cooled specifically for equipment operational purposes and not human comfort. These are likely to be cooled with A2L refrigerants.

429.3 Refrigerants: Refrigerants for ITEFs are limited to nonflammable A1s and mildly flammable A2Ls. There is no significant history in the industry of the use of more flammable or hazardous refrigerants so limiting ITEF cooling to A1 and A2L refrigerant is not a burden. The code official always can accept alternate refrigerants if the permit applicant can demonstrate an equivalent level of protection.

429.4 Separation: ITEFs not cooled as a byproduct of the building's comfort cooling system are required to have a complete fire separation from adjacent spaces.

429.5 Combustible materials in concealed spaces: Combustible materials in concealed spaces must be plenum rated. This accommodates needed cabling runs for the information technology equipment while keeping out other non-plenum rated combustibles.

429.6 Electrical: This section requires electrical equipment serving locations which may have A2L gases to comply with National Electrical Code provisions for hazardous locations where there is a possibility of exceeding 25 percent of the lower flammable limit. This public comment recognizes the relatively new clarification, via the approval of M74-21, that A2Ls are not a subclass of A2 refrigerants by specifically requiring A2Ls to comply. Other refrigerant groups are deleted to be consistent with the limitation in Sec 429.3.

429.7 Elevated Temperatures: This section is consistent with the requirements approved by the Mechanical Code Committee for Group A2L refrigeration machinery rooms in M78-21 Part I.

429.8 Circulation airflow system: This section provides for atmospheric mixing within the space to disperse leaked A2L refrigerant, which is required upon leak detection. The circulation airflow system will, per Sec. 429.9.1 (2), activate when a circuit leak detector activates, which should keep the leaked refrigerant below 25 percent of the lower flammable limit.

The circulation airflow system is intended to forestall automatic exhaust ventilation, thereby protecting the ITEF environment from make-up air which is likely to be contaminated with particulates or humidity.

If the circulation airflow system fails to keep refrigerant concentrations below 25 percent of the lower flammable limit by atmospheric mixing, refrigerant detectors required by reference to IFC Sec. 608.9 will automatically shut-off all refrigeration equipment, just as is currently required for flammable refrigerants.

429.9 Refrigerant detection:

This public comment requires leak detection for the individual refrigeration circuits of equipment using Group A2L refrigerants where a leak could exceed 25% of the lower flammable limit, which enables (requires) the compressors in leaking circuits to be shut-off while permitting normally operating equipment to continue to operate.

This is consistent with the most recent draft of the applicable UL CSA Standard, 60335 Part 2-40, which only requires compressor shutdown for leaking equipment. There are multiple technological leak detection approaches available, so this comment is drafted in performance language to afford design flexibility. Leak detectors are permitted to control the shut-off of multiple circuits because a single cooling unit may have multiple independent circuits. A leak detector can therefore enable shut-off of all possibly leaking circuits in a cooling unit.

Because rapid heat rise threatens data processing operations it is important let normally operating equipment continue to operate for business continuity. Fans are better left running to disperse leaked refrigerant and to help maintain the thermal conditioning of the space. This means leak detection and mitigation must be provided for each independent circuit in addition to the refrigerant detection already required by IFC Sec. 608.9.1.

Refrigerant detection should only be provided where there is the potential of exceeding 25% of LFL because of the threat of false positives in the detection system. A false positive that triggers automatic shut-off of all refrigerant equipment can threaten literally any system that relies upon continuity of operations, like 911 call centers, hospitals, and other critical life safety operations.

Belts and suspenders are very helpful when wrapped around your neck.

429.10 Standby power: This section guarantees that, where the quantity of A2L refrigerants that can be released exceeds 25 percent of the lower flammable limit, critical fire safety features have power in the event of disruption of the building's primary power source.

Deleted sections:

Old 429.3 Fire Protection. The reference to NFPA 75 was deleted. This means that ITEFs that comply with Sec. 429 must comply with fire protection requirements based upon their classification as an F-1 Occupancy. ITEFs not regulated by Section 429 will need to comply with the fire protection requirements of the main use with which they are associated.

Old 429.10 Common path of egress travel was deleted as unnecessary given the classification of ITEFs as F-1 occupancies which already have relatively conservative common path of egress travel provisions. Additionally, the proposed change and public comment in Part VII requires not less than two exit or exit access doorways in ITEFs larger than 1,000 square feet which will also limit the common path of egress travel.

Cost Impact: The net effect of the public comment and code change proposal will increase the cost of construction
An unavoidable increase in data center construction cost will occur as these facilities are designed and constructed to comply with Federal and California environmental regulations for low GWP refrigerants.

Public Comment# 2483

G99-21 Part VII

Proposed Change as Submitted

Proponents: Greg Johnson, representing Codes & Standards International (gjohnsonconsulting@gmail.com); Jay Peters, representing Vertiv (peters.jay@me.com); Ben Dolcich, representing Vertiv (ben.dolcich@vertiv.com); Andrew Klein, representing Building Owners and Managers Association International (andrew@asklein.com); Barry Greive, Target Corporation, representing Target Corporation (barry.greive@target.com); David Collins, representing The Preview Group, Inc. (dcollins@preview-group.com); Lee Kaiser, ORR Protection, representing NFPA 75 Technical Committee (ELT-AAA) (lkaiser@orrprotection.com)

2021 International Building Code

Revise as follows:

1010.2.9.1 Refrigeration machinery room. Refrigeration machinery rooms <u>and information technology equipment facilities</u> larger than 1,000 square feet (93 m^2) shall have not less than two exit or exit access doorways that swing in the direction of egress travel and shall be equipped with *panic hardware* or *fire exit hardware*.

Reason: General information -

This is several proposals across multiple codes and standards to propose requirements appropriate to the unique characteristics of facilities housing computer rooms and data centers or *Information technology equipment* (ITE).Computer rooms and data centers are mission critical applications. All aspects of our public infrastructure, transportation, our education system, our healthcare system, our national defense, our banking, our public safety systems, our process for writing codes - our lives - are wholly dependent on the efficient real-time processing of data. The ITE used to perform this function must be 100% reliable.
For these reasons ITE facilities are secured spaces, atmospherically and physically, with tightly controlled access.

Because access to ITE facilities is restricted, and because ITE facilities are only accessed by technicians performing periodic process maintenance, the occupant load of these spaces is intermittent or sparse.

Like many process industries, ITE facilities have specific environmental process constraints if they are to function properly:

- ITE needs to be continuously cooled to protect the data and sometimes the best way to cool the equipment is to cool the room.
- ITE is extremely sensitive to humidity and atmospheric contaminants; it can ruin equipment and thereby data. Ideally, ITE facilities bring in no outside air or moisture into ITE spaces; ventilation for refrigerants within ITE facilities is solely to reduce refrigerant concentration by fully mixing refrigerant into the atmosphere of the space.
- Alternative methods of fire suppression may be most suitable.

Until recently ITE facilities used nonflammable A1 refrigerants, but separate rule makings by the California Air Resources Board and the US Environmental Protection Agency now require refrigerants to meet Global Warming Potential (GWP) values that are much lower than currently possible with commercially available A1 refrigerants.

For this reason the ITE facilities cooling industry is adopting the use of A2L refrigerants which perform well, which are environmentally friendlier and which have much lower GWP values, but which are mildly flammable.

Adoption of A2L refrigerant necessitates ITE facility code requirements that provide the right protection for the unique industrial process being protected.

Requirements addressing ITE facilities must be flexible and performance oriented to address the many potential configurations of these spaces, from small computer rooms within much larger uses, or as one use in multiple occupancies, to unlimited area data centers that occupy millions of square feet of land, (https://www.analyticsvidhya.com/blog/2020/09/8-largest-data-centers-world-2020/).

PART I - IBC DEFINITIONS

Using common definitions for information technology equipment, data centers and computer rooms will foster uniformity of application between codes and related standards. These definitions have been proposed for use by the building, fire, and mechanical codes as well as ASHRAE 15, the *Safety Standard for Refrigeration Systems*. They are consistent with definitions used in the ASHRAE 90.4 *Energy Standard for Data Centers* as well as NFPA 75 *Standard for the Fire Protection of Information Technology Equipment*. It is likely that the definitions of data centers and computer rooms will be added to future editions of the IECC.The definitions for computer rooms and data centers are based ASHRAE Standard 90.4-2019 *Energy Standard for Data Centers* except that the definition of computer rooms was modified to clarify that computer rooms are not primarily used for any other purpose than to house *information technology equipment*. This modification is necessary to distinguish computer rooms (data processing) from rooms where occupants use computers (data entry).

PART II -IBC Section 429 (New)

See the general reason.

NFPA 75, *The Standard for the Protection of Information Technology Equipment* is proposed as the appropriate reference to assure:

- The need for appropriate fire protection is met regardless of the configuration of the ITE facility.
- The fire protection package appropriately considers the unique environmental needs of the ITE facility.

NFPA 75 benefits from the involvement of subject matter experts in the design, operation and fire protection of these unique industrial processes.

NFPA 75 is realistic and flexible; it requires a documented risk assessment of the ITE facility to serve as the basis for a fire protection approach that is "*permitted to be determined based on an evaluation of fire risks and hazards associated with the* ITE *and services provided and the business continuity planning and disaster restoration capabilities of the* ITE *specific to the* ITE."

NFPA 75 also anticipates that alternative methods of fire suppression may be most suitable to protect data processing capacity and provides references to those NFPA standards that address such systems. It sets forth *"the minimum requirements for the protection of* ITE *equipment and* ITE *areas from damage by fire or its associated effects — namely, smoke, corrosion, heat, and water*."

In addition to the reference to NFPA 75 for performance design provisions, this proposal provides simple prescriptive requirements consistent with the treatment of locations classified as controlled access, industrial occupancies by ASHRAE 15 *Safety Standard for Refrigeration Systems* and the International Mechanical and Fire Codes.

By section, this proposal does the following:

· **Sec. 429.1 General** classifies ITE facilities as industrial occupancies to align with Sec. 1103 of the IMC. Per the IMC, which is consistent with ASHRAE 15, an industrial occupancy is "*that portion of premises that is not open to the public, where access by authorized persons is controlled, and that is used to manufacture, process or store goods such as chemicals, food, ice, meat or petroleum.*" A change has been proposed for the IMC and to ASHRAE 15 to specifically include ITE facilities in this classification.

· **Sec. 429.2 Refrigerants** limits refrigerants to nonflammable or mildly flammable refrigerants, but also provides clarification that the AHJ can approve other refrigerants on an individual basis.

· **Sec. 429.3 Fire Protection** references NFPA 75.

· **Sec. 429.4 Design and construction** requires a minimum of a one-hour fire separation between the ITE facility and adjacent occupancies, but reasonably provides flexibility for small spaces in fully sprinklered buildings. It also requires materials in concealed spaces, such as below a raised floor or above a suspended ceiling to be those permissible for use in a plenum.

· **Sec. 429.5 Electrical** requires compliance for non-IT equipment with Class 1, Division 2, of NFPA 70 (Class I – Flammable gases or vapors may be present; Division 2 – Ignitable concentrations of hazards exist under <u>abnormal</u> operation conditions) requirements where the code official has approved a refrigerant other than a Group A1 or A2L.

· **Sec. 429.6 Ventilation** requires mechanical ventilation of the ITE space to be triggered by refrigerant detection in accordance with the IMC and its secondary reference to the IFC Sec. 608.9. It also permits required ventilation to mix leaked refrigerant in the ITE space without exhausting the space or bringing in make-up air, thereby protecting the ITE from airborne contaminants and undesirable humidity.

· **Sec. 429.7 Refrigerant detection** references the IFC for refrigerant detection provisions and assures the appropriate initiation of measures to address an unintended leak of refrigerant or failure of the detection system.

· **Sec. 429.8 Standby power** ensures that active detection and protection measures are always available.

· **Sec. 429.9 Common path of egress travel** requires ITEF to comply with the same means of egress requirements as those specified in Section 1006.2.2.3 for refrigerated rooms or spaces. All portions of an ITEF must be within 150 feet of an exit or exit access doorway where such facilities are not protected by an approved automatic sprinkler system.

PART III - IBC Section 306.3 Group F-2

It is proposed to add Information Technology Equipment Facilities (data centers and computer rooms) to the F-2 occupancy group as they are industrial applications not currently addressed by the code with any specificity.

A separate code change proposes to add a section in Chapter 4 to address Information Technology Equipment Facilities (ITEF), but the correct occupancy group should be established.

ITEFs are buildings and spaces that are not open to the public, where access by authorized persons is controlled, and that are used to store and process electronic information or data. They are accessed only by IT maintenance technicians and have low or only intermittent occupant loads USEPA and California regulations require transition to lower global warming potential refrigerants, which in turn requires changes in provisions in model codes and standards related to the safe use of new A2L (mildly flammable) refrigerants.

PART IV - IBC Section 311.3 Group S-2

Information technology equipment facilities are unique low hazard and low occupancy uses where data is stored and processed in racked equipment. While there are some moderate hazards specific to ITE facilities under abnormal operational conditions, those hazards are anticipated and mitigated by the codes:

- ITE facilities must be cooled for ITE performance. Potential hazards from flammable refrigerants are managed by compliance with the refrigerant safety provisions of the IMC, the IFC and ASHRAE 15 thereby assuring that leaked flammable refrigerants are detected and managed appropriately.
- IMC Section 1104.2.2 requires that the electrical equipment and appliances in ITE facilities must conform to the Class I, Division 2, hazardous location classification requirements of NFPA 70 where the quantity of any Group A2, B2, A3 or B3 refrigerant in a single independent circuit would exceed 25 percent of the lower flammability limit (LFL) upon release to the space.
- Cabling in underfloor and above ceiling plenum areas of ITE facilities is required to comply with IMC Section 602.2.1.1 and electrical equipment exposed in plenums must comply with IMC Sec. 602.2.1.4.

PART V - IBC Table 509.1 Incidental Uses

Information technology equipment (ITE) facilities -data centers and computer rooms - are cooled for industrial process reasons so that the ITE can operate as needed. This means these facilities can have a significant refrigerant load, just like a refrigerant machinery room, without necessarily having a machinery room. Refrigerant machinery rooms already are identified in Table 509.1 as needing either a one-hour separation or automatic sprinkler system protection. ITE facilities should meet the same standard, except that ITE facilities may need alternative fire protection methods for ITE.

PART VI - IBC Table 1004.5 Occupant Load Factor

The original proponent of Section 1004.8 (Group A, 2015: E9-15) included the section as part of a successful effort to increase the Table 1004.5 occupant load factor (OLF) for the typical business use from 100 to 150 SF gross per occupant. Section 1004.8 was added to ensure that the newly less stringent OLF was not applied inappropriately to business use areas known to have a higher density of occupants.

Data centers and computer rooms do not have a higher density of occupants, but typically have very low or intermittent occupancy loads, being occupied by only IT staff who periodically perform equipment maintenance functions. For this proposal, 300 SF gross OLF was selected as a conservative and appropriate OLF because the footprint of racks of *information technology equipment* are comparable to footprint of the racks of shelving in storage and stock areas of mercantile uses, even though such mercantile areas would be far more frequently occupied.

Data centers and computer rooms have significant cooling needs for process purposes; keeping ITE cool enough is mission critical. USEPA and California regulations require transition to lower global warming potential refrigerants, which in turn requires changes in provisions in model codes and standards related to the safe use of new refrigerants. Using common definitions for data centers and computer rooms will foster uniformity of application between codes and related standards. These definitions have been proposed for use by the building, fire, and mechanical codes as well as ASHRAE 15, the *Safety Standard for Refrigeration Systems*.

PART VII - IBC Section 1010.2.9.2 ITEF exits

Information technology equipment (ITE) facilities (computer rooms and data centers) are cooling intensive spaces because of equipment process needs and have similar exiting concerns to refrigeration machinery rooms because of hazards related to refrigerants.

A separate code change proposal will add ITE facilities (computer rooms and data centers) to the IMC's industrial occupancy classification in recognition of the process cooling needs unique to ITE facilities. This change will permit computer rooms and data centers that comply with new IMC Section 1104.2.3 to have space cooling without requiring a refrigeration machine room per Section 1104.2.2.

PART VIII - IFC Definitions

See the commentary to IBC Definitions above.

PART IX - IFC Section 609.8.1

See the general reason above.

Separate proposals for Chapter 11 of the IMC and Chapter 4 of the IBC apply occupancy specific requirements to ITE facilities. Those proposals:

- limit refrigerants to nonflammable Group A1 and mildly flammable Group A2L refrigerants
- require electrical equipment conformance with the Class I, Division 2, hazardous location classification requirements of NFPA 70, and
- reference NFPA 75, *The Standard for the Protection of Information Technology Equipment* to assure appropriate fire protection is provided regardless of the configuration of the ITE facility and the fire protection package appropriately considers the unique environmental needs of the ITE facility.
- require ITE facilities to be separated from adjacent uses by fire barriers and horizontal assemblies.

Given the other fire safety provisions proposed to apply to ITE facilities, and in recognition that stopping the cooling of an ITE space could jeopardize the data and data processes, automatic stopping of cooling is inadvisable.

Required detection and alarms will inform the facility manager and fire officials of the potential hazard, thereby providing an opportunity for data backup and potential purging of the ITE facility atmosphere.

PART X - IMC Definitions

See the commentary to IBC Definitions above.

PART XI - IMC Occupancy classification.

This proposed change clarifies that data centers and computer rooms, which are cooled solely for the process loads associated with *information technology equipment*, are industrial occupancies.

Per Sec. 1103.2 (6), key features of an industrial occupancy are that it is that portion of a premises that is not open to the public and where access by authorized persons is controlled, both of which are characteristic of data centers and computer rooms.

Industrial occupancies also are defined by the processing of "goods." For data centers and computer rooms the 'goods' being processed is data or electronic information.

It is worth noting that no other occupancy classification specifically addresses any of the characteristics of data centers and computer rooms. The catchall provision in the Commercial occupancy classification for "*work or storage areas that do not qualify as industrial occupancies*," is not appropriate as space cooling in commercial occupancies is intended for comfort cooling, not for process cooling and occupant loads for industrial applications are very low, with restricted access, compared to commercial occupancies that may have no restrictions on access.

Data centers and computer rooms have significant cooling needs for process purposes; keeping ITE cool enough is mission critical.

USEPA and California regulations require transition to lower global warming potential refrigerants, which in turn requires changes in provisions in model codes and standards related to the safe use of new refrigerants. Using common definitions for data centers and computer rooms will foster uniformity of application between codes and related standards. These definitions have been proposed for use by the building, fire, and mechanical codes as well as ASHRAE 15, the *Safety Standard for Refrigeration Systems*.

The definitions for computer rooms and data centers are based upon ASHRAE Standard 90.4-2019 *Energy Standard for Data Centers.*

Appropriately classifying data centers and computer rooms will facilitate the drafting of requirements for the IMC that address the unique circumstances of these occupancies.

PART XII - IMC 1104.2.3 ITEF

See the general reason above.

Currently Sec 1106.3 requires that machinery rooms for Group A2L refrigerants must either conform to Class I, Division 2, hazardous location classification requirements of NFPA 70 **OR** provide provide emergency exhaust ventilation (Sec 1106.4). This proposal allows Group A2L to be used without NFPA 70 compliance and without exhaust ventilation in deference to the ITE environmental needs. A separate proposal to add requirements for ITE facilities in Chapter 4 of the building code clarifies that emergency ventilation for ITE facilities is only required to mix the atmosphere within the ITE space so that leaked refrigerant is fully dispersed.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
PART I, VIII and X - The definitions are to information only and will not add any additional construction requirements.
P ART II- In some facilities there may be an additional cost; in others there may be less cost. It will be very building specific.
PART III - This is a clarification.

PART IV- This is a clarification.
PART V - There may additional costs to provide 1 hour separation for the space where the building does not have a fire sprinkler or fire extinguishing system.
PART VI - Means of egress systems will be 'right sized' for data centers and computer rooms.
PART VII - There may be a minimal increase for exit access doors in certain circumstances.

PART IX- Manual controls for refrigeration equipment shut-off should be less expensive than automatic controls.
PART XI -This proposal will match the space use with the correct requirements which will tend to lower construction costs.

PART XII - Having use specific requirements for ITE facilities should minimize costs by avoiding requirements that do not fit the condition.

Staff Analysis: A review of the standard proposed for inclusion in the code, NFPA 75-20, with regard to the ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before March 20, 2021.

G99-21 Part VII

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: This proposal was disapproved as the committee felt that the special exit criteria for information technology equipment facilities should not be grouped with refrigeration machinery rooms. While these facilities always have to be cooled, the equipment could be in a separate room. There should also be an equipment size limit. (Vote: 13-1)

G99-21 Part VII

Individual Consideration Agenda

Public Comment 1:

IBC: 1010.2.9.1, 1010.2.9.2 (New)

Proponents: Greg Johnson, representing Codes & Standards International (gjohnsonconsulting@gmail.com); Jay Peters, representing Vertiv (peters.jay@me.com); Ben Dolcich, representing Vertiv (ben.dolcich@vertiv.com) requests As Modified by Public Comment

Modify as follows:

2021 International Building Code

1010.2.9.1 Refrigeration machinery room . Refrigeration machinery rooms ~~and information technology equipment facilities~~ larger than 1,000 square feet (93 m^2) shall have not less than two exit or exit access doorways that swing in the direction of egress travel and shall be equipped with *panic hardware* or *fire exit hardware*.

1010.2.9.2 Information technology equipment facilities. . *Information technology equipment facilities* larger than 1,000 square feet (93 m) shall have not less than two exit or exit access doorways that swing in the direction of egress travel and shall be equipped with *panic hardware* or *fire exit hardware.*

Commenter's Reason: The Means of Egress Code committee said that requirements for information technology equipment facilities (ITEFs) should be in their own subsection within Sec. 1010.2.9 rather than added to Section 1010.2.9.1 for refrigeration machinery rooms. This public comment provides the committee's preferred solution.
ITEFs can have the same refrigerant considerations as machinery rooms because of the intensive cooling needs of the information technology equipment, which is why it is appropriate to apply comparable egress requirements.

Note that Section 1010.2.9.1 for refrigeration machinery rooms is **not** being deleted. Stricken text is only applicable to the text added in the original code change: *"… and information technology equipment facilities.*"

Cost Impact: The net effect of the public comment and code change proposal will increase the cost of construction
Additional egress doors may be required for these facilites.

G99-21 Part IX

Proposed Change as Submitted

Proponents: Greg Johnson, representing Codes & Standards International (gjohnsonconsulting@gmail.com); Jay Peters, representing Vertiv (peters.jay@me.com); Andrew Klein, representing Building Owners and Managers Association International (andrew@asklein.com); Barry Greive, Target Corporation, representing Target Corporation (barry.greive@target.com); David Collins, representing The Preview Group, Inc. (dcollins@preview-group.com); Lee Kaiser, ORR Protection, representing NFPA 75 Technical Committee (ELT-AAA) (lkaiser@orrprotection.com)

2021 International Fire Code

Revise as follows:

608.9.1 Refrigerants other than ammonia. A detector, or a sampling tube that draws air to a detector, shall be provided at an *approved* location where refrigerant from a leak is expected to accumulate. The system shall be designed to initiate audible and visible alarms inside of and outside each entrance to the refrigerating machinery room and transmit a signal to an *approved* location where the concentration of refrigerant detected exceeds the lesser of the following:

1. The corresponding TLV-TWA values shown in the *International Mechanical Code* for the refrigerant classification.
2. Twenty-five percent of the lower flammable limit (LFL).

Detection of a refrigerant concentration exceeding the upper detection limit or 25 percent of the lower flammable limit (LFL), whichever is lower, shall stop refrigerant equipment in the machinery room in accordance with Section 608.10.1.

> **Exception:** Automatic shut off shall not be required for refrigeration equipment in *information technology equipment facilities* that comply with Section 429 of the *International Building Code* and Section 1104.2.2.3 of the *International Mechanical Code*.

Reason: General information -

This is several proposals across multiple codes and standards to propose requirements appropriate to the unique characteristics of facilities housing computer rooms and data centers or *Information technology equipment* (ITE).Computer rooms and data centers are mission critical applications. All aspects of our public infrastructure, transportation, our education system, our healthcare system, our national defense, our banking, our public safety systems, our process for writing codes - our lives - are wholly dependent on the efficient real-time processing of data. The ITE used to perform this function must be 100% reliable.
For these reasons ITE facilities are secured spaces, atmospherically and physically, with tightly controlled access.

Because access to ITE facilities is restricted, and because ITE facilities are only accessed by technicians performing periodic process maintenance, the occupant load of these spaces is intermittent or sparse.

Like many process industries, ITE facilities have specific environmental process constraints if they are to function properly:

- ITE needs to be continuously cooled to protect the data and sometimes the best way to cool the equipment is to cool the room.
- ITE is extremely sensitive to humidity and atmospheric contaminants; it can ruin equipment and thereby data. Ideally, ITE facilities bring in no outside air or moisture into ITE spaces; ventilation for refrigerants within ITE facilities is solely to reduce refrigerant concentration by fully mixing refrigerant into the atmosphere of the space.
- Alternative methods of fire suppression may be most suitable.

Until recently ITE facilities used nonflammable A1 refrigerants, but separate rule makings by the California Air Resources Board and the US Environmental Protection Agency now require refrigerants to meet Global Warming Potential (GWP) values that are much lower than currently possible with commercially available A1 refrigerants.

For this reason the ITE facilities cooling industry is adopting the use of A2L refrigerants which perform well, which are environmentally friendlier and which have much lower GWP values, but which are mildly flammable.

Adoption of A2L refrigerant necessitates ITE facility code requirements that provide the right protection for the unique industrial process being protected.

Requirements addressing ITE facilities must be flexible and performance oriented to address the many potential configurations of these spaces, from small computer rooms within much larger uses, or as one use in multiple occupancies, to unlimited area data centers that occupy millions of square feet of land, (https://www.analyticsvidhya.com/blog/2020/09/8-largest-data-centers-world-2020/).

PART I - IBC DEFINITIONS

Using common definitions for information technology equipment, data centers and computer rooms will foster uniformity of application between codes and related standards. These definitions have been proposed for use by the building, fire, and mechanical codes as well as ASHRAE 15, the *Safety Standard for Refrigeration Systems*. They are consistent with definitions used in the ASHRAE 90.4 *Energy Standard for Data Centers* as well as NFPA 75 *Standard for the Fire Protection of Information Technology Equipment*. It is likely that the definitions of data centers and computer rooms will be added to future editions of the IECC.The definitions for computer rooms and data centers are based ASHRAE Standard 90.4-2019 *Energy Standard for Data Centers* except that the definition of computer rooms was modified to clarify that computer rooms are not primarily used for any other purpose than to house *information technology equipment*. This modification is necessary to distinguish computer rooms (data processing) from rooms where occupants use computers (data entry).

PART II -IBC Section 429 (New)

See the general reason.

NFPA 75, *The Standard for the Protection of Information Technology Equipment* is proposed as the appropriate reference to assure:

- The need for appropriate fire protection is met regardless of the configuration of the ITE facility.
- The fire protection package appropriately considers the unique environmental needs of the ITE facility.

NFPA 75 benefits from the involvement of subject matter experts in the design, operation and fire protection of these unique industrial processes.

NFPA 75 is realistic and flexible; it requires a documented risk assessment of the ITE facility to serve as the basis for a fire protection approach that is "*permitted to be determined based on an evaluation of fire risks and hazards associated with the* ITE *and services provided and the business continuity planning and disaster restoration capabilities of the* ITE *specific to the* ITE."

NFPA 75 also anticipates that alternative methods of fire suppression may be most suitable to protect data processing capacity and provides references to those NFPA standards that address such systems. It sets forth *"the minimum requirements for the protection of* ITE *equipment and* ITE *areas from damage by fire or its associated effects — namely, smoke, corrosion, heat, and water.*"

In addition to the reference to NFPA 75 for performance design provisions, this proposal provides simple prescriptive requirements consistent with the treatment of locations classified as controlled access, industrial occupancies by ASHRAE 15 *Safety Standard for Refrigeration Systems* and the International Mechanical and Fire Codes.

By section, this proposal does the following:

· **Sec. 429.1 General** classifies ITE facilities as industrial occupancies to align with Sec. 1103 of the IMC. Per the IMC, which is consistent with ASHRAE 15, an industrial occupancy is "*that portion of premises that is not open to the public, where access by authorized persons is controlled, and that is used to manufacture, process or store goods such as chemicals, food, ice, meat or petroleum.*" A change has been proposed for the IMC and to ASHRAE 15 to specifically include ITE facilities in this classification.

· **Sec. 429.2 Refrigerants** limits refrigerants to nonflammable or mildly flammable refrigerants, but also provides clarification that the AHJ can approve other refrigerants on an individual basis.

· **Sec. 429.3 Fire Protection** references NFPA 75.

· **Sec. 429.4 Design and construction** requires a minimum of a one-hour fire separation between the ITE facility and adjacent occupancies, but reasonably provides flexibility for small spaces in fully sprinklered buildings. It also requires materials in concealed spaces, such as below a raised floor or above a suspended ceiling to be those permissible for use in a plenum.

· **Sec. 429.5 Electrical** requires compliance for non-IT equipment with Class 1, Division 2, of NFPA 70 (Class I – Flammable gases or vapors may be present; Division 2 – Ignitable concentrations of hazards exist under <u>abnormal</u> operation conditions) requirements where the code official has approved a refrigerant other than a Group A1 or A2L.

· **Sec. 429.6 Ventilation** requires mechanical ventilation of the ITE space to be triggered by refrigerant detection in accordance with the IMC and its secondary reference to the IFC Sec. 608.9. It also permits required ventilation to mix leaked refrigerant in the ITE space without exhausting the space or bringing in make-up air, thereby protecting the ITE from airborne contaminants and undesirable humidity.

· **Sec. 429.7 Refrigerant detection** references the IFC for refrigerant detection provisions and assures the appropriate initiation of measures to address an unintended leak of refrigerant or failure of the detection system.

· **Sec. 429.8 Standby power** ensures that active detection and protection measures are always available.

· **Sec. 429.9 Common path of egress travel** requires ITEF to comply with the same means of egress requirements as those specified in

Section 1006.2.2.3 for refrigerated rooms or spaces. All portions of an ITEF must be within 150 feet of an exit or exit access doorway where such facilities are not protected by an approved automatic sprinkler system.

PART III - IBC Section 306.3 Group F-2

It is proposed to add Information Technology Equipment Facilities (data centers and computer rooms) to the F-2 occupancy group as they are industrial applications not currently addressed by the code with any specificity.

A separate code change proposes to add a section in Chapter 4 to address Information Technology Equipment Facilities (ITEF), but the correct occupancy group should be established.

ITEFs are buildings and spaces that are not open to the public, where access by authorized persons is controlled, and that are used to store and process electronic information or data. They are accessed only by IT maintenance technicians and have low or only intermittent occupant loads USEPA and California regulations require transition to lower global warming potential refrigerants, which in turn requires changes in provisions in model codes and standards related to the safe use of new A2L (mildly flammable) refrigerants.

PART IV - IBC Section 311.3 Group S-2

Information technology equipment facilities are unique low hazard and low occupancy uses where data is stored and processed in racked equipment. While there are some moderate hazards specific to ITE facilities under abnormal operational conditions, those hazards are anticipated and mitigated by the codes:

- ITE facilities must be cooled for ITE performance. Potential hazards from flammable refrigerants are managed by compliance with the refrigerant safety provisions of the IMC, the IFC and ASHRAE 15 thereby assuring that leaked flammable refrigerants are detected and managed appropriately.
- IMC Section 1104.2.2 requires that the electrical equipment and appliances in ITE facilities must conform to the Class I, Division 2, hazardous location classification requirements of NFPA 70 where the quantity of any Group A2, B2, A3 or B3 refrigerant in a single independent circuit would exceed 25 percent of the lower flammability limit (LFL) upon release to the space.
- Cabling in underfloor and above ceiling plenum areas of ITE facilities is required to comply with IMC Section 602.2.1.1 and electrical equipment exposed in plenums must comply with IMC Sec. 602.2.1.4.

PART V - IBC Table 509.1 Incidental Uses

Information technology equipment (ITE) facilities -data centers and computer rooms - are cooled for industrial process reasons so that the ITE can operate as needed. This means these facilities can have a significant refrigerant load, just like a refrigerant machinery room, without necessarily having a machinery room. Refrigerant machinery rooms already are identified in Table 509.1 as needing either a one-hour separation or automatic sprinkler system protection. ITE facilities should meet the same standard, except that ITE facilities may need alternative fire protection methods for ITE.

PART VI - IBC Table 1004.5 Occupant Load Factor

The original proponent of Section 1004.8 (Group A, 2015: E9-15) included the section as part of a successful effort to increase the Table 1004.5 occupant load factor (OLF) for the typical business use from 100 to 150 SF gross per occupant. Section 1004.8 was added to ensure that the newly less stringent OLF was not applied inappropriately to business use areas known to have a higher density of occupants.

Data centers and computer rooms do not have a higher density of occupants, but typically have very low or intermittent occupancy loads, being occupied by only IT staff who periodically perform equipment maintenance functions. For this proposal, 300 SF gross OLF was selected as a conservative and appropriate OLF because the footprint of racks of *information technology equipment* are comparable to footprint of the racks of shelving in storage and stock areas of mercantile uses, even though such mercantile areas would be far more frequently occupied.

Data centers and computer rooms have significant cooling needs for process purposes; keeping ITE cool enough is mission critical. USEPA and California regulations require transition to lower global warming potential refrigerants, which in turn requires changes in provisions in model codes and standards related to the safe use of new refrigerants. Using common definitions for data centers and computer rooms will foster uniformity of application between codes and related standards. These definitions have been proposed for use by the building, fire, and mechanical codes as well as ASHRAE 15, the *Safety Standard for Refrigeration Systems*.

PART VII - IBC Section 1010.2.9.2 ITEF exits

Information technology equipment (ITE) facilities (computer rooms and data centers) are cooling intensive spaces because of equipment process needs and have similar exiting concerns to refrigeration machinery rooms because of hazards related to refrigerants.

A separate code change proposal will add ITE facilities (computer rooms and data centers) to the IMC's industrial occupancy classification in recognition of the process cooling needs unique to ITE facilities. This change will permit computer rooms and data centers that comply with new IMC Section 1104.2.3 to have space cooling without requiring a refrigeration machine room per Section 1104.2.2.

PART VIII - IFC Definitions

See the commentary to IBC Definitions above.

PART IX - IFC Section 609.8.1

See the general reason above.

Separate proposals for Chapter 11 of the IMC and Chapter 4 of the IBC apply occupancy specific requirements to ITE facilities. Those proposals:

- limit refrigerants to nonflammable Group A1 and mildly flammable Group A2L refrigerants
- require electrical equipment conformance with the Class I, Division 2, hazardous location classification requirements of NFPA 70, and
- reference NFPA 75, *The Standard for the Protection of Information Technology Equipment* to assure appropriate fire protection is provided regardless of the configuration of the ITE facility and the fire protection package appropriately considers the unique environmental needs of the ITE facility.
- require ITE facilities to be separated from adjacent uses by fire barriers and horizontal assemblies.

Given the other fire safety provisions proposed to apply to ITE facilities, and in recognition that stopping the cooling of an ITE space could jeopardize the data and data processes, automatic stopping of cooling is inadvisable.

Required detection and alarms will inform the facility manager and fire officials of the potential hazard, thereby providing an opportunity for data backup and potential purging of the ITE facility atmosphere.

PART X - IMC Definitions

See the commentary to IBC Definitions above.

PART XI - IMC Occupancy classification.

This proposed change clarifies that data centers and computer rooms, which are cooled solely for the process loads associated with *information technology equipment*, are industrial occupancies.

Per Sec. 1103.2 (6), key features of an industrial occupancy are that it is that portion of a premises that is not open to the public and where access by authorized persons is controlled, both of which are characteristic of data centers and computer rooms.

Industrial occupancies also are defined by the processing of "goods." For data centers and computer rooms the 'goods' being processed is data or electronic information.

It is worth noting that no other occupancy classification specifically addresses any of the characteristics of data centers and computer rooms. The catchall provision in the Commercial occupancy classification for "*work or storage areas that do not qualify as industrial occupancies*," is not appropriate as space cooling in commercial occupancies is intended for comfort cooling, not for process cooling and occupant loads for industrial applications are very low, with restricted access, compared to commercial occupancies that may have no restrictions on access.

Data centers and computer rooms have significant cooling needs for process purposes; keeping ITE cool enough is mission critical.

USEPA and California regulations require transition to lower global warming potential refrigerants, which in turn requires changes in provisions in model codes and standards related to the safe use of new refrigerants. Using common definitions for data centers and computer rooms will foster uniformity of application between codes and related standards. These definitions have been proposed for use by the building, fire, and mechanical codes as well as ASHRAE 15, the *Safety Standard for Refrigeration Systems*.

The definitions for computer rooms and data centers are based upon ASHRAE Standard 90.4-2019 *Energy Standard for Data Centers.*

Appropriately classifying data centers and computer rooms will facilitate the drafting of requirements for the IMC that address the unique circumstances of these occupancies.

PART XII - IMC 1104.2.3 ITEF

See the general reason above.

Currently Sec 1106.3 requires that machinery rooms for Group A2L refrigerants must either conform to Class I, Division 2, hazardous location classification requirements of NFPA 70 **OR** provide provide emergency exhaust ventilation (Sec 1106.4). This proposal allows Group A2L to be used without NFPA 70 compliance and without exhaust ventilation in deference to the ITE environmental needs. A separate proposal to add requirements for ITE facilities in Chapter 4 of the building code clarifies that emergency ventilation for ITE facilities is only required to mix the atmosphere within the ITE space so that leaked refrigerant is fully dispersed.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
PART I, VIII and X - The definitions are to information only and will not add any additional construction requirements.
P ART II- In some facilities there may be an additional cost; in others there may be less cost. It will be very building specific.
PART III - This is a clarification.
PART IV- This is a clarification.
PART V - There may additional costs to provide 1 hour separation for the space where the building does not have a fire sprinkler or fire extinguishing system.
PART VI - Means of egress systems will be 'right sized' for data centers and computer rooms.
PART VII - There may be a minimal increase for exit access doors in certain circumstances.

PART IX- Manual controls for refrigeration equipment shut-off should be less expensive than automatic controls.
PART XI -This proposal will match the space use with the correct requirements which will tend to lower construction costs.

PART XII - Having use specific requirements for ITE facilities should minimize costs by avoiding requirements that do not fit the condition.

Staff Analysis: A review of the standard proposed for inclusion in the code, NFPA 75-20, with regard to the ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before March 20, 2021.

G99-21 Part IX

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: This proposal was disapproved based upon the actions taken on other parts of this proposal. In addition, there was concern that this proposal will be reducing necessary safety factors with removal of automatic shutoffs through the proposed exception. (Vote: 14-0)

G99-21 Part IX

Individual Consideration Agenda

Public Comment 1:

IFC: 608.9.1

Proponents: Greg Johnson, representing Codes & Standards International (gjohnsonconsulting@gmail.com); Jay Peters, representing Vertiv (peters.jay@me.com); Ben Dolcich, representing Vertiv (ben.dolcich@vertiv.com); Paul Wicoff, representing Burr Computer Environments, Inc. (paul.wicoff@bcei.com); Joe Hale, representing 2020 Engineering, LLC (joehale@2020mep.com); Dennis Julian, representing Digital Realty Director of Design (djulian@digitalrealty.com); Kevin Dalton, representing NTT Global Data Centers Americas (kdalton@ragingwire.com); Alan French, representing QTS Data Centers - Alan French (alan.french@qtsdatacenters.com) requests As Modified by Public Comment

Modify as follows:

2021 International Fire Code

608.9.1 Refrigerants other than ammonia . A detector, or a sampling tube that draws air to a detector, shall be provided at an *approved* location where refrigerant from a leak is expected to accumulate. The system shall be designed to initiate audible and visible alarms inside of and outside each entrance to the refrigerating machinery room and transmit a signal to an *approved* location where the concentration of refrigerant detected exceeds the lesser of the following:

1. The corresponding TLV-TWA values shown in the *International Mechanical Code* for the refrigerant classification.

2. Twenty-five percent of the lower flammable limit (LFL).

Detection of a refrigerant concentration exceeding the upper detection limit or 25 percent of the lower flammable limit (LFL), whichever is lower, shall stop refrigerant equipment in the machinery room in accordance with Section 608.10.1.

Exception: ~~Automatic~~ Manual shut off ~~shall not be required for~~ of refrigeration equipment shall be permitted in *information technology equipment facilities* that comply with Section 429 of the *International Building Code* ~~and Section 1104.2.2.3 of the *International Mechanical Code*~~.

Commenter's Reason: ITEF (data center) functionality is absolutely dependent upon refrigeration equipment keeping the information technology equipment within normal operating temperature ranges.
The risk of false-positive, or unintentional shut-off of refrigeration equipment in data centers because of a faulty refrigerant detector can create much broader, and more significant, life-safety hazards than those mitigated by automatic shut-off.

A false positive by a faulty detector, if permitted to automatically shut-down refrigeration equipment, and subsequent loss of processing capability, could compromise any system using the data center, such as 911 call systems, fire, EMS, and police dispatch systems, hospitals, hazardous weather alerts, utility grids, etc. Of course an unintentional ITEF shut-down also can compromise financial systems, which can have its own safety impacts.

It is much safer to permit data center staff to manually shut-off equipment once processing operations have been transferred to redundant facilities. Data centers are secured facilities, continuously staffed with trained technicians so knowledgeable parties will control shut-off upon alarm.

Note that proposed Section 429 of the IBC limits refrigerant types in ITEFs to A1 (nonflammable) and A2L (mildly flammable). Section 429 also requires 1-hour fire separations, limits combustibles in plenums, limits hot surfaces and flame-producing devices, and requires NFPA 70 Class 1, Division II compliance, atmospheric mixing to disperse refrigerant, and standby power where any independent refrigeration circuit could exceed 25% of the lower flammable limit upon release to the space.

Cost Impact: The net effect of the public comment and code change proposal will not increase or decrease the cost of construction
There will be no appreciable cost difference.

Public Comment# 2774

G99-21 Part X

Proposed Change as Submitted

Proponents: Greg Johnson, representing Codes & Standards International (gjohnsonconsulting@gmail.com); Jay Peters, representing Vertiv (peters.jay@me.com); Andrew Klein, representing Building Owners and Managers Association International (andrew@asklein.com); Barry Greive, Target Corporation, representing Target Corporation (barry.greive@target.com); David Collins, representing The Preview Group, Inc. (dcollins@preview-group.com); Lee Kaiser, ORR Protection, representing NFPA 75 Technical Committee (ELT-AAA) (lkaiser@orrprotection.com)

2021 International Mechanical Code

Add new definition as follows:

COMPUTER ROOM. A room or portions of a *building* used primarily to house *information technology equipment (ITE)* and serving an *ITE* load less than or equal to10 kW or 20 W/ft^2 (215 W/m^2) or less of conditioned floor area.

DATA CENTER. A room or *building*, or portions thereof, used primarily to house *information technology equipment (ITE)* and serving a total *ITE* load greater than 10 kW and 20 W/ft^2 (215 W/m^2) of conditioned floor area.

INFORMATION TECHNOLOGY EQUIPMENT (ITE). Computers, data storage, servers, and network communication equipment.

INFORMATION TECHNOLOGY EQUIPMENT FACILITIES (ITEF). *Data centers* and *computer rooms* used primarily to house *information technology equipment.*

Reason: General information -

This is several proposals across multiple codes and standards to propose requirements appropriate to the unique characteristics of facilities housing computer rooms and data centers or *Information technology equipment* (ITE).Computer rooms and data centers are mission critical applications. All aspects of our public infrastructure, transportation, our education system, our healthcare system, our national defense, our banking, our public safety systems, our process for writing codes - our lives - are wholly dependent on the efficient real-time processing of data. The ITE used to perform this function must be 100% reliable.
For these reasons ITE facilities are secured spaces, atmospherically and physically, with tightly controlled access.

Because access to ITE facilities is restricted, and because ITE facilities are only accessed by technicians performing periodic process maintenance, the occupant load of these spaces is intermittent or sparse.

Like many process industries, ITE facilities have specific environmental process constraints if they are to function properly:

- ITE needs to be continuously cooled to protect the data and sometimes the best way to cool the equipment is to cool the room.
- ITE is extremely sensitive to humidity and atmospheric contaminants; it can ruin equipment and thereby data. Ideally, ITE facilities bring in no outside air or moisture into ITE spaces; ventilation for refrigerants within ITE facilities is solely to reduce refrigerant concentration by fully mixing refrigerant into the atmosphere of the space.
- Alternative methods of fire suppression may be most suitable.

Until recently ITE facilities used nonflammable A1 refrigerants, but separate rule makings by the California Air Resources Board and the US Environmental Protection Agency now require refrigerants to meet Global Warming Potential (GWP) values that are much lower than currently possible with commercially available A1 refrigerants.

For this reason the ITE facilities cooling industry is adopting the use of A2L refrigerants which perform well, which are environmentally friendlier and which have much lower GWP values, but which are mildly flammable.

Adoption of A2L refrigerant necessitates ITE facility code requirements that provide the right protection for the unique industrial process being protected.

Requirements addressing ITE facilities must be flexible and performance oriented to address the many potential configurations of these spaces, from small computer rooms within much larger uses, or as one use in multiple occupancies, to unlimited area data centers that occupy millions of square feet of land, (https://www.analyticsvidhya.com/blog/2020/09/8-largest-data-centers-world-2020/).

PART I - IBC DEFINITIONS

Using common definitions for information technology equipment, data centers and computer rooms will foster uniformity of application between codes and related standards. These definitions have been proposed for use by the building, fire, and mechanical codes as well as ASHRAE 15, the *Safety Standard for Refrigeration Systems*. They are consistent with definitions used in the ASHRAE 90.4 *Energy Standard for Data Centers* as well as NFPA 75 *Standard for the Fire Protection of Information Technology Equipment*. It is likely that the definitions of data centers and computer rooms will be added to future editions of the IECC.The definitions for computer rooms and data centers are based ASHRAE Standard 90.4-2019 *Energy Standard for Data Centers* except that the definition of computer rooms was modified to clarify that computer rooms are not primarily used for any other purpose than to house *information technology equipment*. This modification is necessary to distinguish computer rooms (data processing) from rooms where occupants use computers (data entry).

PART II -IBC Section 429 (New)

See the general reason.

NFPA 75, *The Standard for the Protection of Information Technology Equipment* is proposed as the appropriate reference to assure:

- The need for appropriate fire protection is met regardless of the configuration of the ITE facility.
- The fire protection package appropriately considers the unique environmental needs of the ITE facility.

NFPA 75 benefits from the involvement of subject matter experts in the design, operation and fire protection of these unique industrial processes.

NFPA 75 is realistic and flexible; it requires a documented risk assessment of the ITE facility to serve as the basis for a fire protection approach that is "*permitted to be determined based on an evaluation of fire risks and hazards associated with the* ITE *and services provided and the business continuity planning and disaster restoration capabilities of the* ITE *specific to the* ITE."

NFPA 75 also anticipates that alternative methods of fire suppression may be most suitable to protect data processing capacity and provides references to those NFPA standards that address such systems. It sets forth *"the minimum requirements for the protection of* ITE *equipment and* ITE *areas from damage by fire or its associated effects — namely, smoke, corrosion, heat, and water*."

In addition to the reference to NFPA 75 for performance design provisions, this proposal provides simple prescriptive requirements consistent with the treatment of locations classified as controlled access, industrial occupancies by ASHRAE 15 *Safety Standard for Refrigeration Systems* and the International Mechanical and Fire Codes.

By section, this proposal does the following:

· **Sec. 429.1 General** classifies ITE facilities as industrial occupancies to align with Sec. 1103 of the IMC. Per the IMC, which is consistent with ASHRAE 15, an industrial occupancy is "*that portion of premises that is not open to the public, where access by authorized persons is controlled, and that is used to manufacture, process or store goods such as chemicals, food, ice, meat or petroleum.*" A change has been proposed for the IMC and to ASHRAE 15 to specifically include ITE facilities in this classification.

· **Sec. 429.2 Refrigerants** limits refrigerants to nonflammable or mildly flammable refrigerants, but also provides clarification that the AHJ can approve other refrigerants on an individual basis.

· **Sec. 429.3 Fire Protection** references NFPA 75.

· **Sec. 429.4 Design and construction** requires a minimum of a one-hour fire separation between the ITE facility and adjacent occupancies, but reasonably provides flexibility for small spaces in fully sprinklered buildings. It also requires materials in concealed spaces, such as below a raised floor or above a suspended ceiling to be those permissible for use in a plenum.

· **Sec. 429.5 Electrical** requires compliance for non-IT equipment with Class 1, Division 2, of NFPA 70 (Class I – Flammable gases or vapors may be present; Division 2 – Ignitable concentrations of hazards exist under <u>abnormal</u> operation conditions) requirements where the code official has approved a refrigerant other than a Group A1 or A2L.

· **Sec. 429.6 Ventilation** requires mechanical ventilation of the ITE space to be triggered by refrigerant detection in accordance with the IMC and its secondary reference to the IFC Sec. 608.9. It also permits required ventilation to mix leaked refrigerant in the ITE space without exhausting the space or bringing in make-up air, thereby protecting the ITE from airborne contaminants and undesirable humidity.

· **Sec. 429.7 Refrigerant detection** references the IFC for refrigerant detection provisions and assures the appropriate initiation of measures to address an unintended leak of refrigerant or failure of the detection system.

· **Sec. 429.8 Standby power** ensures that active detection and protection measures are always available.

· **Sec. 429.9 Common path of egress travel** requires ITEF to comply with the same means of egress requirements as those specified in Section 1006.2.2.3 for refrigerated rooms or spaces. All portions of an ITEF must be within 150 feet of an exit or exit access doorway where such facilities are not protected by an approved automatic sprinkler system.

PART III - IBC Section 306.3 Group F-2

It is proposed to add Information Technology Equipment Facilities (data centers and computer rooms) to the F-2 occupancy group as they are industrial applications not currently addressed by the code with any specificity.

A separate code change proposes to add a section in Chapter 4 to address Information Technology Equipment Facilities (ITEF), but the correct occupancy group should be established.

ITEFs are buildings and spaces that are not open to the public, where access by authorized persons is controlled, and that are used to store and process electronic information or data. They are accessed only by IT maintenance technicians and have low or only intermittent occupant loads

USEPA and California regulations require transition to lower global warming potential refrigerants, which in turn requires changes in provisions in model codes and standards related to the safe use of new A2L (mildly flammable) refrigerants.

PART IV - IBC Section 311.3 Group S-2

Information technology equipment facilities are unique low hazard and low occupancy uses where data is stored and processed in racked equipment. While there are some moderate hazards specific to ITE facilities under abnormal operational conditions, those hazards are anticipated and mitigated by the codes:

- ITE facilities must be cooled for ITE performance. Potential hazards from flammable refrigerants are managed by compliance with the refrigerant safety provisions of the IMC, the IFC and ASHRAE 15 thereby assuring that leaked flammable refrigerants are detected and managed appropriately.
- IMC Section 1104.2.2 requires that the electrical equipment and appliances in ITE facilities must conform to the Class I, Division 2, hazardous location classification requirements of NFPA 70 where the quantity of any Group A2, B2, A3 or B3 refrigerant in a single independent circuit would exceed 25 percent of the lower flammability limit (LFL) upon release to the space.
- Cabling in underfloor and above ceiling plenum areas of ITE facilities is required to comply with IMC Section 602.2.1.1 and electrical equipment exposed in plenums must comply with IMC Sec. 602.2.1.4.

PART V - IBC Table 509.1 Incidental Uses

Information technology equipment (ITE) facilities -data centers and computer rooms - are cooled for industrial process reasons so that the ITE can operate as needed. This means these facilities can have a significant refrigerant load, just like a refrigerant machinery room, without necessarily having a machinery room. Refrigerant machinery rooms already are identified in Table 509.1 as needing either a one-hour separation or automatic sprinkler system protection. ITE facilities should meet the same standard, except that ITE facilities may need alternative fire protection methods for ITE.

PART VI - IBC Table 1004.5 Occupant Load Factor

The original proponent of Section 1004.8 (Group A, 2015: E9-15) included the section as part of a successful effort to increase the Table 1004.5 occupant load factor (OLF) for the typical business use from 100 to 150 SF gross per occupant. Section 1004.8 was added to ensure that the newly less stringent OLF was not applied inappropriately to business use areas known to have a higher density of occupants.

Data centers and computer rooms do not have a higher density of occupants, but typically have very low or intermittent occupancy loads, being occupied by only IT staff who periodically perform equipment maintenance functions. For this proposal, 300 SF gross OLF was selected as a conservative and appropriate OLF because the footprint of racks of *information technology equipment* are comparable to footprint of the racks of shelving in storage and stock areas of mercantile uses, even though such mercantile areas would be far more frequently occupied.

Data centers and computer rooms have significant cooling needs for process purposes; keeping ITE cool enough is mission critical. USEPA and California regulations require transition to lower global warming potential refrigerants, which in turn requires changes in provisions in model codes and standards related to the safe use of new refrigerants. Using common definitions for data centers and computer rooms will foster uniformity of application between codes and related standards. These definitions have been proposed for use by the building, fire, and mechanical codes as well as ASHRAE 15, the *Safety Standard for Refrigeration Systems*.

PART VII - IBC Section 1010.2.9.2 ITEF exits

Information technology equipment (ITE) facilities (computer rooms and data centers) are cooling intensive spaces because of equipment process needs and have similar exiting concerns to refrigeration machinery rooms because of hazards related to refrigerants.

A separate code change proposal will add ITE facilities (computer rooms and data centers) to the IMC's industrial occupancy classification in recognition of the process cooling needs unique to ITE facilities. This change will permit computer rooms and data centers that comply with new IMC Section 1104.2.3 to have space cooling without requiring a refrigeration machine room per Section 1104.2.2.

PART VIII - IFC Definitions

See the commentary to IBC Definitions above.

PART IX - IFC Section 609.8.1

See the general reason above.

Separate proposals for Chapter 11 of the IMC and Chapter 4 of the IBC apply occupancy specific requirements to ITE facilities. Those proposals:

- limit refrigerants to nonflammable Group A1 and mildly flammable Group A2L refrigerants
- require electrical equipment conformance with the Class I, Division 2, hazardous location classification requirements of NFPA 70, and
- reference NFPA 75, *The Standard for the Protection of Information Technology Equipment* to assure appropriate fire protection is provided regardless of the configuration of the ITE facility and the fire protection package appropriately considers the unique environmental needs of the ITE facility.
- require ITE facilities to be separated from adjacent uses by fire barriers and horizontal assemblies.

Given the other fire safety provisions proposed to apply to ITE facilities, and in recognition that stopping the cooling of an ITE space could jeopardize the data and data processes, automatic stopping of cooling is inadvisable.

Required detection and alarms will inform the facility manager and fire officials of the potential hazard, thereby providing an opportunity for data backup and potential purging of the ITE facility atmosphere.

PART X - IMC Definitions

See the commentary to IBC Definitions above.

PART XI - IMC Occupancy classification.

This proposed change clarifies that data centers and computer rooms, which are cooled solely for the process loads associated with *information technology equipment*, are industrial occupancies.

Per Sec. 1103.2 (6), key features of an industrial occupancy are that it is that portion of a premises that is not open to the public and where access by authorized persons is controlled, both of which are characteristic of data centers and computer rooms.

Industrial occupancies also are defined by the processing of "goods." For data centers and computer rooms the 'goods' being processed is data or electronic information.

It is worth noting that no other occupancy classification specifically addresses any of the characteristics of data centers and computer rooms. The catchall provision in the Commercial occupancy classification for "*work or storage areas that do not qualify as industrial occupancies*," is not appropriate as space cooling in commercial occupancies is intended for comfort cooling, not for process cooling and occupant loads for industrial applications are very low, with restricted access, compared to commercial occupancies that may have no restrictions on access.

Data centers and computer rooms have significant cooling needs for process purposes; keeping ITE cool enough is mission critical.

USEPA and California regulations require transition to lower global warming potential refrigerants, which in turn requires changes in provisions in model codes and standards related to the safe use of new refrigerants. Using common definitions for data centers and computer rooms will foster uniformity of application between codes and related standards. These definitions have been proposed for use by the building, fire, and mechanical codes as well as ASHRAE 15, the *Safety Standard for Refrigeration Systems*.

The definitions for computer rooms and data centers are based upon ASHRAE Standard 90.4-2019 *Energy Standard for Data Centers.*

Appropriately classifying data centers and computer rooms will facilitate the drafting of requirements for the IMC that address the unique circumstances of these occupancies.

PART XII - IMC 1104.2.3 ITEF

See the general reason above.

Currently Sec 1106.3 requires that machinery rooms for Group A2L refrigerants must either conform to Class I, Division 2, hazardous location classification requirements of NFPA 70 **OR** provide provide emergency exhaust ventilation (Sec 1106.4). This proposal allows Group A2L to be used without NFPA 70 compliance and without exhaust ventilation in deference to the ITE environmental needs. A separate proposal to add requirements for ITE facilities in Chapter 4 of the building code clarifies that emergency ventilation for ITE facilities is only required to mix the atmosphere within the ITE space so that leaked refrigerant is fully dispersed.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
PART I, VIII and X - The definitions are to information only and will not add any additional construction requirements.
P ART II- In some facilities there may be an additional cost; in others there may be less cost. It will be very building specific.
PART III - This is a clarification.
PART IV- This is a clarification.
PART V - There may additional costs to provide 1 hour separation for the space where the building does not have a fire sprinkler or fire extinguishing system.
PART VI - Means of egress systems will be 'right sized' for data centers and computer rooms.
PART VII - There may be a minimal increase for exit access doors in certain circumstances.

PART IX- Manual controls for refrigeration equipment shut-off should be less expensive than automatic controls.
PART XI -This proposal will match the space use with the correct requirements which will tend to lower construction costs.

PART XII - Having use specific requirements for ITE facilities should minimize costs by avoiding requirements that do not fit the condition.

Staff Analysis: A review of the standard proposed for inclusion in the code, NFPA 75-20, with regard to the ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before March 20, 2021.

G99-21 Part X

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: This proposal has been disapproved because definitions should not be included in code language that does not currently exist. (Vote: 11-0)

G99-21 Part X

Individual Consideration Agenda

Public Comment 1:

IMC: SECTION 202

Proponents: Greg Johnson, representing Codes & Standards International (gjohnsonconsulting@gmail.com); Jay Peters, representing Vertiv (peters.jay@me.com); Ben Dolcich, representing Vertiv (ben.dolcich@vertiv.com) requests As Modified by Public Comment

Modify as follows:

2021 International Mechanical Code

~~**COMPUTER ROOM.** A room or portions of a *building* used primarily to house *information technology equipment (ITE)* and serving an *ITE* load less than or equal to10 kW or 20 W/ft^2 (215 W/m^2) or less of conditioned floor area.~~

~~**DATA CENTER.** A room or *building*, or portions thereof, used primarily to house *information technology equipment (ITE)* and serving a total *ITE* load greater than 10 kW and 20 W/ft^2 (215 W/m^2) of conditioned floor area.~~

INFORMATION TECHNOLOGY EQUIPMENT (ITE) . Computers, data storage, servers, and network communication equipment.

INFORMATION TECHNOLOGY EQUIPMENT FACILITIES (ITEF) . *Data centers* and *computer rooms* used primarily to house *information technology equipment*.

Commenter's Reason: The mechanical code currently does not assign an occupancy classification to data centers or information technology

equipment facilities (ITEFs), nor does it define these facilities, making it difficult to apply appropriate safety requirements. You cannot adequately regulate something if you do not first define it.
Not having definitions and use specific code requirements historically has not been a problem because ITEFs have had their data processing equipment cooled with nonflammable A1 refrigerants. Unfortunately, because of changes to US EPA and State of California environmental regulations – effective in 2025 – the data center cooling industry is transitioning to mildly flammable A2L refrigerants.

Because the industry will be introducing A2L refrigerants in ITEF cooling an additional, albeit small, hazard has been created, necessitating new code requirements for ITEFs. Those new requirements are proposed in the Part XII code change and public comment. Those new requirements rely upon the definitions proposed in this public comment.

The IBC General Code Committee and Fire Code Committee already added the same proposed definitions to the IBC and IFC, respectively.

Cost Impact: The net effect of the public comment and code change proposal will not increase or decrease the cost of construction
There is no cost associated with these definitions.

Public Comment# 2487

Public Comment 2:

Proponents: Steven Rosenstock, representing Edison Electric Institute (srosenstock@eei.org) requests As Submitted

Commenter's Reason: These definitions are consistent with definitions found in ASHRAE Standard 90.1 for Commercial Buildings and ASHRAE Standard 90.4 for Data Centers, and will be consistent with the definitions approved for G99-21 Part I, Part VI, and Part VIII.

Cost Impact: The net effect of the public comment and code change proposal will not increase or decrease the cost of construction
This proposal only updates definitions and has no impact on construction costs.

Public Comment# 2513

G99-21 Part XII

Proposed Change as Submitted

Proponents: Greg Johnson, representing Codes & Standards International (gjohnsonconsulting@gmail.com); Jay Peters, representing Vertiv (peters.jay@me.com); Ben Dolcich, representing Vertiv (ben.dolcich@vertiv.com); Andrew Klein, representing Building Owners and Managers Association International (andrew@asklein.com); Barry Greive, Target Corporation, representing Target Corporation (barry.greive@target.com); David Collins, representing The Preview Group, Inc. (dcollins@preview-group.com); Lee Kaiser, ORR Protection, representing NFPA 75 Technical Committee (ELT-AAA) (lkaiser@orrprotection.com)

2021 International Mechanical Code

Add new text as follows:

1104.2.3 Industrial occupancies and information technology equipment facilities.
This section applies only to industrial occupancies classified as *information technology equipment facilities* that comply with Section 429 of the *International Building Code*. Where a machinery room would otherwise be required by Section 1104.2, a machinery room shall not be required where all of the following conditions are met:

1. Refrigerants used to cool *ITE* processes are limited to Groups A1 and A2L except where approved.
2. The space containing the *ITE* processes is separated from other occupancies in accordance with Section 429 of the *International Building Code*.
3. Access is restricted to authorized personnel.
4. Where other than Group A1 refrigerants are used, refrigerant detectors are installed as required in accordance with Section 608.9 of the *International Fire Code* for machinery rooms except that any stoppage of refrigeration equipment shall be by manual means.
5. All electrical equipment other than *information technology equipment* shall conform to Class 1, Division 2, of NFPA 70 where the quantity of any Group A2, B2, A3 or B3 refrigerant in a single independent circuit would exceed 25 percent of the lower flammability limit (LFL) upon release to the space.

Reason: General information -

This is several proposals across multiple codes and standards to propose requirements appropriate to the unique characteristics of facilities housing computer rooms and data centers or *Information technology equipment* (ITE).Computer rooms and data centers are mission critical applications. All aspects of our public infrastructure, transportation, our education system, our healthcare system, our national defense, our banking, our public safety systems, our process for writing codes - our lives - are wholly dependent on the efficient real-time processing of data. The ITE used to perform this function must be 100% reliable.
For these reasons ITE facilities are secured spaces, atmospherically and physically, with tightly controlled access.

Because access to ITE facilities is restricted, and because ITE facilities are only accessed by technicians performing periodic process maintenance, the occupant load of these spaces is intermittent or sparse.

Like many process industries, ITE facilities have specific environmental process constraints if they are to function properly:

- ITE needs to be continuously cooled to protect the data and sometimes the best way to cool the equipment is to cool the room.
- ITE is extremely sensitive to humidity and atmospheric contaminants; it can ruin equipment and thereby data. Ideally, ITE facilities bring in no outside air or moisture into ITE spaces; ventilation for refrigerants within ITE facilities is solely to reduce refrigerant concentration by fully mixing refrigerant into the atmosphere of the space.
- Alternative methods of fire suppression may be most suitable.

Until recently ITE facilities used nonflammable A1 refrigerants, but separate rule makings by the California Air Resources Board and the US Environmental Protection Agency now require refrigerants to meet Global Warming Potential (GWP) values that are much lower than currently possible with commercially available A1 refrigerants.

For this reason the ITE facilities cooling industry is adopting the use of A2L refrigerants which perform well, which are environmentally friendlier and which have much lower GWP values, but which are mildly flammable.

Adoption of A2L refrigerant necessitates ITE facility code requirements that provide the right protection for the unique industrial process being protected.

Requirements addressing ITE facilities must be flexible and performance oriented to address the many potential configurations of these spaces, from small computer rooms within much larger uses, or as one use in multiple occupancies, to unlimited area data centers that occupy millions of square feet of land, (https://www.analyticsvidhya.com/blog/2020/09/8-largest-data-centers-world-2020/).

PART I - IBC DEFINITIONS

Using common definitions for information technology equipment, data centers and computer rooms will foster uniformity of application between codes and related standards. These definitions have been proposed for use by the building, fire, and mechanical codes as well as ASHRAE 15, the *Safety Standard for Refrigeration Systems*. They are consistent with definitions used in the ASHRAE 90.4 *Energy Standard for Data Centers* as well as NFPA 75 *Standard for the Fire Protection of Information Technology Equipment*. It is likely that the definitions of data centers and computer rooms will be added to future editions of the IECC.The definitions for computer rooms and data centers are based ASHRAE Standard 90.4-2019 *Energy Standard for Data Centers* except that the definition of computer rooms was modified to clarify that computer rooms are not primarily used for any other purpose than to house *information technology equipment*. This modification is necessary to distinguish computer rooms (data processing) from rooms where occupants use computers (data entry).

PART II -IBC Section 429 (New)

See the general reason.

NFPA 75, *The Standard for the Protection of Information Technology Equipment* is proposed as the appropriate reference to assure:

- The need for appropriate fire protection is met regardless of the configuration of the ITE facility.
- The fire protection package appropriately considers the unique environmental needs of the ITE facility.

NFPA 75 benefits from the involvement of subject matter experts in the design, operation and fire protection of these unique industrial processes.

NFPA 75 is realistic and flexible; it requires a documented risk assessment of the ITE facility to serve as the basis for a fire protection approach that is "*permitted to be determined based on an evaluation of fire risks and hazards associated with the* ITE *and services provided and the business continuity planning and disaster restoration capabilities of the* ITE *specific to the* ITE."

NFPA 75 also anticipates that alternative methods of fire suppression may be most suitable to protect data processing capacity and provides references to those NFPA standards that address such systems. It sets forth *"the minimum requirements for the protection of* ITE *equipment and* ITE *areas from damage by fire or its associated effects — namely, smoke, corrosion, heat, and water*."

In addition to the reference to NFPA 75 for performance design provisions, this proposal provides simple prescriptive requirements consistent with the treatment of locations classified as controlled access, industrial occupancies by ASHRAE 15 *Safety Standard for Refrigeration Systems* and the International Mechanical and Fire Codes.

By section, this proposal does the following:

· **Sec. 429.1 General** classifies ITE facilities as industrial occupancies to align with Sec. 1103 of the IMC. Per the IMC, which is consistent with ASHRAE 15, an industrial occupancy is "*that portion of premises that is not open to the public, where access by authorized persons is controlled, and that is used to manufacture, process or store goods such as chemicals, food, ice, meat or petroleum.*" A change has been proposed for the IMC and to ASHRAE 15 to specifically include ITE facilities in this classification.

· **Sec. 429.2 Refrigerants** limits refrigerants to nonflammable or mildly flammable refrigerants, but also provides clarification that the AHJ can approve other refrigerants on an individual basis.

· **Sec. 429.3 Fire Protection** references NFPA 75.

· **Sec. 429.4 Design and construction** requires a minimum of a one-hour fire separation between the ITE facility and adjacent occupancies, but reasonably provides flexibility for small spaces in fully sprinklered buildings. It also requires materials in concealed spaces, such as below a raised floor or above a suspended ceiling to be those permissible for use in a plenum.

· **Sec. 429.5 Electrical** requires compliance for non-IT equipment with Class 1, Division 2, of NFPA 70 (Class I – Flammable gases or vapors may be present; Division 2 – Ignitable concentrations of hazards exist under abnormal operation conditions) requirements where the code official has approved a refrigerant other than a Group A1 or A2L.

· **Sec. 429.6 Ventilation** requires mechanical ventilation of the ITE space to be triggered by refrigerant detection in accordance with the IMC and its secondary reference to the IFC Sec. 608.9. It also permits required ventilation to mix leaked refrigerant in the ITE space without exhausting the space or bringing in make-up air, thereby protecting the ITE from airborne contaminants and undesirable humidity.

· **Sec. 429.7 Refrigerant detection** references the IFC for refrigerant detection provisions and assures the appropriate initiation of measures to address an unintended leak of refrigerant or failure of the detection system.

· **Sec. 429.8 Standby power** ensures that active detection and protection measures are always available.

· **Sec. 429.9 Common path of egress travel** requires ITEF to comply with the same means of egress requirements as those specified in Section 1006.2.2.3 for refrigerated rooms or spaces. All portions of an ITEF must be within 150 feet of an exit or exit access doorway where such facilities are not protected by an approved automatic sprinkler system.

PART III - IBC Section 306.3 Group F-2

It is proposed to add Information Technology Equipment Facilities (data centers and computer rooms) to the F-2 occupancy group as they are industrial applications not currently addressed by the code with any specificity.

A separate code change proposes to add a section in Chapter 4 to address Information Technology Equipment Facilities (ITEF), but the correct occupancy group should be established.

ITEFs are buildings and spaces that are not open to the public, where access by authorized persons is controlled, and that are used to store and process electronic information or data. They are accessed only by IT maintenance technicians and have low or only intermittent occupant loads

USEPA and California regulations require transition to lower global warming potential refrigerants, which in turn requires changes in provisions in model codes and standards related to the safe use of new A2L (mildly flammable) refrigerants.

PART IV - IBC Section 311.3 Group S-2

Information technology equipment facilities are unique low hazard and low occupancy uses where data is stored and processed in racked equipment. While there are some moderate hazards specific to ITE facilities under abnormal operational conditions, those hazards are anticipated and mitigated by the codes:

- ITE facilities must be cooled for ITE performance. Potential hazards from flammable refrigerants are managed by compliance with the refrigerant safety provisions of the IMC, the IFC and ASHRAE 15 thereby assuring that leaked flammable refrigerants are detected and managed appropriately.
- IMC Section 1104.2.2 requires that the electrical equipment and appliances in ITE facilities must conform to the Class I, Division 2, hazardous location classification requirements of NFPA 70 where the quantity of any Group A2, B2, A3 or B3 refrigerant in a single independent circuit would exceed 25 percent of the lower flammability limit (LFL) upon release to the space.
- Cabling in underfloor and above ceiling plenum areas of ITE facilities is required to comply with IMC Section 602.2.1.1 and electrical equipment exposed in plenums must comply with IMC Sec. 602.2.1.4.

PART V - IBC Table 509.1 Incidental Uses

Information technology equipment (ITE) facilities -data centers and computer rooms - are cooled for industrial process reasons so that the ITE can operate as needed. This means these facilities can have a significant refrigerant load, just like a refrigerant machinery room, without necessarily having a machinery room. Refrigerant machinery rooms already are identified in Table 509.1 as needing either a one-hour separation or automatic sprinkler system protection. ITE facilities should meet the same standard, except that ITE facilities may need alternative fire protection methods for ITE.

PART VI - IBC Table 1004.5 Occupant Load Factor

The original proponent of Section 1004.8 (Group A, 2015: E9-15) included the section as part of a successful effort to increase the Table 1004.5 occupant load factor (OLF) for the typical business use from 100 to 150 SF gross per occupant. Section 1004.8 was added to ensure that the newly less stringent OLF was not applied inappropriately to business use areas known to have a higher density of occupants.

Data centers and computer rooms do not have a higher density of occupants, but typically have very low or intermittent occupancy loads, being occupied by only IT staff who periodically perform equipment maintenance functions. For this proposal, 300 SF gross OLF was selected as a conservative and appropriate OLF because the footprint of racks of *information technology equipment* are comparable to footprint of the racks of shelving in storage and stock areas of mercantile uses, even though such mercantile areas would be far more frequently occupied.

Data centers and computer rooms have significant cooling needs for process purposes; keeping ITE cool enough is mission critical. USEPA and California regulations require transition to lower global warming potential refrigerants, which in turn requires changes in provisions in model codes and standards related to the safe use of new refrigerants. Using common definitions for data centers and computer rooms will foster uniformity of application between codes and related standards. These definitions have been proposed for use by the building, fire, and mechanical codes as well as ASHRAE 15, the *Safety Standard for Refrigeration Systems*.

PART VII - IBC Section 1010.2.9.2 ITEF exits

Information technology equipment (ITE) facilities (computer rooms and data centers) are cooling intensive spaces because of equipment process needs and have similar exiting concerns to refrigeration machinery rooms because of hazards related to refrigerants.

A separate code change proposal will add ITE facilities (computer rooms and data centers) to the IMC's industrial occupancy classification in recognition of the process cooling needs unique to ITE facilities. This change will permit computer rooms and data centers that comply with new IMC Section 1104.2.3 to have space cooling without requiring a refrigeration machine room per Section 1104.2.2.

PART VIII - IFC Definitions

See the commentary to IBC Definitions above.

PART IX - IFC Section 609.8.1

See the general reason above.

Separate proposals for Chapter 11 of the IMC and Chapter 4 of the IBC apply occupancy specific requirements to ITE facilities. Those proposals:

- limit refrigerants to nonflammable Group A1 and mildly flammable Group A2L refrigerants
- require electrical equipment conformance with the Class I, Division 2, hazardous location classification requirements of NFPA 70, and
- reference NFPA 75, *The Standard for the Protection of Information Technology Equipment* to assure appropriate fire protection is provided regardless of the configuration of the ITE facility and the fire protection package appropriately considers the unique environmental needs of the ITE facility.
- require ITE facilities to be separated from adjacent uses by fire barriers and horizontal assemblies.

Given the other fire safety provisions proposed to apply to ITE facilities, and in recognition that stopping the cooling of an ITE space could jeopardize the data and data processes, automatic stopping of cooling is inadvisable.

Required detection and alarms will inform the facility manager and fire officials of the potential hazard, thereby providing an opportunity for data backup and potential purging of the ITE facility atmosphere.

PART X - IMC Definitions

See the commentary to IBC Definitions above.

PART XI - IMC Occupancy classification.

This proposed change clarifies that data centers and computer rooms, which are cooled solely for the process loads associated with *information technology equipment*, are industrial occupancies.

Per Sec. 1103.2 (6), key features of an industrial occupancy are that it is that portion of a premises that is not open to the public and where access by authorized persons is controlled, both of which are characteristic of data centers and computer rooms.

Industrial occupancies also are defined by the processing of "goods." For data centers and computer rooms the 'goods' being processed is data or electronic information.

It is worth noting that no other occupancy classification specifically addresses any of the characteristics of data centers and computer rooms. The catchall provision in the Commercial occupancy classification for "*work or storage areas that do not qualify as industrial occupancies*," is not appropriate as space cooling in commercial occupancies is intended for comfort cooling, not for process cooling and occupant loads for industrial applications are very low, with restricted access, compared to commercial occupancies that may have no restrictions on access.

Data centers and computer rooms have significant cooling needs for process purposes; keeping ITE cool enough is mission critical.

USEPA and California regulations require transition to lower global warming potential refrigerants, which in turn requires changes in provisions in model codes and standards related to the safe use of new refrigerants. Using common definitions for data centers and computer rooms will foster uniformity of application between codes and related standards. These definitions have been proposed for use by the building, fire, and mechanical codes as well as ASHRAE 15, the *Safety Standard for Refrigeration Systems*.

The definitions for computer rooms and data centers are based upon ASHRAE Standard 90.4-2019 *Energy Standard for Data Centers.*

Appropriately classifying data centers and computer rooms will facilitate the drafting of requirements for the IMC that address the unique circumstances of these occupancies.

PART XII - IMC 1104.2.3 ITEF

See the general reason above.

Currently Sec 1106.3 requires that machinery rooms for Group A2L refrigerants must either conform to Class I, Division 2, hazardous location classification requirements of NFPA 70 **OR** provide provide emergency exhaust ventilation (Sec 1106.4). This proposal allows Group A2L to be used without NFPA 70 compliance and without exhaust ventilation in deference to the ITE environmental needs. A separate proposal to add requirements for ITE facilities in Chapter 4 of the building code clarifies that emergency ventilation for ITE facilities is only required to mix the atmosphere within the ITE space so that leaked refrigerant is fully dispersed.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
PART I, VIII and X - The definitions are to information only and will not add any additional construction requirements.
P ART II- In some facilities there may be an additional cost; in others there may be less cost. It will be very building specific.
PART III - This is a clarification.
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PART V - There may additional costs to provide 1 hour separation for the space where the building does not have a fire sprinkler or fire extinguishing system.
PART VI - Means of egress systems will be 'right sized' for data centers and computer rooms.
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PART IX- Manual controls for refrigeration equipment shut-off should be less expensive than automatic controls.
PART XI -This proposal will match the space use with the correct requirements which will tend to lower construction costs.

PART XII - Having use specific requirements for ITE facilities should minimize costs by avoiding requirements that do not fit the condition.

Staff Analysis: A review of the standard proposed for inclusion in the code, NFPA 75-20, with regard to the ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before March 20, 2021.

G99-21 Part XII

Public Hearing Results

Committee Action: **Disapproved**

Committee Modification:

Committee Reason: This proposal has been disapproved by the committee because the solution already exists for circuits in ASHRAE Section 7.6 and conflicts with Group A2L. (Vote: 11-0)

G99-21 Part XII

Individual Consideration Agenda

Public Comment 1:

IMC: 1104.2.3

Proponents: Greg Johnson, representing Codes & Standards International (gjohnsonconsulting@gmail.com); Jay Peters, representing Vertiv (peters.jay@me.com); Ben Dolcich, representing Vertiv (ben.dolcich@vertiv.com) requests As Modified by Public Comment

Modify as follows:

2021 International Mechanical Code

1104.2.3 ~~Industrial occupancies and information~~ <u>Information</u> technology equipment facilities .
This section applies only to ~~industrial occupancies classified as~~ *information technology equipment facilities* that comply with Section 429 of the *International Building Code*. Where a machinery room would otherwise be required by Section 1104.2, a machinery room shall not be required

where all of the following conditions are met:

1. Refrigerants used to cool *ITE* processes are limited to Groups A1 and A2L ~~except where approved~~.
2. The space containing the *ITE* processes is separated from other occupancies in accordance with Section 429 of the *International Building Code* by 1-hour *fire barriers* constructed in accordance with Section 707 or 1-hour *horizontal assemblies* constructed in accordance with Section 711, or both, of the *International Building Code.*
3. Access is restricted to authorized personnel.
4. Where ~~other than Group A1~~ Group A2L refrigerants are used, refrigerant and leak detectors are installed as required in accordance with Section 429.9 of the *International Building Code* ~~608.9 of the *International Fire Code* for machinery rooms except that any stoppage of refrigeration equipment shall be by manual mean.~~.
5. All electrical equipment other than *information technology equipment* ~~shall conform~~ conforms to Class 1, Division 2, of NFPA 70 where the quantity of ~~any~~ Group A2L ~~A2, B2, A3 or B3~~ refrigerant in a single independent circuit would exceed 25 percent of the lower flammability limit (LFL) upon release to the space.
6. Open flame-producing devices or continuously operating hot surfaces over 1290 °F (700 °C) are not permanently installed in the room where Group A2L refrigerants are used.

Commenter's Reason: Roughly 70 percent of the data center cooling industry is being forced to transition to A2L refrigerants before year 2025 and there are **no** workable code requirements to regulate these unique building uses.
We are developing the 2024 codes. Data center uses **must** be addressed now.

The Mechanical Code Committee reason for disapproval is flawed as it relied upon false claims made by competing interests about the content of ASHRAE 15 and UL 60335 2-40 to come to its decision. ASHRAE 15 has no occupancy classifications applicable to information technology equipment facilities (ITEFs). It similarly has no requirements specific to these unique uses. The same is true for UL 60335 2-40.

By disapproving the G99 Part XI change the Mechanical Code Committee declined to assign a Section 1103.2 occupancy classification to ITEFs. This means this new proposed section is needed even more critically so that the code will have **any** requirements specific to ITEFs, which:

· are not cooled for human comfort,

· should not be exhaust ventilated to protect against atmospheric contaminants in make-up air,

· will typically have large quantities of refrigerants to address large spaces with high thermal loads,

· should, in the event of a refrigerant leak, have a compressor and circuit specific shut-down of refrigeration equipment instead a general shut-down to protect the ITEF from thermal overload and destruction of data

By section item number, the rationale for the code change and this public comment are:

Item 1: Refrigerants for ITEFs are limited to nonflammable A1s and mildly flammable A2Ls. There is no significant history in the industry of the use of more flammable or hazardous refrigerants so limiting ITEF cooling to A1 and A2L refrigerant is not a burden. The code official always can accept alternate refrigerants if the permit applicant can demonstrate an equivalent level of protection.

Item 2: The Mechanical Code Committee indicated that the separation requirements for ITEF spaces should be better defined so provisions to construct ITEF separations compliant with requirements for 1-hour fire barriers and 1-hour horizontal assemblies are provided.

Item 3: Secured access is consistent with both ASHRAE and IMC requirements for industrial occupancies which are also permitted to not have refrigeration machinery rooms.

Item 4: The Fire Code Committee was concerned with a broad exception to automatic shutoffs for leaking refrigeration equipment. To address the committee's concern, a public comment to Part II of this code change provides requirements for leak detection and automatic shut-off of individual circuits in IBC Section 429.9. Also, by IBC Section 429.9's secondary reference to IFC Section 608.9, detection of A2L refrigerant over 25% of the lower flammable limit will trigger general shut-off of equipment and exhaust ventilation.

As such, instead of repeating requirements, this public comment proposes to maintain automatic shutoff for compressors in individual circuits of leaking A2L systems by reference to the building code. This permits normally operating equipment to continue to operate.

Because rapid heat rise threatens data processing operations it is important let normally operating equipment continue to operate for business continuity. This means leak detection and mitigation will need to be provided for each independent circuit.

Item 5: This section requires electrical equipment serving locations which may have flammable A2L gases to comply with National Electrical Code provisions for hazardous locations where there is a possibility of exceeding 25 percent of the lower flammable limit. This comment recognizes the new clarification, via the approval of M74-21, that A2Ls are not a subclass of A2 refrigerants by specifically requiring A2Ls to comply. Other refrigerant groups are deleted to be consistent with the limitation in Item 1.

Item 6: Additionally, in M78-21, the Mechanical Committee prohibited open flame producing devices and continuously operating hot surfaces over 1290 °F in A2L machinery rooms. Those requirements are duplicated here.

Cost Impact: The net effect of the public comment and code change proposal will decrease the cost of construction
Adoption of these provisions will forestall the need for a machinery room in the regulated uses which should decrease the cost of construction.

The requirements for a new Section 429 in the International Building Code is addressed in G99-21 Part II. This section references those requirements. The membership is asked to consider coordination in there review.

Public Comment# 2488

NOTE: G99-21 PART I DID NOT RECEIVE A PUBLIC COMMENT AND IS REPRODUCED FOR INFORMATIONAL PURPOSES ONLY

G99-21 Part I

Proposed Change as Submitted

Proponents: Greg Johnson, representing Codes & Standards International (gjohnsonconsulting@gmail.com); Jay Peters, representing Vertiv (peters.jay@me.com); Andrew Klein, representing Building Owners and Managers Association International (andrew@asklein.com); Barry Greive, Target Corporation, representing Target Corporation (barry.greive@target.com); David Collins, representing The Preview Group, Inc. (dcollins@preview-group.com); Lee Kaiser, ORR Protection, representing NFPA 75 Technical Committee (ELT-AAA) (lkaiser@orrprotection.com)

THIS IS A 12 PART CODE CHANGE. PART I THROUGH V WILL BE HEARD BY THE GENERAL CODE COMMITTEE. PART VI AND VII WILL BE HEARD BY THE MEANS OF EGRESS CODE COMMITTEE. PART VIII AND IX WILL BE HEARD BY THE FIRE CODE COMMITTEE.PART X AND XII WILL BE HEARD BY THE MECHANICAL CODE COMMITTEE.SEE THE TENTATIVE HEARING ORDER FOR THESE COMMITTEES.

2021 International Building Code

Add new definition as follows:

COMPUTER ROOM. A room or portions of a *building* used primarily to house *information technology equipment* (ITE) and serving an ITE load less than or equal to10 kW or 20 W/ft^2 (215 W/m^2) or less of conditioned floor area.

DATA CENTER. A room or *building*, or portions thereof, used primarily to house *information technology equipment* (ITE) and serving a total ITE load greater than 10 kW and 20 W/ft^2 (215 W/m^2) of conditioned floor area.

INFORMATION TECHNOLOGY EQUIPMENT (ITE). Computers, data storage, servers, and network communication equipment.

INFORMATION TECHNOLOGY EQUIPMENT FACILITIES (ITEF). *Data centers* and *computer rooms* used primarily to house *information technology equipment.*

Reason: General information -

This is several proposals across multiple codes and standards to propose requirements appropriate to the unique characteristics of facilities housing computer rooms and data centers or *Information technology equipment* (ITE).Computer rooms and data centers are mission critical applications. All aspects of our public infrastructure, transportation, our education system, our healthcare system, our national defense, our banking, our public safety systems, our process for writing codes - our lives - are wholly dependent on the efficient real-time processing of data. The ITE used to perform this function must be 100% reliable.
For these reasons ITE facilities are secured spaces, atmospherically and physically, with tightly controlled access.

Because access to ITE facilities is restricted, and because ITE facilities are only accessed by technicians performing periodic process maintenance, the occupant load of these spaces is intermittent or sparse.

Like many process industries, ITE facilities have specific environmental process constraints if they are to function properly:

- ITE needs to be continuously cooled to protect the data and sometimes the best way to cool the equipment is to cool the room.
- ITE is extremely sensitive to humidity and atmospheric contaminants; it can ruin equipment and thereby data. Ideally, ITE facilities bring in no outside air or moisture into ITE spaces; ventilation for refrigerants within ITE facilities is solely to reduce refrigerant concentration by fully mixing refrigerant into the atmosphere of the space.
- Alternative methods of fire suppression may be most suitable.

Until recently ITE facilities used nonflammable A1 refrigerants, but separate rule makings by the California Air Resources Board and the US Environmental Protection Agency now require refrigerants to meet Global Warming Potential (GWP) values that are much lower than currently possible with commercially available A1 refrigerants.

For this reason the ITE facilities cooling industry is adopting the use of A2L refrigerants which perform well, which are environmentally friendlier and which have much lower GWP values, but which are mildly flammable.

Adoption of A2L refrigerant necessitates ITE facility code requirements that provide the right protection for the unique industrial process being protected.

Requirements addressing ITE facilities must be flexible and performance oriented to address the many potential configurations of these spaces, from small computer rooms within much larger uses, or as one use in multiple occupancies, to unlimited area data centers that occupy millions of square feet of land, (https://www.analyticsvidhya.com/blog/2020/09/8-largest-data-centers-world-2020/).

PART I - IBC DEFINITIONS

Using common definitions for information technology equipment, data centers and computer rooms will foster uniformity of application between codes and related standards. These definitions have been proposed for use by the building, fire, and mechanical codes as well as ASHRAE 15, the *Safety Standard for Refrigeration Systems*. They are consistent with definitions used in the ASHRAE 90.4 *Energy Standard for Data Centers* as well as NFPA 75 *Standard for the Fire Protection of Information Technology Equipment*. It is likely that the definitions of data centers and computer rooms will be added to future editions of the IECC.The definitions for computer rooms and data centers are based ASHRAE Standard 90.4-2019 *Energy Standard for Data Centers* except that the definition of computer rooms was modified to clarify that computer rooms are not primarily used for any other purpose than to house *information technology equipment*. This modification is necessary to distinguish computer rooms (data processing) from rooms where occupants use computers (data entry).

PART II -IBC Section 429 (New)

See the general reason.

NFPA 75, *The Standard for the Protection of Information Technology Equipment* is proposed as the appropriate reference to assure:

- The need for appropriate fire protection is met regardless of the configuration of the ITE facility.
- The fire protection package appropriately considers the unique environmental needs of the ITE facility.

NFPA 75 benefits from the involvement of subject matter experts in the design, operation and fire protection of these unique industrial processes.

NFPA 75 is realistic and flexible; it requires a documented risk assessment of the ITE facility to serve as the basis for a fire protection approach that is "*permitted to be determined based on an evaluation of fire risks and hazards associated with the* ITE *and services provided and the business continuity planning and disaster restoration capabilities of the* ITE *specific to the* ITE."

NFPA 75 also anticipates that alternative methods of fire suppression may be most suitable to protect data processing capacity and provides references to those NFPA standards that address such systems. It sets forth *"the minimum requirements for the protection of* ITE *equipment and* ITE *areas from damage by fire or its associated effects — namely, smoke, corrosion, heat, and water.*"

In addition to the reference to NFPA 75 for performance design provisions, this proposal provides simple prescriptive requirements consistent with the treatment of locations classified as controlled access, industrial occupancies by ASHRAE 15 *Safety Standard for Refrigeration Systems* and the International Mechanical and Fire Codes.

By section, this proposal does the following:

· **Sec. 429.1 General** classifies ITE facilities as industrial occupancies to align with Sec. 1103 of the IMC. Per the IMC, which is consistent with ASHRAE 15, an industrial occupancy is "*that portion of premises that is not open to the public, where access by authorized persons is controlled, and that is used to manufacture, process or store goods such as chemicals, food, ice, meat or petroleum.*" A change has been proposed for the IMC and to ASHRAE 15 to specifically include ITE facilities in this classification.

· **Sec. 429.2 Refrigerants** limits refrigerants to nonflammable or mildly flammable refrigerants, but also provides clarification that the AHJ can approve other refrigerants on an individual basis.

· **Sec. 429.3 Fire Protection** references NFPA 75.

· **Sec. 429.4 Design and construction** requires a minimum of a one-hour fire separation between the ITE facility and adjacent occupancies, but reasonably provides flexibility for small spaces in fully sprinklered buildings. It also requires materials in concealed spaces, such as below a raised floor or above a suspended ceiling to be those permissible for use in a plenum.

· **Sec. 429.5 Electrical** requires compliance for non-IT equipment with Class 1, Division 2, of NFPA 70 (Class I – Flammable gases or vapors may be present; Division 2 – Ignitable concentrations of hazards exist under abnormal operation conditions) requirements where the code official has approved a refrigerant other than a Group A1 or A2L.

· **Sec. 429.6 Ventilation** requires mechanical ventilation of the ITE space to be triggered by refrigerant detection in accordance with the IMC and its secondary reference to the IFC Sec. 608.9. It also permits required ventilation to mix leaked refrigerant in the ITE space without exhausting the space or bringing in make-up air, thereby protecting the ITE from airborne contaminants and undesirable humidity.

· **Sec. 429.7 Refrigerant detection** references the IFC for refrigerant detection provisions and assures the appropriate initiation of measures to address an unintended leak of refrigerant or failure of the detection system.

· **Sec. 429.8 Standby power** ensures that active detection and protection measures are always available.

· **Sec. 429.9 Common path of egress travel** requires ITEF to comply with the same means of egress requirements as those specified in Section 1006.2.2.3 for refrigerated rooms or spaces. All portions of an ITEF must be within 150 feet of an exit or exit access doorway where such facilities are not protected by an approved automatic sprinkler system.

PART III - IBC Section 306.3 Group F-2

It is proposed to add Information Technology Equipment Facilities (data centers and computer rooms) to the F-2 occupancy group as they are industrial applications not currently addressed by the code with any specificity.

A separate code change proposes to add a section in Chapter 4 to address Information Technology Equipment Facilities (ITEF), but the correct occupancy group should be established.

ITEFs are buildings and spaces that are not open to the public, where access by authorized persons is controlled, and that are used to store and process electronic information or data. They are accessed only by IT maintenance technicians and have low or only intermittent occupant loads

USEPA and California regulations require transition to lower global warming potential refrigerants, which in turn requires changes in provisions in model codes and standards related to the safe use of new A2L (mildly flammable) refrigerants.

PART IV - IBC Section 311.3 Group S-2

Information technology equipment facilities are unique low hazard and low occupancy uses where data is stored and processed in racked equipment. While there are some moderate hazards specific to ITE facilities under abnormal operational conditions, those hazards are anticipated and mitigated by the codes:

- ITE facilities must be cooled for ITE performance. Potential hazards from flammable refrigerants are managed by compliance with the refrigerant safety provisions of the IMC, the IFC and ASHRAE 15 thereby assuring that leaked flammable refrigerants are detected and managed appropriately.
- IMC Section 1104.2.2 requires that the electrical equipment and appliances in ITE facilities must conform to the Class I, Division 2, hazardous location classification requirements of NFPA 70 where the quantity of any Group A2, B2, A3 or B3 refrigerant in a single independent circuit would exceed 25 percent of the lower flammability limit (LFL) upon release to the space.
- Cabling in underfloor and above ceiling plenum areas of ITE facilities is required to comply with IMC Section 602.2.1.1 and electrical equipment exposed in plenums must comply with IMC Sec. 602.2.1.4.

PART V - IBC Table 509.1 Incidental Uses

Information technology equipment (ITE) facilities -data centers and computer rooms - are cooled for industrial process reasons so that the ITE can operate as needed. This means these facilities can have a significant refrigerant load, just like a refrigerant machinery room, without necessarily having a machinery room. Refrigerant machinery rooms already are identified in Table 509.1 as needing either a one-hour separation or automatic sprinkler system protection. ITE facilities should meet the same standard, except that ITE facilities may need alternative fire protection methods for ITE.

PART VI - IBC Table 1004.5 Occupant Load Factor

The original proponent of Section 1004.8 (Group A, 2015: E9-15) included the section as part of a successful effort to increase the Table 1004.5 occupant load factor (OLF) for the typical business use from 100 to 150 SF gross per occupant. Section 1004.8 was added to ensure that the newly less stringent OLF was not applied inappropriately to business use areas known to have a higher density of occupants.

Data centers and computer rooms do not have a higher density of occupants, but typically have very low or intermittent occupancy loads, being occupied by only IT staff who periodically perform equipment maintenance functions. For this proposal, 300 SF gross OLF was selected as a conservative and appropriate OLF because the footprint of racks of *information technology equipment* are comparable to footprint of the racks of shelving in storage and stock areas of mercantile uses, even though such mercantile areas would be far more frequently occupied.

Data centers and computer rooms have significant cooling needs for process purposes; keeping ITE cool enough is mission critical. USEPA and California regulations require transition to lower global warming potential refrigerants, which in turn requires changes in provisions in model codes and standards related to the safe use of new refrigerants. Using common definitions for data centers and computer rooms will foster uniformity of application between codes and related standards. These definitions have been proposed for use by the building, fire, and mechanical codes as well as ASHRAE 15, the *Safety Standard for Refrigeration Systems*.

PART VII - IBC Section 1010.2.9.2 ITEF exits

Information technology equipment (ITE) facilities (computer rooms and data centers) are cooling intensive spaces because of equipment process needs and have similar exiting concerns to refrigeration machinery rooms because of hazards related to refrigerants.

A separate code change proposal will add ITE facilities (computer rooms and data centers) to the IMC's industrial occupancy classification in recognition of the process cooling needs unique to ITE facilities. This change will permit computer rooms and data centers that comply with new IMC Section 1104.2.3 to have space cooling without requiring a refrigeration machine room per Section 1104.2.2.

PART VIII - IFC Definitions

See the commentary to IBC Definitions above.

PART IX - IFC Section 609.8.1

See the general reason above.

Separate proposals for Chapter 11 of the IMC and Chapter 4 of the IBC apply occupancy specific requirements to ITE facilities. Those proposals:

- limit refrigerants to nonflammable Group A1 and mildly flammable Group A2L refrigerants
- require electrical equipment conformance with the Class I, Division 2, hazardous location classification requirements of NFPA 70, and
- reference NFPA 75, *The Standard for the Protection of Information Technology Equipment* to assure appropriate fire protection is provided regardless of the configuration of the ITE facility and the fire protection package appropriately considers the unique environmental needs of the ITE facility.
- require ITE facilities to be separated from adjacent uses by fire barriers and horizontal assemblies.

Given the other fire safety provisions proposed to apply to ITE facilities, and in recognition that stopping the cooling of an ITE space could jeopardize the data and data processes, automatic stopping of cooling is inadvisable.

Required detection and alarms will inform the facility manager and fire officials of the potential hazard, thereby providing an opportunity for data backup and potential purging of the ITE facility atmosphere.

PART X - IMC Definitions

See the commentary to IBC Definitions above.

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This proposed change clarifies that data centers and computer rooms, which are cooled solely for the process loads associated with *information technology equipment*, are industrial occupancies.

Per Sec. 1103.2 (6), key features of an industrial occupancy are that it is that portion of a premises that is not open to the public and where access by authorized persons is controlled, both of which are characteristic of data centers and computer rooms.

Industrial occupancies also are defined by the processing of "goods." For data centers and computer rooms the 'goods' being processed is data or electronic information.

It is worth noting that no other occupancy classification specifically addresses any of the characteristics of data centers and computer rooms. The catchall provision in the Commercial occupancy classification for "*work or storage areas that do not qualify as industrial occupancies*," is not appropriate as space cooling in commercial occupancies is intended for comfort cooling, not for process cooling and occupant loads for industrial applications are very low, with restricted access, compared to commercial occupancies that may have no restrictions on access.

Data centers and computer rooms have significant cooling needs for process purposes; keeping ITE cool enough is mission critical.

USEPA and California regulations require transition to lower global warming potential refrigerants, which in turn requires changes in provisions in model codes and standards related to the safe use of new refrigerants. Using common definitions for data centers and computer rooms will foster uniformity of application between codes and related standards. These definitions have been proposed for use by the building, fire, and mechanical codes as well as ASHRAE 15, the *Safety Standard for Refrigeration Systems*.

The definitions for computer rooms and data centers are based upon ASHRAE Standard 90.4-2019 *Energy Standard for Data Centers.*

Appropriately classifying data centers and computer rooms will facilitate the drafting of requirements for the IMC that address the unique circumstances of these occupancies.

PART XII - IMC 1104.2.3 ITEF

See the general reason above.

Currently Sec 1106.3 requires that machinery rooms for Group A2L refrigerants must either conform to Class I, Division 2, hazardous location classification requirements of NFPA 70 **OR** provide provide emergency exhaust ventilation (Sec 1106.4). This proposal allows Group A2L to be used without NFPA 70 compliance and without exhaust ventilation in deference to the ITE environmental needs. A separate proposal to add requirements for ITE facilities in Chapter 4 of the building code clarifies that emergency ventilation for ITE facilities is only required to mix the atmosphere within the ITE space so that leaked refrigerant is fully dispersed.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
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Staff Analysis: A review of the standard proposed for inclusion in the code, NFPA 75-20, with regard to the ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before March 20, 2021.

G99-21 Part I

Public Hearing Results

Committee Action: **As Submitted**

Committee Reason: The proposal was approved because these definitions are an important part of the package for these types of facilities. There was concerned raised about the differences between the four definitions and that there were requirements in the definitions - this could be simplified. (Vote: 8-5)

G99-21 Part I

G99-21 Part III

Proposed Change as Submitted

Proponents: Greg Johnson, representing Codes & Standards International (gjohnsonconsulting@gmail.com); Jay Peters, representing Vertiv (peters.jay@me.com); Andrew Klein, representing Building Owners and Managers Association International (andrew@asklein.com); Barry Greive, Target Corporation, representing Target Corporation (barry.greive@target.com); David Collins, representing The Preview Group, Inc. (dcollins@preview-group.com); Lee Kaiser, ORR Protection, representing NFPA 75 Technical Committee (ELT-AAA) (lkaiser@orrprotection.com)

2021 International Building Code

Revise as follows:

306.3 Low-hazard factory industrial, Group F-2. Factory industrial uses that involve the fabrication or manufacturing of noncombustible materials that during finishing, packing or processing do not involve a significant fire hazard <u>and information technology equipment facilities</u> shall be classified as F-2 occupancies and shall include, but not be limited to, the following:

- Beverages: up to and including 16-percent alcohol content
- *Brick* and masonry
- Ceramic products
- Foundries
- Glass products
- Gypsum
- Ice
- <u>*Information technology equipment facilities*</u>
- Metal products (fabrication and assembly)

Reason: General information -

This is several proposals across multiple codes and standards to propose requirements appropriate to the unique characteristics of facilities housing computer rooms and data centers or *Information technology equipment* (ITE).Computer rooms and data centers are mission critical applications. All aspects of our public infrastructure, transportation, our education system, our healthcare system, our national defense, our banking, our public safety systems, our process for writing codes - our lives - are wholly dependent on the efficient real-time processing of data. The ITE used to perform this function must be 100% reliable.
For these reasons ITE facilities are secured spaces, atmospherically and physically, with tightly controlled access.

Because access to ITE facilities is restricted, and because ITE facilities are only accessed by technicians performing periodic process maintenance, the occupant load of these spaces is intermittent or sparse.

Like many process industries, ITE facilities have specific environmental process constraints if they are to function properly:

- ITE needs to be continuously cooled to protect the data and sometimes the best way to cool the equipment is to cool the room.
- ITE is extremely sensitive to humidity and atmospheric contaminants; it can ruin equipment and thereby data. Ideally, ITE facilities bring in no outside air or moisture into ITE spaces; ventilation for refrigerants within ITE facilities is solely to reduce refrigerant concentration by fully mixing refrigerant into the atmosphere of the space.
- Alternative methods of fire suppression may be most suitable.

Until recently ITE facilities used nonflammable A1 refrigerants, but separate rule makings by the California Air Resources Board and the US Environmental Protection Agency now require refrigerants to meet Global Warming Potential (GWP) values that are much lower than currently possible with commercially available A1 refrigerants.

For this reason the ITE facilities cooling industry is adopting the use of A2L refrigerants which perform well, which are environmentally friendlier and which have much lower GWP values, but which are mildly flammable.

Adoption of A2L refrigerant necessitates ITE facility code requirements that provide the right protection for the unique industrial process being protected.

Requirements addressing ITE facilities must be flexible and performance oriented to address the many potential configurations of these spaces, from small computer rooms within much larger uses, or as one use in multiple occupancies, to unlimited area data centers that occupy millions of square feet of land, (https://www.analyticsvidhya.com/blog/2020/09/8-largest-data-centers-world-2020/).

PART I - IBC DEFINITIONS

Using common definitions for information technology equipment, data centers and computer rooms will foster uniformity of application between codes and related standards. These definitions have been proposed for use by the building, fire, and mechanical codes as well as ASHRAE 15, the *Safety Standard for Refrigeration Systems*. They are consistent with definitions used in the ASHRAE 90.4 *Energy Standard for Data Centers* as well as NFPA 75 *Standard for the Fire Protection of Information Technology Equipment*. It is likely that the definitions of data centers and computer rooms will be added to future editions of the IECC.The definitions for computer rooms and data centers are based ASHRAE Standard 90.4-2019 *Energy Standard for Data Centers* except that the definition of computer rooms was modified to clarify that computer rooms are not primarily used for any other purpose than to house *information technology equipment*. This modification is necessary to distinguish computer rooms (data processing) from rooms where occupants use computers (data entry).

PART II -IBC Section 429 (New)

See the general reason.

NFPA 75, *The Standard for the Protection of Information Technology Equipment* is proposed as the appropriate reference to assure:

- The need for appropriate fire protection is met regardless of the configuration of the ITE facility.
- The fire protection package appropriately considers the unique environmental needs of the ITE facility.

NFPA 75 benefits from the involvement of subject matter experts in the design, operation and fire protection of these unique industrial processes.

NFPA 75 is realistic and flexible; it requires a documented risk assessment of the ITE facility to serve as the basis for a fire protection approach that is "*permitted to be determined based on an evaluation of fire risks and hazards associated with the* ITE *and services provided and the business continuity planning and disaster restoration capabilities of the* ITE *specific to the* ITE."

NFPA 75 also anticipates that alternative methods of fire suppression may be most suitable to protect data processing capacity and provides references to those NFPA standards that address such systems. It sets forth *"the minimum requirements for the protection of* ITE *equipment and*

ITE *areas from damage by fire or its associated effects — namely, smoke, corrosion, heat, and water*."

In addition to the reference to NFPA 75 for performance design provisions, this proposal provides simple prescriptive requirements consistent with the treatment of locations classified as controlled access, industrial occupancies by ASHRAE 15 *Safety Standard for Refrigeration Systems* and the International Mechanical and Fire Codes.

By section, this proposal does the following:

· **Sec. 429.1 General** classifies ITE facilities as industrial occupancies to align with Sec. 1103 of the IMC. Per the IMC, which is consistent with ASHRAE 15, an industrial occupancy is "*that portion of premises that is not open to the public, where access by authorized persons is controlled, and that is used to manufacture, process or store goods such as chemicals, food, ice, meat or petroleum.*" A change has been proposed for the IMC and to ASHRAE 15 to specifically include ITE facilities in this classification.

· **Sec. 429.2 Refrigerants** limits refrigerants to nonflammable or mildly flammable refrigerants, but also provides clarification that the AHJ can approve other refrigerants on an individual basis.

· **Sec. 429.3 Fire Protection** references NFPA 75.

· **Sec. 429.4 Design and construction** requires a minimum of a one-hour fire separation between the ITE facility and adjacent occupancies, but reasonably provides flexibility for small spaces in fully sprinklered buildings. It also requires materials in concealed spaces, such as below a raised floor or above a suspended ceiling to be those permissible for use in a plenum.

· **Sec. 429.5 Electrical** requires compliance for non-IT equipment with Class 1, Division 2, of NFPA 70 (Class I – Flammable gases or vapors may be present; Division 2 – Ignitable concentrations of hazards exist under <u>abnormal</u> operation conditions) requirements where the code official has approved a refrigerant other than a Group A1 or A2L.

· **Sec. 429.6 Ventilation** requires mechanical ventilation of the ITE space to be triggered by refrigerant detection in accordance with the IMC and its secondary reference to the IFC Sec. 608.9. It also permits required ventilation to mix leaked refrigerant in the ITE space without exhausting the space or bringing in make-up air, thereby protecting the ITE from airborne contaminants and undesirable humidity.

· **Sec. 429.7 Refrigerant detection** references the IFC for refrigerant detection provisions and assures the appropriate initiation of measures to address an unintended leak of refrigerant or failure of the detection system.

· **Sec. 429.8 Standby power** ensures that active detection and protection measures are always available.

· **Sec. 429.9 Common path of egress travel** requires ITEF to comply with the same means of egress requirements as those specified in Section 1006.2.2.3 for refrigerated rooms or spaces. All portions of an ITEF must be within 150 feet of an exit or exit access doorway where such facilities are not protected by an approved automatic sprinkler system.

PART III - IBC Section 306.3 Group F-2

It is proposed to add Information Technology Equipment Facilities (data centers and computer rooms) to the F-2 occupancy group as they are industrial applications not currently addressed by the code with any specificity.

A separate code change proposes to add a section in Chapter 4 to address Information Technology Equipment Facilities (ITEF), but the correct occupancy group should be established.

ITEFs are buildings and spaces that are not open to the public, where access by authorized persons is controlled, and that are used to store and process electronic information or data. They are accessed only by IT maintenance technicians and have low or only intermittent occupant loads

USEPA and California regulations require transition to lower global warming potential refrigerants, which in turn requires changes in provisions in model codes and standards related to the safe use of new A2L (mildly flammable) refrigerants.

PART IV - IBC Section 311.3 Group S-2

Information technology equipment facilities are unique low hazard and low occupancy uses where data is stored and processed in racked equipment. While there are some moderate hazards specific to ITE facilities under abnormal operational conditions, those hazards are anticipated and mitigated by the codes:

- ITE facilities must be cooled for ITE performance. Potential hazards from flammable refrigerants are managed by compliance with the refrigerant safety provisions of the IMC, the IFC and ASHRAE 15 thereby assuring that leaked flammable refrigerants are detected and managed appropriately.
- IMC Section 1104.2.2 requires that the electrical equipment and appliances in ITE facilities must conform to the Class I, Division 2, hazardous location classification requirements of NFPA 70 where the quantity of any Group A2, B2, A3 or B3 refrigerant in a single independent circuit would exceed 25 percent of the lower flammability limit (LFL) upon release to the space.
- Cabling in underfloor and above ceiling plenum areas of ITE facilities is required to comply with IMC Section 602.2.1.1 and electrical equipment exposed in plenums must comply with IMC Sec. 602.2.1.4.

PART V - IBC Table 509.1 Incidental Uses

Information technology equipment (ITE) facilities -data centers and computer rooms - are cooled for industrial process reasons so that the ITE can operate as needed. This means these facilities can have a significant refrigerant load, just like a refrigerant machinery room, without necessarily having a machinery room. Refrigerant machinery rooms already are identified in Table 509.1 as needing either a one-hour separation or automatic sprinkler system protection. ITE facilities should meet the same standard, except that ITE facilities may need alternative fire protection methods for ITE.

PART VI - IBC Table 1004.5 Occupant Load Factor

The original proponent of Section 1004.8 (Group A, 2015: E9-15) included the section as part of a successful effort to increase the Table 1004.5 occupant load factor (OLF) for the typical business use from 100 to 150 SF gross per occupant. Section 1004.8 was added to ensure that the newly less stringent OLF was not applied inappropriately to business use areas known to have a higher density of occupants.

Data centers and computer rooms do not have a higher density of occupants, but typically have very low or intermittent occupancy loads, being occupied by only IT staff who periodically perform equipment maintenance functions. For this proposal, 300 SF gross OLF was selected as a conservative and appropriate OLF because the footprint of racks of *information technology equipment* are comparable to footprint of the racks of shelving in storage and stock areas of mercantile uses, even though such mercantile areas would be far more frequently occupied.

Data centers and computer rooms have significant cooling needs for process purposes; keeping ITE cool enough is mission critical. USEPA and

California regulations require transition to lower global warming potential refrigerants, which in turn requires changes in provisions in model codes and standards related to the safe use of new refrigerants. Using common definitions for data centers and computer rooms will foster uniformity of application between codes and related standards. These definitions have been proposed for use by the building, fire, and mechanical codes as well as ASHRAE 15, the *Safety Standard for Refrigeration Systems*.

PART VII - IBC Section 1010.2.9.2 ITEF exits

Information technology equipment (ITE) facilities (computer rooms and data centers) are cooling intensive spaces because of equipment process needs and have similar exiting concerns to refrigeration machinery rooms because of hazards related to refrigerants.

A separate code change proposal will add ITE facilities (computer rooms and data centers) to the IMC's industrial occupancy classification in recognition of the process cooling needs unique to ITE facilities. This change will permit computer rooms and data centers that comply with new IMC Section 1104.2.3 to have space cooling without requiring a refrigeration machine room per Section 1104.2.2.

PART VIII - IFC Definitions

See the commentary to IBC Definitions above.

PART IX - IFC Section 609.8.1

See the general reason above.

Separate proposals for Chapter 11 of the IMC and Chapter 4 of the IBC apply occupancy specific requirements to ITE facilities. Those proposals:

- limit refrigerants to nonflammable Group A1 and mildly flammable Group A2L refrigerants
- require electrical equipment conformance with the Class I, Division 2, hazardous location classification requirements of NFPA 70, and
- reference NFPA 75, *The Standard for the Protection of Information Technology Equipment* to assure appropriate fire protection is provided regardless of the configuration of the ITE facility and the fire protection package appropriately considers the unique environmental needs of the ITE facility.
- require ITE facilities to be separated from adjacent uses by fire barriers and horizontal assemblies.

Given the other fire safety provisions proposed to apply to ITE facilities, and in recognition that stopping the cooling of an ITE space could jeopardize the data and data processes, automatic stopping of cooling is inadvisable.

Required detection and alarms will inform the facility manager and fire officials of the potential hazard, thereby providing an opportunity for data backup and potential purging of the ITE facility atmosphere.

PART X - IMC Definitions

See the commentary to IBC Definitions above.

PART XI - IMC Occupancy classification.

This proposed change clarifies that data centers and computer rooms, which are cooled solely for the process loads associated with *information technology equipment*, are industrial occupancies.

Per Sec. 1103.2 (6), key features of an industrial occupancy are that it is that portion of a premises that is not open to the public and where access by authorized persons is controlled, both of which are characteristic of data centers and computer rooms.

Industrial occupancies also are defined by the processing of "goods." For data centers and computer rooms the 'goods' being processed is data or electronic information.

It is worth noting that no other occupancy classification specifically addresses any of the characteristics of data centers and computer rooms. The catchall provision in the Commercial occupancy classification for "*work or storage areas that do not qualify as industrial occupancies*," is not appropriate as space cooling in commercial occupancies is intended for comfort cooling, not for process cooling and occupant loads for industrial applications are very low, with restricted access, compared to commercial occupancies that may have no restrictions on access.

Data centers and computer rooms have significant cooling needs for process purposes; keeping ITE cool enough is mission critical.

USEPA and California regulations require transition to lower global warming potential refrigerants, which in turn requires changes in provisions in model codes and standards related to the safe use of new refrigerants. Using common definitions for data centers and computer rooms will foster uniformity of application between codes and related standards. These definitions have been proposed for use by the building, fire, and mechanical codes as well as ASHRAE 15, the *Safety Standard for Refrigeration Systems*.

The definitions for computer rooms and data centers are based upon ASHRAE Standard 90.4-2019 *Energy Standard for Data Centers.*

Appropriately classifying data centers and computer rooms will facilitate the drafting of requirements for the IMC that address the unique circumstances of these occupancies.

PART XII - IMC 1104.2.3 ITEF

See the general reason above.

Currently Sec 1106.3 requires that machinery rooms for Group A2L refrigerants must either conform to Class I, Division 2, hazardous location classification requirements of NFPA 70 **OR** provide provide emergency exhaust ventilation (Sec 1106.4). This proposal allows Group A2L to be used without NFPA 70 compliance and without exhaust ventilation in deference to the ITE environmental needs. A separate proposal to add requirements for ITE facilities in Chapter 4 of the building code clarifies that emergency ventilation for ITE facilities is only required to mix the atmosphere within the ITE space so that leaked refrigerant is fully dispersed.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
PART I, VIII and X - The definitions are to information only and will not add any additional construction requirements.
P ART II- In some facilities there may be an additional cost; in others there may be less cost. It will be very building specific.
PART III - This is a clarification.
PART IV- This is a clarification.
PART V - There may additional costs to provide 1 hour separation for the space where the building does not have a fire sprinkler or fire extinguishing system.
PART VI - Means of egress systems will be 'right sized' for data centers and computer rooms.
PART VII - There may be a minimal increase for exit access doors in certain circumstances.

PART IX- Manual controls for refrigeration equipment shut-off should be less expensive than automatic controls.
PART XI -This proposal will match the space use with the correct requirements which will tend to lower construction costs.

PART XII - Having use specific requirements for ITE facilities should minimize costs by avoiding requirements that do not fit the condition.

Staff Analysis: A review of the standard proposed for inclusion in the code, NFPA 75-20, with regard to the ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before March 20, 2021.

G99-21 Part III

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: This proposal was disapproved because the committee felt that this was was the wrong classification for informational technology equipment facilities - these are not manufacturing. In addition, this type of facility does not fit with the other items in the description of Group F-2. (Vote: 13-0)

G99-21 Part III

Individual Consideration Agenda

Public Comment 1:

Proponents: Dennis Julian, representing Digital Realty Director of Design (djulian@digitalrealty.com) requests As Submitted

Commenter's Reason: I support the proposed changes

Cost Impact: The net effect of the public comment and code change proposal will not increase or decrease the cost of construction
No change in cost expected

NOTE: G99-21 PART IV DID NOT RECEIVE A PUBLIC COMMENT AND IS REPRODUCED FOR INFORMATIONAL PURPOSES ONLY

G99-21 Part IV

Proposed Change as Submitted

Proponents: Greg Johnson, representing Codes & Standards International (gjohnsonconsulting@gmail.com); Jay Peters, representing Vertiv (peters.jay@me.com); Andrew Klein, representing Building Owners and Managers Association International (andrew@asklein.com); Barry Greive, Target Corporation, representing Target Corporation (barry.greive@target.com); David Collins, representing The Preview Group, Inc. (dcollins@preview-group.com); Lee Kaiser, ORR Protection, representing NFPA 75 Technical Committee (ELT-AAA) (lkaiser@orrprotection.com)

2021 International Building Code

Revise as follows:

311.3 Low-hazard storage, Group S-2. Storage Group S-2 occupancies include, among others, buildings housing information technology equipment facilities, buildings used for the storage of noncombustible materials such as products on wood pallets or in paper cartons with or without single thickness divisions; or in paper wrappings. Such products are permitted to have a negligible amount of plastic *trim*, such as knobs, handles or film wrapping. Group S-2 storage uses shall include, but not be limited to, storage of the following:

- Asbestos
- Beverages up to and including 16-percent alcohol
- Cement in bags
- Chalk and crayons
- Dairy products in nonwaxed coated paper containers
- Dry cell batteries
- Electrical coils
- Electrical motors
- Empty cans
- Food products
- Foods in noncombustible containers
- Fresh fruits and vegetables in nonplastic trays or containers
- Frozen foods
- Glass
- Glass bottles, empty or filled with noncombustible liquids
- *Gypsum board*
- Inert pigments
- Information technology equipment facilities
- Ivory
- Meats
- Metal cabinets
- Metal desks with plastic tops and *trim*
- Metal parts
- Metals
- Mirrors
- Oil-filled and other types of distribution transformers
- Public parking garages, open or enclosed
- Porcelain and pottery
- Stoves
- Talc and soapstones
- Washers and dryers

Reason: General information -

This is several proposals across multiple codes and standards to propose requirements appropriate to the unique characteristics of facilities housing computer rooms and data centers or *Information technology equipment* (ITE).Computer rooms and data centers are mission critical applications. All aspects of our public infrastructure, transportation, our education system, our healthcare system, our national defense, our banking, our public safety systems, our process for writing codes - our lives - are wholly dependent on the efficient real-time processing of data. The ITE used to perform this function must be 100% reliable.
For these reasons ITE facilities are secured spaces, atmospherically and physically, with tightly controlled access.

Because access to ITE facilities is restricted, and because ITE facilities are only accessed by technicians performing periodic process maintenance, the occupant load of these spaces is intermittent or sparse.

Like many process industries, ITE facilities have specific environmental process constraints if they are to function properly:

- ITE needs to be continuously cooled to protect the data and sometimes the best way to cool the equipment is to cool the room.
- ITE is extremely sensitive to humidity and atmospheric contaminants; it can ruin equipment and thereby data. Ideally, ITE facilities bring in no outside air or moisture into ITE spaces; ventilation for refrigerants within ITE facilities is solely to reduce refrigerant concentration by fully mixing refrigerant into the atmosphere of the space.
- Alternative methods of fire suppression may be most suitable.

Until recently ITE facilities used nonflammable A1 refrigerants, but separate rule makings by the California Air Resources Board and the US Environmental Protection Agency now require refrigerants to meet Global Warming Potential (GWP) values that are much lower than currently possible with commercially available A1 refrigerants.

For this reason the ITE facilities cooling industry is adopting the use of A2L refrigerants which perform well, which are environmentally friendlier and which have much lower GWP values, but which are mildly flammable.

Adoption of A2L refrigerant necessitates ITE facility code requirements that provide the right protection for the unique industrial process being protected.

Requirements addressing ITE facilities must be flexible and performance oriented to address the many potential configurations of these spaces, from small computer rooms within much larger uses, or as one use in multiple occupancies, to unlimited area data centers that occupy millions of square feet of land, (https://www.analyticsvidhya.com/blog/2020/09/8-largest-data-centers-world-2020/).

PART I - IBC DEFINITIONS

Using common definitions for information technology equipment, data centers and computer rooms will foster uniformity of application between codes and related standards. These definitions have been proposed for use by the building, fire, and mechanical codes as well as ASHRAE 15, the *Safety Standard for Refrigeration Systems*. They are consistent with definitions used in the ASHRAE 90.4 *Energy Standard for Data Centers* as well as NFPA 75 *Standard for the Fire Protection of Information Technology Equipment*. It is likely that the definitions of data centers and computer rooms will be added to future editions of the IECC.The definitions for computer rooms and data centers are based ASHRAE Standard 90.4-2019 *Energy Standard for Data Centers* except that the definition of computer rooms was modified to clarify that computer rooms are not primarily used for any other purpose than to house *information technology equipment*. This modification is necessary to distinguish computer rooms (data processing) from rooms where occupants use computers (data entry).

PART II -IBC Section 429 (New)

See the general reason.

NFPA 75, *The Standard for the Protection of Information Technology Equipment* is proposed as the appropriate reference to assure:

- The need for appropriate fire protection is met regardless of the configuration of the ITE facility.
- The fire protection package appropriately considers the unique environmental needs of the ITE facility.

NFPA 75 benefits from the involvement of subject matter experts in the design, operation and fire protection of these unique industrial processes.

NFPA 75 is realistic and flexible; it requires a documented risk assessment of the ITE facility to serve as the basis for a fire protection approach that is "*permitted to be determined based on an evaluation of fire risks and hazards associated with the* ITE *and services provided and the business continuity planning and disaster restoration capabilities of the* ITE *specific to the* ITE."

NFPA 75 also anticipates that alternative methods of fire suppression may be most suitable to protect data processing capacity and provides references to those NFPA standards that address such systems. It sets forth *"the minimum requirements for the protection of* ITE *equipment and* ITE *areas from damage by fire or its associated effects — namely, smoke, corrosion, heat, and water*."

In addition to the reference to NFPA 75 for performance design provisions, this proposal provides simple prescriptive requirements consistent with the treatment of locations classified as controlled access, industrial occupancies by ASHRAE 15 *Safety Standard for Refrigeration Systems* and the International Mechanical and Fire Codes.

By section, this proposal does the following:

· **Sec. 429.1 General** classifies ITE facilities as industrial occupancies to align with Sec. 1103 of the IMC. Per the IMC, which is consistent with ASHRAE 15, an industrial occupancy is "*that portion of premises that is not open to the public, where access by authorized persons is controlled, and that is used to manufacture, process or store goods such as chemicals, food, ice, meat or petroleum.*" A change has been proposed for the IMC and to ASHRAE 15 to specifically include ITE facilities in this classification.

· **Sec. 429.2 Refrigerants** limits refrigerants to nonflammable or mildly flammable refrigerants, but also provides clarification that the AHJ can approve other refrigerants on an individual basis.

· **Sec. 429.3 Fire Protection** references NFPA 75.

· **Sec. 429.4 Design and construction** requires a minimum of a one-hour fire separation between the ITE facility and adjacent occupancies, but reasonably provides flexibility for small spaces in fully sprinklered buildings. It also requires materials in concealed spaces, such as below a raised floor or above a suspended ceiling to be those permissible for use in a plenum.

· **Sec. 429.5 Electrical** requires compliance for non-IT equipment with Class 1, Division 2, of NFPA 70 (Class I – Flammable gases or vapors may be present; Division 2 – Ignitable concentrations of hazards exist under <u>abnormal</u> operation conditions) requirements where the code official has approved a refrigerant other than a Group A1 or A2L.

· **Sec. 429.6 Ventilation** requires mechanical ventilation of the ITE space to be triggered by refrigerant detection in accordance with the IMC and its secondary reference to the IFC Sec. 608.9. It also permits required ventilation to mix leaked refrigerant in the ITE space without exhausting the space or bringing in make-up air, thereby protecting the ITE from airborne contaminants and undesirable humidity.

· **Sec. 429.7 Refrigerant detection** references the IFC for refrigerant detection provisions and assures the appropriate initiation of measures to address an unintended leak of refrigerant or failure of the detection system.

· **Sec. 429.8 Standby power** ensures that active detection and protection measures are always available.

· **Sec. 429.9 Common path of egress travel** requires ITEF to comply with the same means of egress requirements as those specified in Section 1006.2.2.3 for refrigerated rooms or spaces. All portions of an ITEF must be within 150 feet of an exit or exit access doorway where such facilities are not protected by an approved automatic sprinkler system.

PART III - IBC Section 306.3 Group F-2

It is proposed to add Information Technology Equipment Facilities (data centers and computer rooms) to the F-2 occupancy group as they are industrial applications not currently addressed by the code with any specificity.

A separate code change proposes to add a section in Chapter 4 to address Information Technology Equipment Facilities (ITEF), but the correct occupancy group should be established.

ITEFs are buildings and spaces that are not open to the public, where access by authorized persons is controlled, and that are used to store and process electronic information or data. They are accessed only by IT maintenance technicians and have low or only intermittent occupant loads

USEPA and California regulations require transition to lower global warming potential refrigerants, which in turn requires changes in provisions in model codes and standards related to the safe use of new A2L (mildly flammable) refrigerants.

PART IV - IBC Section 311.3 Group S-2

Information technology equipment facilities are unique low hazard and low occupancy uses where data is stored and processed in racked equipment. While there are some moderate hazards specific to ITE facilities under abnormal operational conditions, those hazards are anticipated and mitigated by the codes:

- ITE facilities must be cooled for ITE performance. Potential hazards from flammable refrigerants are managed by compliance with the refrigerant safety provisions of the IMC, the IFC and ASHRAE 15 thereby assuring that leaked flammable refrigerants are detected and managed appropriately.
- IMC Section 1104.2.2 requires that the electrical equipment and appliances in ITE facilities must conform to the Class I, Division 2, hazardous location classification requirements of NFPA 70 where the quantity of any Group A2, B2, A3 or B3 refrigerant in a single independent circuit would exceed 25 percent of the lower flammability limit (LFL) upon release to the space.
- Cabling in underfloor and above ceiling plenum areas of ITE facilities is required to comply with IMC Section 602.2.1.1 and electrical equipment exposed in plenums must comply with IMC Sec. 602.2.1.4.

PART V - IBC Table 509.1 Incidental Uses

Information technology equipment (ITE) facilities -data centers and computer rooms - are cooled for industrial process reasons so that the ITE can operate as needed. This means these facilities can have a significant refrigerant load, just like a refrigerant machinery room, without necessarily having a machinery room. Refrigerant machinery rooms already are identified in Table 509.1 as needing either a one-hour separation or automatic sprinkler system protection. ITE facilities should meet the same standard, except that ITE facilities may need alternative fire protection methods for ITE.

PART VI - IBC Table 1004.5 Occupant Load Factor

The original proponent of Section 1004.8 (Group A, 2015: E9-15) included the section as part of a successful effort to increase the Table 1004.5 occupant load factor (OLF) for the typical business use from 100 to 150 SF gross per occupant. Section 1004.8 was added to ensure that the newly less stringent OLF was not applied inappropriately to business use areas known to have a higher density of occupants.

Data centers and computer rooms do not have a higher density of occupants, but typically have very low or intermittent occupancy loads, being occupied by only IT staff who periodically perform equipment maintenance functions. For this proposal, 300 SF gross OLF was selected as a conservative and appropriate OLF because the footprint of racks of *information technology equipment* are comparable to footprint of the racks of shelving in storage and stock areas of mercantile uses, even though such mercantile areas would be far more frequently occupied.

Data centers and computer rooms have significant cooling needs for process purposes; keeping ITE cool enough is mission critical. USEPA and California regulations require transition to lower global warming potential refrigerants, which in turn requires changes in provisions in model codes and standards related to the safe use of new refrigerants. Using common definitions for data centers and computer rooms will foster uniformity of application between codes and related standards. These definitions have been proposed for use by the building, fire, and mechanical codes as well as ASHRAE 15, the *Safety Standard for Refrigeration Systems*.

PART VII - IBC Section 1010.2.9.2 ITEF exits

Information technology equipment (ITE) facilities (computer rooms and data centers) are cooling intensive spaces because of equipment process needs and have similar exiting concerns to refrigeration machinery rooms because of hazards related to refrigerants.

A separate code change proposal will add ITE facilities (computer rooms and data centers) to the IMC's industrial occupancy classification in recognition of the process cooling needs unique to ITE facilities. This change will permit computer rooms and data centers that comply with new IMC Section 1104.2.3 to have space cooling without requiring a refrigeration machine room per Section 1104.2.2.

PART VIII - IFC Definitions

See the commentary to IBC Definitions above.

PART IX - IFC Section 609.8.1

See the general reason above.

Separate proposals for Chapter 11 of the IMC and Chapter 4 of the IBC apply occupancy specific requirements to ITE facilities. Those proposals:

- limit refrigerants to nonflammable Group A1 and mildly flammable Group A2L refrigerants
- require electrical equipment conformance with the Class I, Division 2, hazardous location classification requirements of NFPA 70, and
- reference NFPA 75, *The Standard for the Protection of Information Technology Equipment* to assure appropriate fire protection is provided regardless of the configuration of the ITE facility and the fire protection package appropriately considers the unique environmental needs of the ITE facility.
- require ITE facilities to be separated from adjacent uses by fire barriers and horizontal assemblies.

Given the other fire safety provisions proposed to apply to ITE facilities, and in recognition that stopping the cooling of an ITE space could jeopardize the data and data processes, automatic stopping of cooling is inadvisable.

Required detection and alarms will inform the facility manager and fire officials of the potential hazard, thereby providing an opportunity for data backup and potential purging of the ITE facility atmosphere.

PART X - IMC Definitions

See the commentary to IBC Definitions above.

PART XI - IMC Occupancy classification.

This proposed change clarifies that data centers and computer rooms, which are cooled solely for the process loads associated with *information technology equipment*, are industrial occupancies.

Per Sec. 1103.2 (6), key features of an industrial occupancy are that it is that portion of a premises that is not open to the public and where access by authorized persons is controlled, both of which are characteristic of data centers and computer rooms.

Industrial occupancies also are defined by the processing of "goods." For data centers and computer rooms the 'goods' being processed is data or electronic information.

It is worth noting that no other occupancy classification specifically addresses any of the characteristics of data centers and computer rooms. The catchall provision in the Commercial occupancy classification for "*work or storage areas that do not qualify as industrial occupancies*," is not appropriate as space cooling in commercial occupancies is intended for comfort cooling, not for process cooling and occupant loads for industrial applications are very low, with restricted access, compared to commercial occupancies that may have no restrictions on access.

Data centers and computer rooms have significant cooling needs for process purposes; keeping ITE cool enough is mission critical.

USEPA and California regulations require transition to lower global warming potential refrigerants, which in turn requires changes in provisions in model codes and standards related to the safe use of new refrigerants. Using common definitions for data centers and computer rooms will foster uniformity of application between codes and related standards. These definitions have been proposed for use by the building, fire, and mechanical codes as well as ASHRAE 15, the *Safety Standard for Refrigeration Systems*.

The definitions for computer rooms and data centers are based upon ASHRAE Standard 90.4-2019 *Energy Standard for Data Centers.*

Appropriately classifying data centers and computer rooms will facilitate the drafting of requirements for the IMC that address the unique circumstances of these occupancies.

PART XII - IMC 1104.2.3 ITEF

See the general reason above.

Currently Sec 1106.3 requires that machinery rooms for Group A2L refrigerants must either conform to Class I, Division 2, hazardous location classification requirements of NFPA 70 **OR** provide provide emergency exhaust ventilation (Sec 1106.4). This proposal allows Group A2L to be used without NFPA 70 compliance and without exhaust ventilation in deference to the ITE environmental needs. A separate proposal to add requirements for ITE facilities in Chapter 4 of the building code clarifies that emergency ventilation for ITE facilities is only required to mix the atmosphere within the ITE space so that leaked refrigerant is fully dispersed.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
PART I, VIII and X - The definitions are to information only and will not add any additional construction requirements.
P ART II- In some facilities there may be an additional cost; in others there may be less cost. It will be very building specific.
PART III - This is a clarification.
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PART XI -This proposal will match the space use with the correct requirements which will tend to lower construction costs.

PART XII - Having use specific requirements for ITE facilities should minimize costs by avoiding requirements that do not fit the condition.

Staff Analysis: A review of the standard proposed for inclusion in the code, NFPA 75-20, with regard to the ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before March 20, 2021.

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: This proposal was disapproved as the committee felt that informational technology equipment facilities are not low hazard since that have many combustible elements. These items are too flamable to be considered a Group S-2. (Vote: 13-0)

G99-21 Part IV

NOTE: G99-21 PART V DID NOT RECEIVE A PUBLIC COMMENT AND IS REPRODUCED FOR INFORMATIONAL PURPOSES ONLY

G99-21 Part V

Proposed Change as Submitted

Proponents: Greg Johnson, representing Codes & Standards International (gjohnsonconsulting@gmail.com); Jay Peters, representing Vertiv (peters.jay@me.com); Andrew Klein, representing Building Owners and Managers Association International (andrew@asklein.com); Barry Greive, Target Corporation, representing Target Corporation (barry.greive@target.com); David Collins, representing The Preview Group, Inc. (dcollins@preview-group.com); Lee Kaiser, ORR Protection, representing NFPA 75 Technical Committee (ELT-AAA) (lkaiser@orrprotection.com)

2021 International Building Code

Revise as follows:

TABLE 509.1 INCIDENTAL USES

ROOM OR AREA	SEPARATION AND/OR PROTECTION
Furnace room where any piece of equipment is over 400,000 Btu per hour input	1 hour or provide automatic sprinkler system
Rooms with boilers where the largest piece of equipment is over 15 psi and 10 horsepower	1 hour or provide automatic sprinkler system
Refrigerant machinery room	1 hour or provide automatic sprinkler system
Information Technology Equipment Facilities	1 hour or provide automatic fire-extiguishing system
Hydrogen fuel gas rooms, not classified as Group H	1 hour in Group B, F, M, S and U occupancies; 2 hours in Group A, E, I and R occupancies.
Incinerator rooms	2 hours and provide automatic sprinkler system
Paint shops, not classified as Group H, located in occupancies other than Group F	2 hours; or 1 hour and provide automatic sprinkler system
In Group E occupancies, laboratories and vocational shops not classified as Group H	1 hour or provide automatic sprinkler system
In Group I-2 occupancies, laboratories not classified as Group H	1 hour and provide automatic sprinkler system
In *ambulatory care facilities*, laboratories not classified as Group H	1 hour or provide automatic sprinkler system
Laundry rooms over 100 square feet	1 hour or provide automatic sprinkler system
In Group I-2, laundry rooms over 100 square feet	1 hour
Group I-3 cells and Group I-2 patient rooms equipped with padded surfaces	1 hour
In Group I-2, physical plant maintenance shops	1 hour
In ambulatory care facilities or Group I-2 occupancies, waste and linen collection rooms with containers that have an aggregate volume of 10 cubic feet or greater	1 hour
In other than ambulatory care facilities and Group I-2 occupancies, waste and linen collection rooms over 100 square feet	1 hour or provide automatic sprinkler system
In ambulatory care facilities or Group I-2 occupancies, storage rooms greater than 100 square feet	1 hour
Electrical installations and transformers	See Sections 110.26 through 110.34 and Sections 450.8 through 450.48 of NFPA 70 for protection and separation requirements.

For SI: 1 square foot = 0.0929 m^2, 1 pound per square inch (psi) = 6.9 kPa, 1 British thermal unit (Btu) per hour = 0.293 watts, 1 horsepower = 746 watts, 1 gallon = 3.785 L, 1 cubic foot = 0.0283 m^3.

Reason: General information -

This is several proposals across multiple codes and standards to propose requirements appropriate to the unique characteristics of facilities housing computer rooms and data centers or *Information technology equipment* (ITE).Computer rooms and data centers are mission critical applications. All aspects of our public infrastructure, transportation, our education system, our healthcare system, our national defense, our banking, our public safety systems, our process for writing codes - our lives - are wholly dependent on the efficient real-time processing of data. The ITE used to perform this function must be 100% reliable.
For these reasons ITE facilities are secured spaces, atmospherically and physically, with tightly controlled access.

Because access to ITE facilities is restricted, and because ITE facilities are only accessed by technicians performing periodic process maintenance, the occupant load of these spaces is intermittent or sparse.

Like many process industries, ITE facilities have specific environmental process constraints if they are to function properly:

- ITE needs to be continuously cooled to protect the data and sometimes the best way to cool the equipment is to cool the room.
- ITE is extremely sensitive to humidity and atmospheric contaminants; it can ruin equipment and thereby data. Ideally, ITE facilities bring in no outside air or moisture into ITE spaces; ventilation for refrigerants within ITE facilities is solely to reduce refrigerant concentration by fully

mixing refrigerant into the atmosphere of the space.
- Alternative methods of fire suppression may be most suitable.

Until recently ITE facilities used nonflammable A1 refrigerants, but separate rule makings by the California Air Resources Board and the US Environmental Protection Agency now require refrigerants to meet Global Warming Potential (GWP) values that are much lower than currently possible with commercially available A1 refrigerants.

For this reason the ITE facilities cooling industry is adopting the use of A2L refrigerants which perform well, which are environmentally friendlier and which have much lower GWP values, but which are mildly flammable.

Adoption of A2L refrigerant necessitates ITE facility code requirements that provide the right protection for the unique industrial process being protected.

Requirements addressing ITE facilities must be flexible and performance oriented to address the many potential configurations of these spaces, from small computer rooms within much larger uses, or as one use in multiple occupancies, to unlimited area data centers that occupy millions of square feet of land, (https://www.analyticsvidhya.com/blog/2020/09/8-largest-data-centers-world-2020/).

PART I - IBC DEFINITIONS

Using common definitions for information technology equipment, data centers and computer rooms will foster uniformity of application between codes and related standards. These definitions have been proposed for use by the building, fire, and mechanical codes as well as ASHRAE 15, the *Safety Standard for Refrigeration Systems*. They are consistent with definitions used in the ASHRAE 90.4 *Energy Standard for Data Centers* as well as NFPA 75 *Standard for the Fire Protection of Information Technology Equipment*. It is likely that the definitions of data centers and computer rooms will be added to future editions of the IECC.The definitions for computer rooms and data centers are based ASHRAE Standard 90.4-2019 *Energy Standard for Data Centers* except that the definition of computer rooms was modified to clarify that computer rooms are not primarily used for any other purpose than to house *information technology equipment*. This modification is necessary to distinguish computer rooms (data processing) from rooms where occupants use computers (data entry).

PART II -IBC Section 429 (New)

See the general reason.

NFPA 75, *The Standard for the Protection of Information Technology Equipment* is proposed as the appropriate reference to assure:

- The need for appropriate fire protection is met regardless of the configuration of the ITE facility.
- The fire protection package appropriately considers the unique environmental needs of the ITE facility.

NFPA 75 benefits from the involvement of subject matter experts in the design, operation and fire protection of these unique industrial processes.

NFPA 75 is realistic and flexible; it requires a documented risk assessment of the ITE facility to serve as the basis for a fire protection approach that is "*permitted to be determined based on an evaluation of fire risks and hazards associated with the* ITE *and services provided and the business continuity planning and disaster restoration capabilities of the* ITE *specific to the* ITE."

NFPA 75 also anticipates that alternative methods of fire suppression may be most suitable to protect data processing capacity and provides references to those NFPA standards that address such systems. It sets forth *"the minimum requirements for the protection of* ITE *equipment and* ITE *areas from damage by fire or its associated effects — namely, smoke, corrosion, heat, and water.*"

In addition to the reference to NFPA 75 for performance design provisions, this proposal provides simple prescriptive requirements consistent with the treatment of locations classified as controlled access, industrial occupancies by ASHRAE 15 *Safety Standard for Refrigeration Systems* and the International Mechanical and Fire Codes.

By section, this proposal does the following:

· **Sec. 429.1 General** classifies ITE facilities as industrial occupancies to align with Sec. 1103 of the IMC. Per the IMC, which is consistent with ASHRAE 15, an industrial occupancy is "*that portion of premises that is not open to the public, where access by authorized persons is controlled, and that is used to manufacture, process or store goods such as chemicals, food, ice, meat or petroleum.*" A change has been proposed for the IMC and to ASHRAE 15 to specifically include ITE facilities in this classification.

· **Sec. 429.2 Refrigerants** limits refrigerants to nonflammable or mildly flammable refrigerants, but also provides clarification that the AHJ can approve other refrigerants on an individual basis.

· **Sec. 429.3 Fire Protection** references NFPA 75.

· **Sec. 429.4 Design and construction** requires a minimum of a one-hour fire separation between the ITE facility and adjacent occupancies, but reasonably provides flexibility for small spaces in fully sprinklered buildings. It also requires materials in concealed spaces, such as below a raised floor or above a suspended ceiling to be those permissible for use in a plenum.

· **Sec. 429.5 Electrical** requires compliance for non-IT equipment with Class 1, Division 2, of NFPA 70 (Class I – Flammable gases or vapors may be present; Division 2 – Ignitable concentrations of hazards exist under <u>abnormal</u> operation conditions) requirements where the code official has approved a refrigerant other than a Group A1 or A2L.

· **Sec. 429.6 Ventilation** requires mechanical ventilation of the ITE space to be triggered by refrigerant detection in accordance with the IMC and its secondary reference to the IFC Sec. 608.9. It also permits required ventilation to mix leaked refrigerant in the ITE space without exhausting the space or bringing in make-up air, thereby protecting the ITE from airborne contaminants and undesirable humidity.

· **Sec. 429.7 Refrigerant detection** references the IFC for refrigerant detection provisions and assures the appropriate initiation of measures to address an unintended leak of refrigerant or failure of the detection system.

· **Sec. 429.8 Standby power** ensures that active detection and protection measures are always available.

· **Sec. 429.9 Common path of egress travel** requires ITEF to comply with the same means of egress requirements as those specified in Section 1006.2.2.3 for refrigerated rooms or spaces. All portions of an ITEF must be within 150 feet of an exit or exit access doorway where such facilities are not protected by an approved automatic sprinkler system.

PART III - IBC Section 306.3 Group F-2

It is proposed to add Information Technology Equipment Facilities (data centers and computer rooms) to the F-2 occupancy group as they are industrial applications not currently addressed by the code with any specificity.

A separate code change proposes to add a section in Chapter 4 to address Information Technology Equipment Facilities (ITEF), but the correct occupancy group should be established.

ITEFs are buildings and spaces that are not open to the public, where access by authorized persons is controlled, and that are used to store and process electronic information or data. They are accessed only by IT maintenance technicians and have low or only intermittent occupant loads

USEPA and California regulations require transition to lower global warming potential refrigerants, which in turn requires changes in provisions in model codes and standards related to the safe use of new A2L (mildly flammable) refrigerants.

PART IV - IBC Section 311.3 Group S-2

Information technology equipment facilities are unique low hazard and low occupancy uses where data is stored and processed in racked equipment. While there are some moderate hazards specific to ITE facilities under abnormal operational conditions, those hazards are anticipated and mitigated by the codes:

- ITE facilities must be cooled for ITE performance. Potential hazards from flammable refrigerants are managed by compliance with the refrigerant safety provisions of the IMC, the IFC and ASHRAE 15 thereby assuring that leaked flammable refrigerants are detected and managed appropriately.
- IMC Section 1104.2.2 requires that the electrical equipment and appliances in ITE facilities must conform to the Class I, Division 2, hazardous location classification requirements of NFPA 70 where the quantity of any Group A2, B2, A3 or B3 refrigerant in a single independent circuit would exceed 25 percent of the lower flammability limit (LFL) upon release to the space.
- Cabling in underfloor and above ceiling plenum areas of ITE facilities is required to comply with IMC Section 602.2.1.1 and electrical equipment exposed in plenums must comply with IMC Sec. 602.2.1.4.

PART V - IBC Table 509.1 Incidental Uses

Information technology equipment (ITE) facilities -data centers and computer rooms - are cooled for industrial process reasons so that the ITE can operate as needed. This means these facilities can have a significant refrigerant load, just like a refrigerant machinery room, without necessarily having a machinery room. Refrigerant machinery rooms already are identified in Table 509.1 as needing either a one-hour separation or automatic sprinkler system protection. ITE facilities should meet the same standard, except that ITE facilities may need alternative fire protection methods for ITE.

PART VI - IBC Table 1004.5 Occupant Load Factor

The original proponent of Section 1004.8 (Group A, 2015: E9-15) included the section as part of a successful effort to increase the Table 1004.5 occupant load factor (OLF) for the typical business use from 100 to 150 SF gross per occupant. Section 1004.8 was added to ensure that the newly less stringent OLF was not applied inappropriately to business use areas known to have a higher density of occupants.

Data centers and computer rooms do not have a higher density of occupants, but typically have very low or intermittent occupancy loads, being occupied by only IT staff who periodically perform equipment maintenance functions. For this proposal, 300 SF gross OLF was selected as a conservative and appropriate OLF because the footprint of racks of *information technology equipment* are comparable to footprint of the racks of shelving in storage and stock areas of mercantile uses, even though such mercantile areas would be far more frequently occupied.

Data centers and computer rooms have significant cooling needs for process purposes; keeping ITE cool enough is mission critical. USEPA and California regulations require transition to lower global warming potential refrigerants, which in turn requires changes in provisions in model codes and standards related to the safe use of new refrigerants. Using common definitions for data centers and computer rooms will foster uniformity of application between codes and related standards. These definitions have been proposed for use by the building, fire, and mechanical codes as well as ASHRAE 15, the *Safety Standard for Refrigeration Systems*.

PART VII - IBC Section 1010.2.9.2 ITEF exits

Information technology equipment (ITE) facilities (computer rooms and data centers) are cooling intensive spaces because of equipment process needs and have similar exiting concerns to refrigeration machinery rooms because of hazards related to refrigerants.

A separate code change proposal will add ITE facilities (computer rooms and data centers) to the IMC's industrial occupancy classification in recognition of the process cooling needs unique to ITE facilities. This change will permit computer rooms and data centers that comply with new IMC Section 1104.2.3 to have space cooling without requiring a refrigeration machine room per Section 1104.2.2.

PART VIII - IFC Definitions

See the commentary to IBC Definitions above.

PART IX - IFC Section 609.8.1

See the general reason above.

Separate proposals for Chapter 11 of the IMC and Chapter 4 of the IBC apply occupancy specific requirements to ITE facilities. Those proposals:

- limit refrigerants to nonflammable Group A1 and mildly flammable Group A2L refrigerants
- require electrical equipment conformance with the Class I, Division 2, hazardous location classification requirements of NFPA 70, and
- reference NFPA 75, *The Standard for the Protection of Information Technology Equipment* to assure appropriate fire protection is provided regardless of the configuration of the ITE facility and the fire protection package appropriately considers the unique environmental needs of the ITE facility.
- require ITE facilities to be separated from adjacent uses by fire barriers and horizontal assemblies.

Given the other fire safety provisions proposed to apply to ITE facilities, and in recognition that stopping the cooling of an ITE space could jeopardize the data and data processes, automatic stopping of cooling is inadvisable.

Required detection and alarms will inform the facility manager and fire officials of the potential hazard, thereby providing an opportunity for data backup and potential purging of the ITE facility atmosphere.

PART X - IMC Definitions

See the commentary to IBC Definitions above.

PART XI - IMC Occupancy classification.

This proposed change clarifies that data centers and computer rooms, which are cooled solely for the process loads associated with *information technology equipment*, are industrial occupancies.

Per Sec. 1103.2 (6), key features of an industrial occupancy are that it is that portion of a premises that is not open to the public and where access by authorized persons is controlled, both of which are characteristic of data centers and computer rooms.

Industrial occupancies also are defined by the processing of "goods." For data centers and computer rooms the 'goods' being processed is data or electronic information.

It is worth noting that no other occupancy classification specifically addresses any of the characteristics of data centers and computer rooms. The catchall provision in the Commercial occupancy classification for "*work or storage areas that do not qualify as industrial occupancies*," is not appropriate as space cooling in commercial occupancies is intended for comfort cooling, not for process cooling and occupant loads for industrial applications are very low, with restricted access, compared to commercial occupancies that may have no restrictions on access.

Data centers and computer rooms have significant cooling needs for process purposes; keeping ITE cool enough is mission critical.

USEPA and California regulations require transition to lower global warming potential refrigerants, which in turn requires changes in provisions in model codes and standards related to the safe use of new refrigerants. Using common definitions for data centers and computer rooms will foster uniformity of application between codes and related standards. These definitions have been proposed for use by the building, fire, and mechanical codes as well as ASHRAE 15, the *Safety Standard for Refrigeration Systems*.

The definitions for computer rooms and data centers are based upon ASHRAE Standard 90.4-2019 *Energy Standard for Data Centers.*

Appropriately classifying data centers and computer rooms will facilitate the drafting of requirements for the IMC that address the unique circumstances of these occupancies.

PART XII - IMC 1104.2.3 ITEF

See the general reason above.

Currently Sec 1106.3 requires that machinery rooms for Group A2L refrigerants must either conform to Class I, Division 2, hazardous location classification requirements of NFPA 70 **OR** provide provide emergency exhaust ventilation (Sec 1106.4). This proposal allows Group A2L to be used without NFPA 70 compliance and without exhaust ventilation in deference to the ITE environmental needs. A separate proposal to add requirements for ITE facilities in Chapter 4 of the building code clarifies that emergency ventilation for ITE facilities is only required to mix the atmosphere within the ITE space so that leaked refrigerant is fully dispersed.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
PART I, VIII and X - The definitions are to information only and will not add any additional construction requirements.
P ART II- In some facilities there may be an additional cost; in others there may be less cost. It will be very building specific.
PART III - This is a clarification.
PART IV- This is a clarification.
PART V - There may additional costs to provide 1 hour separation for the space where the building does not have a fire sprinkler or fire extinguishing system.
PART VI - Means of egress systems will be 'right sized' for data centers and computer rooms.
PART VII - There may be a minimal increase for exit access doors in certain circumstances.

PART IX- Manual controls for refrigeration equipment shut-off should be less expensive than automatic controls.
PART XI -This proposal will match the space use with the correct requirements which will tend to lower construction costs.

PART XII - Having use specific requirements for ITE facilities should minimize costs by avoiding requirements that do not fit the condition.

Staff Analysis: A review of the standard proposed for inclusion in the code, NFPA 75-20, with regard to the ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before March 20, 2021.

G99-21 Part V

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: This proposal was disapproved because there was no size limit for the information technology equipment facilities in the incidental use tables. There was also a conflict with Section 509.4.2 in the terminology for sprinklers versus suppression. (Vote: 13-0)

G99-21 Part V

NOTE: G99-21 PART VI DID NOT RECEIVE A PUBLIC COMMENT AND IS REPRODUCED FOR INFORMATIONAL PURPOSES ONLY

G99-21 Part VI

Proposed Change as Submitted

Proponents: Greg Johnson, representing Codes & Standards International (gjohnsonconsulting@gmail.com); Jay Peters, representing Vertiv (peters.jay@me.com); Andrew Klein, representing Building Owners and Managers Association International (andrew@asklein.com); Barry Greive, Target Corporation, representing Target Corporation (barry.greive@target.com); David Collins, representing The Preview Group, Inc. (dcollins@preview-group.com); Lee Kaiser, ORR Protection, representing NFPA 75 Technical Committee (ELT-AAA) (lkaiser@orrprotection.com)

2021 International Building Code

Revise as follows:

TABLE 1004.5 MAXIMUM FLOOR AREA ALLOWANCES PER OCCUPANT

Portions of table not shown remain unchanged.

FUNCTION OF SPACE	OCCUPANT LOAD FACTOR[a]
Business areas	150 gross
Information Technology Equipment Facilities	300 gross
Concentrated business use areas	See Section 1004.8

For SI: 1 foot = 304.8 mm, 1 square foot = 0.0929 m^2.

a. Floor area in square feet per occupant.

1004.8 Concentrated business use areas. The*occupant load* factor for concentrated business use shall be applied to telephone call centers, trading floors, electronic data ~~processing~~ entry centers and similar business use areas with a higher density of occupants than would normally be expected in a typical business occupancy environment. Where approved by the *building official*, the *occupant load* for concentrated business use areas shall be the actual *occupant load*, but not less than one occupant per 50 square feet (4.65 m^2) of gross occupiable floor space.

Reason: General information -

This is several proposals across multiple codes and standards to propose requirements appropriate to the unique characteristics of facilities housing computer rooms and data centers or *Information technology equipment* (ITE).Computer rooms and data centers are mission critical applications. All aspects of our public infrastructure, transportation, our education system, our healthcare system, our national defense, our banking, our public safety systems, our process for writing codes - our lives - are wholly dependent on the efficient real-time processing of data. The ITE used to perform this function must be 100% reliable.
For these reasons ITE facilities are secured spaces, atmospherically and physically, with tightly controlled access.

Because access to ITE facilities is restricted, and because ITE facilities are only accessed by technicians performing periodic process maintenance, the occupant load of these spaces is intermittent or sparse.

Like many process industries, ITE facilities have specific environmental process constraints if they are to function properly:

- ITE needs to be continuously cooled to protect the data and sometimes the best way to cool the equipment is to cool the room.
- ITE is extremely sensitive to humidity and atmospheric contaminants; it can ruin equipment and thereby data. Ideally, ITE facilities bring in no outside air or moisture into ITE spaces; ventilation for refrigerants within ITE facilities is solely to reduce refrigerant concentration by fully mixing refrigerant into the atmosphere of the space.
- Alternative methods of fire suppression may be most suitable.

Until recently ITE facilities used nonflammable A1 refrigerants, but separate rule makings by the California Air Resources Board and the US Environmental Protection Agency now require refrigerants to meet Global Warming Potential (GWP) values that are much lower than currently possible with commercially available A1 refrigerants.

For this reason the ITE facilities cooling industry is adopting the use of A2L refrigerants which perform well, which are environmentally friendlier and which have much lower GWP values, but which are mildly flammable.

Adoption of A2L refrigerant necessitates ITE facility code requirements that provide the right protection for the unique industrial process being protected.

Requirements addressing ITE facilities must be flexible and performance oriented to address the many potential configurations of these spaces, from small computer rooms within much larger uses, or as one use in multiple occupancies, to unlimited area data centers that occupy millions of square feet of land, (https://www.analyticsvidhya.com/blog/2020/09/8-largest-data-centers-world-2020/).

PART I - IBC DEFINITIONS

Using common definitions for information technology equipment, data centers and computer rooms will foster uniformity of application between codes and related standards. These definitions have been proposed for use by the building, fire, and mechanical codes as well as ASHRAE 15, the *Safety Standard for Refrigeration Systems*. They are consistent with definitions used in the ASHRAE 90.4 *Energy Standard for Data Centers* as well as NFPA 75 *Standard for the Fire Protection of Information Technology Equipment*. It is likely that the definitions of data centers and computer rooms will be added to future editions of the IECC.The definitions for computer rooms and data centers are based ASHRAE Standard 90.4-2019 *Energy Standard for Data Centers* except that the definition of computer rooms was modified to clarify that computer rooms are not primarily used for any other purpose than to house *information technology equipment*. This modification is necessary to distinguish computer rooms (data processing) from rooms where occupants use computers (data entry).

PART II -IBC Section 429 (New)

See the general reason.

NFPA 75, *The Standard for the Protection of Information Technology Equipment* is proposed as the appropriate reference to assure:

- The need for appropriate fire protection is met regardless of the configuration of the ITE facility.
- The fire protection package appropriately considers the unique environmental needs of the ITE facility.

NFPA 75 benefits from the involvement of subject matter experts in the design, operation and fire protection of these unique industrial processes.

NFPA 75 is realistic and flexible; it requires a documented risk assessment of the ITE facility to serve as the basis for a fire protection approach that is "*permitted to be determined based on an evaluation of fire risks and hazards associated with the* ITE *and services provided and the business continuity planning and disaster restoration capabilities of the* ITE *specific to the* ITE."

NFPA 75 also anticipates that alternative methods of fire suppression may be most suitable to protect data processing capacity and provides references to those NFPA standards that address such systems. It sets forth *"the minimum requirements for the protection of* ITE *equipment and* ITE *areas from damage by fire or its associated effects — namely, smoke, corrosion, heat, and water.*"

In addition to the reference to NFPA 75 for performance design provisions, this proposal provides simple prescriptive requirements consistent with the treatment of locations classified as controlled access, industrial occupancies by ASHRAE 15 *Safety Standard for Refrigeration Systems* and the International Mechanical and Fire Codes.

By section, this proposal does the following:

· **Sec. 429.1 General** classifies ITE facilities as industrial occupancies to align with Sec. 1103 of the IMC. Per the IMC, which is consistent with ASHRAE 15, an industrial occupancy is "*that portion of premises that is not open to the public, where access by authorized persons is controlled, and that is used to manufacture, process or store goods such as chemicals, food, ice, meat or petroleum.*" A change has been proposed for the IMC and to ASHRAE 15 to specifically include ITE facilities in this classification.

· **Sec. 429.2 Refrigerants** limits refrigerants to nonflammable or mildly flammable refrigerants, but also provides clarification that the AHJ can approve other refrigerants on an individual basis.

· **Sec. 429.3 Fire Protection** references NFPA 75.

· **Sec. 429.4 Design and construction** requires a minimum of a one-hour fire separation between the ITE facility and adjacent occupancies, but reasonably provides flexibility for small spaces in fully sprinklered buildings. It also requires materials in concealed spaces, such as below a raised floor or above a suspended ceiling to be those permissible for use in a plenum.

· **Sec. 429.5 Electrical** requires compliance for non-IT equipment with Class 1, Division 2, of NFPA 70 (Class I – Flammable gases or vapors may be present; Division 2 – Ignitable concentrations of hazards exist under abnormal operation conditions) requirements where the code official has approved a refrigerant other than a Group A1 or A2L.

· **Sec. 429.6 Ventilation** requires mechanical ventilation of the ITE space to be triggered by refrigerant detection in accordance with the IMC and its secondary reference to the IFC Sec. 608.9. It also permits required ventilation to mix leaked refrigerant in the ITE space without exhausting the space or bringing in make-up air, thereby protecting the ITE from airborne contaminants and undesirable humidity.

· **Sec. 429.7 Refrigerant detection** references the IFC for refrigerant detection provisions and assures the appropriate initiation of measures to address an unintended leak of refrigerant or failure of the detection system.

· **Sec. 429.8 Standby power** ensures that active detection and protection measures are always available.

· **Sec. 429.9 Common path of egress travel** requires ITEF to comply with the same means of egress requirements as those specified in Section 1006.2.2.3 for refrigerated rooms or spaces. All portions of an ITEF must be within 150 feet of an exit or exit access doorway where such facilities are not protected by an approved automatic sprinkler system.

PART III - IBC Section 306.3 Group F-2

It is proposed to add Information Technology Equipment Facilities (data centers and computer rooms) to the F-2 occupancy group as they are industrial applications not currently addressed by the code with any specificity.

A separate code change proposes to add a section in Chapter 4 to address Information Technology Equipment Facilities (ITEF), but the correct occupancy group should be established.

ITEFs are buildings and spaces that are not open to the public, where access by authorized persons is controlled, and that are used to store and process electronic information or data. They are accessed only by IT maintenance technicians and have low or only intermittent occupant loads

USEPA and California regulations require transition to lower global warming potential refrigerants, which in turn requires changes in provisions in model codes and standards related to the safe use of new A2L (mildly flammable) refrigerants.

PART IV - IBC Section 311.3 Group S-2

Information technology equipment facilities are unique low hazard and low occupancy uses where data is stored and processed in racked equipment. While there are some moderate hazards specific to ITE facilities under abnormal operational conditions, those hazards are anticipated and mitigated by the codes:

- ITE facilities must be cooled for ITE performance. Potential hazards from flammable refrigerants are managed by compliance with the refrigerant safety provisions of the IMC, the IFC and ASHRAE 15 thereby assuring that leaked flammable refrigerants are detected and managed appropriately.
- IMC Section 1104.2.2 requires that the electrical equipment and appliances in ITE facilities must conform to the Class I, Division 2, hazardous location classification requirements of NFPA 70 where the quantity of any Group A2, B2, A3 or B3 refrigerant in a single independent circuit would exceed 25 percent of the lower flammability limit (LFL) upon release to the space.
- Cabling in underfloor and above ceiling plenum areas of ITE facilities is required to comply with IMC Section 602.2.1.1 and electrical equipment exposed in plenums must comply with IMC Sec. 602.2.1.4.

PART V - IBC Table 509.1 Incidental Uses

Information technology equipment (ITE) facilities -data centers and computer rooms - are cooled for industrial process reasons so that the ITE can operate as needed. This means these facilities can have a significant refrigerant load, just like a refrigerant machinery room, without necessarily having a machinery room. Refrigerant machinery rooms already are identified in Table 509.1 as needing either a one-hour separation or automatic sprinkler system protection. ITE facilities should meet the same standard, except that ITE facilities may need alternative fire protection methods for ITE.

PART VI - IBC Table 1004.5 Occupant Load Factor

The original proponent of Section 1004.8 (Group A, 2015: E9-15) included the section as part of a successful effort to increase the Table 1004.5 occupant load factor (OLF) for the typical business use from 100 to 150 SF gross per occupant. Section 1004.8 was added to ensure that the newly less stringent OLF was not applied inappropriately to business use areas known to have a higher density of occupants.

Data centers and computer rooms do not have a higher density of occupants, but typically have very low or intermittent occupancy loads, being occupied by only IT staff who periodically perform equipment maintenance functions. For this proposal, 300 SF gross OLF was selected as a conservative and appropriate OLF because the footprint of racks of *information technology equipment* are comparable to footprint of the racks of shelving in storage and stock areas of mercantile uses, even though such mercantile areas would be far more frequently occupied.

Data centers and computer rooms have significant cooling needs for process purposes; keeping ITE cool enough is mission critical. USEPA and California regulations require transition to lower global warming potential refrigerants, which in turn requires changes in provisions in model codes and standards related to the safe use of new refrigerants. Using common definitions for data centers and computer rooms will foster uniformity of application between codes and related standards. These definitions have been proposed for use by the building, fire, and mechanical codes as well as ASHRAE 15, the *Safety Standard for Refrigeration Systems*.

PART VII - IBC Section 1010.2.9.2 ITEF exits

Information technology equipment (ITE) facilities (computer rooms and data centers) are cooling intensive spaces because of equipment process needs and have similar exiting concerns to refrigeration machinery rooms because of hazards related to refrigerants.

A separate code change proposal will add ITE facilities (computer rooms and data centers) to the IMC's industrial occupancy classification in recognition of the process cooling needs unique to ITE facilities. This change will permit computer rooms and data centers that comply with new IMC Section 1104.2.3 to have space cooling without requiring a refrigeration machine room per Section 1104.2.2.

PART VIII - IFC Definitions

See the commentary to IBC Definitions above.

PART IX - IFC Section 609.8.1

See the general reason above.

Separate proposals for Chapter 11 of the IMC and Chapter 4 of the IBC apply occupancy specific requirements to ITE facilities. Those proposals:

- limit refrigerants to nonflammable Group A1 and mildly flammable Group A2L refrigerants
- require electrical equipment conformance with the Class I, Division 2, hazardous location classification requirements of NFPA 70, and
- reference NFPA 75, *The Standard for the Protection of Information Technology Equipment* to assure appropriate fire protection is provided regardless of the configuration of the ITE facility and the fire protection package appropriately considers the unique environmental needs of the ITE facility.
- require ITE facilities to be separated from adjacent uses by fire barriers and horizontal assemblies.

Given the other fire safety provisions proposed to apply to ITE facilities, and in recognition that stopping the cooling of an ITE space could jeopardize the data and data processes, automatic stopping of cooling is inadvisable.

Required detection and alarms will inform the facility manager and fire officials of the potential hazard, thereby providing an opportunity for data backup and potential purging of the ITE facility atmosphere.

PART X - IMC Definitions

See the commentary to IBC Definitions above.

PART XI - IMC Occupancy classification.

This proposed change clarifies that data centers and computer rooms, which are cooled solely for the process loads associated with *information technology equipment*, are industrial occupancies.

Per Sec. 1103.2 (6), key features of an industrial occupancy are that it is that portion of a premises that is not open to the public and where access by authorized persons is controlled, both of which are characteristic of data centers and computer rooms.

Industrial occupancies also are defined by the processing of "goods." For data centers and computer rooms the 'goods' being processed is data or electronic information.

It is worth noting that no other occupancy classification specifically addresses any of the characteristics of data centers and computer rooms. The catchall provision in the Commercial occupancy classification for "*work or storage areas that do not qualify as industrial occupancies*," is not appropriate as space cooling in commercial occupancies is intended for comfort cooling, not for process cooling and occupant loads for industrial applications are very low, with restricted access, compared to commercial occupancies that may have no restrictions on access.

Data centers and computer rooms have significant cooling needs for process purposes; keeping ITE cool enough is mission critical.

USEPA and California regulations require transition to lower global warming potential refrigerants, which in turn requires changes in provisions in model codes and standards related to the safe use of new refrigerants. Using common definitions for data centers and computer rooms will foster uniformity of application between codes and related standards. These definitions have been proposed for use by the building, fire, and mechanical codes as well as ASHRAE 15, the *Safety Standard for Refrigeration Systems*.

The definitions for computer rooms and data centers are based upon ASHRAE Standard 90.4-2019 *Energy Standard for Data Centers.*

Appropriately classifying data centers and computer rooms will facilitate the drafting of requirements for the IMC that address the unique circumstances of these occupancies.

PART XII - IMC 1104.2.3 ITEF

See the general reason above.

Currently Sec 1106.3 requires that machinery rooms for Group A2L refrigerants must either conform to Class I, Division 2, hazardous location classification requirements of NFPA 70 **OR** provide provide emergency exhaust ventilation (Sec 1106.4). This proposal allows Group A2L to be used without NFPA 70 compliance and without exhaust ventilation in deference to the ITE environmental needs. A separate proposal to add requirements for ITE facilities in Chapter 4 of the building code clarifies that emergency ventilation for ITE facilities is only required to mix the atmosphere within the ITE space so that leaked refrigerant is fully dispersed.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
PART I, VIII and X - The definitions are to information only and will not add any additional construction requirements.
P ART II- In some facilities there may be an additional cost; in others there may be less cost. It will be very building specific.
PART III - This is a clarification.
PART IV- This is a clarification.
PART V - There may additional costs to provide 1 hour separation for the space where the building does not have a fire sprinkler or fire extinguishing system.
PART VI - Means of egress systems will be 'right sized' for data centers and computer rooms.
PART VII - There may be a minimal increase for exit access doors in certain circumstances.

PART IX- Manual controls for refrigeration equipment shut-off should be less expensive than automatic controls.
PART XI -This proposal will match the space use with the correct requirements which will tend to lower construction costs.

PART XII - Having use specific requirements for ITE facilities should minimize costs by avoiding requirements that do not fit the condition.

Staff Analysis: A review of the standard proposed for inclusion in the code, NFPA 75-20, with regard to the ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before March 20, 2021.

G99-21 Part VI

Public Hearing Results

Committee Action: **As Modified**

Committee Modification:

TABLE 1004.5 MAXIMUM FLOOR AREA ALLOWANCES PER OCCUPANT

FUNCTION OF SPACE	OCCUPANT LOAD FACTOR[a]
Business areas	150 gross
~~*Information Technology Equipment Facilities*~~	~~300 gross~~
Concentrated business use areas	See Section 1004.8
<u>*Information Technology Equipment Facilities*</u>	<u>300 gross</u>

For SI: 1 foot = 304.8 mm, 1 square foot = 0.0929 m^2.

a. Floor area in square feet per occupant.

Committee Reason: The modification moved Information Technology Equipment Facilities out from under business, which is a more appropriate location. The proposal was approved as it separated data entry from equipment facilities. The coordinates with the action on G99-21 Part 1. (Vote: 14-0)

G99-21 Part VI

NOTE: G99-21 PART VIII DID NOT RECEIVE A PUBLIC COMMENT AND IS REPRODUCED FOR INFORMATIONAL PURPOSES ONLY

G99-21 Part VIII

Proposed Change as Submitted

Proponents: Greg Johnson, representing Codes & Standards International (gjohnsonconsulting@gmail.com); Jay Peters, representing Vertiv (peters.jay@me.com); Andrew Klein, representing Building Owners and Managers Association International (andrew@asklein.com); Barry Greive, Target Corporation, representing Target Corporation (barry.greive@target.com); David Collins, representing The Preview Group, Inc. (dcollins@preview-group.com); Lee Kaiser, ORR Protection, representing NFPA 75 Technical Committee (ELT-AAA) (lkaiser@orrprotection.com)

2021 International Fire Code

Add new definition as follows:

COMPUTER ROOM. A room or portions of a *building* used primarily to house *information technology equipment (ITE)* and serving an *ITE* load less than or equal to10 kW or 20 W/ft2 (215 W/m2) or less of conditioned floor area.

DATA CENTER. A room or *building*, or portions thereof, used primarily to house *information technology equipment (ITE)* and serving a total *ITE* load greater than 10 kW and 20 W/ft^2 (215 W/m^2) of conditioned floor area.

INFORMATION TECHNOLOGY EQUIPMENT (ITE). Computers, data storage, servers, and network communication equipment.

INFORMATION TECHNOLOGY EQUIPMENT FACILITIES (ITEF). *Data centers* and *computer rooms* used primarily to house *information technology equipment.*

Reason: General information -

This is several proposals across multiple codes and standards to propose requirements appropriate to the unique characteristics of facilities housing computer rooms and data centers or *Information technology equipment* (ITE).Computer rooms and data centers are mission critical applications. All aspects of our public infrastructure, transportation, our education system, our healthcare system, our national defense, our banking, our public safety systems, our process for writing codes - our lives - are wholly dependent on the efficient real-time processing of data. The ITE used to perform this function must be 100% reliable.
For these reasons ITE facilities are secured spaces, atmospherically and physically, with tightly controlled access.

Because access to ITE facilities is restricted, and because ITE facilities are only accessed by technicians performing periodic process maintenance, the occupant load of these spaces is intermittent or sparse.

Like many process industries, ITE facilities have specific environmental process constraints if they are to function properly:

- ITE needs to be continuously cooled to protect the data and sometimes the best way to cool the equipment is to cool the room.
- ITE is extremely sensitive to humidity and atmospheric contaminants; it can ruin equipment and thereby data. Ideally, ITE facilities bring in no outside air or moisture into ITE spaces; ventilation for refrigerants within ITE facilities is solely to reduce refrigerant concentration by fully mixing refrigerant into the atmosphere of the space.
- Alternative methods of fire suppression may be most suitable.

Until recently ITE facilities used nonflammable A1 refrigerants, but separate rule makings by the California Air Resources Board and the US Environmental Protection Agency now require refrigerants to meet Global Warming Potential (GWP) values that are much lower than currently possible with commercially available A1 refrigerants.

For this reason the ITE facilities cooling industry is adopting the use of A2L refrigerants which perform well, which are environmentally friendlier and which have much lower GWP values, but which are mildly flammable.

Adoption of A2L refrigerant necessitates ITE facility code requirements that provide the right protection for the unique industrial process being protected.

Requirements addressing ITE facilities must be flexible and performance oriented to address the many potential configurations of these spaces, from small computer rooms within much larger uses, or as one use in multiple occupancies, to unlimited area data centers that occupy millions of square feet of land, (https://www.analyticsvidhya.com/blog/2020/09/8-largest-data-centers-world-2020/).

PART I - IBC DEFINITIONS

Using common definitions for information technology equipment, data centers and computer rooms will foster uniformity of application between codes and related standards. These definitions have been proposed for use by the building, fire, and mechanical codes as well as ASHRAE 15, the *Safety Standard for Refrigeration Systems*. They are consistent with definitions used in the ASHRAE 90.4 *Energy Standard for Data Centers* as well as NFPA 75 *Standard for the Fire Protection of Information Technology Equipment*. It is likely that the definitions of data centers and computer rooms will be added to future editions of the IECC.The definitions for computer rooms and data centers are based ASHRAE Standard 90.4-2019 *Energy Standard for Data Centers* except that the definition of computer rooms was modified to clarify that computer rooms are not primarily used for any other purpose than to house *information technology equipment*. This modification is necessary to distinguish computer rooms (data processing) from rooms where occupants use computers (data entry).

PART II -IBC Section 429 (New)

See the general reason.

NFPA 75, *The Standard for the Protection of Information Technology Equipment* is proposed as the appropriate reference to assure:

- The need for appropriate fire protection is met regardless of the configuration of the ITE facility.
- The fire protection package appropriately considers the unique environmental needs of the ITE facility.

NFPA 75 benefits from the involvement of subject matter experts in the design, operation and fire protection of these unique industrial processes.

NFPA 75 is realistic and flexible; it requires a documented risk assessment of the ITE facility to serve as the basis for a fire protection approach that is “*permitted to be determined based on an evaluation of fire risks and hazards associated with the* ITE *and services provided and the business continuity planning and disaster restoration capabilities of the* ITE *specific to the* ITE.”

NFPA 75 also anticipates that alternative methods of fire suppression may be most suitable to protect data processing capacity and provides references to those NFPA standards that address such systems. It sets forth *"the minimum requirements for the protection of* ITE *equipment and* ITE *areas from damage by fire or its associated effects — namely, smoke, corrosion, heat, and water*."

In addition to the reference to NFPA 75 for performance design provisions, this proposal provides simple prescriptive requirements consistent with the treatment of locations classified as controlled access, industrial occupancies by ASHRAE 15 *Safety Standard for Refrigeration Systems* and the International Mechanical and Fire Codes.

By section, this proposal does the following:

· **Sec. 429.1 General** classifies ITE facilities as industrial occupancies to align with Sec. 1103 of the IMC. Per the IMC, which is consistent with ASHRAE 15, an industrial occupancy is "*that portion of premises that is not open to the public, where access by authorized persons is controlled, and that is used to manufacture, process or store goods such as chemicals, food, ice, meat or petroleum.*" A change has been proposed for the IMC and to ASHRAE 15 to specifically include ITE facilities in this classification.

· **Sec. 429.2 Refrigerants** limits refrigerants to nonflammable or mildly flammable refrigerants, but also provides clarification that the AHJ can approve other refrigerants on an individual basis.

· **Sec. 429.3 Fire Protection** references NFPA 75.

· **Sec. 429.4 Design and construction** requires a minimum of a one-hour fire separation between the ITE facility and adjacent occupancies, but reasonably provides flexibility for small spaces in fully sprinklered buildings. It also requires materials in concealed spaces, such as below a raised floor or above a suspended ceiling to be those permissible for use in a plenum.

· **Sec. 429.5 Electrical** requires compliance for non-IT equipment with Class 1, Division 2, of NFPA 70 (Class I – Flammable gases or vapors may be present; Division 2 – Ignitable concentrations of hazards exist under <u>abnormal</u> operation conditions) requirements where the code official has approved a refrigerant other than a Group A1 or A2L.

· **Sec. 429.6 Ventilation** requires mechanical ventilation of the ITE space to be triggered by refrigerant detection in accordance with the IMC and its secondary reference to the IFC Sec. 608.9. It also permits required ventilation to mix leaked refrigerant in the ITE space without exhausting the space or bringing in make-up air, thereby protecting the ITE from airborne contaminants and undesirable humidity.

· **Sec. 429.7 Refrigerant detection** references the IFC for refrigerant detection provisions and assures the appropriate initiation of measures to address an unintended leak of refrigerant or failure of the detection system.

· **Sec. 429.8 Standby power** ensures that active detection and protection measures are always available.

· **Sec. 429.9 Common path of egress travel** requires ITEF to comply with the same means of egress requirements as those specified in Section 1006.2.2.3 for refrigerated rooms or spaces. All portions of an ITEF must be within 150 feet of an exit or exit access doorway where such facilities are not protected by an approved automatic sprinkler system.

PART III - IBC Section 306.3 Group F-2

It is proposed to add Information Technology Equipment Facilities (data centers and computer rooms) to the F-2 occupancy group as they are industrial applications not currently addressed by the code with any specificity.

A separate code change proposes to add a section in Chapter 4 to address Information Technology Equipment Facilities (ITEF), but the correct occupancy group should be established.

ITEFs are buildings and spaces that are not open to the public, where access by authorized persons is controlled, and that are used to store and process electronic information or data. They are accessed only by IT maintenance technicians and have low or only intermittent occupant loads

USEPA and California regulations require transition to lower global warming potential refrigerants, which in turn requires changes in provisions in model codes and standards related to the safe use of new A2L (mildly flammable) refrigerants.

PART IV - IBC Section 311.3 Group S-2

Information technology equipment facilities are unique low hazard and low occupancy uses where data is stored and processed in racked equipment. While there are some moderate hazards specific to ITE facilities under abnormal operational conditions, those hazards are anticipated and mitigated by the codes:

- ITE facilities must be cooled for ITE performance. Potential hazards from flammable refrigerants are managed by compliance with the refrigerant safety provisions of the IMC, the IFC and ASHRAE 15 thereby assuring that leaked flammable refrigerants are detected and managed appropriately.
- IMC Section 1104.2.2 requires that the electrical equipment and appliances in ITE facilities must conform to the Class I, Division 2, hazardous location classification requirements of NFPA 70 where the quantity of any Group A2, B2, A3 or B3 refrigerant in a single independent circuit would exceed 25 percent of the lower flammability limit (LFL) upon release to the space.
- Cabling in underfloor and above ceiling plenum areas of ITE facilities is required to comply with IMC Section 602.2.1.1 and electrical equipment exposed in plenums must comply with IMC Sec. 602.2.1.4.

PART V - IBC Table 509.1 Incidental Uses

Information technology equipment (ITE) facilities -data centers and computer rooms - are cooled for industrial process reasons so that the ITE can operate as needed. This means these facilities can have a significant refrigerant load, just like a refrigerant machinery room, without necessarily having a machinery room. Refrigerant machinery rooms already are identified in Table 509.1 as needing either a one-hour separation or automatic sprinkler system protection. ITE facilities should meet the same standard, except that ITE facilities may need alternative fire protection methods for ITE.

PART VI - IBC Table 1004.5 Occupant Load Factor

The original proponent of Section 1004.8 (Group A, 2015: E9-15) included the section as part of a successful effort to increase the Table 1004.5 occupant load factor (OLF) for the typical business use from 100 to 150 SF gross per occupant. Section 1004.8 was added to ensure that the newly less stringent OLF was not applied inappropriately to business use areas known to have a higher density of occupants.

Data centers and computer rooms do not have a higher density of occupants, but typically have very low or intermittent occupancy loads, being occupied by only IT staff who periodically perform equipment maintenance functions. For this proposal, 300 SF gross OLF was selected as a conservative and appropriate OLF because the footprint of racks of *information technology equipment* are comparable to footprint of the racks of shelving in storage and stock areas of mercantile uses, even though such mercantile areas would be far more frequently occupied.

Data centers and computer rooms have significant cooling needs for process purposes; keeping ITE cool enough is mission critical. USEPA and California regulations require transition to lower global warming potential refrigerants, which in turn requires changes in provisions in model codes and standards related to the safe use of new refrigerants. Using common definitions for data centers and computer rooms will foster uniformity of application between codes and related standards. These definitions have been proposed for use by the building, fire, and mechanical codes as well as ASHRAE 15, the *Safety Standard for Refrigeration Systems*.

PART VII - IBC Section 1010.2.9.2 ITEF exits

Information technology equipment (ITE) facilities (computer rooms and data centers) are cooling intensive spaces because of equipment process needs and have similar exiting concerns to refrigeration machinery rooms because of hazards related to refrigerants.

A separate code change proposal will add ITE facilities (computer rooms and data centers) to the IMC's industrial occupancy classification in recognition of the process cooling needs unique to ITE facilities. This change will permit computer rooms and data centers that comply with new IMC Section 1104.2.3 to have space cooling without requiring a refrigeration machine room per Section 1104.2.2.

PART VIII - IFC Definitions

See the commentary to IBC Definitions above.

PART IX - IFC Section 609.8.1

See the general reason above.

Separate proposals for Chapter 11 of the IMC and Chapter 4 of the IBC apply occupancy specific requirements to ITE facilities. Those proposals:

- limit refrigerants to nonflammable Group A1 and mildly flammable Group A2L refrigerants
- require electrical equipment conformance with the Class I, Division 2, hazardous location classification requirements of NFPA 70, and
- reference NFPA 75, *The Standard for the Protection of Information Technology Equipment* to assure appropriate fire protection is provided regardless of the configuration of the ITE facility and the fire protection package appropriately considers the unique environmental needs of the ITE facility.
- require ITE facilities to be separated from adjacent uses by fire barriers and horizontal assemblies.

Given the other fire safety provisions proposed to apply to ITE facilities, and in recognition that stopping the cooling of an ITE space could jeopardize the data and data processes, automatic stopping of cooling is inadvisable.

Required detection and alarms will inform the facility manager and fire officials of the potential hazard, thereby providing an opportunity for data backup and potential purging of the ITE facility atmosphere.

PART X - IMC Definitions

See the commentary to IBC Definitions above.

PART XI - IMC Occupancy classification.

This proposed change clarifies that data centers and computer rooms, which are cooled solely for the process loads associated with *information technology equipment*, are industrial occupancies.

Per Sec. 1103.2 (6), key features of an industrial occupancy are that it is that portion of a premises that is not open to the public and where access by authorized persons is controlled, both of which are characteristic of data centers and computer rooms.

Industrial occupancies also are defined by the processing of "goods." For data centers and computer rooms the 'goods' being processed is data or electronic information.

It is worth noting that no other occupancy classification specifically addresses any of the characteristics of data centers and computer rooms. The catchall provision in the Commercial occupancy classification for "*work or storage areas that do not qualify as industrial occupancies*," is not appropriate as space cooling in commercial occupancies is intended for comfort cooling, not for process cooling and occupant loads for industrial applications are very low, with restricted access, compared to commercial occupancies that may have no restrictions on access.

Data centers and computer rooms have significant cooling needs for process purposes; keeping ITE cool enough is mission critical.

USEPA and California regulations require transition to lower global warming potential refrigerants, which in turn requires changes in provisions in model codes and standards related to the safe use of new refrigerants. Using common definitions for data centers and computer rooms will foster uniformity of application between codes and related standards. These definitions have been proposed for use by the building, fire, and mechanical codes as well as ASHRAE 15, the *Safety Standard for Refrigeration Systems*.

The definitions for computer rooms and data centers are based upon ASHRAE Standard 90.4-2019 *Energy Standard for Data Centers.*

Appropriately classifying data centers and computer rooms will facilitate the drafting of requirements for the IMC that address the unique circumstances of these occupancies.

PART XII - IMC 1104.2.3 ITEF

See the general reason above.

Currently Sec 1106.3 requires that machinery rooms for Group A2L refrigerants must either conform to Class I, Division 2, hazardous location classification requirements of NFPA 70 **OR** provide provide emergency exhaust ventilation (Sec 1106.4). This proposal allows Group A2L to be used without NFPA 70 compliance and without exhaust ventilation in deference to the ITE environmental needs. A separate proposal to add requirements for ITE facilities in Chapter 4 of the building code clarifies that emergency ventilation for ITE facilities is only required to mix the atmosphere within the ITE space so that leaked refrigerant is fully dispersed.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
PART I, VIII and X - The definitions are to information only and will not add any additional construction requirements.
P ART II- In some facilities there may be an additional cost; in others there may be less cost. It will be very building specific.
PART III - This is a clarification.
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PART XI -This proposal will match the space use with the correct requirements which will tend to lower construction costs.

PART XII - Having use specific requirements for ITE facilities should minimize costs by avoiding requirements that do not fit the condition.

Staff Analysis: A review of the standard proposed for inclusion in the code, NFPA 75-20, with regard to the ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before March 20, 2021.

G99-21 Part VIII

Public Hearing Results

Committee Action: **As Submitted**

Committee Reason: This proposal was approved to be consistent with Part I. Additionally if the other portions are placed within the code these definitions will be critical. It was noted that NFPA 75 does not appear to be consistent with these definitions. (Vote: 10-4)

G99-21 Part VIII

NOTE: G99-21 PART XI DID NOT RECEIVE A PUBLIC COMMENT AND IS REPRODUCED FOR INFORMATIONAL PURPOSES ONLY

G99-21 Part XI

Proposed Change as Submitted

Proponents: Greg Johnson, representing Codes & Standards International (gjohnsonconsulting@gmail.com); Jay Peters, representing Vertiv (peters.jay@me.com); Andrew Klein, representing Building Owners and Managers Association International (andrew@asklein.com); Barry Greive, Target Corporation, representing Target Corporation (barry.greive@target.com); David Collins, representing The Preview Group, Inc. (dcollins@preview-group.com); Lee Kaiser, ORR Protection, representing NFPA 75 Technical Committee (ELT-AAA) (lkaiser@orrprotection.com)

2021 International Mechanical Code

Revise as follows:

1103.2 Occupancy classification. Locations of refrigerating systems are described by*occupancy* classifications that consider the ability of people to respond to potential exposure to refrigerants. Where *equipment* or *appliances*, other than piping, are located outside a building and within 20 feet (6096 mm) of any building opening, such *equipment* or *appliances* shall be governed by the *occupancy* classification of the building. *Occupancy* classifications shall be defined as follows:

1. Institutional *occupancy* is that portion of premises from which occupants cannot readily leave without the assistance of others because they are disabled, debilitated or confined. Institutional occupancies include, among others, hospitals, nursing homes, asylums and spaces containing locked cells.
2. Public assembly *occupancy* is that portion of premises where large numbers of people congregate and from which occupants cannot quickly vacate the space. Public assembly occupancies include, among others, auditoriums, ballrooms, classrooms, passenger depots, restaurants and theaters.
3. Residential *occupancy* is that portion of premises that provides the occupants with complete independent living facilities, including permanent provisions for living, sleeping, eating, cooking and sanitation. Residential occupancies include, among others, dormitories, hotels, multiunit apartments and private residences.
4. Commercial *occupancy* is that portion of premises where people transact business, receive personal service or purchase food and other goods. Commercial occupancies include, among others, office and professional buildings, markets (but not large mercantile occupancies) and work or storage areas that do not qualify as industrial occupancies.
5. Large mercantile *occupancy* is that portion of premises where more than 100 persons congregate on levels above or below street level to purchase personal merchandise.
6. Industrial *occupancy* is that portion of premises that is not open to the public, where access by authorized persons is controlled, and that is used to house *information technology equipment* such as *computer rooms* or *data centers* or for the manufacture, ~~process~~ processing or ~~store~~ storage of goods such as chemicals, food, ice, meat or petroleum.
7. Mixed *occupancy* occurs where two or more occupancies are located within the same building. Where each *occupancy* is isolated from the rest of the building by tight walls, floors and ceilings and by self-closing doors, the requirements for each *occupancy* shall apply to its portion of the building. Where the various occupancies are not so isolated, the *occupancy* having the most stringent requirements shall be the governing *occupancy*.

Reason: General information -

This is several proposals across multiple codes and standards to propose requirements appropriate to the unique characteristics of facilities housing computer rooms and data centers or *Information technology equipment* (ITE).Computer rooms and data centers are mission critical applications. All aspects of our public infrastructure, transportation, our education system, our healthcare system, our national defense, our banking, our public safety systems, our process for writing codes - our lives - are wholly dependent on the efficient real-time processing of data. The ITE used to perform this function must be 100% reliable.
For these reasons ITE facilities are secured spaces, atmospherically and physically, with tightly controlled access.

Because access to ITE facilities is restricted, and because ITE facilities are only accessed by technicians performing periodic process maintenance, the occupant load of these spaces is intermittent or sparse.

Like many process industries, ITE facilities have specific environmental process constraints if they are to function properly:

- ITE needs to be continuously cooled to protect the data and sometimes the best way to cool the equipment is to cool the room.
- ITE is extremely sensitive to humidity and atmospheric contaminants; it can ruin equipment and thereby data. Ideally, ITE facilities bring in no outside air or moisture into ITE spaces; ventilation for refrigerants within ITE facilities is solely to reduce refrigerant concentration by fully mixing refrigerant into the atmosphere of the space.
- Alternative methods of fire suppression may be most suitable.

Until recently ITE facilities used nonflammable A1 refrigerants, but separate rule makings by the California Air Resources Board and the US Environmental Protection Agency now require refrigerants to meet Global Warming Potential (GWP) values that are much lower than currently possible with commercially available A1 refrigerants.

For this reason the ITE facilities cooling industry is adopting the use of A2L refrigerants which perform well, which are environmentally friendlier and which have much lower GWP values, but which are mildly flammable.

Adoption of A2L refrigerant necessitates ITE facility code requirements that provide the right protection for the unique industrial process being protected.

Requirements addressing ITE facilities must be flexible and performance oriented to address the many potential configurations of these spaces, from small computer rooms within much larger uses, or as one use in multiple occupancies, to unlimited area data centers that occupy millions of square feet of land, (https://www.analyticsvidhya.com/blog/2020/09/8-largest-data-centers-world-2020/).

PART I - IBC DEFINITIONS

Using common definitions for information technology equipment, data centers and computer rooms will foster uniformity of application between codes and related standards. These definitions have been proposed for use by the building, fire, and mechanical codes as well as ASHRAE 15, the *Safety Standard for Refrigeration Systems*. They are consistent with definitions used in the ASHRAE 90.4 *Energy Standard for Data Centers* as well as NFPA 75 *Standard for the Fire Protection of Information Technology Equipment*. It is likely that the definitions of data centers and computer rooms will be added to future editions of the IECC.The definitions for computer rooms and data centers are based ASHRAE Standard 90.4-

2019 *Energy Standard for Data Centers* except that the definition of computer rooms was modified to clarify that computer rooms are not primarily used for any other purpose than to house *information technology equipment*. This modification is necessary to distinguish computer rooms (data processing) from rooms where occupants use computers (data entry).

PART II -IBC Section 429 (New)

See the general reason.

NFPA 75, *The Standard for the Protection of Information Technology Equipment* is proposed as the appropriate reference to assure:

- The need for appropriate fire protection is met regardless of the configuration of the ITE facility.
- The fire protection package appropriately considers the unique environmental needs of the ITE facility.

NFPA 75 benefits from the involvement of subject matter experts in the design, operation and fire protection of these unique industrial processes.

NFPA 75 is realistic and flexible; it requires a documented risk assessment of the ITE facility to serve as the basis for a fire protection approach that is "*permitted to be determined based on an evaluation of fire risks and hazards associated with the* ITE *and services provided and the business continuity planning and disaster restoration capabilities of the* ITE *specific to the* ITE."

NFPA 75 also anticipates that alternative methods of fire suppression may be most suitable to protect data processing capacity and provides references to those NFPA standards that address such systems. It sets forth *"the minimum requirements for the protection of* ITE *equipment and* ITE *areas from damage by fire or its associated effects — namely, smoke, corrosion, heat, and water*."

In addition to the reference to NFPA 75 for performance design provisions, this proposal provides simple prescriptive requirements consistent with the treatment of locations classified as controlled access, industrial occupancies by ASHRAE 15 *Safety Standard for Refrigeration Systems* and the International Mechanical and Fire Codes.

By section, this proposal does the following:

· **Sec. 429.1 General** classifies ITE facilities as industrial occupancies to align with Sec. 1103 of the IMC. Per the IMC, which is consistent with ASHRAE 15, an industrial occupancy is "*that portion of premises that is not open to the public, where access by authorized persons is controlled, and that is used to manufacture, process or store goods such as chemicals, food, ice, meat or petroleum.*" A change has been proposed for the IMC and to ASHRAE 15 to specifically include ITE facilities in this classification.

· **Sec. 429.2 Refrigerants** limits refrigerants to nonflammable or mildly flammable refrigerants, but also provides clarification that the AHJ can approve other refrigerants on an individual basis.

· **Sec. 429.3 Fire Protection** references NFPA 75.

· **Sec. 429.4 Design and construction** requires a minimum of a one-hour fire separation between the ITE facility and adjacent occupancies, but reasonably provides flexibility for small spaces in fully sprinklered buildings. It also requires materials in concealed spaces, such as below a raised floor or above a suspended ceiling to be those permissible for use in a plenum.

· **Sec. 429.5 Electrical** requires compliance for non-IT equipment with Class 1, Division 2, of NFPA 70 (Class I – Flammable gases or vapors may be present; Division 2 – Ignitable concentrations of hazards exist under abnormal operation conditions) requirements where the code official has approved a refrigerant other than a Group A1 or A2L.

· **Sec. 429.6 Ventilation** requires mechanical ventilation of the ITE space to be triggered by refrigerant detection in accordance with the IMC and its secondary reference to the IFC Sec. 608.9. It also permits required ventilation to mix leaked refrigerant in the ITE space without exhausting the space or bringing in make-up air, thereby protecting the ITE from airborne contaminants and undesirable humidity.

· **Sec. 429.7 Refrigerant detection** references the IFC for refrigerant detection provisions and assures the appropriate initiation of measures to address an unintended leak of refrigerant or failure of the detection system.

· **Sec. 429.8 Standby power** ensures that active detection and protection measures are always available.

· **Sec. 429.9 Common path of egress travel** requires ITEF to comply with the same means of egress requirements as those specified in Section 1006.2.2.3 for refrigerated rooms or spaces. All portions of an ITEF must be within 150 feet of an exit or exit access doorway where such facilities are not protected by an approved automatic sprinkler system.

PART III - IBC Section 306.3 Group F-2

It is proposed to add Information Technology Equipment Facilities (data centers and computer rooms) to the F-2 occupancy group as they are industrial applications not currently addressed by the code with any specificity.

A separate code change proposes to add a section in Chapter 4 to address Information Technology Equipment Facilities (ITEF), but the correct occupancy group should be established.

ITEFs are buildings and spaces that are not open to the public, where access by authorized persons is controlled, and that are used to store and process electronic information or data. They are accessed only by IT maintenance technicians and have low or only intermittent occupant loads

USEPA and California regulations require transition to lower global warming potential refrigerants, which in turn requires changes in provisions in model codes and standards related to the safe use of new A2L (mildly flammable) refrigerants.

PART IV - IBC Section 311.3 Group S-2

Information technology equipment facilities are unique low hazard and low occupancy uses where data is stored and processed in racked equipment. While there are some moderate hazards specific to ITE facilities under abnormal operational conditions, those hazards are anticipated and mitigated by the codes:

- ITE facilities must be cooled for ITE performance. Potential hazards from flammable refrigerants are managed by compliance with the refrigerant safety provisions of the IMC, the IFC and ASHRAE 15 thereby assuring that leaked flammable refrigerants are detected and managed appropriately.
- IMC Section 1104.2.2 requires that the electrical equipment and appliances in ITE facilities must conform to the Class I, Division 2, hazardous location classification requirements of NFPA 70 where the quantity of any Group A2, B2, A3 or B3 refrigerant in a single independent circuit would exceed 25 percent of the lower flammability limit (LFL) upon release to the space.
- Cabling in underfloor and above ceiling plenum areas of ITE facilities is required to comply with IMC Section 602.2.1.1 and electrical equipment exposed in plenums must comply with IMC Sec. 602.2.1.4.

PART V - IBC Table 509.1 Incidental Uses

Information technology equipment (ITE) facilities -data centers and computer rooms - are cooled for industrial process reasons so that the ITE can operate as needed. This means these facilities can have a significant refrigerant load, just like a refrigerant machinery room, without necessarily having a machinery room. Refrigerant machinery rooms already are identified in Table 509.1 as needing either a one-hour separation or automatic sprinkler system protection. ITE facilities should meet the same standard, except that ITE facilities may need alternative fire protection methods for ITE.

PART VI - IBC Table 1004.5 Occupant Load Factor

The original proponent of Section 1004.8 (Group A, 2015: E9-15) included the section as part of a successful effort to increase the Table 1004.5 occupant load factor (OLF) for the typical business use from 100 to 150 SF gross per occupant. Section 1004.8 was added to ensure that the newly less stringent OLF was not applied inappropriately to business use areas known to have a higher density of occupants.

Data centers and computer rooms do not have a higher density of occupants, but typically have very low or intermittent occupancy loads, being occupied by only IT staff who periodically perform equipment maintenance functions. For this proposal, 300 SF gross OLF was selected as a conservative and appropriate OLF because the footprint of racks of *information technology equipment* are comparable to footprint of the racks of shelving in storage and stock areas of mercantile uses, even though such mercantile areas would be far more frequently occupied.

Data centers and computer rooms have significant cooling needs for process purposes; keeping ITE cool enough is mission critical. USEPA and California regulations require transition to lower global warming potential refrigerants, which in turn requires changes in provisions in model codes and standards related to the safe use of new refrigerants. Using common definitions for data centers and computer rooms will foster uniformity of application between codes and related standards. These definitions have been proposed for use by the building, fire, and mechanical codes as well as ASHRAE 15, the *Safety Standard for Refrigeration Systems*.

PART VII - IBC Section 1010.2.9.2 ITEF exits

Information technology equipment (ITE) facilities (computer rooms and data centers) are cooling intensive spaces because of equipment process needs and have similar exiting concerns to refrigeration machinery rooms because of hazards related to refrigerants.

A separate code change proposal will add ITE facilities (computer rooms and data centers) to the IMC's industrial occupancy classification in recognition of the process cooling needs unique to ITE facilities. This change will permit computer rooms and data centers that comply with new IMC Section 1104.2.3 to have space cooling without requiring a refrigeration machine room per Section 1104.2.2.

PART VIII - IFC Definitions

See the commentary to IBC Definitions above.

PART IX - IFC Section 609.8.1

See the general reason above.

Separate proposals for Chapter 11 of the IMC and Chapter 4 of the IBC apply occupancy specific requirements to ITE facilities. Those proposals:

- limit refrigerants to nonflammable Group A1 and mildly flammable Group A2L refrigerants
- require electrical equipment conformance with the Class I, Division 2, hazardous location classification requirements of NFPA 70, and
- reference NFPA 75, *The Standard for the Protection of Information Technology Equipment* to assure appropriate fire protection is provided regardless of the configuration of the ITE facility and the fire protection package appropriately considers the unique environmental needs of the ITE facility.
- require ITE facilities to be separated from adjacent uses by fire barriers and horizontal assemblies.

Given the other fire safety provisions proposed to apply to ITE facilities, and in recognition that stopping the cooling of an ITE space could jeopardize the data and data processes, automatic stopping of cooling is inadvisable.

Required detection and alarms will inform the facility manager and fire officials of the potential hazard, thereby providing an opportunity for data backup and potential purging of the ITE facility atmosphere.

PART X - IMC Definitions

See the commentary to IBC Definitions above.

PART XI - IMC Occupancy classification.

This proposed change clarifies that data centers and computer rooms, which are cooled solely for the process loads associated with *information technology equipment*, are industrial occupancies.

Per Sec. 1103.2 (6), key features of an industrial occupancy are that it is that portion of a premises that is not open to the public and where access by authorized persons is controlled, both of which are characteristic of data centers and computer rooms.

Industrial occupancies also are defined by the processing of "goods." For data centers and computer rooms the 'goods' being processed is data or electronic information.

It is worth noting that no other occupancy classification specifically addresses any of the characteristics of data centers and computer rooms. The catchall provision in the Commercial occupancy classification for "*work or storage areas that do not qualify as industrial occupancies*," is not appropriate as space cooling in commercial occupancies is intended for comfort cooling, not for process cooling and occupant loads for industrial applications are very low, with restricted access, compared to commercial occupancies that may have no restrictions on access.

Data centers and computer rooms have significant cooling needs for process purposes; keeping ITE cool enough is mission critical.

USEPA and California regulations require transition to lower global warming potential refrigerants, which in turn requires changes in provisions in model codes and standards related to the safe use of new refrigerants. Using common definitions for data centers and computer rooms will foster uniformity of application between codes and related standards. These definitions have been proposed for use by the building, fire, and mechanical codes as well as ASHRAE 15, the *Safety Standard for Refrigeration Systems*.

The definitions for computer rooms and data centers are based upon ASHRAE Standard 90.4-2019 *Energy Standard for Data Centers.*

Appropriately classifying data centers and computer rooms will facilitate the drafting of requirements for the IMC that address the unique circumstances of these occupancies.

PART XII - IMC 1104.2.3 ITEF

See the general reason above.

Currently Sec 1106.3 requires that machinery rooms for Group A2L refrigerants must either conform to Class I, Division 2, hazardous location classification requirements of NFPA 70 **OR** provide provide emergency exhaust ventilation (Sec 1106.4). This proposal allows Group A2L to be used without NFPA 70 compliance and without exhaust ventilation in deference to the ITE environmental needs. A separate proposal to add requirements for ITE facilities in Chapter 4 of the building code clarifies that emergency ventilation for ITE facilities is only required to mix the atmosphere within the ITE space so that leaked refrigerant is fully dispersed.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
PART I, VIII and X - The definitions are to information only and will not add any additional construction requirements.
P ART II- In some facilities there may be an additional cost; in others there may be less cost. It will be very building specific.
PART III - This is a clarification.
PART IV- This is a clarification.
PART V - There may additional costs to provide 1 hour separation for the space where the building does not have a fire sprinkler or fire extinguishing system.
PART VI - Means of egress systems will be 'right sized' for data centers and computer rooms.
PART VII - There may be a minimal increase for exit access doors in certain circumstances.

PART IX- Manual controls for refrigeration equipment shut-off should be less expensive than automatic controls.
PART XI -This proposal will match the space use with the correct requirements which will tend to lower construction costs.

PART XII - Having use specific requirements for ITE facilities should minimize costs by avoiding requirements that do not fit the condition.

Staff Analysis: A review of the standard proposed for inclusion in the code, NFPA 75-20, with regard to the ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before March 20, 2021.

G99-21 Part XI

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: This proposal has been disapproved because industrial is not an occupancy classification. The committee also had concerns regarding merging spaces with correct requirements. (Vote: 11-0)

G99-21 Part XI

G100-21 Part II

Proposed Change as Submitted

Proponents: Chad Sievers, representing NYS Dept. of State (chad.sievers@dos.ny.gov); Kevin Duerr-Clark, representing New York State Department of State (kevin.duerr-clark@dos.ny.gov)

THIS IS A 3 PART CODE CHANGE. PART I WILL BE HEARD BY THE GENERAL CODE COMMITTEE. PART II WILL BE HEARD BY THE FIRE CODE COMMITTEE. PART III WILL BE HEARD BY THE PROPERTY MAINTENANCE/ZONING CODE COMMITTEE.SEE THE TENTATIVE HEARING ORDER FOR THESE COMMITTEES.

2021 International Fire Code

Add new definition as follows:

LIVE FIRE TRAINING BUILDING. A *building* in which live fire training, fire, rescue, hazmat, and/or other related training evolutions are conducted on a repetitive basis. This shall include, but not be limited to, containerized training structures, live fire training structures, and training towers, as defined in NFPA 1402, and their associated systems, appliances, and props.

Add new text as follows:

SECTION 322
LIVE FIRE TRAINING BUILDINGS

322.1 Live fire training buildings.
Live fire training buildings shall be designed, constructed, and maintained in accordance with the applicable provisions of NFPA 1402 and with this code where NFPA 1402 so requires.

Add new standard(s) as follows:

NFPA

National Fire Protection Association
1 Batterymarch Park
Quincy, MA 02169-7471

NFPA 1402-2019 Standard on Facilities for Fire Training and Associated Props

Reason: Live fire training facilities contain unique types of buildings/structures that are purposely designed to not meet building codes. NFPA 1402 provides for the necessary design and construction provisions of these types of buildings and gives the code enforcement community the tools necessary to properly regulate them. The scope of the standards acknowledges that building codes and gas codes do not address the unique and specific requirements for these specialized types of facilities. It is not the intent of this proposal to capture buildings that are designed, constructed, and maintained to the International Building Code and Fire Code already, such as a B or A occupancy where instruction on fire practices takes place, rather, to capture those buildings not clearly covered by the Codes that would typically require variances or modifications of code language to be compliant.
This is a multi part proposal that will propose parallel modifications to the International Building Code, International Fire Code, Existing Building Code, and Property Maintenance Code in order to address the design, modification, and maintenance of these types of facilities.

Cost Impact: The code change proposal will increase the cost of construction
This proposal may increase the cost of construction or the cost may remain the same, depending on how the enforcement community has previously enforced the provisions of the code on these types of buildings. Some already enforce these additional standards, others may enforce nothing, treating these buildings as outside the scope. In the second scenario, the cost may increase in order to ensure compliance with the new standards.

Staff Analysis: A review of the standard proposed for inclusion in the code, NFPA 1402-2019, with regard to the ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before March 20, 2021.

G100-21 Part II

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The committee stated that the reasons for disapproval were based on the conflicts in the proposal with the existing IBC and

IFC sections and that there are no design load requirements in the proposed referenced standard. (Vote: 10-2)

G100-21 Part II

Individual Consideration Agenda

Public Comment 1:

IFC: SECTION 202, 322.1

Proponents: Chad Sievers, representing NYS Dept. of State (chad.sievers@dos.ny.gov); Kevin Duerr-Clark, representing New York State Department of State (kevin.duerr-clark@dos.ny.gov) requests As Modified by Public Comment

Modify as follows:

2021 International Fire Code

LIVE FIRE TRAINING BUILDING . A *building* in which live fire trainin~~g, fire, rescue, hazmat, and/or other related training~~ evolutions are conducted on a repetitive basis. This shall include, but not be limited to, containerized training structures, live fire training structures, and training towers, as defined in NFPA 1402~~, and their associated systems, appliances, and props~~.

322.1 Live fire training buildings . Live fire training buildings <u>and any appurtenances connected or attached to such buildings or structures</u> shall be designed, constructed, and maintained in accordance with the applicable provisions of NFPA 1402,~~and with~~ this code,~~where~~ and the International Building Code~~ where NFPA 1402 so requires~~.

Commenter's Reason: The definition of "Live Fire Training Building" was modified to ensure only buildings where live fire training exercises are conducted are captured. The "associated systems, appliances and props" was also removed from the definition and the term "appurtenances" was added to the section to ensure the intent is not to capture stand-alone props that may be co-located at the same facility such as a gas-fired car prop but to capture gas-fired props used to simulate fire in or on the structure. Furthermore the requirement that the building still had to be constructed following the applicable provisions of the IBC was added.

Cost Impact: The net effect of the public comment and code change proposal will increase the cost of construction
This proposal may increase the cost of construction or the cost may remain the same, depending on how the enforcement community has previously enforced the provisions of the code on these types of buildings. Some already enforce these additional standards, others may enforce nothing, treating these buildings as outside the scope. In the second scenario, the cost may increase in order to ensure compliance with the new standards.

Public Comment# 2517

G100-21 Part I

Proposed Change as Submitted

Proponents: Kevin Duerr-Clark, representing New York State Department of State (kevin.duerr-clark@dos.ny.gov); Chad Sievers, representing NYS Dept. of State (chad.sievers@dos.ny.gov)

THIS IS A 3 PART CODE CHANGE. PART I WILL BE HEARD BY THE GENERAL CODE COMMITTEE. PART II WILL BE HEARD BY THE FIRE CODE COMMITTEE. PART III WILL BE HEARD BY THE PROPERTY MAINTENANCE/ZONING CODE COMMITTEE.SEE THE TENTATIVE HEARING ORDER FOR THESE COMMITTEES.

2021 International Building Code

Add new definition as follows:

LIVE FIRE TRAINING BUILDING. A *building* in which live fire training, fire, rescue, hazmat, and/or other related training evolutions are conducted on a repetitive basis . This shall include, but not be limited to, containerized training structures, live fire training structures, and training towers, as defined in NFPA 1402, and their associated systems, appliances, and props.

Add new text as follows:

SECTION 429
LIVE FIRE TRAINING BUILDINGS

429.1 Live fire training buildings.
Live fire training buildings shall be designed and constructed in accordance with the applicable provisions of NFPA 1402 and with this code where NFPA 1402 so requires.

Revise as follows:

312.1 General. Buildings and structures of an accessory character and miscellaneous structures not classified in any specific occupancy shall be constructed, equipped and maintained to conform to the requirements of this code commensurate with the fire and life hazard incidental to their occupancy. Group U shall include, but not be limited to, the following:

Agricultural buildings
Aircraft hangars, accessory to a one- or two-family residence (see Section 412.4)
Barns
Carports
Communication equipment structures with a *gross floor area* of less than 1,500 square feet (139 m^2)
Fences more than 7 feet (2134 mm) in height
Grain silos, accessory to a residential occupancy
Live fire training buildings (see Section 429)
Livestock shelters
Private garages
Retaining walls
Sheds
Stables
Tanks
Towers

Add new text as follows:

NFPA

National Fire Protection Association
1 Batterymarch Park
Quincy, MA 02169-7471

NFPA 1402-2019 Standard on Facilities for Fire Training and Associated Props

Reason: Live fire training facilities contain unique types of buildings/structures that are purposely designed to not meet building codes. NFPA 1402 provides for the necessary design and construction provisions of these types of buildings and gives the code enforcement community the tools necessary to properly regulate them. The scope of the standards acknowledges that building codes and gas codes do not address the unique and specific requirements for these specialized types of facilities. It is not the intent of this proposal to capture buildings that are designed, constructed, and maintained to the International Building Code and Fire Code already, such as a B or A occupancy where instruction on fire practices takes place, rather, to capture those buildings not clearly covered by the Codes that would typically require variances or modifications of code language to be compliant.

This is a multi part proposal that will propose parallel modifications to the Building Code, Fire Code, Existing Building Code, and Property Maintenance Code in order to address the design, modification, and maintenance of these types of facilities.

Cost Impact: The code change proposal will increase the cost of construction
This proposal may increase the cost of construction or the cost may remain the same, depending on how the enforcement community has previously enforced the provisions of the code on these types of buildings. Some already enforce these additional standards, others may enforce nothing, treating these buildings as outside the scope. In the second scenario, the cost may increase in order to ensure compliance with the new standards.

Staff Analysis: A review of the standard proposed for inclusion in the code, NFPA 1402-2019, with regard to the ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before March 20, 2021.

G100-21 Part I

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: This proposal was disapproved as the committee felt several items needed to be considered. What is the separation requirements for other uses/buildings, including classrooms in the same facilities? NFPA 1402 seems to regulate prop, but that was not included in the proposal - what props should be included. There is additional correlation needed for how these facilities should be constructed since NFPA 1402 sends you back to the code for construction requirements. Since the requirements in NFPA 1402 seem to be minimal, maybe they should be added to the code instead of a reference. (Vote: 13-1)

G100-21 Part I

Individual Consideration Agenda

Public Comment 1:

IBC: SECTION 202, 429.1

Proponents: Chad Sievers, representing NYS Dept. of State (chad.sievers@dos.ny.gov); Kevin Duerr-Clark, representing New York State Department of State (kevin.duerr-clark@dos.ny.gov) requests As Modified by Public Comment

Modify as follows:

2021 International Building Code

LIVE FIRE TRAINING BUILDING . A *building* in which live fire training~~, fire, rescue, hazmat, and/or other related training~~ evolutions are conducted on a repetitive basis. This shall include, but not be limited to, containerized training structures, live fire training structures, and training towers, as defined in NFPA 1402~~, and their associated systems, appliances, and props~~.

429.1 Live fire training buildings . *Live fire training buildings* <u>and any appurtenances connected or attached to such buildings or structures</u> shall be designed and constructed in accordance with the applicable provisions of NFPA 1402 and with this code~~ where NFPA 1402 so requires~~.

Commenter's Reason: The definition of “Live Fire Training Building” was modified to ensure only buildings where live fire training exercises are conducted are captured. The “associated systems, appliances and props” was also removed from the definition and the term “appurtenances” was added to the section to ensure the intent is not to capture stand-alone props that may be co-located at the same facility such as a gas-fired car prop but to capture gas-fired props used to simulate fire in or on the structure. Furthermore the requirement that the building still had to be constructed following the applicable provisions of the IBC was added.

Cost Impact: The net effect of the public comment and code change proposal will increase the cost of construction
This proposal may increase the cost of construction or the cost may remain the same, depending on how the enforcement community has previously enforced the provisions of the code on these types of buildings. Some already enforce these additional standards, others may enforce nothing, treating these buildings as outside the scope. In the second scenario, the cost may increase in order to ensure compliance with the new standards.

Public Comment# 2387

NOTE: G100-21 PART III DID NOT RECEIVE A PUBLIC COMMENT AND IS REPRODUCED FOR INFORMATIONAL PURPOSES ONLY

G100-21 Part III

Proposed Change as Submitted

Proponents: Chad Sievers, representing NYS Dept. of State (chad.sievers@dos.ny.gov); Kevin Duerr-Clark, representing New York State Department of State (kevin.duerr-clark@dos.ny.gov)

THIS IS A 3 PART CODE CHANGE. PART I WILL BE HEARD BY THE GENERAL CODE COMMITTEE. PART II WILL BE HEARD BY THE FIRE CODE COMMITTEE. PART III WILL BE HEARD BY THE PROPERTY MAINTENANCE/ZONING CODE COMMITTEE.SEE THE TENTATIVE HEARING ORDER FOR THESE COMMITTEES.

2021 International Property Maintenance Code

Add new definition as follows:

LIVE FIRE TRAINING BUILDING. A *building* in which live fire training, fire, rescue, hazmat, and/or other related training evolutions are conducted on a repetitive basis. This shall include, but not be limited to, containerized training structures, live fire training structures, and training towers, as defined in NFPA 1402, and their associated systems, appliances, and props.

Add new text as follows:

310
LIVE FIRE TRAINING BUILDINGS

310.1 Live fire training buildings.
Live fire training buildings shall be maintained in accordance with the applicable provisions of NFPA 1402 and with this code where NFPA 1402 so requires.

Add new standard(s) as follows:

NFPA

National Fire Protection Association
1 Batterymarch Park
Quincy, MA 02169-7471

1402-2019 Standard on Facilities for Fire Training and Associated Props

Reason: Live fire training facilities contain unique types of buildings/structures that are purposely designed to not meet building codes. NFPA 1402 provides for the necessary design and construction provisions of these types of buildings and gives the code enforcement community the tools necessary to properly regulate them. The scope of the standards acknowledges that building codes and gas codes do not address the unique and specific requirements for these specialized types of facilities. It is not the intent of this proposal to capture buildings that are designed, constructed, and maintained to the International Building Code, Property Maintenance Code, and Fire Code already, such as a B or A occupancy where instruction on fire practices takes place, rather, to capture those buildings not clearly covered by the Codes that would typically require variances or modifications of code language to be compliant.
This is a multi part proposal that will propose parallel modifications to the Fire Code, Existing Building Code, and International Building Code in order to address the design, modification, and maintenance of these types of facilities.

Cost Impact: The code change proposal will increase the cost of construction
This proposal may increase the cost of construction or the cost may remain the same, depending on how the enforcement community has previously enforced the provisions of the code on these types of buildings. Some already enforce these additional standards, others may enforce nothing, treating these buildings as outside the scope. In the second scenario, the cost may increase in order to ensure compliance with the new standards.

Staff Analysis: A review of the standard proposed for inclusion in the code, NFPA 1402-2019, with regard to the ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before March 20, 2021.

G100-21 Part III

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The committee felt that these types of inspections were performed by the Fire Code Official. Further, the committee agreed that the determination of requirements for fire training buildings was by jurisdiction and should therefore not be in a model code. (Vote 9-2)

G100-21 Part III

G101-21

Proposed Change as Submitted

Proponents: Jonathan Roberts, representing UL LLC (jonathan.roberts@ul.com)

2021 International Building Code

Add new definition as follows:

MODULAR ROOM. An occupiable prefabricated structure, consisting of walls and a ceiling, with or without an integrated floor, designed and intended for use as an office or privacy space, which may include integral electrical wiring, ventilation, and furnishings.

SLEEP POD. A modular room that is designed and used for sleeping purposes.

Add new text as follows:

SECTION 429
MODULAR ROOMS AND SLEEP PODS

429.1 General.
Modular rooms and *sleep pods* shall comply with Sections 429.2 through 429.5.5 and other applicable requirements in the code. *Modular rooms* and *sleep pods* shall comply with one of the following:

1. *Modular rooms* 100 square feet (9.3 m^2) or less in floor area and 8 feet (2438 mm) or less in height.
2. *Sleep pods* 36 square feet (3.3 m^2) or less in floor area, 8 feet (2438 mm) or less in height and 4 feet (1219 mm) or less in width.

Modular rooms and sleep pods exceeding these dimensions shall comply with all applicable requirements in this code.

429.2 Listing.
Modular rooms and *sleep pods* shall be *listed* and *labeled* in accordance with UL 962 and installed in accordance with the *listing* and the manufacturer's instructions. *Modular rooms* and *sleep pods* shall be marked with the following ratings:

1. Wall and ceiling interior finish ratings as established in accordance with Chapter 8.
2. Plastic material ratings as established in accordance with Chapter 26.

429.3 Locations.
Modular rooms and *sleep pods* shall only be installed in *approved* locations and shall not obstruct required *means of egress*.

429.4 Elevation change.
Modular rooms and *sleep pods* with integral floors shall be permitted to have an elevation change measured from the finished floor that is a maximum of 5 inches (127 mm) higher than the floor of the existing structure outside the modular booth provided a sign is installed on each side of the door warning about the elevation change, and a distinctive marking stripe is installed across the threshold having a width of not less than 1 inch (25 mm) but not more than 2 inches (51 mm).

429.5 Sleep pods.
The installation of *sleep pods* shall comply with Sections 429.5.1 through 429.5.5.

429.5.1 Locations.
Where *approved*, *sleep pods* shall be permitted to be installed in all occupancies. Individual *sleep pods* exceeding the dimensions in Section 429.1 shall be treated as *sleeping units* and shall only be installed in locations in which *sleeping units* are allowed.

429.5.2 Multiple sleep pod installations.
The installation of more than one sleep pod in a room or space shall comply with the following:

1. The area in which sleep pods are installed shall not exceed 10 percent of the building area of the story in which they are located.
2. A maximum of four sleep pods can be located adjacent to each other, and each group of sleep pods shall be separated from other groups by a minimum of 10 feet (3048 mm).
3. Stacking of sleep pods shall only be done in accordance with the manufacturer's instructions and the listing.

Exception:
Installations exceeding these limitations shall be permitted based on an approved risk assessment of the installation.

429.5.3 Fire suppression.
Sleep pods shall be installed in rooms or spaces equipped with an *automatic sprinkler system* in accordance with Section 903.3.1.1.

429.5.4 Smoke detection.
An *automatic smoke detection system* complying with Section 907 shall be provided in the rooms or spaces in which *sleep pods* are located. The system shall activate the occupant notification system in accordance with Section 907.5.

429.5.5 Smoke alarms.
Smoke alarms shall be provided in sleep pods in accordance with Section 907.2.11. Where multiple sleep pods are located in the same room or space, the smoke alarms shall be interconnected in such a manner that the activation of one alarm will activate alarms in all of the sleep pods in the group that is installed in accordance with Section 429.5.2.

Reason: Modular rooms and sleep pods are becoming increasingly popular, and are showing up in a variety of different occupancies. This proposal provides a means for building officials to approve these installations and allow the use of these prefabricated structures.
This proposal treats modular rooms and sleep pods, such as those shown in the attached pictures, as products that can be installed in a building, and not as building construction, while not losing applicable code requirements. The proposal covers:

Section 429.1 places limitations on the size of modular rooms and sleep pods that are more appropriate for listed products. Modular rooms and sleep pods that exceed these size limitations will not fall under Section 429, and will be addressed with other building code requirements, including internal wirings, lighting, and other construction.

Section 429.2 - The UL 962 listing covers the fabrication and safety of the modular room. UL 962 includes requirements for insulation, finish materials, internal wiring, lighting, ventilation, and other construction features. Markings are to be provided on the listed products to document the Chapter 8 and 26 ratings, such as the ASTM E84 (UL 723) flame spread and smoke developed indexes. This makes it easy to determine their suitability for use in the specific areas of the building.

Section 429.3 allows the building official to approve the installation locations, to make sure the means of egress is not compromised and other code requirements are not adversely impacted.

Section 429.4 addresses potential tripping hazards, and is based on Section 3.1.3, Item D in ICC ES AC519, “Enclosed Booths for Installation Inside New and Existing Buildings”.

Section 429.5 includes additional requirements that are applicable to sleep pods, a type of modular room that are showing up in occupancies such as airports and office buildings. The proposal provides protection for these products by requiring the room or space in which they are installed to be provided with fire suppression and fire detection, smoke alarms in the units, and addresses multiple sleep pod installations.

These come in a variety of forms. For some examples see these links:

- https://www.sleepinginairports.net/blog/airport-sleeping-pods.htm
- https://www.aviationpros.com/airports/press-release/12339876/dubai-airports-airport-sleep-lounge-sleep-n-fly-opens-at-dxb
- https://www.flightcentre.com.au/travel-news/destinations/airport-sleeping-options
- https://www.pinterest.com/pin/340584790540317201/
- https://dickinsonstatenews.com/dickinson-state-is-making-life-a-little-easier-for-parents-of-young-children/

Cost Impact: The code change proposal will increase the cost of construction
The cost of these construction will increase since these products are not currently regulated.

G101-21

Public Hearing Results

This proposal includes the following errata

Chapter 35:

UL 962 -2014 Includes all amendments and changes through Revision Page(s) , January 12, 2021 - UL Standard for Safety Household and Commercial Furnishings

Review of the standard is as follows:

Appears to be written in enforceable language. Does not appear to require proprietary materials or agencies. Promulgation by a consensus process stated in preface

Committee Action: **Disapproved**

Committee Reason: This proposal was disapproved. The referenced standard, UL962, was not provided to the committee. What is required for risk assessment? It is not clear if modular rooms and sleep pods were considered rooms or furniture. The 5 inch step up permitted is an issue for accessibility requirements. If the sleep pods are stacked, there is an egress issue that is not currently addressed. There was concern that these would be permitted in all occupancies. Criteria is needed for what would be an approved location. The installation limits in Section 429.5.2 is unclear and does not address modular rooms, only sleep pods. There is a concern about seismic anchorage if the sleep pods are stacked. There is a concern about fire alarm notification in the enclosed sleep pods and modular rooms. Do these need to be sprinklered? (Vote: 13-0)

G101-21

Individual Consideration Agenda

Public Comment 1:

IBC: 429.1, 429.4, 429.5, 429.5.1, 429.5.2, 429.5.3, 429.5.4, 429.5.5, [F] 903.3.3 (IFC: 903.3.3), UL Chapter 35

Proponents: Jonathan Roberts, representing UL LLC (jonathan.roberts@ul.com) requests As Modified by Public Comment

Modify as follows:

2021 International Building Code

MODULAR ROOM . An occupiable prefabricated structure , consisting of walls and a ceiling, with or without an integrated floor. It is typically intended for use as an indoor privacy space, and may include integral electrical wiring, ventilation, and furnishings.

SLEEP POD . A *modular room* that is designed and used for sleeping purposes.

SECTION 429
MODULAR ROOMS AND SLEEP PODS

429.1 General . Modular rooms and sleep pods installed in indoor locations shall comply with Sections 429.2 through 429.5 ~~429.5.5 and other applicable requirements in the code~~. Modular rooms and sleep pods shall ~~comply with one of the following:~~ not exceed the following dimensions:

1. Modular rooms 100 square feet (9.3 m^2) or less in floor area and 8 feet (2438 mm) or less in height.
2. Sleep pods 36 square feet (3.3 m^2) or less in floor area, 8 feet (2438 mm) or less in height and 4 feet (1219 mm) or less in width.

~~Modular rooms and sleep pods exceeding these dimensions shall comply with all applicable requirements in this code.~~

Exceptions:

1. Precast concrete construction in accordance with Chapter 17 and Chapter 19 shall not be required to comply with this section.
2. *Modular rooms* constructed under an off-site or modular construction program approved by the Building Official shall not be required to comply with this section.

429.2 Listing . Modular rooms and sleep pods shall be listed and labeled in accordance with UL 962 and installed in accordance with the listing and the manufacturer's instructions. Modular rooms and sleep pods shall be marked with the following ratings:

1. Wall and ceiling interior finish ratings as established in accordance with Chapter 8.
2. Plastic material ratings as established in accordance with Chapter 26.

429.3 Locations . Modular rooms and sleep pods shall only be installed in approved locations and shall not obstruct required means of egress.

~~**429.4 Elevation change .** *Modular rooms* and *sleep pods* with integral floors shall be permitted to have an elevation change measured from the finished floor that is a maximum of 5 inches (127 mm) higher than the floor of the existing structure outside the modular booth provided a sign is installed on each side of the door warning about the elevation change, and a distinctive marking stripe is installed across the threshold having a width of not less than 1 inch (25 mm) but not more than 2 inches (51 mm).~~

~~**429.5 Sleep pods**~~ **.** ~~The installation of *sleep pods* shall comply with Sections 429.5.1 through 429.5.5.~~

~~**429.5.1 Locations .** Where *approved, sleep pods* shall be permitted to be installed in all occupancies. Individual *sleep pods* exceeding the dimensions in Section 429.1 shall be treated as *sleeping units* and shall only be installed in locations in which *sleeping units* are allowed.~~

~~**429.5.2 Multiple sleep pod installations .** The installation of more than one sleep pod in a room or space shall comply with the following:~~

1. ~~The area in which sleep pods are installed shall not exceed 10 percent of the building area of the story in which they are located.~~
2. ~~A maximum of four sleep pods can be located adjacent to each other, and each group of sleep pods shall be separated from other groups by a minimum of 10 feet (3048 mm).~~
3. ~~Stacking of sleep pods shall only be done in accordance with the manufacturer's instructions and the listing.~~

~~**Exception:**~~
~~Installations exceeding these limitations shall be permitted based on an approved risk assessment of the installation.~~

~~**429.5.3 Fire suppression .** *Sleep pods* shall be installed in rooms or spaces equipped with an *automatic sprinkler system* in accordance with Section 903.3.1.1.~~

~~**429.5.4 Smoke detection .** An *automatic smoke detection system* complying with Section 907 shall be provided in the rooms or spaces in which *sleep pods* are located. The system shall activate the occupant notification system in accordance with Section 907.5.~~

429.4 Fire alarm notification . Where modular rooms or sleep pods are provided in areas with occupant notification systems, the required audible and visible signal shall be extended into the interior of these units in accordance with Section 907.5.

429.5 ~~429.5.5~~ Smoke alarms . Smoke alarms shall be provided in sleep pods in accordance with Section 907.2.11. Where multiple sleep pods are located in the same room or space, the smoke alarms shall be interconnected in such a manner that the activation of one alarm will activate alarms in all of the sleep pods in the room or space ~~group that is installed in accordance with Section 429.5.2~~.

Exception: Smoke alarms are not required where smoke detection systems complying with Section 907.4 provide alarm notification in the sleep pods.

[F] 903.3.3 Obstructed locations . Automatic sprinklers shall be installed with regard to obstructions that will delay activation or obstruct the water distribution pattern and shall be in accordance with the applicable automatic sprinkler system standard that is being used. Automatic sprinklers shall be installed in or under covered kiosks, displays, booths, concession stands, modular rooms, sleep pods, or equipment that exceeds 4 feet (1219 mm) in width. Not less than a 3-foot (914 mm) clearance shall be maintained between automatic sprinklers and the top of piles of combustible fibers.

Exception: Kitchen equipment under exhaust hoods protected with a fire-extinguishing system in accordance with Section 904.

UL

UL LLC
333 Pfingsten Road
Northbrook, IL 60062

UL 962 - 2014 Household and Commercial Furnishings - with Revisions through 2020

Commenter's Reason: At the committee action hearings there was strong support for the concept of covering modular rooms and sleep pods, but concerns with how the original proposal was crafted. This public comment addressed the major concerns raised including the following:

1. Clarified that the requirements do not cover precast concrete construction in accordance with Chapter 17 and Chapter 19, including units used in detention facilities.
2. Clarified that the requirements do not cover off-site or modular construction where the program is approved by the Building Official.
3. Deleted the confusing reference to elevation change for door sills.
4. Deleted criteria for the percentage of floor area that can be devoted for sleep pod installation.
5. Removed occupancy criteria for acceptable sleep pod installation. The 429.3 criteria allows the building official to evaluate and approve the intended locations.
6. Removed the criteria for sleep pods to only be provided in rooms containing automatic sprinklers.
7. Removed unnecessary criteria related to the maximum number and stacking of sleep pods. Existing Code requirements address these concerns.
8. Clarified that where alarm notification is provided in the room or area in which the units are installed, that it shall extend into the privacy room and sleep pod, since the sound insulation in these units would typically obstruct the notification.
9. Added references to modular rooms and sleep pods to the Section 903.3.3 obstructed location section.
10. Added the referenced standard that was provided to the committee, UL 962, into Chapter 35.

Cost Impact: The net effect of the public comment and code change proposal will increase the cost of construction
Since modular rooms and sleep pods are not currently covered by the Code the public comment could increase the cost to install these products in a building.

G102-21

Proposed Change as Submitted

Proponents: Tom Hardiman, representing Modular Building Institute (tom@modular.org)

2021 International Building Code

Add new definition as follows:

OFF-SITE CONSTRUCTION. A modular building, modular component, panelized system or tiny house which is designed and constructed in compliance with Section 429 of this code and is wholly or in substantial part fabricated or assembled in manufacturing plants for installation - or assembly and installation - on a separate building site and has been manufactured in such a manner that all parts or processes cannot be inspected at the installation site without disassembly, damage to, or destruction thereof.

Add new text as follows:

SECTION 429
OFF-SITE CONSTRUCTION

429.1 General.
This section applies to off-site construction and shall govern the requirements for planning, design, fabrication, assembly, inspection and regulatory compliance.

429.2 Construction.
In addition to other applicable requirements in this code, off-site construction shall be constructed in accordance with ICC 1200.

429.3 Regulatory Compliance.
In addition to other applicable requirements in this code, off-site construction shall be inspected and regulated in accordance with ICC 1205.

Add new standard(s) as follows:

ICC

International Code Council, Inc.
500 New Jersey Ave NW 6th Floor
Washington, DC 20001

ICC 1200-2021	Standard for Off-Site Construction: Planning, Design, Fabrication and Assembly
ICC 1205-2021	Standard for Off-Site Construction: Inspection and Regulatory Compliance

Reason: Interest in off-site construction including modular and panelized systems and tiny houses is growing. Off-site construction has been identified as a solution for multiple societal and industry challenges including affordability, sustainability, job site safety, and the availability of skilled workers. However, many segments of the building industry including code officials, building owners, designers and contractors are often unfamiliar with these processes. While all off-site construction projects (with the exception of manufactured housing covered under the U.S. Department of Housing and Urban Development's Manufactured Home Construction and Safety Standards) must meet the requirements of the code in place at the final project site, the translation between code requirements and the off-site construction process is not always clear. To facilitate enhanced understanding of the off-site construction process, assure off-site projects maintain the requirements in code and are implemented in an efficient manner for both AHJs and manufacturers, the International Code Council (ICC) and the Modular Building Institute (MBI) initiated a joint project to write standards for the planning, design, fabrication, assembly, inspection and regulatory compliance of off-site and modular construction in February 2019.
A standard development committee was created by the ICC Board of Directors in July 2019, and the first meeting of that committee was in October of 2019. The scope of standard ICC 1200 is to provide minimum requirements to safeguard the public health, safety, general welfare and address societal and industry challenges in multiple facets of the off-site construction process including: planning, designing, fabricating, transporting and assembling commercial and residential building elements. The scope of standard ICC 1205 is to provide minimum requirements for the inspection and regulatory compliance of off-site construction.

Off-site (or modular) construction entails the planning, design, fabrication and assembly of building elements at a location other than the location where they were fabricated. Large components of a structure can be assembled in a factory-like setting and transported to the building site for final assembly. Subsequently, the finished construction is required to comply with the model building code adopted by the local authority having jurisdiction. These standards provide planning and preparation requirements such as: the role of the architect/modular manufacturer/construction manager/general contractor, location of plant vs construction site, engagement early on in the process, material procurement and lead times, and change orders. These standards also provide for requirements for a controlled manufacturing environment, supply chain integration, structural modular vs non-structural modular (e.g. bathroom pods), the fabrication process and on-site assembly such as: staging area for construction materials, foundation, placing modules, structural connections, utilities (PMG), weather considerations, finishing mate lines, inspection, approval and regulatory compliance of off-site residential and commercial construction components and their assembly and completion at the final building site such as: permitting; in-plant and on-site final inspections; third party inspections; the role of Industrialized Building Departments, state modular programs and the Authority Having Jurisdiction.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal outlines off-site construction methods that may be unfamiliar to inexperienced industry participants and offers a model regulatory process to address state and local needs.

Staff Analysis: A review of the standard proposed for inclusion in the code, ICC 1200-2021 and ICC 1205-2021, with regard to the ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before March 20, 2021.

G102-21

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: This proposal was disapproved. The definition for off-site construction included modular buildings and components. Modular units are typically regulated by state specific requirements. The definition for off-site construction includes tiny houses. Tiny houses are not address by the code, but are in Appendix Q. This blanket exception for tiny houses is too broad. Would this cause a conflict with the tiny house emergency escape and rescue openings? The definition of off-site construction is too broad - it could be read to include items such as prefabricated trusses, the modular units and sleep pods in G101-21 or precast panels. (Vote: 13-1)

G102-21

Individual Consideration Agenda

Public Comment 1:

IBC: 429.1, 429.3

Proponents: Tom Hardiman, representing Modular Building Institute (tom@modular.org); Lakisha Woods, representing National Institute of Building Sciences (lwoods@nibs.org); Jeffrey Brown, representing Virginia Department of Housing and Community Development (jeff.brown@dhcd.virginia.gov); Norman Wang, representing Maryland Dept of Labor (norman.wang1@maryland.gov); Dave Walsh, representing Marriott International (david.walsh@marriott.com); Jon Hannah-Spacagna, representing Modular Building Institute (jon@modular.org); Matthew Laase, representing Jackson|Main Architecture (matt.laase@jacksonmain.com); Michelle Benoit, representing Modular Building Institute (michelleb@proveng.com); Suzie Hall, representing The Cornerstone Collective (suzie@thecornerstonecollective.net) requests As Modified by Public Comment

Modify as follows:

2021 International Building Code

OFF-SITE CONSTRUCTION. . A modular building, modular component, panelized system or tiny house which is designed and constructed in compliance with Section 429 of this code and is wholly or in substantial part fabricated or assembled in manufacturing plants for installation - or assembly and installation - on a separate building site and has been manufactured in such a manner that all parts or processes cannot be inspected at the installation site without disassembly, damage to, or destruction thereof.

SECTION 429
OFF-SITE CONSTRUCTION

429.1 General . ~~This section~~ <u>The provisions of Sections 429.1 through 429.3</u> applies to off-site construction and shall govern the requirements for planning, design, fabrication, assembly, inspection and regulatory compliance.

> <u>**Exception:** Structural, load-bearing, or lateral load-resisting members or assemblies fabricated and inspected in accordance with Section 1704.2.5.</u>

429.2 Construction . In addition to other applicable requirements in this code, off-site construction shall be constructed in accordance with ICC 1200.

429.3 Regulatory Compliance . In addition to other applicable requirements in this code, off-site construction shall be inspected and regulated in accordance with ICC 1205 unless otherwise required by the state law of the jurisdiction having authority.

,

ICC 1200-2021 Standard for Off-Site Construction: Planning, Design, Fabrication and Assembly

,

ICC 1205-2021 Standard for Off-Site Construction: Inspection and Regulatory Compliance

Commenter's Reason: The ICC's Committee Action Hearings provided beneficial feedback relative to the development of the two new standards for offsite construction (ICC 1200 and 1205). At the time of the hearing, the standards had not yet been finalized, allowing the standards work group to incorporate the feedback from the committee directly into the standards. The changes to the standards based on committee feedback are as follows:

1) Remove all references to "tiny homes." Several committee members raised concerns about the inclusion of tiny homes and potential conflicts within Appendix Q. Rather than exempting tiny homes from the standard, the standards working group removed specific references to tiny homes, allowing each state to address whether tiny homes should be included in their program. This also eliminates any potential conflicts with Appendix Q.

2) Incorporated language in the standard providing the AHJ the option to exempt "listed and labeled modular components" to address concerns and a related proposal for UL listed components such as medical headwalls.

For anyone who wants to look at the revisions to ICC 1200 and 1205, the link to the OSMC committee webpage is: https://www.iccsafe.org/products-and-services/standards/is-osmc/. Drafts that were approved by the ballot are in the Administrative section. These standards will by finalized and published by the time of the public comment hearings.

To address the other committee concerns raised, we have modified our original proposal to provide greater flexibility for states with existing programs and for prefabricated components inspected in accordance with Section 1704.2.5 of the IBC. We addressed concerns specific to the proposed floor modification that was made (Smith 1) exempting fabricated items complying with section 1704.2.5 of the IBC and have added that exception into Section 429.1.This standard does not cover other common prefabricated components such as roof trusses, as those products do not incorporate concealed elements and can be readily inspected on site or need only the special inspection of the fabricator's shop required per Chapter 17 of the IBC and not the additional procedures, inspections and AHJ oversight required under ICC 1200 and ICC 1205. This standard also does not change the fact that any building component will still need to be constructed in accordance with all applicable building codes in the jurisdiction where the building will be located.

This standard provides a consistent path for AHJs to review and inspect offsite constructed building components, a process gaining rapidly in popularity due to the labor shortages and massive infrastructure demands. This standard has been well vetted as evidenced by the number and diversity of co-proponents to this comment and should be incorporated into the main body of the codes rather than as an appendix as suggested by two committee members. By modifying the proposal to provide state programs the option of using the standard or their existing program, we have eliminated the need for an appendix while providing much needed guidance to those states with no program in place.

Cost Impact: The net effect of the public comment and code change proposal will not increase or decrease the cost of construction
This proposal outlines off-site construction methods that may be unfamiliar to inexperienced industry participants and offers a model regulatory process to address state and local needs.

Staff Analysis: In accordance with Section 3.6.3.1 of ICC Council Policy 28, the new referenced standard ICC 1200 and ICC 1205, must be completed and readily available prior to the Public Comment Hearing in order for this public comment to be considered.

Public Comment# 2744

G103-21

Proposed Change as Submitted

Proponents: Eric Bressman, representing Ankrom Moisan Architects (ericb@ankrommoisan.com)

2021 International Building Code

Revise as follows:

503.1 General. Unless otherwise specifically modified in Chapter 4 and this chapter, *building height*, number of *stories* and *building area* shall not exceed the limits specified in Sections 504 and 506 based on the type of construction as determined by Section 602 and the occupancies as determined by Section 302 except as modified hereafter. *Building height*, number of *stories* and *building area* provisions shall be applied independently. For the purposes of determining area ~~limitations,~~ and height limitations ~~and type of construction~~, each portion of a building separated by one or more *fire walls* complying with Section 706 shall be considered to be a separate building.

602.1 General. Buildings and structures erected or to be erected, altered or extended in height or area shall be classified in one of the five *construction types* defined in Sections 602.2 through 602.5. The *building elements* shall have a *fire-resistance rating* not less than that specified in Table 601 and *exterior walls* shall have a *fire-resistance rating* not less than that specified in Table 705.5. Where required to have a *fire-resistance rating* by Table 601, *building elements* shall comply with the applicable provisions of Section 703.2. The protection of openings, ducts and air transfer openings in *building elements* shall not be required unless required by other provisions of this code.

> **Exception:** Each portion of a building separated by one or more fire walls complying with Section 706 shall be considered separate buildings and shall be permitted to be of different construction types.

Reason: The reference to type of construction is out of context in Chapter 5, which is specifically addressing building height and area. The provision allowing buildings to be constructed of varying types should be included in Chapter 6 where all of the types are defined and the charging language implies that a building may only be of a single construction type.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This amendment does not change any Code requirement. It is only moving it to a more logical location in the Code.

G103-21

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The proposal was disapproved. The current code language is clear on the requirements.
(Vote: 10-4)

G103-21

Individual Consideration Agenda

Public Comment 1:

IBC: 503.1, 602.1

Proponents: Eric Bressman, representing Ankrom Moisan Architects (ericb@ankrommoisan.com) requests As Modified by Public Comment

Modify as follows:

2021 International Building Code

503.1 General . Unless otherwise specifically modified in Chapter 4 and this chapter, *building height*, number of *stories* and *building area* shall not exceed the limits specified in Sections 504 and 506 based on the type of construction as determined by Section 602 and the occupancies as determined by Section 302 except as modified hereafter. *Building height*, number of *stories* and *building area* provisions shall be applied independently. For the purposes of determining area and height limitations, each portion of a building separated by one or more *fire walls* complying with Section 706 shall be considered to be a separate building.

602.1 General . Buildings and structures erected or to be erected, altered or extended in height or area shall be classified in one of the five *construction types* defined in Sections 602.2 through 602.5. The *building elements* shall have a *fire-resistance rating* not less than that specified in Table 601 and *exterior walls* shall have a *fire-resistance rating* not less than that specified in Table 705.5. Where required to have a *fire-resistance rating* by Table 601, *building elements* shall comply with the applicable provisions of Section 703.2. The protection of openings, ducts and air transfer openings in *building elements* shall not be required unless required by other provisions of this code.

> **Exception:**~~Each~~ For the purposes of determining construction type, each portion of a building separated by one or more fire walls complying with Section 706 shall be considered separate buildings and shall be permitted to be of different construction types.

Commenter's Reason: At the hearings, one of the comments by a committee member was that this was 'a solution looking for a problem'. I don't believe that to be the case and that this change will help better organize where end users go to find appropriate information. The concern brought forth by FEMA regarding the seismic considerations was not documented in the public records of the hearings, but has been addressed by the attached change to the proposal.

Cost Impact: The net effect of the public comment and code change proposal will not increase or decrease the cost of construction
This change includes no material change to existing code requirements. Therefore it has no cost impact.

Public Comment# 2391

G104-21

Proposed Change as Submitted

Proponents: Larry Sherwood, on behalf of Sustainable Energy Action Committee, representing Interstate Renewable Energy Council (Larry@irecusa.org); Benjamin Davis, CA Solar & Storage Association, representing CA Solar & Storage Association (ben@calssa.org); Joseph H. Cain, P.E., Solar Energy Industries Association (SEIA), representing SEIA (joecainpe@gmail.com); Kevin Reinertson, Riverside County Fire Dept., representing California Fire Chiefs Association FPO (kevin.reinertson@fire.ca.gov)

2021 International Building Code

Revise as follows:

503.1 General. Unless otherwise specifically modified in Chapter 4 and this chapter, *building height*, number of *stories* and *building area* shall not exceed the limits specified in Sections 504 and 506 based on the type of construction as determined by Section 602 and the occupancies as determined by Section 302 except as modified hereafter. *Building height*, number of *stories* and *building area* provisions shall be applied independently. For the purposes of determining area limitations, height limitations and type of construction, each portion of a building separated by one or more *fire walls* complying with Section 706 shall be considered to be a separate building.

Exceptions:

1. Rooftop-mounted photovoltaic (PV) panel systems shall not constitute an additional story or additional floor area and shall be permitted to exceed the height limit of a building where one of the following conditions are met:

    1.1. For all occupancies, the highest point of the PV panel system shall meet the lower of the following values:

    1.1.1. 3 feet (915 mm) above the allowable building height.

    1.1.2. 3 feet (915 mm) above the roof of the building immediately below.

    1.2. For installations on low-slope roofs (roof slope < 2:12) in other than Group R-3 and R-4 occupancies, the highest point of the PV panel system shall meet the lower of the following values:

    1.2.1. 10 feet (3050 mm) above the allowable building height.

    1.2.2. 10 feet (3050 mm) above the roof of the building immediately below.

2. Photovoltaic (PV) support structures installed on the roof of an open parking structure shall not constitute an additional story or additional floor area and shall be permitted to exceed the height limit of a building where all the following conditions are met (see Figure 503.1):

    2.1. The area within the perimeter of PV support structures has maximum rectangular dimension of 40 feet by 150 feet (12 195 mm by 45 720 mm).

    2.2. The distance between PV support structures is a minimum of 10 feet (3050 mm) clear.

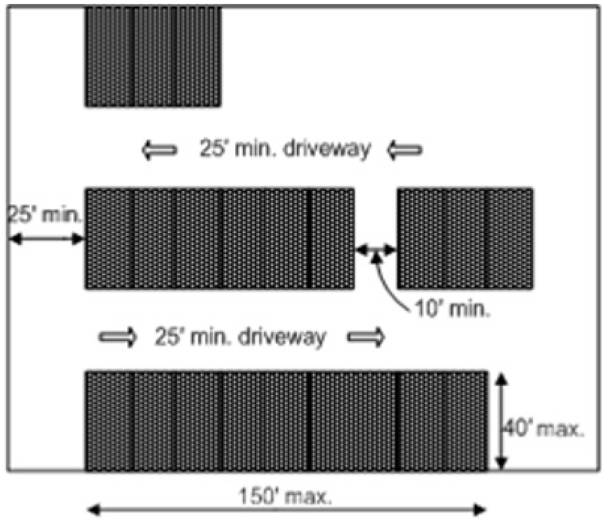
    2.3. The driveway aisle separating PV support structures has a minimum width of 25 feet (7620 mm) clear.

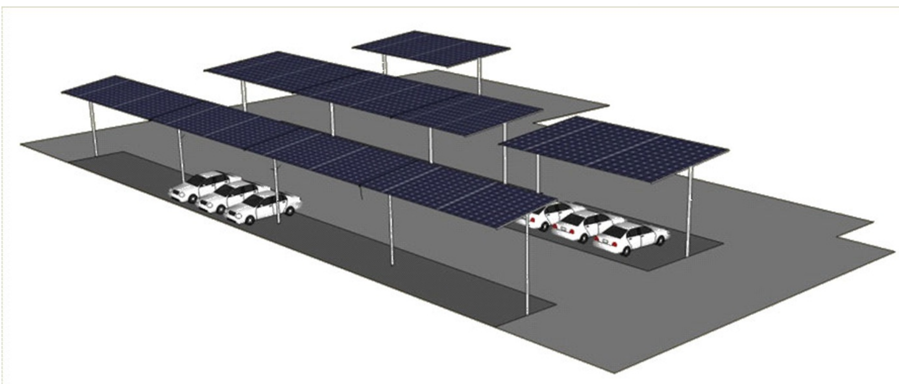
    2.4. PV support structures are used only for parking purposes with no storage.

    2.5. PV support structures are completely open on all sides, other than necessary structural supports, with no interior partitions.

Add new text as follows:

Figure 503.1 Location of PV Support Structures on Open Parking Structures.





Reason: The primary objective of this proposal is to provide exceptions to clarify that elevated PV support structures can be installed on top of a multi-story parking garage under certain conditions without impacting restrictions on number of stories, height or area. Likewise, under certain conditions, rooftop-mounted PV systems do not cause a building to be noncompliant with these provisions.
The exceptions in this proposal are similar to exceptions that have existed in the California Building Code for several cycles, with support of the fire service and without any compromises in safety to the building or fire fighters. These exceptions will not impact the ability to fight fires on top of buildings.

Without the exceptions proposed here, rooftop solar structures can be interpreted to constitute an additional story of the building, increase the overall building height or where there is a use underneath such as elevated PV support structures, increase the floor area of the building. As a result, solar installations may not be allowed in buildings that are built to the maximum height, story or floor area. The proposed code revision provides an exemption for photovoltaic systems from these code restrictions.

Exception 1: This amendment allows solar PV systems to be installed above the maximum building height specified by code with limitation. This amendment will make it feasible to install rooftop solar PV systems on top of buildings that are built to the maximum height which is especially common in existing buildings. It will also make it practical for PV panels to be installed above the roof with the required tilt angle and be at a height that avoids interference with vents and equipment on the roof. **Exception 2:** The amendment allows solar PV panel installations over parking stalls to be installed without being considered a story or floor area, these restrictions may prevent solar PV systems from being installed in buildings that have the maximum number of stories or floor area which is especially common in existing buildings. The exception requires minimum spacing between solar PV panel structures to allow fire access and provide a fire break.

This proposal was prepared by the Sustainable Energy Action Committee (SEAC), a forum for all stakeholders (including, but not limited to, AHJs, designers, engineers, contractors, first responders, manufacturers, suppliers, utilities, and testing labs) to collaboratively identify and find solutions for issues that affect the installation and use of solar energy systems, energy storage systems, demand response, and energy efficiency. The purpose is to facilitate the deployment and use of affordable, clean and renewable energy in a safe, efficient, and sustainable manner.

All recommendations from SEAC are approved by diverse stakeholders through a consensus process.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
It encourages the use of solar without adversely impacting safety.

Staff Note: This proposal addresses similar requirements in a different manner to those found in current code section IBC Section 1511.2.1 and

311.3.4 and IFC Section 1205. The committee is urged to make their intentions clear with their actions on these proposals.

G104-21

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The proposal was disapproved. The code change proposal is different than the requirements in California. The language needs to be cleaned up. (Vote: 14-0)

Staff Analysis: This proposal addresses similar requirements in a different manner to those found in current code section IBC Section 1511.2.1 and 311.3.4 and IFC Section 1205. The committee is urged to make their intentions clear with their actions on these proposals.

G104-21

Individual Consideration Agenda

Public Comment 1:

IBC: 503.1

Proponents: Larry Sherwood, representing Interstate Renewable Energy Council (larry@irecusa.org); Kevin Reinertson, representing California Fire Chiefs Association FPO (kevin.reinertson@fire.ca.gov) requests As Modified by Public Comment

Modify as follows:

2021 International Building Code

503.1 General . Unless otherwise specifically modified in Chapter 4 and this chapter, *building height*, number of *stories* and *building area* shall not exceed the limits specified in Sections 504 and 506 based on the type of construction as determined by Section 602 and the occupancies as determined by Section 302 except as modified hereafter. *Building height*, number of *stories* and *building area* provisions shall be applied independently. For the purposes of determining area limitations, height limitations and type of construction, each portion of a building separated by one or more *fire walls* complying with Section 706 shall be considered to be a separate building.

Exceptions:

1. Other than structural requirements, ~~Rooftop~~ rooftop-mounted photovoltaic (PV) panel systems with no use underneath shall not constitute an additional story or additional floor area and shall be permitted to exceed the height limit of a building where one of the following conditions are met:

   1.1. For all occupancies, the highest point of the PV panel system shall meet the lower of the following values:
   1.1.1. 3 feet (915 mm) above the allowable building height.

   1.1.2. 3 feet (915 mm) above the roof of the building immediately below.

   1.2. For installations on low-slope roofs (roof slope < 2:12) in other than Group R-3 and R-4 occupancies, the highest point of the PV panel system shall meet the lower of the following values:
   1.2.1. 10 feet (3050 mm) above the allowable building height.

   1.2.2. 10 feet (3050 mm) above the roof of the building immediately below.

2. Other than structural requirements, photovoltaic ~~Photovoltaic~~ (PV) support structures installed on the roof of an open parking structure shall not constitute an additional story or additional floor area and shall be permitted to exceed the height limit of a building where all the following conditions are met (see Figure 503.1):
   2.1. The area within the perimeter of PV support structures has maximum rectangular dimension of 40 feet by 150 feet (12 195 mm by 45 720 mm).

   2.2. The distance between PV support structures is a minimum of 10 feet (3050 mm) clear.

   2.3. The driveway aisle separating PV support structures has a minimum width of 25 feet (7620 mm) clear.

2.4. PV support structures are used only for parking purposes with no storage.
2.5. PV support structures are completely open on all sides, other than necessary structural supports, with no interior partitions.

Commenter's Reason:
As a direct result of public testimony, co-proponents have made two specific changes in this public comment. Both changes bring the exceptions in this proposal into closer alignment with the exceptions to Section 503.1 in the California Building Code.

The first change is to add in two locations, at the beginning of each exception, the words “Other than structural requirements …” This change is made at the request of representatives of the FEMA committee. The changes are consistent with language in the 2019 California Building Code Section 503.1, Exceptions 1 and 2.

The second change is an improvement in direct response to public testimony and Committee discussion regarding number of stories. The co-proponents have added the words “… with no use underneath …” to clarify that Exception 1 (including both conditions 1.1 and 1.2) apply only to rooftop-mounted PV panel systems that serve only to produce power, with no secondary use. The change is consistent with language in the 2019 California Building Code Section 503.1, Exception 1.

Public testimony regarding fire-resistive construction is addressed in a separate public comment by the same co-proponents.

The co-proponents would like to reiterate that these exceptions have existed in the California Building Code (with the two changes in this public comment) for several cycles. These provisions have been used by California cities and counties by industry, building owners, building departments, and fire departments, without questions or concerns that have come to the attention of the co-proponents. All stakeholders have been able to utilize these technical requirements without issues, and without any proposed modifications to the language for multiple cycles.

This public comment was prepared by the Sustainable Energy Action Committee (SEAC), a forum for all stakeholders (including, but not limited to, AHJs, designers, engineers, contractors, first responders, manufacturers, suppliers, utilities, and testing labs) to collaboratively identify and find solutions for issues that affect the installation and use of solar energy systems, energy storage systems, demand response, and energy efficiency. The purpose is to facilitate the deployment and use of affordable, clean and renewable energy in a safe, efficient, and sustainable manner.

All recommendations from SEAC are approved by diverse stakeholders through a consensus process.

Bibliography: None

Cost Impact: The net effect of the public comment and code change proposal will not increase or decrease the cost of construction
It encourages solar without adversely affecting safety.

Public Comment# 2783

Public Comment 2:

IBC: 602.1

Proponents: Larry Sherwood, representing Interstate Renewable Energy Council (larry@irecusa.org); Kevin Reinertson, representing California Fire Chiefs Association FPO (kevin.reinertson@fire.ca.gov) requests As Modified by Public Comment

Modify as follows:

2021 International Building Code

602.1 General . Buildings and structures erected or to be erected, altered or extended in height or area shall be classified in one of the five *construction types* defined in Sections 602.2 through 602.5. The *building elements* shall have a *fire-resistance rating* not less than that specified in Table 601 and*exterior walls* shall have a *fire-resistance rating* not less than that specified in Table 705.5. Where required to have a *fire-resistance rating* by Table 601, *building elements*shall comply with the applicable provisions of Section 703.2. The protection of openings, ducts and air transfer openings in *building elements* shall not be required unless required by other provisions of this code.

Exception: Noncombustible structural members supporting *photovoltaic (PV) panels* are not required to meet the *fire resistance rating* for the following:

1. Rooftop-mounted *photovoltaic panel systems* with no use underneath.
2. Photovoltaic (PV) support structures with noncombustible framing that have sufficient uniformly distributed and unobstructed openings throughout the top of the array to allow heat and gases to escape, as determined by the *building official.*
3. Photovoltaic (PV) support structures installed on the roof of an open parking structure where all the following conditions are met (see

Figure 503.1):

3.1. The area within the perimeter of PV support structures has maximum rectangular dimension of 40 feet by 150 feet (12 195 mm by 45 720 mm).

3.2. The distance between PV support structures is a minimum of 10 feet (3050 mm) clear.

3.3. The driveway aisle separating PV support structures has a minimum width of 25 feet (7620 mm) clear.

3.4. PV support structures are used only for parking purposes with no storage.

3.5. PV support structures are completely open on all sides, other than necessary structural supports, with no interior partitions.

Commenter's Reason:
During the Committee Action Hearing, we heard public testimony that expressed steel industry members are concerned with whether the structural elements supporting the PV system are required to be protected with the same fire-resistive construction as the building below. During public testimony, co-proponents made a commitment to respond to this concern. As noted during the Committee Action Hearing, this public comment is necessary to provide clarity for exceptions to fire-resistance for structural elements supporting PV panel systems.

This public comment provides a direct response to the concerns of steel industry members, by incorporating new exceptions to IBC Section 602.1 that correlate with exceptions found in California Building Code Section 602.1 for several cycles.

Although the language in this public comment is not identical to language found in the California Building Code, the technical requirements are the same. The exceptions are edited to use IBC defined terms and to be appropriate for a nationwide use, rather than just in California.

This public comment maintains fire safety for the building as well as for firefighters.

This public comment was prepared by the Sustainable Energy Action Committee (SEAC), a forum for all stakeholders (including, but not limited to, AHJs, designers, engineers, contractors, first responders, manufacturers, suppliers, utilities, and testing labs) to collaboratively identify and find solutions for issues that affect the installation and use of solar energy systems, energy storage systems, demand response, and energy efficiency. The purpose is to facilitate the deployment and use of affordable, clean and renewable energy in a safe, efficient, and sustainable manner.

All recommendations from SEAC are approved by diverse stakeholders through a consensus process.

Cost Impact: The net effect of the public comment and code change proposal will not increase or decrease the cost of construction
It encourages solar energy without adversely impacting safety.

Public Comment# 2791

G105-21

Proposed Change as Submitted

Proponents: Mike Nugent, Chair, representing ICC Building Code Action Committee (bcac@iccsafe.org)

2021 International Building Code

Revise as follows:

503.1.4.1 Enclosures over occupied roof areas. Elements or structures enclosing the occupied roof areas shall not extend more than 48 inches (1220 mm) above the surface of the occupied roof.

~~**Exception:**~~ **Exceptions:**

1. Penthouses constructed in accordance with Section 1511.2 and towers, domes, spires and cupolas constructed in accordance with Section 1511.5.
2. Required guards shall be permitted to be greater than 48 inches (1219 mm) above the surface of the occupied roof where the roof deck is located more than 75 feet (22 860 mm) above the level of fire department vehicle access.

Reason: The limit on the guard height was based on fire department access to the roof. Once the roof deck is higher than fire ladder access, this is no longer justification for this limitation. There has been concerns that higher guards are needed on higher roofs to prevent people from jumping off the roof deck and/or to allow for wind breaks to limit items blowing off the roof deck and falling on people below.

This proposal is submitted by the ICC Building Code Action Committee (BCAC). BCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2020 the BCAC has held several virtual meetings open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the BCAC website at BCAC.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This allows additional design options for guards around roof decks.

G105-21

Public Hearing Results

Committee Action: **As Submitted**

Committee Reason: The proposal was approved as submitted. The proposal will allow for what is currently done. The committee recommend the section title be reviewed to read "enclosures around and over roof areas" to better match the provision. (Vote: 9-5)

G105-21

Individual Consideration Agenda

Public Comment 1:

IBC: 503.1.4.1

Proponents: David Renn, City and County of Denver, representing Code Change Committee of ICC Colorado Chapter (david.renn@denvergov.org) requests As Modified by Public Comment

Modify as follows:

2021 International Building Code

503.1.4.1 Enclosures over occupied roof areas . Elements or structures enclosing the occupied roof areas shall not extend more than 48 inches

(1220 mm) above the surface of the occupied roof.

Exceptions:

1. Penthouses constructed in accordance with Section 1511.2 and towers, domes, spires and cupolas constructed in accordance with Section 1511.5.
2. Required guards shall be permitted to be greater than 48 inches (1219 mm) above the surface of the occupied roof where the roof deck is located more than 75 feet (22 860 mm) above the highest level of fire department vehicle access.

Commenter's Reason: The reason statement for the original proposal indicates that the guard height limitation is not needed where the roof deck is higher than fire ladder access, which is 75' above the level of fire department access; however, the original proposal does not address which level of fire department vehicle access is to be used to determine the height of the roof deck. This public comment modification requires that the highest level of fire department access is to be used for this height. By using the highest level of fire department access, this new exception is only allowed if the roof deck is more than 75' above all levels of fire department access. This is needed since the fire department access adjacent to the occupied roof could be higher than access away from the occupied roof, which could create on unsafe condition where a higher guard would prevent access to the roof from a ladder. For example, if the lowest level of fire department access is 80' from the roof deck, but the level of fire department access adjacent to the roof is 73', using the lowest level would allow the exception to be used and a taller guard height could prohibit ladder access that would otherwise be possible.

Cost Impact: The net effect of the public comment and code change proposal will not increase or decrease the cost of construction
As stated in original proposal, this allows for design options for guards around roof decks. Since these options are not required (i.e. they are allowed by exception), the cost of construction for minimum code requirements does not increase or decrease.

Public Comment# 2496

Public Comment 2:

IBC: 503.1.4.1

Proponents: Jonathan Siu, representing Washington Association of Building Officials Technical Code Development Committee; Micah Chappell, representing Washington Association of Building Officials (micah.chappell@seattle.gov) requests As Modified by Public Comment

Further modify as follows:

2021 International Building Code

503.1.4.1 Enclosures over occupied roof areas . Elements or structures enclosing the occupied roof areas shall not extend more than 48 inches (1220 mm) above the surface of the occupied roof.

Exceptions:

1. Penthouses constructed in accordance with Section 1511.2 and towers, domes, spires and cupolas constructed in accordance with Section 1511.5.
2. Required guards shall be permitted to be greater than 48 inches (1219 mm) above the surface of the occupied roof where the roof deck is located more than 75 feet (22 860 mm) above the lowest level of fire department vehicle access.

Commenter's Reason: We agree with the intent of this proposal, that in tall buildings, the 48" limitation is not necessary. However, we believe the originally proposed text is ambiguous. What fire department access is used to determine the 75' threshold? We believe it is much clearer to tie it to the trigger for high rise buildings, which uses lowest fire department vehicle access as the datum. Note that because of other proposals in this cycle that may change the definition of high rise buildings as related to occupied/occupiable roofs, we have not proposed to refer directly to high rise buildings.

Cost Impact: The net effect of the public comment and code change proposal will not increase or decrease the cost of construction
The public comment does not change the original cost impact statement: "This allows additional design options for guards around roof decks."

Public Comment# 2343

Public Comment 3:

IBC: 503.1.4.1

Proponents: Jonathan Siu, representing Self; Lee Kranz, representing Myself (lkranz@bellevuewa.gov); Micah Chappell, representing Seattle Department of Construction and Inspections (micah.chappell@seattle.gov) requests As Modified by Public Comment

Modify as follows:

2021 International Building Code

503.1.4.1 Enclosures over occupied roof areas . Elements or structures enclosing the occupied roof areas shall not extend more than 48 inches (1220 mm) above the surface of the occupied roof.

Exceptions:

1. Penthouses constructed in accordance with Section 1511.2 and towers, domes, spires and cupolas constructed in accordance with Section 1511.5.
2. ~~Required guards~~ Elements or structures enclosing the occupied roof areas shall be permitted to be greater than 48 inches (1219 mm) above the surface of the occupied roof where the roof deck is located more than 75 feet (22 860 mm) above the level of fire department vehicle access.

Commenter's Reason: The proposed Exception 2 to Section 503.1.4.1 takes an important step forward, but does not go far enough. As written, the new exception only applies to "required guards." This public comment would expand the application of the exception to any element or structure that encloses the occupied roof.

The reason statement for the original proposal states there is no justification for the restriction on guard heights once the roof deck is higher than fire ladder access. We agree. However, the current (2021) code text is not just about guards, and even the reason statement refers to items that are not "required guards." The language in Section 503.1.4.1 was deliberately crafted to be broad, so it would encompass any elements that might extend upward at the perimeter of the roof such as walls, parapets, rooftop structures (some of which are exempted in Exception 1), and wind screens ("wind breaks" in the reason statement).

This public comment would allow any of these elements or structures to extend above the roof level, once the occupied roof is above fire department ladder reach.

Cost Impact: The net effect of the public comment and code change proposal will not increase or decrease the cost of construction
The original proposal stated this will not change the cost of construction. This public comment does not change that.

Public Comment# 2439

G106-21 Part I

Proposed Change as Submitted

Proponents: Lee Kranz, City of Bellevue, WA, representing Myself (lkranz@bellevuewa.gov)

THIS IS A 2 PART CODE CHANGE. PART I WILL BE HEARD BY THE GENERAL CODE COMMITTEE. PART II WILL BE HEARD BY THE MEANS OF EGRESS COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THESE COMMITTEES.

2021 International Building Code

503.1.4 Occupied roofs. A roof level or portion thereof shall be permitted to be used as an occupied roof provided the occupancy of the roof is an occupancy that is permitted by Table 504.4 for the *story* immediately below the roof. The area of the occupied roofs shall not be included in the *building area* as regulated by Section 506. An occupied roof shall not be included in the *building height* or number of *stories* as regulated by Section 504, provided that the *penthouses* and other enclosed *rooftop structures* comply with Section 1511.

Exceptions:

1. The occupancy located on an occupied roof shall not be limited to the occupancies allowed on the *story* immediately below the roof where the building is equipped throughout with an *automatic sprinkler system* in accordance with Section 903.3.1.1 or 903.3.1.2 and occupant notification in accordance with Sections 907.5.2.1 and 907.5.2.3 is provided in the area of the occupied roof. *Emergency voice/alarm communication* system notification per Section 907.5.2.2 shall also be provided in the area of the occupied roof where such system is required elsewhere in the building.
2. Assembly occupancies shall be permitted on roofs of open parking spaces of Type I or Type II construction, in accordance with the exception to Section 903.2.1.6.

503.1.4.1 Enclosures over occupied roof areas. Elements or structures enclosing the occupied roof areas shall not extend more than 48 inches (1220 mm) above the surface of the occupied roof.

Exception: *Penthouses* constructed in accordance with Section 1511.2 and towers, domes, spires and cupolas constructed in accordance with Section 1511.5.

Add new text as follows:

503.1.4.2 Guards.
Occupied roofs shall have guards in accordance with Section 1015.2.

Reason: This code change is needed to protect children. There are many cases where the design of an occupied roof includes only a portion of the entire roof area. The occupied portions of the roof are typically elevated 18" or less above the adjacent unoccupied areas of the roof, therefor no guard is currently required per Section 1015.2. This issue is regularly debated on building official chat lines and other forums due to the lack of regulatory authority to require the guard in this design scenario. Even the idea of a small child falling to their death because they bolted from a parent or guardian to look over the edge of a roof is unthinkable. Occupied roofs are relatively new in the IBC and we're discovering issues related to their design on a regular basis. This code change will eliminate or drastically reduce the potential for kids, or even adults who may be inebriated, from falling over the edge of a roof which even if the occupied portion of the roof is some distance away from the roof edge.
Adding a new Section 503.1.4.2 Guards, will insure that the reader will go to Section 1015.2 to see that guards are required. Examples of this can be found in Sections 406.4.1, 505.3.3 and 1029.17.

Cost Impact: The code change proposal will increase the cost of construction
The cost to construct some occupied roofs where the edge of the occupied portion of the occupied roof is inboard of the roof edge will go up due to the installation of guards.

G106-21 Part I

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The proposal was disapproved. The proposal does not allow for other options such as planters. Generally guards are unnecessary unless there is a drop. (Vote: 8-5)

Individual Consideration Agenda

Public Comment 1:

Proponents: Bill McHugh, representing National Fireproofing Contractors Association (bill@mc-hugh.us) requests As Submitted

Commenter's Reason: The trend of building owners and managers using rooftop areas or the whole roof - as an occupiable area - is growing and happening. People with little or no experience on a rooftop are now allowed to experience the roof for various activities. The issue in this proposal addresses keeping the general public from wandering past the occupiable area and safe. The construction industry is a hazardous occupation. Roofing workers account for about 1/3 or fall deaths, according to an OSHA report over a 10 year period.

Falls are the leading cause of death in the construction industry, accounting for over 3,500 fatalities between 2003 and 2013. Falls from roofs accounted for nearly 1,200, or 34%, of the fall deaths during that period. Roofers encounter many hazards on the job, including hazards associated with working at heights and from ladders, power tools, electricity, noise, hazardous substances, and extreme temperatures. Unless these hazards are controlled by the employer, roofers risk serious injury, illness and death.1

The roofing industry - and others who work on roofs - get safety training from their employers about the risks, and safety equipment needed to work on rooftops. People on occupiable rooftops do not have safety training. Yet, they can be on roofs. Without specified guards, they can wander around on the roof without protection, presenting a safety risk to themselves and others. This proposal points to Chapter 10 and brings attention that a guard is needed to protect people on occupiable roofs.

Bibliography: Protecting Roofing Workers U.S. Department of Labor Occupational Safety and Health Administration OSHA 3755-05 2015

Cost Impact: The net effect of the public comment and code change proposal will increase the cost of construction
The cost to construct some occupied roofs where the edge of the occupied portion of the occupied roof is inboard of the roof edge will go up due to the installation of guards.

Public Comment# 2869

G106-21 Part II

Proposed Change as Submitted

Proponents: Lee Kranz, City of Bellevue, WA, representing Myself (lkranz@bellevuewa.gov)

2021 International Building Code

Revise as follows:

1015.2 Where required. *Guards* shall be located along open-sided walking surfaces, including *mezzanines*, equipment platforms, *aisles*, *stairs*, *ramps* and landings that are located more than 30 inches (762 mm) measured vertically to the floor or grade below at any point within 36 inches (914 mm) horizontally to the edge of the open side. <u>*Guards* shall be provided at the perimeter of the occupied portions of an occupied roof.</u> *Guards* shall be adequate in strength and attachment in accordance with Section 1607.9.

Exceptions: *Guards* are not required for the following locations:

1. On the loading side of loading docks or piers.
2. On the audience side of *stages* and raised *platforms*, including *stairs* leading up to the *stage* and raised *platforms*.
3. On raised *stage* and *platform* floor areas, such as runways, *ramps* and side *stages* used for entertainment or presentations.
4. At vertical openings in the performance area of *stages* and *platforms*.
5. At elevated walking surfaces appurtenant to *stages* and *platforms* for access to and utilization of special lighting or equipment.
6. Along vehicle service pits not accessible to the public.
7. In assembly seating areas at cross *aisles* in accordance with Section 1030.17.2.
8. On the loading side of station platforms on fixed guideway transit or passenger rail systems.

Reason: This code change is needed to protect children. There are many cases where the design of an occupied roof includes only a portion of the entire roof area. The occupied portions of the roof are typically elevated 18" or less above the adjacent unoccupied areas of the roof, therefor no guard is currently required per Section 1015.2. This issue is regularly debated on building official chat lines and other forums due to the lack of regulatory authority to require the guard in this design scenario. Even the idea of a small child falling to their death because they bolted from a parent or guardian to look over the edge of a roof is unthinkable. Occupied roofs are relatively new in the IBC and we're discovering issues related to their design on a regular basis. This code change will eliminate or drastically reduce the potential for kids, or even adults who may be inebriated, from falling over the edge of a roof which even if the occupied portion of the roof is some distance away from the roof edge.
Adding a new Section 503.1.4.2 Guards, will insure that the reader will go to Section 1015.2 to see that guards are required. Examples of this can be found in Sections 406.4.1, 505.3.3 and 1029.17.

Cost Impact: The code change proposal will increase the cost of construction
The cost to construct some occupied roofs where the edge of the occupied portion of the occupied roof is inboard of the roof edge will go up due to the installation of guards.

G106-21 Part II

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The proposal was disapproved for several reasons. There are issues with structural attachment if the guard is not on the edge of the roof. There are a lot of barriers that would work to stop people from moving out of the areas intended to be occupied. There are no fall issues, so a guard is not needed. This is an issue to prevent access, not a fall issue. This requirement is an over reach. (Vote: 11-3)

G106-21 Part II

Individual Consideration Agenda

Public Comment 1:

IBC: 1015.2

Proponents: Lee Kranz, representing Washington Association of Building Officials Technical Code Development Committee; Micah Chappell, representing Washington Association of Building Officials (micah.chappell@seattle.gov) requests As Modified by Public Comment

Modify as follows:

2021 International Building Code

1015.2 Where required . *Guards* shall be located along open-sided walking surfaces, including *mezzanines*, equipment platforms, *aisles*, *stairs*, *ramps* and landings that are located more than 30 inches (762 mm) measured vertically to the floor or grade below at any point within 36 inches (914 mm) horizontally to the edge of the open side, ~~*Guards* shall be provided~~ and at the perimeter of ~~the occupied portions of an~~ occupied roofs. ~~roof.~~ *Guards* shall be adequate in strength and attachment in accordance with Section 1607.9.

Exceptions: *Guards* are not required for the following locations:

1. On the loading side of loading docks or piers.
2. On the audience side of *stages* and raised *platforms*, including *stairs* leading up to the *stage* and raised *platforms*.
3. On raised *stage* and *platform* floor areas, such as runways, *ramps* and side *stages* used for entertainment or presentations.
4. At vertical openings in the performance area of *stages* and *platforms*.
5. At elevated walking surfaces appurtenant to *stages* and *platforms* for access to and utilization of special lighting or equipment.
6. Along vehicle service pits not accessible to the public.
7. In assembly seating areas at cross *aisles* in accordance with Section 1030.17.2.
8. On the loading side of station platforms on fixed guideway transit or passenger rail systems.
9. Portions of an occupied roof located less than 30 inches measured vertically to adjacent unoccupied roof areas where approved guards are present at the perimeter of the roof.
10. At portions of an occupied roof where an *approved* barrier is provided.

Commenter's Reason: Clarification is needed in the code to inform design professionals and building officials when a *guard* or barrier is required for occupied roofs where the occupied roof deck is less than 30" above the adjoining unoccupied roof areas. There are many cases where the design of an occupied roof includes only a portion of the entire roof area. Occupied portions of the roof are typically elevated 18" or less above the adjacent unoccupied areas of the roof, therefor, no *guard* is currently required for these areas per Section 1015.2 which means that a child or an adult could wander over to the edge of the roof and fall off. This issue is regularly debated on building official chat lines and other forums due to the lack of regulatory authority to require the *guard* in this design scenario.
To address the constructive comments made at the Committee Action Hearings we have made the following changes:

- Instead of having a separate sentence to add the need for guards at the perimeter of the occupied roofs, the scoping has been added to the end of the laundry list for where guards are required. This creates continuity for the scoping and provides better clarity for the reader. Because the new scoping comes after the 30 inch change in elevation language in Section 1015.2, guards will typically be required at the perimeter of occupied roofs.

Exceptions 9 and 10 have been added in this Public Comment to address concerns expressed at the Committee Action Hearings.

- Exception 9 exempts the need for *guards* between the occupied and unoccupied roof areas if the entire roof perimeter is provided with a *guard*. In this scenario, safety is ensured even if occupants wander over to the edge roof.
- Exception 10 allows the building official to approve the use of a barrier when the need for a full Chapter 16 compliant *guard* is not warranted. In these cases, an approved barrier may be provided instead of a *guard*.

Occupied roofs are relatively new in the IBC and we're discovering new issues such as this related to their design. This code change will eliminate or drastically reduce the potential for kids, or even adults who may be inebriated, from falling over the edge of a roof, even if the occupied portion of the roof is some distance away from the roof edge.

Cost Impact: The net effect of the public comment and code change proposal will increase the cost of construction
This code change will add cost because there will be a need for more guardrail installations on occupied roofs. There are most likely many occupied roofs that, under the current code, would not require a guard; this code change will change that to require a guard or barrier for most partial roof area occupied roofs at the perimeter of the occupied roof.

Public Comment# 2379

G109-21

Proposed Change as Submitted

Proponents: Jeffrey Grove, representing Jensen Hughes (jgrove@jensenhughes.com)

2021 International Building Code

Revise as follows:

TABLE 504.4 ALLOWABLE NUMBER OF STORIES ABOVE GRADE PLANE[a, b]

Portions of table not shown remain unchanged.

OCCUPANCY CLASSIFICATION	See Footnotes	TYPE OF CONSTRUCTION											
		Type I		Type II		Type III		Type IV				Type V	
		A	B	A	B	A	B	A	B	C	HT	A	B
B	NS	UL	11	5	3	5	3	5	5	5	5	3	2
	S	UL	12	6	~~4~~ 5	6	4	18	12	9	6	4	3

UL = Unlimited; NP = Not Permitted; NS = Buildings not equipped throughout with an automatic sprinkler system; S = Buildings equipped throughout with an automatic sprinkler system installed in accordance with Section 903.3.1.1; S13R = Buildings equipped throughout with an automatic sprinkler system installed in accordance with Section 903.3.1.2; S13D = Buildings equipped throughout with an automatic sprinkler system installed in accordance with Section 903.3.1.3.

a. See Chapters 4 and 5 for specific exceptions to the allowable height in this chapter.
b. See Section 903.2 for the minimum thresholds for protection by an automatic sprinkler system for specific occupancies.
c. New Group H occupancies are required to be protected by an automatic sprinkler system in accordance with Section 903.2.5.
d. The NS value is only for use in evaluation of existing *building height* in accordance with the *International Existing Building Code*.
e. New Group I-1 and I-3 occupancies are required to be protected by an automatic sprinkler system in accordance with Section 903.2.6. For new Group I-1 occupancies, Condition 1, see Exception 1 of Section 903.2.6.
f. New and existing Group I-2 occupancies are required to be protected by an automatic sprinkler system in accordance with Section 903.2.6 and 1103.5 of the International Fire Code.
g. For new Group I-4 occupancies, see Exceptions 2 and 3 of Section 903.2.6.
h. New Group R occupancies are required to be protected by an automatic sprinkler system in accordance with Section 903.2.8.

Reason: In general, the allowable height measured in stories for business occupancies is equal to or higher than the allowable height for group R residential occupancies. This is in recognition that occupants in business occupancies are generally awake and alert, while occupants of group R residential buildings may be sleeping, and thus take longer to evacuate.
However, for buildings of type IIB constriction that are sprinklered in accordance with NFPA 13, table 504.4 allows R residential buildings to be five stories in height, but it only allows group B buildings to be four stories in height. Table 504.3 allows both group B and group R buildings of type IIB construction that are sprinklered in accordance with NFPA 13 to be 75 feet in height.

Cost Impact: The code change proposal will decrease the cost of construction
Construction cost would decrease as an additional story could be constructed of Type IIB construction for a Group B occupancy building.

G109-21

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The proposal was disapproved. The proposal provided insufficient justification for the proposed change. (Vote: 9-5)

G109-21

Individual Consideration Agenda

Public Comment 1:

Proponents: Shamim Rashid-Sumar, representing National Ready Mixed Concrete Association (ssumar@nrmca.org); Jeffrey Grove, representing Jensen Hughes (jgrove@jensenhughes.com) requests As Submitted

Commenter's Reason: G109-21 is recommended for Approval As Submitted based on documentation of additional technical justification to support

the proposed code change.
Previously in the support statement for G109-21, it was identified that in general, in accordance with Table 504.4 the allowable height measured in stories for Business Occupancy is equal to or higher than the allowable height for Residential Occupancy for Type IIB construction. This is shown in Figure 1, which provides a side by side comparison for allowable height in stories for Group B and Group R occupancies in Table 504.4. However, for buildings of Type IIB construction that are sprinklered in accordance with NFPA 13, Table 504.4 allows R Residential buildings to be five stories in height, while Group B buildings are permitted only to be four stories in height.

It should be noted that NFPA 5000 [2021 edition] Table 7.4.1 permits Business occupancy group buildings constructed of Type II unprotected construction to be built 5 stories in height, consistent with Residential occupancies.

TABLE 504.4
ALLOWABLE NUMBER OF STORIES ABOVE GRADE PLANE[a, b]

OCCUPANCY CLASSIFICATION	See Footnotes	TYPE OF CONSTRUCTION											
		Type I		Type II		Type III		Type IV				Type V	
		A	B	A	B	A	B	A	B	C	HT	A	B
A-1	NS	UL	5	3	2	3	2	3	3	3	3	2	1
	S	UL	6	4	3	4	3	9	6	4	4	3	2
A-2	NS	UL	11	3	2	3	2	3	3	3	3	2	1
	S	UL	12	4	3	4	3	18	12	6	4	3	2
A-3	NS	UL	11	3	2	3	2	3	3	3	3	2	1
	S	UL	12	4	3	4	3	18	12	6	4	3	2
A-4	NS	UL	11	3	2	3	2	3	3	3	3	2	1
	S	UL	12	4	3	4	3	18	12	6	4	3	2
A-5	NS	UL	UL	UL	UL	UL	UL	1	1	1	UL	UL	UL
	S	UL	UL	UL	UL	UL	UL	UL	UL	UL	UL	UL	UL
B	NS	UL	11	5	3	5	3	5	5	5	5	3	2
	S	UL	12	6	4	6	4	18	12	9	6	4	3

TABLE 504.4—continued
ALLOWABLE NUMBER OF STORIES ABOVE GRADE PLANE[a, b]

OCCUPANCY CLASSIFICATION	See Footnotes	TYPE OF CONSTRUCTION											
		Type I		Type II		Type III		Type IV				Type V	
		A	B	A	B	A	B	A	B	C	HT	A	B
R-1[h]	NS[d]	UL	11	4	4	4	4	4	4	4	4	3	2
	S13R	4	4									4	3
	S	UL	12	5	5	5	5	18	12	8	5	4	3
R-2[h]	NS[d]	UL	11	4	4	4	4	4	4	4	4	3	2
	S13R	4	4	4								4	3
	S	UL	12	5	5	5	5	18	12	8	5	4	3
R-3[h]	NS[d]	UL	11	4	4	4	4	4	4	4	4	3	3
	S13D	4	4									3	3
	S13R	4	4									4	4
	S	UL	12	5	5	5	5	18	12	5	5	4	4
R-4[h]	NS[d]	UL	11	4	4	4	4	4	4	4	4	3	2
	S13D	4	4									3	2
	S13R	4	4									4	3
	S	UL	12	5	5	5	5	18	12	5	5	4	3

Figure 1. Comparison of allowable height in stories for Group B and Group R occupancies in accordance with Table 504.4.

An additional comparison is provided in Table 1 below for the allowable number of stories for selected occupancy types in buildings protected by automatic sprinklers in accordance with Table 504.4.

Occupancy Group	Allowable Number of Stories Permitted for Type II-B Buildings Protected by Automatic Sprinklers
Business (B)	4
Residential (R-1, R-2, R-3, R-4)	5
Factory Industrial, Moderate Hazard (F-1)	3
Factory Industrial, Low Hazard (F-2)	4
Storage, Moderate Hazard (S-1)	4
Storage, Low Hazard (S-2)	4

Table 1. Allowable Number of Stories for Selected Occupancy Types in Type II-B Buildings Protected by Automatic Sprinklers in accordance with Table 504.4.

Based on this comparison, Storage occupancies of low and moderate hazard as well as low hazard Factory/Industrial occupancies are permitted to be constructed to the same number of stories as Business occupancies, even though Business occupancies present a lesser hazard than Group F and Group S occupancies.

The low level of fire threat that is presented by Business occupancies as compared to Residential occupancies is most clearly apparent in the statistics of civilian fire deaths in Residential occupancies. According to NFPA Research on “Number of Fires Reported to Local Fire Departments in the United States by Property Use”, annual averages for 2014-2018 included 15 civilian deaths reported in structural fires in Business and Mercantile properties. However, 2,746 deaths were reported in Residential properties for the same period. This is a staggering differential.

In summary, Business occupancies present a low level of fire threat as compared with Residential occupancies and should be allowed the additional story height proposed in G109-21 consistent with Residential occupancies and other nationally recognized construction codes.

Recommend APPROVAL AS SUBMITTED for G109-21.

Bibliography: National Fire Protection Association. (n.d.). *Fires By Occupancy or Property Type*. Retrieved July 2, 2021, from https://www.nfpa.org/News-and-Research/Data-research-and-tools/US-Fire-Problem/Fires-by-occupancy-or-property-type
NFPA 5000: Building Construction and Safety Code, 2021 Edition. In NFPA National Fire Codes Online (Free Access). Retrieved from https://www.nfpa.org/5000

Cost Impact: The net effect of the public comment and code change proposal will decrease the cost of construction
Construction cost would decrease as an additional story could be constructed of Type IIB construction for a Group B occupancy building.

Public Comment# 2857

G112-21 Part I

Proposed Change as Submitted

Proponents: Micah Chappell, representing Washington Association of Building Officials (micah.chappell@seattle.gov); Jonathan Siu, representing Washington Association of Building Officials Technical Code Development Committee (jonsiuconsulting@gmail.com)

THIS IS A 3 PART CODE CHANGE. PART I WILL BE HEARD BY THE GENERAL CODE COMMITTEE. PART II WILL BE HEARD BY THE MEANS OF EGRESS CODE COMMITTEE. PART III WILL BE HEARD BY THE FIRE CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THESE COMMITTEES.

2021 International Building Code

Add new definition as follows:

EGRESS ROOF ACCESS WINDOW. A skylight or roof window designed and installed to satisfy the emergency escape and rescue opening requirements of Section 1031.

SLEEPING LOFT. A sleeping space on a floor level located more than 30 inches (762 mm) above the main floor and open to the main floor on one or more sides with a ceiling height of less than 6 feet 8 inches (2032 mm).

LANDING PLATFORM. A landing provided as the top step of a stairway accessing a sleeping loft.

Add new text as follows:

SECTION 506
SLEEPING LOFT

506.1 General.
Sleeping lofts shall comply with Sections 506.1 through 506.5.

506.2 Sleeping loft area and dimensions.
Sleeping lofts shall meet the minimum area and dimension requirements of Sections 506.2.1 through 506.2.3. A s*leeping loft* or *sleeping lofts* in compliance with Section 506.2 shall be considered a portion of the story below. Such *sleeping lofts* shall not contribute to either the building area or number of stories as regulated by Section 503.1. The area of the *sleeping loft* shall be included in determining the *fire area*.

506.2.1 Area.
Sleeping lofts shall have a floor area of not less than 35 square feet (3.25 m^2) and less than 70 square feet (6.5 m^2).

506.2.2 Minimum horizontal dimensions.
Sleeping lofts shall be not less than 5 feet (1524 mm) in any horizontal dimension.

506.2.3 Height effect on sleeping loft area.
Portions of a *sleeping loft* with a sloped ceiling measuring less than 3 feet (914 mm) from the finished floor to the finished ceiling shall not be considered as contributing to the minimum required area for the loft but shall contribute to the maximum allowable area.

> **Exception:**
> Under gable roofs with a minimum slope of 6 units vertical in 12 units horizontal (50-percent slope), portions of a sleeping loft with a sloped ceiling measuring less than 16 inches (406 mm) from the finished floor to the finished ceiling shall not be considered as contributing to the minimum required area for the sleeping loft but shall contribute to the maximum allowable area.

506.3 Sleeping loft access and egress.
The access to and primary egress from sleeping lofts shall be of any type described in Sections 506.3.1 through 506.3.5 and shall meet the sleeping loft where the sleeping loft's ceiling height is not less than 3 feet (914 mm) along the entire width of the access and egress component.

506.3.1 Stairways.
Stairways accessing sleeping lofts shall comply with Sections 506.3.1.1 through 506.3.1.7.

506.3.1.1 Headroom.
The headroom above the sleeping loft access and egress shall be not less than 6 feet 2 inches (1880 mm), as measured vertically, from a sloped line connecting the tread, landing, or landing platform nosing's in the center of their width, and vertically from the landing or landing platform along the center of its width.

506.3.1.2 Width.
Stairways accessing a sleeping loft shall not be less than 17 inches (432 mm) in clear width at or above the handrail. The width below the handrail shall be not less than 20 inches (508 mm).

506.3.1.3 Treads and risers.
Risers for stairs accessing a sleeping loft shall be not less than 7 inches (178 mm) and not more than 12 inches (305 mm) in height. Tread depth and riser height shall be calculated in accordance with one of the following formulas:

1. The tread depth shall be 20 inches (508 mm) minus four-thirds of the riser height.
2. The riser height shall be 15 inches (381 mm) minus three-fourths of the tread depth.

506.3.1.4 Landings.
Intermediate landings and landings at the bottom of stairways shall comply with Section 1011.6, except that the depth in the direction of travel shall be not less than 24 inches (508 mm).

506.3.1.5 Landing platforms.
The top tread and riser of *stairways* accessing *sleeping lofts* shall be constructed as a *landing platform* where the loft ceiling height is less than 6 feet 2 inches (1880 mm) where the stairway meets the *sleeping loft*. The *landing platform* shall be not less than 18 inches (508 mm) in width and in depth measured horizontally from and perpendicular to the nosing of the *landing platform*. The *landing platform* riser height to the edge of the *sleeping loft* floor, shall not be greater than 18 inches (508 mm) in height.

506.3.1.6 Handrails.
Handrails shall comply with Section 1011.11.

506.3.1.7 Stairway guards.
Guards at open sides of *stairways*, *landings*, and *landing platforms* shall comply with Section 1115.

506.3.2 Ladders.
Ladders accessing sleeping lofts shall comply with Sections 506.3.2.1 and 506.3.2.2.

506.3.2.1 Size and capacity.
Ladders accessing sleeping lofts shall have a rung width of not less than 12 inches (305 mm), and 10-inch (254 mm) to 14-inch (356 mm) spacing between rungs. Ladders shall be capable of supporting a 300-pound (136 kg) load on any rung. Rung spacing shall be uniform within 3/8 inch (9.5 mm).

506.3.2.2 Incline.
Ladders shall be installed at 70 to 80 degrees from horizontal.

506.3.3 Alternating tread devices.
Alternating tread devices accessing *sleeping lofts* shall comply with Section 1011.14. The clear width at and below the handrails shall be not less than 20 inches (508 mm).

506.3.4 Ships ladders.
Ships ladders accessing sleeping lofts shall comply with Sections 1011.15. The clear width at and below handrails shall be not less than 20 inches (508 mm).

506.4 Sleeping Loft Guards.
Guards shall be located along open sides of sleeping lofts that are located more than 30 inches (762 mm) measured vertically to the floor below at any point within 36 inches (914 mm) horizontally to the edge of the open side. Sleeping loft guards shall be constructed in accordance with Section 1015.

506.5 Emergency escape and rescue openings.
An emergency escape and rescue opening shall be located in each *sleeping loft.*

Exception:
Sleeping lofts where an egress roof access window is provided complying with Section 1031.3.

Reason: This proposal takes an important part of the Residential Code Appendix Q outlining the design criteria for a loft, modifies some of the requirements, and then incorporates it into the main sections of the IBC with definitions and a new section. This proposal provides allowances and limitations on designed spaces specifically identified as a sleeping loft, while clearly differentiating these small spaces from mezzanines and other habitable space.
The proposal requires these small spaces to include smoke detection and an emergency escape and rescue opening. A sleeping loft in an IBC dwelling unit would provide the equivalent safety standards as a loft located in a small dwelling unit as currently allowed in IRC Appendix Q. Expanding the availability of sleeping lofts will promote more broad uses of space, while possibly allowing for an increase in housing density and affordability.

Most of the technical provisions are taken from IRC Appendix Q. However, the list below explains the differences between this proposal and Appendix Q, and our rationale.

- "sleeping loft" vs "loft" – we want to trigger smoke alarm, emergency escape/rescue opening.
- 506.2.1: Imposes max. 70 sf area. Intent is to keep these small, without being able to circumvent minimum habitable space requirements for larger rooms. Thus, beyond 70 sf, space should meet full interior dimension requirements for habitable space (IBC 1208) and mezzanines (IBC 505)
- 506.3: Requires 3' ceiling height at access/egress component. Stair requires 6'2" headroom, but ladders, alternating tread devices, and ships ladders have no similar requirement. Ceiling heights of less than 3' are allowed, and nothing states that the ladders, etc. can't be placed in those lower-ceiling areas. Some minimum height above the device is necessary to allow people in the sleeping loft to egress in an emergency.
- 506.3.1.5: Allows 18" landing platforms, vs "18 to 22 inches" in direction of travel in Appendix Q. Picked lower limit, since Appendix Q doesn't say when to use anything larger. Allows 18" rise from landing platform to loft floor, where Appendix Q allows 16 to 18 inches. In this case, picked 18" as the maximum, again, because there is no other guidance in Appendix Q why something smaller might be required.
- 506.3.2.1: Requires ladders be capable of supporting 300 pound load on any rung, vs 200 in Appendix Q. 300 is consistent with load requirements in IBC Chapter 16.

The change to 1011.14 is for coordination with the new Section 506.3.3. In order to add to the list of allowed uses, there was a need to clarify whether alternating tread devices are allowed to provide access to unoccupied roofs to other than I-3 occupancies. Numbering the list is for clarity, taking the place of a long sentence with clauses separated by semicolons, and also clearly allows these for unoccupied roof access in other occupancies besides I-3s, consistent with the IBC Commentary. The change to 1015.2 and the new Exception 4 in 1015.3 integrate the sleeping loft guard provisions from IRC Appendix Q Section AQ104.2.5 into the guard provisions of the IBC, instead of having them reside in the sleeping loft section."

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal will not increase or decrease the cost of construction because the new sections to the code add an option and not a requirement. When and applicant decides to utilize these new sections, the code provides guidance on minimum standards for that space.

G112-21 Part I

Public Hearing Results

This proposal includes the following errata

Section 506.2. - replace "floor area of not less than 35" with "floor area greater than or equal to 35"

Section 506.3.1.7 - replace "Section 1115" with "Section "1015"

Committee Action: Disapproved

Committee Reason: The proposal was disapproved. The committee had several concerns, including appropriate location in the code. Confusion between mezzanine and/or sleeping loft. There is no defined height. The proposal had no scoping. The committee expressed concerns about guards. (Vote: 12-1)

G112-21 Part I

Individual Consideration Agenda

Public Comment 1:

IBC: 202 (New), 420.12 (New), 420.12.1 (New), 420.12.2 (New), 420.12.3 (New), 420.12.4 (New), 420.12.4.1 (New), 420.12.4.2 (New), 420.12.4.2.1 (New), 420.12.4.2.2 (New), 420.12.4.2.3 (New), 420.12.4.3 (New), 420.12.4.4 (New), 420.12.4.5 (New), 420.12.4.5.1 (New), 420.12.4.5.2 (New), 420.12.5 (New), SECTION 505, 505.1

Proponents: Jonathan Siu, representing Washington Association of Building Officials Technical Code Development Committee; Micah Chappell, representing Washington Association of Building Officials (micah.chappell@seattle.gov) requests As Modified by Public Comment

Replace as follows:

2021 International Building Code

SLEEPING LOFT . A space on an intermediate level or levels between the floor and ceiling of a Group R occupancy dwelling or sleeping unit, open on one or more sides to the room in which the sleeping loft is located, and in accordance with Section 420.12.

420.12 Sleeping lofts . Where provided in Group R occupancies, sleeping lofts shall comply with this code as modified by Sections 420.12.1 through 420.12.5. Sleeping lofts constructed in compliance with this section shall be considered a portion of the story below. Such sleeping lofts shall not contribute to either the building area or number of stories as regulated by Section 503.1. The sleeping loft floor area shall be included in determining the fire area.

Exception: Sleeping lofts need not comply with Section 420.12 where they meet any of the following conditions:

1. The sleeping loft has a maximum depth of less than 3 feet (914 mm).
2. The sleeping loft has a floor area of less than 35 square feet (3.3 m^2).
3. The sleeping loft is not provided with a permanent means of egress.

420.12.1 Sleeping loft limitations . Sleeping lofts shall comply with the following conditions:

1. The sleeping loft floor area shall be less than 70 square feet (6.5 m^2).
2. The sleeping loft ceiling height shall not exceed 7 feet (2134 mm) for more than one-half of the sleeping loft floor area.

The provisions of Sections 420.12.2 through 420.12.5 shall not apply to to sleeping lofts that do not comply with Items 1 and 2.

420.12.2 Sleeping loft ceiling height . The clear height below the sleeping loft floor construction shall not be less than 7 feet (2134 mm). The ceiling height above the finished floor of the sleeping loft shall not be less than 3 feet (914 mm). Spaces adjacent to the sleeping loft with a sloped ceiling measuring less than 3 feet (914 mm) from the finished floor to the finished ceiling shall not contribute to the sleeping loft floor area.

420.12.3 Sleeping loft area . The aggregate area of all sleeping lofts and mezzanines within a room shall comply with Section 505.2.1.

Exception: The area of a single sleeping loft shall not be greater than two-thirds of the area of the room in which it is located, provided that no other sleeping lofts or mezzanines are open to the room in which the sleeping loft is located.

420.12.4 Permanent egress for sleeping lofts . Where a permanent means of egress is provided for sleeping lofts, the means of egress shall comply with Chapter 10 as modified by Sections 420.12.4.1 through 420.12.4.5.

420.12.4.1 Ceiling height at sleeping loft means of egress . A minimum ceiling height of 3 feet (914 mm) shall be provided for the entire width of the means of egress from the sleeping loft.

420.12.4.2 Stairways . Stairways providing egress from sleeping lofts shall be permitted to comply with Sections 420.12.4.2.1 through 420.12.4.2.3.

420.12.4.2.1 Width . Stairways providing egress from a sleeping loft shall not be less than 17 inches (432 mm) in clear width at or above the handrail. The width below the handrail shall be not less than 20 inches (508 mm).

420.12.4.2.2 Treads and risers . Risers for stairs providing egress from a sleeping loft shall be not less than 7 inches (178 mm) and not more than 12 inches (305 mm) in height. Tread depth and riser height shall be calculated in accordance with one of the following formulas:

1. The tread depth shall be 20 inches (508 mm) minus four-thirds of the riser height.
2. The riser height shall be 15 inches (381 mm) minus three-fourths of the tread depth.

420.12.4.2.3 Landings . Landings at stairways providing egress from sleeping lofts shall comply with Section 1011.6, except that the depth of landings in the direction of travel shall be not less than 24 inches (508 mm).

420.12.4.3 Alternating tread devices . Alternating tread devices shall be permitted as a means of egress from sleeping lofts where the sleeping loft floor is no more than 10 feet (3048 mm) above the floor of the room in which it is located. Handrails and treads of such alternating tread devices shall comply with Section 1011.14.

420.12.4.4 Ship's ladders . Ship's ladders shall be permitted as a means of egress from sleeping lofts where the sleeping loft floor is no more than 10 feet (3048 mm) above the floor of the room in which it is located. Handrails and treads of such ship's ladders shall comply with Section 1011.15.

420.12.4.5 Ladders . Ladders shall be permitted as a means of egress from sleeping lofts where the sleeping loft floor is no more than 10 feet (3048 mm) above the floor of the room in which it is located. Such ladders shall comply with Sections 420.12.4.5.1 and 420.12.4.5.2.

420.12.4.5.1 Size and capacity . Ladders providing egress from sleeping lofts shall have a rung width of not less than 12 inches (305 mm), and 10-inch (254 mm) to 14-inch (356 mm) spacing between rungs. Ladders shall be capable of supporting a 300-pound (136 kg) load on any rung. Rung spacing shall be uniform within 3/8 inch (9.5 mm).

<u>420.12.4.5.2</u> <u>Incline</u> . <u>Ladders shall be inclined at 70 to 80 degrees from horizontal.</u>

<u>420.12.5</u> <u>Smoke alarms</u> . <u>Single- or multiple-station smoke alarms shall be installed in all sleeping lofts in accordance with Section 907.2.11.1 or 907.2.11.2.</u>

SECTION 505
MEZZANINES AND EQUIPMENT PLATFORMS

505.1 General . *Mezzanines* shall comply with Section 505.2. *Equipment platforms* shall comply with Section 505.3.

> **<u>Exception:</u>** <u>Sleeping lofts in Group R occupancy dwelling units and sleeping units shall be permitted to comply with Section 420.12, subject to the limitations in Section 420.12.1.</u>

Commenter's Reason: This public comment fully replaces the originally-proposed sleeping loft provisions. We have made changes in response to comments we received from the Committees and opposing testimony at the Committee Action Hearings, and in collaboration with some of the opponents. The revisions we have made are attempting to balance flexibility in design with maintaining a minimum level of safety.
Housing affordability has also become increasingly important in recent years due to the impacts of recessions and COVID. This proposal allows for densification of multi-family residential housing, allowing for additional sleeping space within the same building footprint. The proposed provisions are especially important for increasing usable space in very small units, which have been increasingly popular with the importance of sustainability and living more simply. Not only would this allow more living space within a new multifamily building, but would also encourage alteration of existing dwelling and sleeping units rather than demolition and new construction.

We received conflicting comments whether sleeping loft provisions belong in Chapter 4 or Chapter 5 (specifically, in Section 505 re mezzanines), or in an appendix. We believe the issue of how to reasonably regulate sleeping lofts is prevalent and important enough to warrant placement in the body of the code. While the proposed text scopes sleeping lofts to Group R occupancies, this public comment places the provisions in Section 420 – GROUPS I-1, R-1, R-2, R-3 AND R-4, in order to clarify and reinforce that scope. Other changes and responses are described below.

Sleeping loft scoping and general provisions:

In response to opposing testimony, we have clarified that sleeping lofts are an
<u>option</u> in Section 420.12 ("Where provided….") It will be up to the designer to decide whether or not to designate these areas as sleeping lofts.

- In response to Committee comments, sleeping lofts are limited to dwelling units or sleeping units <u>in R occupancies</u> (420.12 and Definition). I-2 sleeping units are not included.
- We have clarified that sleeping lofts are required to comply with the base code, except where the provisions of the new section modify them (420.12). This allowed us to clean up the text by removing pointers to other sections of the code for various provisions.
- In response to opposing testimony at the CAH, small spaces that might technically meet the definition of a sleeping loft, or sleeping loft-like spaces that don't have a permanent means of egress are exempt from the requirements of this section (420.12, Exception, Items 1, 2, and 3).
- In response to comments from a Committee member, the proposal now specifies a sleeping loft must be smaller than 70 square feet, and any ceiling height above the sleeping loft cannot exceed 7 feet for more than half of its area. The intent is to keep sleeping lofts as small spaces. Once the space is provided with dimensions that are equivalent to habitable residential living spaces, this section no longer applies (420.12.1).
- The requirement for 7 feet below the sleeping loft (420.12.2) was added in response to a comment received from a Committee member. The text is drawn from IBC 505.2 regarding clear height below mezzanines. We actually don't see an issue with having shorter, usable spaces below sleeping lofts (what about a storage closet?) but the 7-foot dimension is consistent with the required height of spaces below mezzanines, and also reflects what we have seen in real-world project proposals, where these are generally placed on top of bathrooms in microhousing. (See Figure 1 below.)

Sleeping loft vs mezzanine:

During testimony, the question was raised as to how sleeping lofts are the same as or different from mezzanines. We also received conflicting comments as to whether these provisions belonged in the mezzanine provisions or in its own section. We believe it is more understandable to keep sleeping loft provisions separate from mezzanine provisions. However, we have added a pointer back to 420.12 in the new exception to Section 505.1, with a condition that sleeping lofts are limited in size.

In response to Committee and opposing comments, we have clarified that the aggregate area of sleeping lofts plus any mezzanines must meet the area limitations of mezzanines (420.12.3). However, the exception in 420.12.3 allows a very small dwelling or sleeping unit, to have a single sleeping loft (up to 69.9 square feet), as long as it is the only sleeping loft or mezzanine in the room and its area does not exceed two thirds of the area of the main room (420.12.3, Exception). The two-thirds figure is based on the allowance for mezzanines and equipment platforms in IBC Section 505.2.1.1. This allows microhousing units, which in today's code can have as little as 70 square feet of habitable space, to utilize the space on top of the bathroom for a sleeping loft.

Sleeping loft egress:

In general, means of egress (including individual components) must comply with the base code, but the specific provisions in 420.12.4.1 through 420.12.4.5 modify Chapter 10 (420.12.4).

Changes from the original proposal include specifically allowing the use of alternating tread devices, ship's ladders, and ladders as a means of egress, but limiting their height (420.12.4.3, 420.12.4.4, and 420.12.4.5). We received a comment after the CAH expressing concern about having small children only having a ladder for a means of egress from an unlimited height. The 10-foot limitation is consistent with the 7-foot clear height requirement in 420.12.2, and would allow for floor framing plus the flexibility to provide a full-height space below the sleeping loft.

In response to a comment received after the CAH, the base requirement in Section 420.12.4 to comply with Chapter 10 would allow the use of a spiral stair to provide egress from a sleeping loft. Because we are not modifying any of the requirements for spiral stairs, there is no section devoted to spiral stairs in 420.12.4

Examples of sleeping lofts:

Figures 1 and 2 below show real-life examples of sleeping lofts taken from the article, "What you need to know about NYC apartments with sleeping lofts" posted on www.brickunderground.com. The loft in Figure 1 appears to have been located on top of the unit's bathroom. It is unclear what is below the loft in Figure 2, or if the ceiling height below the loft would comply with the 7-foot requirement in this public comment. Note the non-compliant guard in Figure 1, and the total lack of a guard in Figure 2. The object of providing these examples is not to question what is allowed in New York, but to show that sleeping lofts are not a "niche" as was suggested in testimony at the CAH. As the chair of the Means of Egress Committee indicated, sleeping lofts are prevalent across the country, particularly in college towns. These spaces are being created whether or not the code addresses them, so code provisions are needed for consistency in regulating them.

FIGURE 1

FIGURE 2

Cost Impact: The net effect of the public comment and code change proposal will not increase or decrease the cost of construction
As stated in the original proposal, sleeping lofts are an option and not a requirement. When an applicant chooses to install a sleeping loft, the code will provide guidance on the minimum standards for the space.

Public Comment# 2401

Public Comment 2:

IBC: APPENDIX P (New), SECTION P101 (New), P101.1 (New), P101.2 (New), P101.3 (New), P101.4 (New), SECTION P102 (New), P102.1 (New), SECTION P103 (New), P103.1 (New), P103.2 (New), P103.3 (New), P103.3.1 (New), P103.3.2 (New), P103.3.3 (New), P103.4 (New), P103.5 (New), P103.6 (New), P103.6.1 (New), P103.6.2 (New), SECTION P104 (New), P104.1 (New), SECTION P105 (New), P105.1 (New)

Proponents: Sue Coffman, representing City of Tacoma (sue.coffman@cityoftacoma.org); Ardel Jala, representing Seattle Dept of Construction & Inspections (ardel.jala@seattle.gov); Hoyt Jeter, representing City of Tacoma (hjeter@cityoftacoma.org); Quyen Thai, representing City of Tacoma (qthai76@gmail.com) requests As Modified by Public Comment

Replace as follows:

2021 International Building Code

APPENDIX P
SLEEPING LOFTS

SECTION P101
GENERAL

P101.1 General . Where provided in Group R occupancies,sleeping lofts shall comply with the provisions of this code, except as modified by this appendix. Sleeping lofts constructed in compliance with this appendix shall be considered a portion of the story below. Such sleeping lofts shall not contribute to either the building area or number of stories as regulated by Section 503.1. The sleeping loft floor area shall be included in determining the fire area.
The following sleeping lofts are exempt from compliance with this appendix:

1. Sleeping lofts with a maximum depth of less than 3 feet (914 mm).
2. Sleeping lofts with a floor area of less than 35 square feet (3.3 m^2).

3. Sleeping lofts not provided with a permanent means of egress.

P101.2 Sleeping loft limitations . Sleeping lofts shall comply with the following:

1. The sleeping loft floor area shall be less than 70 square feet (6.5 m^2).
2. The sleeping loft ceiling height shall not exceed 7 feet (2134 mm) for more than one half of the sleeping loft floor area.

The provisions of this appendix shall not apply to sleeping lofts that do not comply with Items 1 and 2.

P101.3 Sleeping loft ceiling height . The clear height below the sleeping loft floor construction shall not be less than 7 feet (2134 mm). The ceiling height above the finished floor of the sleeping loft shall not be less than 3 feet (914 mm). Portions of the sleeping loft with a sloped ceiling measuring less than 3 feet (914 mm) from the finished floor to the finished ceiling shall not contribute to the sleeping loft floor area.

P101.4 Sleeping loft area . The aggregate area of all sleeping lofts and mezzanines within a room shall comply with Section 505.2.1.

> **Exception:** The area of a single sleeping loft shall not be greater than two-thirds of the area of the room in which it is located, provided that no other sleeping lofts or mezzanines are open to the room in which the sleeping loft is located.

SECTION P102
DEFINITIONS

P102.1 General . The following words and terms shall, for the purposes of this appendix, have the meanings shown herein. Refer to Chapter 2 of this code for general definitions.
SLEEPING LOFT. A space on an intermediate level or levels between the floor and ceiling of a Group R occupancy dwelling or sleeping unit, open on one or more sides to the room in which the sleeping loft is located.

SECTION P103
MEANS OF EGRESS

P103.1 General . Where a permanent means of egress is provided for sleeping lofts, the means of egress shall comply with Chapter 10 of this code, as modified by Sections P103.2 through P103.6.

P103.2 Ceiling height at sleeping loft means of egress . A minimum ceiling height of 3 feet (914 mm) shall be provided for the entire width of the means of egress from the sleeping loft.

P103.3 Stairways . Stairways providing egress from sleeping lofts shall be permitted to comply with Sections P103.3.1 through P103.3.3.

P103.3.1 Width . Stairways providing egress from a sleeping loft shall not be less than 17 inches (432 mm) in clear width at or above the handrail. The width below the handrail shall be not less than 20 inches (508 mm).

P103.3.2 Treads and risers . Risers for stairs providing egress from a sleeping loft shall be not less than 7 inches (178 mm) and not more than 12 inches (305 mm) in height. Tread depth and riser height shall be calculated in accordance with one of the following formulas:

1. The tread depth shall be 20 inches (508 mm) minus four-thirds of the riser height.
2. The riser height shall be 15 inches (381 mm) minus three-fourths of the tread depth.

P103.3.3 Landings . Landings at stairways providing egress from sleeping lofts shall comply with Section 1011.6, except that the depth of landings in the direction of travel shall be not less than 24 inches (508 mm).

P103.4 Alternating tread devices . Alternating tread devices shall be permitted as a means of egress from sleeping lofts, where the sleeping loft floor is no more than 10 feet (3048 mm) above the floor of the room to which it is open. Handrails and treads of such alternating tread devices shall comply with Section 1011.14.

P103.5 Ship's ladders . Ship’s ladders shall be permitted as a means of egress from sleeping lofts where the sleeping loft floor is no more than 10 feet (3048 mm) above the floor of the room to which it is open. Handrails and treads of such ship’s ladders shall comply with Section 1011.15.

P103.6 Ladders . Ladders shall be permitted as a means of egress from sleeping lofts where the sleeping loft floor is no more than 10 feet (3048 mm) above the floor of the room to which it is open. Such ladders shall comply with Sections P103.6.1 and P103.6.2.

P103.6.1 Size and capacity . Ladders providing egress from sleeping lofts shall have a rung width of not less than 12 inches (305 mm), and 10-inch (254 mm) to 14-inch (356 mm) spacing between rungs. Ladders shall be capable of supporting a 300-pound (136 kg) load on any rung. Rung spacing shall be uniform within 3/8 inch (9.5 mm).

P103.6.2 Incline . Ladders shall be inclined at 70 to 80 degrees from horizontal.

SECTION P104
GUARDS

P104.1 General . Guards complying with Section 1015 of this code shall be provided at the open sides of sleeping lofts.

Exception: The guard height at sleeping lofts shall be permitted to be 36 inches (914 mm) where the ceiling height of the sleeping loft is 42 inches (1067 mm) or less.

SECTION P105
SMOKE ALARMS

P105.1 General . Listed single- or multiple-station smoke alarms complying with UL 217 shall be installed in all sleeping lofts.

Commenter's Reason: This public comment fully replaces G112-21 Parts I, II, and III, and places the proposed sleeping loft provisions from G112-21 Parts I, II, and III into a new appendix, where a jurisdiction has the option to adopt them. While sleeping lofts are a prevalent and important enough issue to warrant placement in the body of the code, this appendix is being offered in response to comments from some Committee members and some opponents.
The provisions of the appendix were modified from the original proposal in response to comments we received from the Committees and opposing testimony, and in collaboration with some of the opponents. A general description of the changes made to the original provisions follows.

Sleeping loft scoping and general provisions:

Even if the appendix is adopted by a jurisdiction, application of the appendix is an option ("Where provided…," P101.1). It will be up to the designer to decide whether or not to designate these areas as sleeping lofts.

- Sleeping lofts are limited to dwelling units or sleeping units in R occupancies (P101.1, P102.1).
- Sleeping lofts are required to comply with the base code, except where the provisions of the appendix modify them (P101.1).
- Small spaces that might technically meet the definition of a sleeping loft or sleeping loft-like spaces that don't have a permanent means of egress are exempt from the requirements of the appendix (P101.1).
- Once a sleeping loft is provided with dimensions that are equivalent to "normal" residential living spaces, it must comply with the full provisions for egress, habitable space, etc. (P101.2).
- The requirement for 7 feet below the sleeping loft was added in response to a comment received from a Committee member (P101.3). The text is drawn from IBC 505.2 regarding clear height below mezzanines. We actually don't see an issue with having smaller, usable spaces below sleeping lofts (what about a storage closet?) but the 7-foot requirement also reflects what we have seen in real-world project proposals, where these are generally placed on top of bathrooms in microhousing. See Figure 1 below, which is an example of a real-life (constructed) sleeping loft, taken from the article, "What you need to know about NYC apartments with sleeping lofts" posted on www.brickunderground.com.

Figure 1: Example of constructed sleeping loft

Sleeping loft vs mezzanine:

During testimony, the question was raised as to how sleeping lofts are the same as or different from mezzanines. We also received conflicting comments as to whether these provisions belonged in the mezzanine provisions or in its own section. We believe it is more understandable to keep sleeping lofts separate. We have clarified that the aggregate area of all sleeping lofts plus any mezzanines must meet the area limitations of mezzanines (P101.4). However, the exception in P101.4 allows a very small dwelling or sleeping unit, which can be as small as 70 square feet of habitable space (think microhousing), to have a single sleeping loft that can be up to two-thirds of the area of the main room. This is based on the allowance for mezzanines and equipment platforms in IBC 505.2.1.1.

Sleeping loft egress and guards:

In general, means of egress (including individual components) and guards must comply with the base code, but the specific provisions in P103 and the exception in P104.1 modify Chapter 10 (P103.1, P104.1). Changes from the original proposal include:

- Allowing the use of alternating tread devices, ship's ladders, and ladders as a means of egress, but limiting their height (P103.4, P103.5, P103.6). We received a comment after the CAH expressing concern about having small children only having a ladder for a means of egress from an unlimited height. The 10-foot limitation is consistent with the 7-foot clear height requirement in P101.3, and would also allow for floor framing and a full-height space below the sleeping loft.
- Guards at sleeping lofts must fully comply with Section 1015 (P104.1), but the exception allows a shorter guard in sleeping lofts with lower ceiling heights. Based on comments we received after the CAH, a 36-inch guard is only allowed where a 42-inch guard would not fit.

Housing affordability has become increasingly important in recent years due to the impacts of recessions and COVID. This proposal allows for densification of multi-family residential housing by providing an option for additional sleeping space within the same building footprint. The proposed provisions are especially important for increasing usable space in very small units, which have been increasingly popular with the importance of sustainability and living more simply. Not only would this allow more living space within a new multifamily building, but it also encourages the alteration of existing dwelling and sleeping units rather than demolition and new construction.

Cost Impact: The net effect of the public comment and code change proposal will not increase or decrease the cost of construction
This proposal will not increase or decrease the cost of construction because the appendix adds an option and not a
requirement. When a jurisdiction adopts the appendix and an applicant decides to utilize these new provisions, the code will provide guidance on minimum standards for that space.

Public Comment# 2422

G112-21 Part II

Proposed Change as Submitted

Proponents: Micah Chappell, representing Washington Association of Building Officials (micah.chappell@seattle.gov); Jonathan Siu, representing Washington Association of Building Officials Technical Code Development Committee (jonsiuconsulting@gmail.com)

2021 International Building Code

Revise as follows:

1011.14 Alternating tread devices. *Alternating tread devices* are limited to an element of a *means of egress* in any of the following locations:

1. ~~buildings of~~ Groups F, H and S from a mezzanine not more than 250 square feet (23 m^2) in area and that serves not more than five occupants~~;~~ .
2. ~~in buildings of~~ Group I-3 from a guard tower, observation station or control room not more than 250 square feet (23 m^2) in area ~~and~~ .
3. For ~~for~~ access to unoccupied roofs
4. Group R from sleeping lofts.

Alternating tread devices used as a *means of egress* shall not have a rise greater than 20 feet (6096 mm) between floor levels or landings.

1015.2 Where required. *Guards* shall be located along open-sided walking surfaces, including *mezzanines*, equipment platforms, *aisles*, *stairs*, *ramps* and landings that are located more than 30 inches (762 mm) measured vertically to the floor or grade below at any point within 36 inches (914 mm) horizontally to the edge of the open side. Guards shall be located along sleeping lofts in accordance with Section 506.4. *Guards* shall be adequate in strength and attachment in accordance with Section 1607.9.

Exceptions: *Guards* are not required for the following locations:

1. On the loading side of loading docks or piers.
2. On the audience side of *stages* and raised *platforms*, including *stairs* leading up to the *stage* and raised *platforms*.
3. On raised *stage* and *platform* floor areas, such as runways, *ramps* and side *stages* used for entertainment or presentations.
4. At vertical openings in the performance area of *stages* and *platforms*.
5. At elevated walking surfaces appurtenant to *stages* and *platforms* for access to and utilization of special lighting or equipment.
6. Along vehicle service pits not accessible to the public.
7. In assembly seating areas at cross *aisles* in accordance with Section 1030.17.2.
8. On the loading side of station platforms on fixed guideway transit or passenger rail systems.

1015.3 Height. Required *guards* shall be not less than 42 inches (1067 mm) high, measured vertically as follows:

1. From the adjacent walking surfaces.
2. On *stairways* and stepped *aisles*, from the line connecting the leading edges of the tread *nosings*.
3. On *ramps* and ramped *aisles*, from the *ramp* surface at the guard.

Exceptions:

1. For occupancies in Group R-3 not more than three stories above grade in height and within individual *dwelling units* in occupancies in Group R-2 not more than three stories above grade in height with separate *means of egress*, required *guards* shall be not less than 36 inches (914 mm) in height measured vertically above the adjacent walking surfaces.
2. For occupancies in Group R-3, and within individual *dwelling units* in occupancies in Group R-2, *guards* on the open sides of *stairs* shall have a height not less than 34 inches (864 mm) measured vertically from a line connecting the leading edges of the treads.
3. For occupancies in Group R-3, and within individual *dwelling units* in occupancies in Group R-2, where the top of the *guard* serves as a *handrail* on the open sides of *stairs*, the top of the *guard* shall be not less than 34 inches (864 mm) and not more than 38 inches (965 mm) measured vertically from a line connecting the leading edges of the treads.
4. *Sleeping loft guards* shall be not less than 36 inches (914 mm) in height or one-half of the clear height to the ceiling, whichever is less.

~~4.~~ 5. The *guard* height in assembly seating areas shall comply with Section 1030.17 as applicable.

~~5.~~ 6. Along *alternating tread devices* and ships ladders, *guards* where the top rail serves as a *handrail* shall have height not less than 30 inches (762 mm) and not more than 34 inches (864 mm), measured vertically from the leading edge of the device tread *nosing*.

~~6.~~ 7. In Group F occupancies where *exit access stairways* serve fewer than three stories and such *stairways* are not open to the public, and where the top of the *guard* also serves as a *handrail*, the top of the *guard* shall be not less than 34 inches (864 mm) and not more than 38 inches (965 mm) measured vertically from a line connecting the leading edges of the treads.

Reason: This proposal takes an important part of the Residential Code Appendix Q outlining the design criteria for a loft, modifies some of the requirements, and then incorporates it into the main sections of the IBC with definitions and a new section. This proposal provides allowances and limitations on designed spaces specifically identified as a sleeping loft, while clearly differentiating these small spaces from mezzanines and other habitable space.
The proposal requires these small spaces to include smoke detection and an emergency escape and rescue opening. A sleeping loft in an IBC dwelling unit would provide the equivalent safety standards as a loft located in a small dwelling unit as currently allowed in IRC Appendix Q. Expanding the availability of sleeping lofts will promote more broad uses of space, while possibly allowing for an increase in housing density and affordability.

Most of the technical provisions are taken from IRC Appendix Q. However, the list below explains the differences between this proposal and Appendix Q, and our rationale.

- "sleeping loft" vs "loft" – we want to trigger smoke alarm, emergency escape/rescue opening.
- 506.2.1: Imposes max. 70 sf area. Intent is to keep these small, without being able to circumvent minimum habitable space requirements for larger rooms. Thus, beyond 70 sf, space should meet full interior dimension requirements for habitable space (IBC 1208) and mezzanines (IBC 505)
- 506.3: Requires 3' ceiling height at access/egress component. Stair requires 6'2" headroom, but ladders, alternating tread devices, and ships ladders have no similar requirement. Ceiling heights of less than 3' are allowed, and nothing states that the ladders, etc. can't be placed in those lower-ceiling areas. Some minimum height above the device is necessary to allow people in the sleeping loft to egress in an emergency.
- 506.3.1.5: Allows 18" landing platforms, vs "18 to 22 inches" in direction of travel in Appendix Q. Picked lower limit, since Appendix Q doesn't say when to use anything larger. Allows 18" rise from landing platform to loft floor, where Appendix Q allows 16 to 18 inches. In this case, picked 18" as the maximum, again, because there is no other guidance in Appendix Q why something smaller might be required.
- 506.3.2.1: Requires ladders be capable of supporting 300 pound load on any rung, vs 200 in Appendix Q. 300 is consistent with load requirements in IBC Chapter 16.

The change to 1011.14 is for coordination with the new Section 506.3.3. In order to add to the list of allowed uses, there was a need to clarify whether alternating tread devices are allowed to provide access to unoccupied roofs to other than I-3 occupancies. Numbering the list is for clarity, taking the place of a long sentence with clauses separated by semicolons, and also clearly allows these for unoccupied roof access in other occupancies besides I-3s, consistent with the IBC Commentary. The change to 1015.2 and the new Exception 4 in 1015.3 integrate the sleeping loft guard provisions from IRC Appendix Q Section AQ104.2.5 into the guard provisions of the IBC, instead of having them reside in the sleeping loft section."

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal will not increase or decrease the cost of construction because the new sections to the code add an option and not a requirement. When and applicant decides to utilize these new sections, the code provides guidance on minimum standards for that space.

G112-21 Part II

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: This proposal was disapproved because the committee felt this was a very niche market that would be more appropriate in an appendix, similar to the IRC. It could be read to prohibit something as simple as a built in bunk bed. The requirements for guards have safety concerns. G112-21 Part 1 did not pass, and this needs to be a package. (Vote: 13-0)

G112-21 Part II

Individual Consideration Agenda

Public Comment 1:

IBC: 1011.14, 1011.15, 1011.16, 1015.2, 1015.3

Proponents: Jonathan Siu, representing Washington Association of Building Officials Technical Code Development Committee; Micah Chappell, representing Washington Association of Building Officials (micah.chappell@seattle.gov) requests As Modified by Public Comment

Replace as follows:

2021 International Building Code

1011.14 Alternating tread devices . *Alternating tread devices* are limited to an element of a *means of egress* in any of the following locations:

1. ~~buildings of~~ Groups F, H and S from a *mezzanine* not more than 250 square feet (23 m^2) in area and that serves not more than five occupants~~;~~.
2. ~~in buildings of~~ Group I-3 from a guard tower, observation station or control room not more than 250 square feet (23 m^2) in area. ~~and~~
3. For ~~for~~ access to unoccupied roofs.
4. Group R dwelling units and sleeping units from sleeping lofts in accordance with Section 420.12.

Alternating tread devices used as a *means of egress* shall not have a rise greater than 20 feet (6096 mm) between floor levels or landings.

1011.15 Ship's ladders . Ship's ladders are permitted to be used in Group I-3 as a component of a *means of egress* to and from control rooms or elevated facility observation stations not more than 250 square feet (23 m^2) with not more than three occupants and in sleeping lofts in accordance with Section 420.12, and for access to unoccupied roofs. The minimum clear width at and below the *handrails* shall be 20 inches (508 mm). Ship's ladders shall be designed for the live loads indicated in Section 1607.17.

1011.16 Ladders . Permanent ladders shall not serve as a part of the *means of egress* from occupied spaces within a building. Permanent ladders shall be constructed in accordance with Section 306.5 of the International Mechanical Code and designed for the live loads indicated in Section 1607.17. Permanent ladders shall be permitted to provide access to the following areas:

1. Spaces frequented only by personnel for maintenance, repair or monitoring of equipment.
2. Nonoccupiable spaces accessed only by catwalks, crawl spaces, freight elevators or very narrow passageways.
3. Raised areas used primarily for purposes of security, life safety or fire safety including, but not limited to, observation galleries, prison guard towers, fire towers or lifeguard stands.
4. Elevated levels in Group U not open to the general public.
5. Nonoccupied roofs that are not required to have *stairway* access in accordance with Section 1011.12.1.
6. Where permitted to access equipment and appliances in accordance with Section 306.5 of the International Mechanical Code.

Exception: Permanent ladders shall be permitted to serve as a means of egress from sleeping lofts in accordance with Section 420.12.

1015.2 Where required . *Guards* shall be located along open-sided walking surfaces, including *mezzanines*, equipment platforms, sleeping lofts in accordance with Section 420.12, *aisles*, *stairs*, *ramps* and landings that are located more than 30 inches (762 mm) measured vertically to the floor or grade below at any point within 36 inches (914 mm) horizontally to the edge of the open side. *Guards* shall be adequate in strength and attachment in accordance with Section 1607.9.

Exceptions: *Guards* are not required for the following locations:

1. On the loading side of loading docks or piers.
2. On the audience side of *stages* and raised *platforms*, including *stairs* leading up to the *stage* and raised *platforms*.
3. On raised *stage* and *platform* floor areas, such as runways, *ramps* and side *stages* used for entertainment or presentations.
4. At vertical openings in the performance area of *stages* and *platforms*.
5. At elevated walking surfaces appurtenant to *stages* and *platforms* for access to and utilization of special lighting or equipment.
6. Along vehicle service pits not accessible to the public.
7. In assembly seating areas at cross *aisles* in accordance with Section 1030.17.2.
8. On the loading side of station platforms on fixed guideway transit or passenger rail systems.

1015.3 Height . Required *guards* shall be not less than 42 inches (1067 mm) high, measured vertically as follows:

1. From the adjacent walking surfaces.
2. On *stairways* and stepped *aisles*, from the line connecting the leading edges of the tread *nosings*.
3. On *ramps* and ramped *aisles*, from the *ramp* surface at the guard.

Exceptions:

1. For occupancies in Group R-3 not more than three stories above grade in height and within individual *dwelling units* in occupancies in Group R-2 not more than three stories above grade in height with separate *means of egress*, required *guards* shall be not less than 36 inches (914 mm) in height measured vertically above the adjacent walking surfaces.
2. For occupancies in Group R-3, and within individual *dwelling units* in occupancies in Group R-2, *guards* on the open sides of *stairs* shall have a height not less than 34 inches (864 mm) measured vertically from a line connecting the leading edges of the treads.
3. For occupancies in Group R-3, and within individual *dwelling units* in occupancies in Group R-2, where the top of the *guard* serves as a *handrail* on the open sides of *stairs*, the top of the *guard* shall be not less than 34 inches (864 mm) and not more than 38 inches (965 mm) measured vertically from a line connecting the leading edges of the treads.
4. The guard height at sleeping lofts constructed in accordance with Section 420.12 shall be permitted to be 36 inches (914 mm) where the ceiling height of the sleeping loft is 42 inches (1067 mm) or less.

~~4~~ 5. The *guard* height in assembly seating areas shall comply with Section 1030.17 as applicable.

~~5~~ 6. Along *alternating tread devices* and ships ladders, *guards* where the top rail serves as a *handrail* shall have height not less than 30 inches (762 mm) and not more than 34 inches (864 mm), measured vertically from the leading edge of the device tread *nosing*.

~~6~~ 7. In Group F occupancies where *exit access stairways* serve fewer than three stories and such *stairways* are not open to the public, and where the top of the *guard* also serves as a *handrail*, the top of the *guard* shall be not less than 34 inches (864 mm) and not more than 38 inches (965 mm) measured vertically from a line connecting the leading edges of the treads.

Commenter's Reason: This public comment fully replaces the original Part II. Most of the revisions clarify that the proposed changes in Chapter 10 are scoped to sleeping lofts that comply with the new Section 420.12 in Part I (added "…in accordance with Section 420.12" in each of the sections being modified). We made the following substantive changes to the proposed language in response to comments specifically related to Part II we received during and after the CAH:

- We added specific allowances for ship's ladders and ladders to serve as a means of egress from sleeping lofts, since Section 420.12.4 in Part I allows them. We received a comment after the CAH that while the original proposal had an allowance for alternating tread devices (1011.14), the public comment should include corresponding allowances for ship's ladders and permanent ladders in Sections 1011.15 and 1011.16.
- We moved the trigger for guards in sleeping lofts from its own sentence in 1015.2 to the laundry list in the first sentence. This change was made in response to a comment we received after the CAH, indicating that as a result of the multi-year ICC Code Technology Committee's negotiations on guards, every trigger for guards must be included in the laundry list in the first sentence or significant opposition will be triggered because of liability.
- Guards at sleeping lofts must fully comply with Section 1015, but Exception 4 to 1015.3 allows a shorter guard in sleeping lofts with lower ceiling heights. Based on comments we received from a Committee member and comments we received after the CAH, the revised Exception 4 only allows a 36" high guard where a 42" guard would not fit.

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Cost Impact: The net effect of the public comment and code change proposal will not increase or decrease the cost of construction
As stated in the original proposal, sleeping lofts are an option and not a requirement. When an applicant chooses to install a sleeping loft, the code will provide guidance on the minimum standards for the space.

Public Comment# 2305

Public Comment 2:

IBC: 1015.3

Proponents: Sue Coffman, representing City of Tacoma (sue.coffman@cityoftacoma.org); Ardel Jala, representing Seattle Dept of Construction & Inspections (ardel.jala@seattle.gov); Hoyt Jeter, representing City of Tacoma (hjeter@cityoftacoma.org); Quyen Thai, representing City of Tacoma (qthai76@gmail.com) requests As Modified by Public Comment

Modify as follows:

2021 International Building Code

1015.3 Height . Required *guards* shall be not less than 42 inches (1067 mm) high, measured vertically as follows:

1. From the adjacent walking surfaces.
2. On *stairways* and stepped *aisles*, from the line connecting the leading edges of the tread *nosings*.
3. On *ramps* and ramped *aisles*, from the *ramp* surface at the guard.

Exceptions:

1. For occupancies in Group R-3 not more than three stories above grade in height and within individual *dwelling units* in occupancies in Group R-2 not more than three stories above grade in height with separate *means of egress*, required *guards* shall be not less than 36 inches (914 mm) in height measured vertically above the adjacent walking surfaces.
2. For occupancies in Group R-3, and within individual *dwelling units* in occupancies in Group R-2, *guards* on the open sides of *stairs* shall have a height not less than 34 inches (864 mm) measured vertically from a line connecting the leading edges of the treads.
3. For occupancies in Group R-3, and within individual *dwelling units* in occupancies in Group R-2, where the top of the *guard* serves as a *handrail* on the open sides of *stairs*, the top of the *guard* shall be not less than 34 inches (864 mm) and not more than 38 inches (965 mm) measured vertically from a line connecting the leading edges of the treads.
4. ~~*Sleeping loft guards*~~ In areas of sleeping lofts with ceiling heights of 7 feet (2134 mm) or less, guards shall be not less than 36 inches (914 mm) in height or one-half of the clear height to the ceiling, whichever is less.
5. The *guard* height in assembly seating areas shall comply with Section 1030.17 as applicable.
6. Along *alternating tread devices* and ships ladders, *guards* where the top rail serves as a *handrail* shall have height not less than 30 inches (762 mm) and not more than 34 inches (864 mm), measured vertically from the leading edge of the device tread *nosing*.
7. In Group F occupancies where *exit access stairways* serve fewer than three stories and such *stairways* are not open to the public, and where the top of the *guard* also serves as a *handrail*, the top of the *guard* shall be not less than 34 inches (864 mm) and not more than 38 inches (965 mm) measured vertically from a line connecting the leading edges of the treads.

Commenter's Reason: This public comment is only intended to address the height of guards for sleeping lofts.
This public comment will require a 42-inch guard where ceiling heights are 7 feet or more. For a ceiling height between 7 feet and 6 feet, the guard height will be 36 inches. For ceiling heights less than 6 feet, the guard will linearly decrease in height until an 18-inch guard is provided for the lowest allowable ceiling height (3 feet).

We believe the half-height guard is reasonable because:

- Providing a guard that is at least half the height of the sleeping loft space will allow the occupant(s) to hoist a mattress over the guard, even at the minimum 3-foot ceiling height.
- As noted above, the standard 42-inch guard will be required where ceiling heights are 7 feet or greater.
- 36-inch guards are permitted by Exception 1 to Section 1015.3 for R-3 and R-2 dwelling units, regardless of ceiling height. In this public comment, the ceiling height must be 6 feet before you have a 36-inch guard. While the code limits the 36-inch allowance to buildings of 3 stories or less, this does not make sense for interior guards--whether the unit is on the ground floor or on the fourth floor, the hazard on the interior is the same.
- Bunk beds have railings as low as 14 inches, and are apparently deemed to be safe enough by other regulatory agencies (Consumer Product Safety Commission) to prevent falls out of bunk beds, since that is the height of the railings on a bunk bed purchased by a contributor to this public comment.

Cost Impact: The net effect of the public comment and code change proposal will not increase or decrease the cost of construction
Because sleeping lofts are being introduced as an option, this public comment in conjunction with the main proposal will not affect the cost of construction.

Public Comment# 2481

G112-21 Part III

Proposed Change as Submitted

Proponents: Micah Chappell, representing Washington Association of Building Officials (micah.chappell@seattle.gov); Jonathan Siu, representing Washington Association of Building Officials Technical Code Development Committee (jonsiuconsulting@gmail.com)

2021 International Fire Code

Revise as follows:

907.2.11.1 Group R-1. Single- or multiple-station smoke alarms shall be installed in all of the following locations in Group R-1:

1. In sleeping areas and in each sleeping loft.
2. In every room in the path of the means of egress from the sleeping area to the door leading from the sleeping unit.
3. In each story within the sleeping unit, including basements. For sleeping units with split levels and without an intervening door between the adjacent levels, a smoke alarm installed on the upper level shall suffice for the adjacent lower level provided that the lower level is less than one full story below the upper level.

907.2.11.2 Groups R-2, R-3, R-4 and I-1. Single- or multiple-station smoke alarms shall be installed and maintained in Groups R-2, R-3, R-4 and I-1 regardless of *occupant load* at all of the following locations:

1. On the ceiling or wall outside of each separate sleeping area in the immediate vicinity of bedrooms.
2. In each room sleeping loft and used for sleeping purposes.
3. In each story within a *dwelling unit*, including *basements* but not including crawl spaces and uninhabitable attics. In *dwellings* or *dwelling units* with split levels and without an intervening door between the adjacent levels, a smoke alarm installed on the upper level shall suffice for the adjacent lower level provided that the lower level is less than one full story below the upper level.

Reason: This proposal takes an important part of the Residential Code Appendix Q outlining the design criteria for a loft, modifies some of the requirements, and then incorporates it into the main sections of the IBC with definitions and a new section. This proposal provides allowances and limitations on designed spaces specifically identified as a sleeping loft, while clearly differentiating these small spaces from mezzanines and other habitable space.
The proposal requires these small spaces to include smoke detection and an emergency escape and rescue opening. A sleeping loft in an IBC dwelling unit would provide the equivalent safety standards as a loft located in a small dwelling unit as currently allowed in IRC Appendix Q. Expanding the availability of sleeping lofts will promote more broad uses of space, while possibly allowing for an increase in housing density and affordability.

Most of the technical provisions are taken from IRC Appendix Q. However, the list below explains the differences between this proposal and Appendix Q, and our rationale.

- "sleeping loft" vs "loft" – we want to trigger smoke alarm, emergency escape/rescue opening.
- 506.2.1: Imposes max. 70 sf area. Intent is to keep these small, without being able to circumvent minimum habitable space requirements for larger rooms. Thus, beyond 70 sf, space should meet full interior dimension requirements for habitable space (IBC 1208) and mezzanines (IBC 505)
- 506.3: Requires 3' ceiling height at access/egress component. Stair requires 6'2" headroom, but ladders, alternating tread devices, and ships ladders have no similar requirement. Ceiling heights of less than 3' are allowed, and nothing states that the ladders, etc. can't be placed in those lower-ceiling areas. Some minimum height above the device is necessary to allow people in the sleeping loft to egress in an emergency.
- 506.3.1.5: Allows 18" landing platforms, vs "18 to 22 inches" in direction of travel in Appendix Q. Picked lower limit, since Appendix Q doesn't say when to use anything larger. Allows 18" rise from landing platform to loft floor, where Appendix Q allows 16 to 18 inches. In this case, picked 18" as the maximum, again, because there is no other guidance in Appendix Q why something smaller might be required.
- 506.3.2.1: Requires ladders be capable of supporting 300 pound load on any rung, vs 200 in Appendix Q. 300 is consistent with load requirements in IBC Chapter 16.

The change to 1011.14 is for coordination with the new Section 506.3.3. In order to add to the list of allowed uses, there was a need to clarify whether alternating tread devices are allowed to provide access to unoccupied roofs to other than I-3 occupancies. Numbering the list is for clarity, taking the place of a long sentence with clauses separated by semicolons, and also clearly allows these for unoccupied roof access in other occupancies besides I-3s, consistent with the IBC Commentary. The change to 1015.2 and the new Exception 4 in 1015.3 integrate the sleeping loft guard provisions from IRC Appendix Q Section AQ104.2.5 into the guard provisions of the IBC, instead of having them reside in the sleeping loft section."

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal will not increase or decrease the cost of construction because the new sections to the code add an option and not a requirement. When and applicant decides to utilize these new sections, the code provides guidance on minimum standards for that space.

G112-21 Part III

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The committee stated that the reasons for disapproval were that sleeping lofts may not be considered just for sleeping, a separate definition is needed, and the proponent requested it based on the other committees actions taken on Parts I and II. (Vote: 14-0)

G112-21 Part III

Individual Consideration Agenda

Public Comment 1:

IFC: 907.2.11.1, 907.2.11.2

Proponents: Jonathan Siu, representing Washington Association of Building Officials Technical Code Development Committee; Micah Chappell, representing Washington Association of Building Officials (micah.chappell@seattle.gov) requests As Modified by Public Comment

Replace as follows:

2021 International Fire Code

907.2.11.1 Group R-1 . Single- or multiple-station smoke alarms shall be installed in all of the following locations in Group R-1:

1. In sleeping areas.
2. In each sleeping loft constructed in accordance with Section 420.12 of the International Building Code.
~~2~~ 3. In every room in the path of the *means of egress* from the sleeping area to the door leading from the *sleeping unit*.
~~3~~ 4. In each story within the *sleeping unit*, including *basements*. For *sleeping units* with split levels and without an intervening door between the adjacent levels, a smoke alarm installed on the upper level shall suffice for the adjacent lower level provided that the lower level is less than one full story below the upper level.

907.2.11.2 Groups R-2, R-3, R-4 and I-1 . Single- or multiple-station smoke alarms shall be installed and maintained in Groups R-2, R-3, R-4 and I-1 regardless of *occupant load* at all of the following locations:

1. On the ceiling or wall outside of each separate sleeping area in the immediate vicinity of bedrooms.
2. In each room used for sleeping purposes.
3. In each sleeping loft constructed in accordance with Section 420.12 of the International Building Code.
~~3~~ 4. In each story within a *dwelling unit*, including *basements* but not including crawl spaces and uninhabitable attics. In *dwellings* or *dwelling units* with split levels and without an intervening door between the adjacent levels, a smoke alarm installed on the upper level shall suffice for the adjacent lower level provided that the lower level is less than one full story below the upper level.

Commenter's Reason: While this public comment is a complete replacement of the original Part III submittal for clarity, we are making only minimal editorial modifications to the original proposal. No technical changes are being made. The feedback we received from the Committee was that the technical content of the original Part III was fine, and did not need to be modified. However, despite the fact that Section 201.3 in both the IBC and IFC states that definitions in other I-codes are applicable in the code under consideration, there was some testimony that suggested definitions for "sleeping loft" were necessary in the IFC. In order to address the concern without duplicating the definitions, we have created a new, separate trigger for smoke alarms in sleeping lofts in each of the lists in Sections 907.2.11.2 and 907.2.11.2. The new items point back to the new

IBC Section 420.12 created in Part I, which not only scopes the provision, but will also get code users to the definition in the IBC.

Cost Impact: The net effect of the public comment and code change proposal will not increase or decrease the cost of construction
As stated in the original proposal, sleeping lofts are an option and not a requirement. When an applicant chooses to install a sleeping loft, the code will provide guidance on the minimum standards for the space.

Public Comment# 2646

G116-21

Proposed Change as Submitted

Proponents: Stephen Thomas, Colorado Code Consulting, a Shums Coda Assoc Company, representing Colorado Chapter ICC (sthomas@coloradocode.net); Timothy Pate, representing Colorado Chapter Code Change Committee (tpate@broomfield.org)

2021 International Building Code

506.3 Frontage increase. Every building shall adjoin or have access to a *public way* to receive an area factor increase based on frontage. Area factor increase shall be determined in accordance with Sections 506.3.1 through 506.3.3.

506.3.1 Minimum percentage of perimeter. To qualify for an area factor increase based on frontage, a building shall have not less than 25 percent of its perimeter on a *public way* or open space. Such open space shall be either on the same lot or dedicated for public use and shall be accessed from a street or approved *fire lane*.

Revise as follows:

506.3.2 Minimum frontage distance. To qualify for an area factor increase based on frontage, the *public way* or open space adjacent to the building perimeter shall have a minimum distance *(W)* of 20 feet (6096 mm) measured at right angles from the building face to any of the following:

1. The closest interior lot line.
2. The entire width of a street, alley or *public way.*
3. The exterior face of an adjacent building on the same property.

The frontage increase shall be based on the smallest *public way* or open space that is 20 feet (6096 mm) or greater, and the percentage of building perimeter having a minimum 20 feet (6096 mm) *public way* or open space. <u>Not all public ways or open spaces that are 20 feet (6096 mm) or greater are required to be used to determine the frontage increase.</u>

506.3.3 Amount of increase. The area factor increase based on frontage shall be determined in accordance with Table 506.3.3.

Revise as follows:

TABLE 506.3.3 FRONTAGE INCREASE FACTOR[a]

PERCENTAGE OF BUILDING PERIMETER	OPEN SPACE (feet)			
	~~0 to less than 20~~	20 to less than 25	25 to less than 30	30 or greater
0 to less than 25	~~0~~	0	0	0
25 to less than 50	~~0~~	0.17	0.21	0.25
50 to less than 75	~~0~~	0.33	0.42	0.50
75 to 100	~~0~~	0.50	0.63	0.75

a. Interpolation is permitted.

506.3.3.1 Section 507 buildings. Where a building meets the requirements of Section 507, as applicable, except for compliance with the minimum 60-foot (18 288 mm) *public way* or *yard* requirement, the area factor increase based on frontage shall be determined in accordance with Table 506.3.3.1. The frontage increase shall be based on the smallest public way or open space that is 30 feet (9144 mm) or greater, and the percentage of building perimeter having a minimum 30 feet (9144 mm) public way or open space. Not all public ways or open spaces that are 20 feet (6096 mm) or greater are required to be used to determine the frontage increase.

TABLE 506.3.3.1 SECTION 507 BUILDINGS[a]

PERCENTAGE OF BUILDING PERIMETER	OPEN SPACE (feet)					
	30 to less than 35	**35 to less than 40**	**40 to less than 45**	**45 to less than 50**	**50 to less than 55**	**55 ~~to less than 60~~ or greater**
0 to less than 25	0	0	0	0	0	0
25 to less than 50	0.29	0.33	0.38	0.42	0.46	0.50
50 to less than 75	0.58	0.67	0.75	0.83	0.92	1.00
75 to 100	0.88	1.00	1.13	1.25	1.38	1.50

a. Interpolation is permitted.

Reason: This proposal provides some minor revisions to the new process of determining the frontage increase. We felt that additional clarification was needed for application. The proposed language does not change any technical provisions of the section.
The additional language is needed because there are situations where you can get a larger increase by not using all of the open space around the building.

For a couple examples:

1) A building with four sides open at 30', 35', 24' and 60'. The percentage of building perimeter open (>20') is 100%, with the smallest open space at 25 feet, my increase would be 0.50.

2) A building with three sides open at 30' 35' and 60', plus a short side that is not open. Assume the percentage of perimeter at least 20' open at 90%. With the smallest open space that is 20' or more being 30', my increase would be 0.75.

So I get a bigger increase with no yard than I do with a 24' yard.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The proposal is designed to clarify the requirement.

G116-21

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The proposal was disapproved as it is not needed as it is understood that one does not have to use the frontage increase. Additionally, when calculating the frontage increase, one does not need to consider all the open spaces around the building. (Vote: 8-7)

G116-21

Individual Consideration Agenda

Public Comment 1:

IBC: 506.3.2, 506.3.3.1

Proponents: Stephen Thomas, representing Colorado Chapter ICC (sthomas@coloradocode.net) requests As Modified by Public Comment

Modify as follows:

2021 International Building Code

506.3.2 Minimum frontage distance . To qualify for an area factor increase based on frontage, the *public way* or open space adjacent to the building perimeter shall have a minimum distance *(W)* of 20 feet (6096 mm) measured at right angles from the building face to any of the following:

1. The closest interior lot line.
2. The entire width of a street, alley or *public way.*
3. The exterior face of an adjacent building on the same property.

The frontage increase shall be based on the smallest *public way* or open space that is 20 feet (6096 mm) or greater, and the percentage of building perimeter having a minimum 20 feet (6096 mm) *public way* or open space. ~~Not all public ways or open spaces that are 20 feet (6096 mm) or greater are required to be used to determine the frontage increase.~~

506.3.3.1 Section 507 buildings . Where a building meets the requirements of Section 507, as applicable, except for compliance with the minimum 60-foot (18 288 mm) *public way* or *yard* requirement, the area factor increase based on frontage shall be determined in accordance with Table 506.3.3.1. The frontage increase shall be based on the smallest public way or open space that is 30 feet (9144 mm) or greater, and the percentage of building perimeter having a minimum 30 feet (9144 mm) public way or open space. ~~Not all public ways or open spaces that are 20 feet (6096 mm) or greater are required to be used to determine the frontage increase.~~

Commenter's Reason: The committee agreed with the major portion of this proposal. However, they did not like the last sentence in Sections 506.3.2 and 506.3.3.1. They felt that the language was more commentary and already permitted by the current language. They did not think it was necessary. Therefore, we have deleted the two sentences to address their concerns. The original reason statement supports the public comment as well. This proposed language is intended to clean up the language based on users of the code contacting us with their questions and concerns. The new language is intended to be a clarification and does not create a technical change.

Cost Impact: The net effect of the public comment and code change proposal will not increase or decrease the cost of construction
The proposal is a clarification of the current language.

Public Comment# 2359

G118-21

Proposed Change as Submitted

Proponents: Christopher Athari, representing Hoover Treated Wood Products (cathari@frtw.com)

2021 International Building Code

Revise as follows:

507.11 Group E buildings. The area of a Group E building not more than one *story above grade plane*, of Type II, III ~~IIIA~~ or IV construction, shall not be limited provided that the following criteria are met:

1. Each classroom shall have not less than two *means of egress*, with one of the *means of egress* being a direct exit to the outside of the building complying with Section 1022.
2. The building is equipped throughout with an *automatic sprinkler system* in accordance with Section 903.3.1.1.
3. The building is surrounded and adjoined by *public ways* or *yards* not less than 60 feet (18 288 mm) in width.

Reason: In Table 601, the hourly fire-resistance rating for bearing walls, both exterior and interior, in Type IIB construction is 0 hours. In Type IIIB construction, the hourly fire-resistance rating for exterior bearing walls is 2 hours and 0 hours for interior bearing walls. In Table 602, for Group E (Educational) occupancies, the most restrictive categories for exterior nonbearing walls and partitions have a 1-hour rating, based on fire separation distance. Yet, Type IIB allows for a 0-hour rating when the fire-separation distance is at least 10 feet but less than 30 feet.In other words, the hourly fire-resistance rating requirements for Type IIIB construction is just as, and in some cases, more restrictive when compared to Type IIB construction (i.e., 2 hours for exterior bearing walls in Type IIIB vs. 0 hours for Type IIB). However, Type IIB is allowed in this code provision, and Type IIIB is not. Finally, note that for Group A-3 buildings, Types II (507.6) and III (507.7) construction have essentially the same requirements with nearly identical language except that Type III has an additional requirement for ramps (507.7#3).Removing the “A” in this proposal will allow Type IIIB construction with its stronger hourly fire-resistance requirements, thus improving building and life safety for educational buildings and their occupants.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The proposal does not change the current standard for Type II and Type IV construction. Those costs are constant for any who wish to continue building those types. The change from Type IIIA to Type III opens another option for designers.

G118-21

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The proposal was disapproved as not appropriate due to the differences in Type IIIB and IIIA construction. (Vote: 14-0)

G118-21

Individual Consideration Agenda

Public Comment 1:

Proponents: Mike Eckhoff, representing Hoover Treated Wood Products, Inc. (meckhoff@frtw.com); Christopher Athari, representing Hoover Treated Wood Products (cathari@frtw.com) requests As Submitted

Commenter's Reason: Adding Type IIIB to the list of types of construction suitable for Group E occupancies is appropriate for this exception. Type IIIB has the same hourly ratings in Table 601 that Type IIB has, with one exception: exterior bearing walls in Type IIIB construction must have a minimum 2-hour rating; exterior bearing walls in Type IIB construction, which is already allowed in this exception, have no minimum hourly rating requirement. Type IIIB therefore requires the same, if not higher, minimum hourly rating requirement as Type IIB.

Regarding fire flow and fire loading concerns raised during the hearing: For understanding how the code addresses fire flow, one would look to the fire flow requirements of Table B105.1(2) of the International Fire Code, Appendix B. The table does not differentiate between either Types IIA and

IIIA or between Types IIB and IIIB. Despite one construction type being noncombustible and the other combustible, they share the same fire flow (water GPM) requirements. In other words, the IFC does not consider building material composition (fire loading) influential for fire-flow water demand. Therefore, this is a moot issue.

Cost Impact: The net effect of the public comment and code change proposal will not increase or decrease the cost of construction
The proposal does not change the current standard for Type II and Type IV construction. Those costs are constant for any who wish to continue building those types. The change from Type IIIA to Type III opens another option for designers.

Public Comment# 2889

G119-21

Proposed Change as Submitted

Proponents: Christopher Athari, representing Hoover Treated Wood Products (cathari@frtw.com)

2021 International Building Code

Revise as follows:

507.12 Motion picture theaters. In buildings of Type II <u>or Type III</u> construction, the area of a motion picture theater located on the first *story above grade plane* shall not be limited where the building is provided with an *automatic sprinkler system* throughout in accordance with Section 903.3.1.1 and is surrounded and adjoined by *public ways* or *yards* not less than 60 feet (18 288 mm) in width.

Reason: In Table 601, the most restrictive rating for bearing walls in Type II construction is 1 hour (Type IIA, exterior and interior). In Type III construction, the most restrictive rating for exterior bearing walls is 2 hours (in both Types IIIA and IIIB). In Table 602, for Group A (Assembly) occupancies, the most restrictive categories for exterior nonbearing walls and partitions have a 1-hour rating, based on fire separation distance**.**
In other words, the hourly fire-resistance rating requirements for Type III construction are just as, and in some cases, more restrictive compared to Type II construction (i.e., 2 hours for Type III vs. 1 hour for Type II).

Finally, note that for Group A-3 buildings, Types II (507.6) and III (507.7) construction have essentially the same requirements with nearly identical language except for Type III has an additional requirement for ramps (507.7#3).

Adding "Type III" to this exception will allow for exterior walls with higher hourly requirements, thus improving building and life safety for motion picture theaters and their occupants.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The code change does not change that which is currently allowed. It gives another option, which is Type III

G119-21

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The proposal was disapproved based on the proposal to add Type III construction to Section 507.12 is not appropriate for motion picture theaters. (Vote: 14-0)

G119-21

Individual Consideration Agenda

Public Comment 1:

Proponents: Mike Eckhoff, representing Hoover Treated Wood Products, Inc. (meckhoff@frtw.com); Christopher Athari, representing Hoover Treated Wood Products (cathari@frtw.com) requests As Submitted

Commenter's Reason: Adding Type III to the list of types of construction allowed for motion picture theaters is appropriate for this exception.
Type IIIB has the same hourly ratings in Table 601 that Type IIB has, with one exception: exterior bearing walls in Type IIIB construction must have a minimum 2-hour rating; exterior bearing walls in Type IIB construction, which is already allowed in this exception, have no minimum hourly rating requirement.

Interior bearing wall requirements are identical for Type IIA and Type IIIA and for Type IIB and Type IIIB.

The inclusion of Type III also provides designers with additional options that in some cases could also increase a project's ability to sequester carbon.

Regarding fire flow and fire loading concerns raised during the hearing: For understanding how the code addresses fire flow, one would look to the fire flow requirements of Table B105.1(2) of the International Fire Code, Appendix B. The table does not differentiate between either Types IIA and IIIA or between Types IIB and IIIB. Despite one construction type being noncombustible and the other combustible, they share the same fire flow (water GPM) requirements. In other words, the IFC does not consider building material composition (fire loading) influential for fire-flow water demand. Therefore, this is a moot issue.

Cost Impact: The net effect of the public comment and code change proposal will not increase or decrease the cost of construction
The code change does not change that which is currently allowed. It gives another option, which is Type III.

Public Comment# 2890

G121-21

Proposed Change as Submitted

Proponents: Shane Nilles, City of Cheney, WA, representing Self (snilles@cityofcheney.org)

2021 International Building Code

Revise as follows:

302.1 Occupancy classification. Occupancy classification is the formal designation of the primary purpose of the building, structure or portion thereof. Structures shall be classified into one or more of the occupancy groups specified in this section based on the nature of the hazards and risks to building occupants generally associated with the intended purpose of the building or structure. An area, room or space that is intended to be occupied at different times for different purposes shall comply with all applicable requirements associated with such potential multipurpose. ~~Structures containing multiple occupancy groups shall comply with Section 508 .~~ Where a structure is proposed for a purpose that is not specified in this section, such structure shall be classified in the occupancy it most nearly resembles based on the fire safety and relative hazard. Occupied roofs shall be classified in the group that the occupancy most nearly resembles, according to the fire safety and relative hazard, and shall comply with Section 503.1.4 .

1. Assembly (see Section 303): Groups A-1, A-2, A-3, A-4 and A-5.
2. Business (see Section 304): Group B.
3. Educational (see Section 305): Group E.
4. Factory and Industrial (see Section 306): Groups F-1 and F-2.
5. High Hazard (see Section 307): Groups H-1, H-2, H-3, H-4 and H-5.
6. Institutional (see Section 308): Groups I-1, I-2, I-3 and I-4.
7. Mercantile (see Section 309): Group M.
8. Residential (see Section 310): Groups R-1, R-2, R-3 and R-4.
9. Storage (see Section 311): Groups S-1 and S-2.
10. Utility and Miscellaneous (see Section 312): Group U.

SECTION 403
HIGH-RISE BUILDINGS

Revise as follows:

403.1 General ~~Applicability~~. *High-rise buildings* shall comply with Sections 403.2 through 403.6. Where high-rise buildings contain mixed use and occupancies, the most restrictive provisions of this section shall apply throughout the fire area of the high-rise building or portion thereof.

Exceptions: The provisions of Sections 403.2 through 403.6 shall not apply to the following buildings and structures:

1. Airport traffic control towers in accordance with Section 412.2.
2. *Open parking garages* in accordance with Section 406.5.
3. The portion of a building containing a Group A-5 occupancy in accordance with Section 303.6.
4. Special industrial occupancies in accordance with Section 503.1.1.
5. Buildings containing any one of the following:

   5.1. A Group H-1 occupancy.

   5.2. A Group H-2 occupancy in accordance with Section 415.8, 415.9.2, 415.9.3 or 426.1.

   5.3. A Group H-3 occupancy in accordance with Section 415.8.

SECTION 406
MOTOR-VEHICLE-RELATED OCCUPANCIES

Revise as follows:

406.2.8 Mixed occupancies and uses. Mixed uses shall be allowed in the same building provided that they are separated from ~~as~~ public parking garages and *repair garages* by 2-hour rated fire barriers or horizontal assemblies.~~in accordance with Section 508.1.~~ Mixed uses in the same building as an *open parking garage* are subject to Sections 402.4.2.3, 406.5.11,~~ 508.1,~~ 510.3, 510.4 and 510.7.

Exception: The separation from public parking garages and repair garages shall be permitted to be reduced to 1-hour provided that the building is equipped throughout with an automatic sprinkler system installed in accordance with Section 903.3.1.1

406.3.2 Separation. For other than *private garages* adjacent to dwelling units, the separation of *private garages* from other occupancies shall comply with Section 406.2.8~~508~~. Separation of *private garages* from *dwelling units* shall comply with Sections 406.3.2.1 and 406.3.2.2.

406.5.3 Mixed occupancies and uses. Mixed uses shall be allowed in the same building as an *open parking garage* subject to the provisions of Sections 402.4.2.3, 406.5.11, 504.2, 506.2.2,~~ 508.1,~~ 510.3, 510.4 and 510.7.

406.5.4 Area and height. Area and height of *open parking garages* shall be limited as set forth in Chapter 5 for Group S-2 occupancies~~ and as further provided for in Section 508.1~~.

SECTION 407
GROUP I-2

Revise as follows:

407.1.1 Group I-2, Condition 2 occupancies. The most restrictive requirements of Section 407, 509, and 712 shall apply throughout the entire fire area containing the Group I-2 occupancy. The most restrictive requirements of Chapter 10 shall apply to the path of egress from the Group I-2, Condition 2 occupancy up to and including the exit discharge.

SECTION 415
GROUPS H-1, H-2, H-3, H-4 AND H-5

415.6.4 Mixed-occupancies. Where located in the same building H-2, H-3, H-4, and H-5 occupancies shall each be individually separated from the rest of the building by fire barriers constructed in accordance with Section 707, horizontal assemblies constructed in accordance with Section 711, or combination thereof having a fire-resistance rating of no less than required by Table 415.6.4. H-1 shall not be located in buildings containing any other occupancies or uses.

Add new text as follows:

TABLE 415.6.4 SEPARATION OF GROUP H OCCUPANCIES (HOURS)

OCCUPANCY	H-2	H-3, H-4	H-5
A, E, I, R, F-2, S-2	3	2	2
B, F-1, M, S-1	2	1	1
H-2	N	1	1
H-3, H-4	1	1[a]	1
H-5	1	1	N

N = No separation requirement

a. Separation is not required between occupancies of the same classification.

Revise as follows:

[F] 415.9.1.1 Mixed occupancies. Where the storage tank area is located in a building of two or more occupancies and the quantity of liquid exceeds the maximum allowable quantity for one *control area*, the use shall be completely separated from adjacent occupancies in accordance with the requirements of Section 415.6.4~~508.4~~.

SECTION 428
HIGHER EDUCATION LABORATORIES

Revise as follows:

[F] 428.3.1 Separation from other nonlaboratory areas. *Laboratory suites* shall be separated from other portions of the building with fire barriers or horizontal assemblies as required in Table 428.3. Fire barriers shall be constructed in accordance with Section 707 and horizontal assemblies constructed in accordance with Section 711.~~in accordance with the most restrictive of the following~~:

Exception: Where an individual laboratory suite occupies more than one story, the fire-resistance rating of intermediate floors contained within the laboratory suite shall comply with the requirements of this code.

~~1. *Fire barriers* and *horizontal assemblies* as required in Table 428.3. *Fire barriers* shall be constructed in accordance with Section 707 and *horizontal assemblies*constructed in accordance with Section 711.~~

~~**Exception:** Where an individual*laboratory suite*occupies more than one *story*, the *fire-resistance rating* of intermediate floors contained within the *laboratory suite*shall comply with the requirements of this code.~~

~~2. Separations as required by Section 508.~~

SECTION 504
BUILDING HEIGHT AND NUMBER OF STORIES

Revise as follows:

504.2 Mixed occupancy. In a building containing mixed occupancies~~ in accordance with Section 508~~, no individual occupancy shall exceed the height and number of *story* limits specified in this section for the applicable occupancies.

Exception: Accessory occupancies with an aggregate area that does not exceed 10% of the floor area of the story in which they are located, and does not exceed the tabular values for nonsprinklered buildings in Table 506.2 for such occupancy, the allowable height and number of stories of the accessory occupancy is permitted to be evaluated as part of one of the other occupancies on that story.

SECTION 506
BUILDING AREA

Revise as follows:

506.2.2 Mixed-occupancy buildings. The allowable area of each *story* of a mixed-occupancy building shall be determined in accordance with Section 506.2.2.1~~ the applicable provisions of , Section 508.3.2 for nonseparated occupancies and Section 508.4.2 for separated occupancies~~. For buildings with more than three *stories above grade plane,* the total *building area* shall be such that the aggregate sum of the ratios of the actual area of each *story* divided by the allowable area of such stories, determined in accordance with Equation 5-3 based on the ~~applicable ~~provisions of Section 506.2.2.1~~508.1~~, shall not exceed three.

$$A_a = [A_t + (NS \times I_f)]$$ **(Equation 5-3)**

A_a

= Allowable area (square feet).

A_t = Tabular allowable area factor (NS, S13R, S13D or SM value, as applicable) in accordance with Table 506.2.
NS = Tabular allowable area factor in accordance with Table 506.2 for a nonsprinklered building, regardless of whether the building is sprinklered.
I_f = Area factor increase due to frontage (percent) as calculated in accordance with Section 506.3.

Exception: For buildings ~~designed as separated occupancies under Section 508.4 and~~ equipped throughout with an *automatic sprinkler system* installed in accordance with Section 903.3.1.2, the total *building area* shall be such that the aggregate sum of the ratios of the actual area of each *story* divided by the allowable area of such *stories* determined in accordance with Equation 5-3 based on the ~~applicable~~ provisions of Section 506.2.2.1~~508.1~~, shall not exceed four.

Add new text as follows:

506.2.2.1 Mixed-occupancy, stories.
Where a building story contains more than one occupancy group, each portion of the building story shall be individually classified in accordance with Section 302.1. In each story, the building area shall be such that the sum of the rations of the actual building area of each occupancy divided by the allowable building area of each occupancy shall not exceed 1.

Exception: Accessory occupancies with an aggregate area that does not exceed 10% of the floor area of the story in which they are located, and does not exceed the tabular values for nonsprinklered buildings in Table 506.2 for such occupancy, the area of the accessory occupancy is permitted to be included as part of the area for one of the other occupancies on that story.

Revise as follows:

~~506.2.2.1~~ 506.2.2.1.1
Group H-2 or H-3 mixed occupancies. For a building containing Group H-2 or H-3 occupancies, the allowable area shall be determined in accordance with Section506.2.2.1~~508.4.2~~, with the sprinkler system increase applicable only to the portions of the building not classified as Group H-2 or H-3.

SECTION 507
UNLIMITED AREA BUILDINGS

Revise as follows:

507.1.1 Accessory occupancies. Accessory occupancies shall be permitted in unlimited area buildings in accordance with the provisions of Section 504.2 and 506.2.2~~508.2~~, otherwise the requirements of Sections 507.3 through 507.13 shall be applied, where applicable.

507.4.1 Mixed occupancy buildings with Groups A-1 and A-2. Group A-1 and A-2 occupancies of other than Type V construction shall be permitted within mixed occupancy buildings of unlimited area complying with Section 507.4, provided that the following criteria are met:

1. Group A-1 and A-2 occupancies are separated from B, F, M, or S occupancies with 2-hour rated fire barriers or horizontal assemblies. Fire barriers shall be constructed in accordance with Section 707 and horizontal assemblies shall be constructed in accordance with Section 711 ~~as required for separated occupancies in Section 508.4.4 with no reduction allowed in the *fire-resistance rating* of the separation based upon the installation of an *automatic sprinkler system*~~.
2. Each area of the portions of the building used for Group A-1 or A-2 occupancies shall not exceed the maximum allowable area permitted for such occupancies in Section 503.1.
3. *Exit* doors from Group A-1 and A-2 occupancies shall discharge directly to the exterior of the building.

Delete without substitution:

~~SECTION 508~~
~~MIXED USE AND OCCUPANCY~~

~~508.1 General~~.
~~Each portion of a building shall be individually classified in accordance with Section 302.1. Where a building contains more than one occupancy group, the building or portion thereof shall comply with the applicable provisions of Section 508.2, 508.3, 508.4 or 508.5, or a combination of these sections.~~

~~Exceptions:~~

1. ~~Occupancies separated in accordance with Section 510.~~
2. ~~Where required by Table 415.6.5, areas of Group H-1, H-2 and H-3 occupancies shall be located in a *detached building* or structure.~~

~~**508.2 Accessory occupancies.** Accessory occupancies are those occupancies that are ancillary to the main occupancy of the building or portion thereof. Accessory occupancies shall comply with the provisions of Sections 508.2.1 through 508.2.4.~~

~~**508.2.1 Occupancy classification.** Accessory occupancies shall be individually classified in accordance with Section 302.1. The requirements of this code shall apply to each portion of the building based on the occupancy classification of that space.~~

~~**508.2.2 Allowable building height.** The allowable height and number of *stories* of the building containing accessory occupancies shall be in accordance with Section 504 for the main occupancy of the building.~~

~~**508.2.3 Allowable building area.** The allowable area of the building shall be based on the applicable provisions of Section 506 for the main occupancy of the building. Aggregate accessory occupancies shall not occupy more than 10 percent of the floor area of the *story* in which they are located and shall not exceed the tabular values for nonsprinklered buildings in Table 506.2 for each such accessory occupancy.~~

~~**508.2.4 Separation of occupancies.**~~
~~No separation is required between accessory occupancies and the main occupancy.~~

~~**Exceptions:**~~

1. ~~Group H-2, H-3, H-4 and H-5 occupancies shall be separated from all other occupancies in accordance with Section 508.4.~~
2. ~~Group I-1, R-1, R-2 and R-3 *dwelling units* and *sleeping units* shall be separated from other *dwelling* or *sleeping units* and from accessory occupancies contiguous to them in accordance with the requirements of Section 420.~~

~~**508.3 Nonseparated occupancies.** Buildings or portions of buildings that comply with the provisions of this section shall be considered as nonseparated occupancies.~~

~~**508.3.1 Occupancy classification.** Nonseparated occupancies shall be individually classified in accordance with Section 302.1. The requirements of this code shall apply to each portion of the building based on the occupancy classification of that space. In addition, the most restrictive provisions of Chapter 9 that apply to the nonseparated occupancies shall apply to the total nonseparated occupancy area.~~

~~**508.3.1.1 High-rise buildings.** Where nonseparated occupancies occur in a *high-rise building*, the most restrictive requirements of Section 403 that apply to the nonseparated occupancies shall apply throughout the *high-rise building.*~~

~~**508.3.1.2 Group I-2, Condition 2 occupancies.** Where one of the nonseparated occupancies is Group I-2, Condition 2, the most restrictive requirements of Sections 407, 509 and 712 shall apply throughout the *fire area* containing the Group I-2 occupancy. The most restrictive requirements of Chapter 10 shall apply to the path of egress from the Group I-2, Condition 2 occupancy up to and including the *exit discharge.*~~

~~**508.3.2 Allowable building area, height and number of stories.** The allowable *building area, height* and number of *stories* of the building or portion thereof shall be based on the most restrictive allowances for the occupancy groups under consideration for the type of construction of the building in accordance with Section 503.1.~~

~~**508.3.3 Separation.**~~
~~No separation is required between nonseparated occupancies.~~

~~**Exceptions:**~~

1. ~~Group H-2, H-3, H-4 and H-5 occupancies shall be separated from all other occupancies in accordance with Section 508.4.~~
2. ~~Group I-1, R-1, R-2 and R-3 *dwelling units* and *sleeping units* shall be separated from other *dwelling* or *sleeping units* and from other occupancies contiguous to them in accordance with the requirements of Section 420.~~

~~**508.4 Separated occupancies.** Buildings or portions of buildings that comply with the provisions of this section shall be considered as separated occupancies.~~

~~TABLE 508.4 REQUIRED SEPARATION OF OCCUPANCIES (HOURS)[f]~~

OCCUPANCY	A, E		I-1[a], I-3, I-4		I-2		R[a]		F-2, S-2[b], U		B[e], F-1, M, S-1		H-1		H-2		H-3, H-4		H-5	
	S	NS	S	NS	S	NS	S	NS	S	NS	S	NS	S	NS	S	NS	S	NS	S	NS
A, E	N	N	1	2	2	NP	1	2	N	1	1	2	NP	NP	3	4	2	3	2	NP
I-1[a], I-3, I-4	1	2	N	N	2	NP	1	NP	1	2	1	2	NP	NP	3	NP	2	NP	2	NP
I-2	2	NP	2	NP	N	N	2	NP	2	NP	2	NP	NP	NP	3	NP	2	NP	2	NP
R[a]	1	2	1	NP	2	NP	N	N	1[c]	2[c]	1	2	NP	NP	3	NP	2	NP	2	NP
F-2, S-2[b], U	N	1	1	2	2	NP	1[c]	2[c]	N	N	1	2	NP	NP	3	4	2	3	2	NP
B[e], F-1, M, S-1	1	2	1	2	2	NP	1	2	1	2	N	N	NP	NP	2	3	1	2	1	NP
H-1	NP	NP	NP	NP	NP	NP	NP	NP	NP	NP	NP	NP	N	NP	NP	NP	NP	NP	NP	NP
H-2	3	4	3	NP	3	NP	3	NP	3	4	2	3	NP	NP	N	NP	1	NP	1	NP
H-3, H-4	2	3	2	NP	2	NP	2	NP	2	3	1	2	NP	NP	1	NP	1[d]	NP	1	NP
H-5	2	NP	2	NP	2	NP	2	NP	2	NP	1	NP	NP	NP	1	NP	1	NP	N	NP

~~S = Buildings equipped throughout with an automatic sprinkler system installed in accordance with Section 903.3.1.1.~~

~~NS = Buildings not equipped throughout with an automatic sprinkler system installed in accordance with Section 903.3.1.1.~~

~~N = No separation requirement.~~

~~NP = Not Permitted.~~

a. ~~See Section 420.~~

b. ~~The required separation from areas used only for private or pleasure vehicles shall be reduced by 1 hour but not to less than 1 hour.~~

c. ~~See Sections 406.3.2 and 406.6.4.~~

d. ~~Separation is not required between occupancies of the same classification.~~

e. ~~See Section 422.2 for *ambulatory care facilities*.~~

f. ~~Occupancy separations that serve to define fire area limits established in Chapter 9 for requiring fire protection systems shall also comply with Section 707.3.10 and Table 707.3.10 in accordance with Section 901.7.~~

~~**508.4.1 Occupancy classification.** Separated occupancies shall be individually classified in accordance with Section 302.1. Each separated space shall comply with this code based on the occupancy classification of that portion of the building. The most restrictive provisions of Chapter 9 that apply to the separate occupancies shall apply to the total nonfire-barrier-separated occupancy areas. Occupancy separations that serve to define *fire area* limits established in Chapter 9 for requiring a *fire protection system* shall also comply with Section 901.7.~~

~~**508.4.2 Allowable building area.** In each *story*, the *building area* shall be such that the sum of the ratios of the actual *building area* of each separated occupancy divided by the allowable *building* area of each separated occupancy shall not exceed 1.~~

~~**508.4.3 Allowable building height and number of stories.**~~
~~Each separated occupancy shall comply with the *building height limitations* and *story* limitations based on the type of construction of the building in accordance with Section 503.1.~~

> ~~**Exception:** Special provisions of Section 510 shall permit occupancies at *building heights* and number of *stories* other than provided in Section 503.1.~~

~~**508.4.4 Separation.** Individual occupancies shall be separated from adjacent occupancies in accordance with Table 508.4.~~

~~**508.4.4.1 Construction.** Required separations shall be *fire barriers* constructed in accordance with Section 707 or *horizontal assemblies* constructed in accordance with Section 711, or both, so as to completely separate adjacent occupancies. *Mass timber* elements serving as *fire barriers* or *horizontal assemblies* to separate occupancies in Type IV-B or IV-C construction shall be separated from the interior of the building with an *approved* thermal barrier consisting of *gypsum board* that is not less than 1/2 inch (12.7 mm) in thickness or a material that is tested in accordance with and meets the acceptance criteria of both the Temperature Transmission Fire Test and the Integrity Fire Test of NFPA 275.~~

SECTION 510
SPECIAL PROVISIONS

Revise as follows:

510.4 Parking beneath Group R. Where a maximum one *story above grade plane* Group S-2 parking garage, enclosed or open, or combination thereof, of Type I construction or open of Type IV construction, with grade entrance, is provided under a building of Group R, the number of *stories* to be used in determining the minimum type of construction shall be measured from the floor above such a parking area. The floor assembly between the parking garage and the Group R above shall comply with the type of construction required for the parking garage and shall also provide a *fire-resistance rating* not less than 2 hours~~the mixed occupancy separation required in Section 508.4~~.

> **Exception:** Where permitted by the type of construction, the floor assembly shall be permitted to be reduced to 1-hour provided that the building is equipped throughout with an automatic sprinkler system installed in accordance with Section 903.3.1.1.

510.7.1 Fire separation. The parking occupancy shall be separated from the upper occupancy by 2-hour rated fire barriers or horizontal assemblies. *Fire barriers* constructed in accordance with Section 707 or *horizontal assemblies* constructed in accordance with Section 711~~between the parking occupancy and the upper occupancy shall correspond to the required *fire-resistance rating* prescribed in Table 508.4 for the uses involved~~. The type of construction shall apply to each occupancy individually, except that structural members, including main bracing within the open parking structure, which is necessary to support the upper occupancy, shall be protected with the more restrictive fire-resistance-rated assemblies of the groups involved as shown in Table 601. *Means of egress* for the upper occupancy shall conform to Chapter 10 and shall be separated from the parking occupancy by *fire barriers* having not less than a 2-hour *fire-resistance rating* as required by Section 707 with *self-closing* doors complying with Section 716 or *horizontal assemblies* having not less than a 2-hour *fire-resistance rating* as required by Section 711, with *self-closing* doors complying with Section 716. *Means of egress* from the *open parking garage* shall comply with Section 406.5.

> **Exception:** Where permitted by the type of construction, the separation between the parking occupancy and the upper occupancy shall be permitted to be reduced to 1-hour provided that the building is equipped throughout with an automatic sprinkler system installed in accordance with Section 903.3.1.1.

SECTION 707
FIRE BARRIERS

Revise as follows:

~~**707.3.9 Separated occupancies.** Where the provisions of Section 508.4 are applicable, the *fire barrier* separating mixed occupancies shall have a *fire-resistance rating* of not less than that indicated in Table 508.4 based on the occupancies being separated.~~

SECTION 711
FLOOR AND ROOF ASSEMBLIES

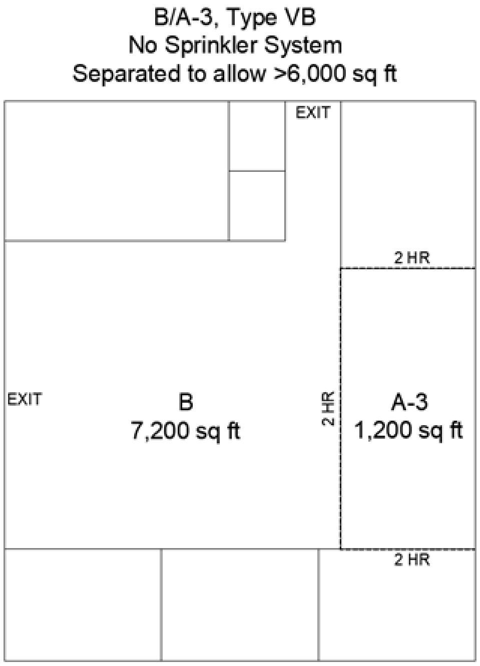
Revise as follows:

~~**711.2.4.1 Separating mixed occupancies.** Where the *horizontal assembly* separates mixed occupancies, the assembly shall have a *fire-resistance rating* of not less than that required by Section 508.4 based on the occupancies being separated.~~

~~SECTION C103~~
~~MIXED OCCUPANCIES~~

~~**C103.1 Mixed occupancies.** Mixed occupancies shall be protected in accordance with Section 508.~~

Reason: The way mixed-occupancy buildings are currently addressed for allowable area is confusing, misleading, commonly misapplied, and arbitrary. Designers are forced to analyze the building multiple ways and do multiple presentations on the cost of construction for each option and limitations in future building expansions. In unfortunate scenarios, designers, builders, and officials may even be misled to believe that the “separated” option is the only option, leading to a network of fire-rated separations, including all associated opening protectives, to be put into place where the “non-separated” option would work without even coming close to the maximum allowable area, which is a substantial penalty that is not necessary. Even more alarming is scenarios where a code user misapplies 508 to extend beyond its purpose, which is allowable height and area only, and uses it to justify not providing proper separations for “fire areas” or otherwise uses it to avoid sprinklers or fire alarms where they actually would be needed. More importantly, having two options, separated and nonseparated, is unnecessary as a single option can provide a logical allowable area without requiring separations that serve no actual life/safety function. As an example, a building that contains B/A-3 occupancies, non-sprinkled, Type VB construction, in order to be larger than the 6,000 square feet restriction where the non-separated option is used, the separated option requires a 2hr fire barrier between the B and A-3. Looking at the illustration below the question is, what does the fire barrier achieve? Are we protecting the occupants in the A-3 that are going to exit out through the B? Are we concerned about the storage of combustibles that wouldn’t actually occur in the A-3? How is the expense of the fire barrier in terms of materials, extra construction and design time to address all details therefore, and the cost to install and maintain all opening protectives justified in order to allow the allowable area to be ratio based, which logically should apply without any arbitrary separation? It makes sense to not penalize the building and code user.



This proposal simplifies and corrects these issues by taking height/area provisions from 508 and redistributing to 504.2 (new exception) and a new Section 506.2.2.1 which will govern limitations to all mixed occupancy buildings' height and area by allowing ratio method for allowable area, without the unnecessary separations, and providing for "accessory occupancies" as a permissible exception as appropriate. Additionally, there are many provisions that are currently in 508 that are unrelated to height and area, or are better located elsewhere in the code. This proposal relocates those provisions so that the information is in the place where the user is initially looking, and therefore prevents further misinterpretation:

-302.1 (Occupancy classification), edited to remove no longer needed reference to 508.

- 508.2.4 exception #1 (requirement for H-2, H-3, H-4 and H-5 to always be separated from other occupancies) relocated as charging language in new section 415.6.4 and new table 415.6.4 (415 is H occupancy provisions)

- 508.3.1.1 (high-rise building provisions), provisions are moved to section 403.1 (403 is high-rise building provisions)

- 508.3.1.2 (Group I-2, Condition 2 occupancy provisions), provisions are moved to new section 407.1.1 (407 is Group I-2 provisions)

- 406.2.8 (mixed occupancies with garages), edited to specify 2 hour separation as is currently otherwise required by its pointing to 508 with exception for 1 hour if NFPA 13 system throughout.

- 406.3.2 (Non-private garage provisions), edited to remove no longer needed reference to 508.

- 406.5.3 (Mixed use building with open parking garages), edited to change the pointer from 508 to the new provision location of 504.2 and 506.2.

- 406.5.4 (Area and height of open parking garages), edited to remove no longer needed reference to 508.

- 428.3.1 (Separation from other nonlaboratory areas), edited to removed no longer needed reference to 508.

- 507.1.1 (Accessory occupancies in unlimited are buildings), edited to change the pointer from 508 to the new provision location of 504.2 and 506.2.

-507.4.1 (Unlimited size mixed occupancy buildings with Groups A-1 and A-2), edited to specify 2 hour separation as is currently otherwise required by its pointing to 508.

- 510.4 (Special Height/Area provisions with parking beneath Group R), edited to specify 2 hour separation as is currently otherwise required by its pointing to 508 with exception for 1 hour if NFPA 13 system throughout.

- 510.7.1 (Special Height/Area provisions with open parking below provisions), edited to specify 2 hour separation as is currently otherwise required by its pointing to 508 with exception for 1 hour if NFPA 13 system throughout.

- 707.3.9 (Fire barriers separating mixed occupancies pointer), deleted entirely as it is only a reference to 508.

- 711.2.4.1 (Horizontal assemblies separating mixed occupancies pointer), deleted entirely as it is only a reference to 508.

- C103 and C103.1 (Mixed occupancies in agricultural buildings), deleted entirely as it is only a reference to 508.

Any situation where the code is not correctly applied leads to frustration, lack of proper life/safety features, and unnecessary costs; this proposal will lead to more consistent application of the codes which will prevent those issues.

There is a correlative change to move Section 508.5 back to Section 419 where it was in 2018 IBC.

Cost Impact: The code change proposal will decrease the cost of construction
There is a reduction in cost of construction for mixed use buildings in cases where rated separations will no longer be required to use the ratio-calculation for allowable area.

G121-21

Public Hearing Results

This proposal includes published errata
This proposal was part of the listed errata at https://cdn-web.iccsafe.org/wp-content/uploads/2021-GROUP-A-CONSOLIDATED-MONOGRAPH-UPDATES-Updated-4-02-2021-complete.pdf. Section 406.2.8 was missing from the posted proposal and some sections were out of order.

Committee Action: **Disapproved**

Committee Reason: The proposal was disapproved as not necessary. The committee was concerned about the effect on mixed use buildings. (Vote 14-0)

G121-21

Individual Consideration Agenda

Public Comment 1:

IBC: SECTION 406, 406.2.8

Proponents: Shane Nilles, representing Self (snilles@cityofcheney.org) requests As Modified by Public Comment

Modify as follows:

2021 International Building Code

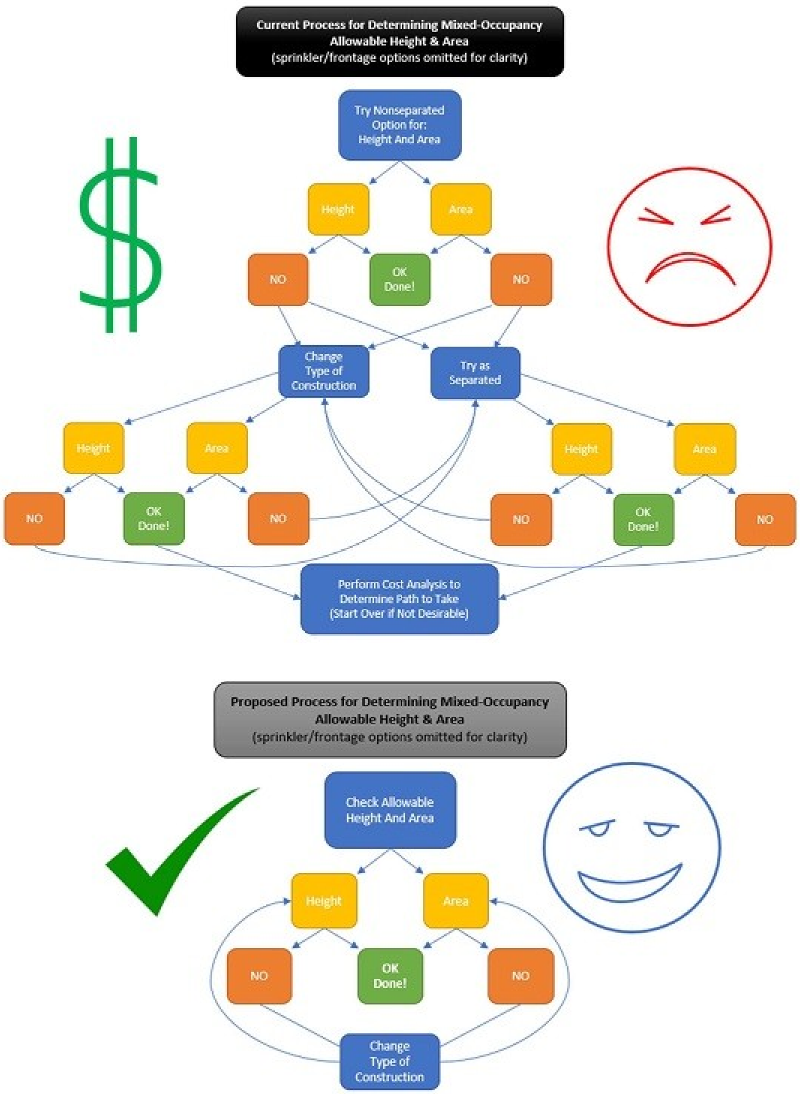
SECTION 406
MOTOR-VEHICLE-RELATED OCCUPANCIES

406.2.8 Mixed occupancies and uses . Mixed uses shall be allowed in the same building provided that they are separated from public parking garages and *repair garages* by ~~2-hour 2~~ 1 -hour rated fire barriers or horizontal assemblies. Mixed uses in the same building as an *open parking garage* are subject to Sections 402.4.2.3, 406.5.11, 510.3, 510.4 and 510.7.

> **Exception:** ~~-~~ In other than buildings with I-2 occupancies, The separation from public parking garages and repair garages ~~shall be permitted to be reduced to 1-hour~~ is not required provided that the building is equipped throughout with an automatic sprinkler system installed in accordance with Section 903.3.1.1

Commenter's Reason: The committee was mislead by the opposition to believe that the proposal deleted all mixed-uses from the code. This is not

the case as the proposal only changes the methodology to calculate the allowable height and area of a mixed-use building. Some of the opposition further confused the committee by suggesting that the proposal would be more restrictive in the allowed number of stories for buildings but in reality the proposal maintains the same allowances while removing the need for horizontal separations that otherwise the code currently penalizes non-separated mixed use buildings, regardless as to which story of the building each type of use is located. The public comment addresses an inaccuracy for the separation for public garages and repair garages to be more consistent with the current code provisions.
The approval of this proposal will greatly reduce costs, level of confusion, and time of all code users while increasing the level of safety for buildings by facilitating consistent enforcement and application of the life safety provisions that are commonly overlooked due to the current provisions or the code's common confusion.



Cost Impact: The net effect of the public comment and code change proposal will decrease the cost of construction
Costs of construction will decrease as unnecessary separations will no longer be required and planning and design time will be greatly reduced. It will also reduce time for enforcement agencies.

Public Comment# 2549

G122-21 Part I

Proposed Change as Submitted

Proponents: Dennis Richardson, representing self (dennisrichardsonpe@yahoo.com)

THIS IS A 2 PART CODE CHANGE. PART I WILL BE HEARD BY THE GENERAL CODE COMMITTEE. PART II WILL BE HEARD BY THE FIRE SAFETY CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THESE COMMITTEES.

2021 International Building Code

Revise as follows:

508.4.4.1 Construction. Required separations shall be *fire barriers* constructed in accordance with Section 707 or *horizontal assemblies* constructed in accordance with Section 711, or both, so as to completely separate adjacent occupancies. ~~*Mass timber* elements serving as *fire barriers* or *horizontal assemblies* to separate occupancies in Type IV-B or IV-C construction shall be separated from the interior of the building with an *approved* thermal barrier consisting of *gypsum board* that is not less than 1/2 inch (12.7 mm) in thickness or a material that is tested in accordance with and meets the acceptance criteria of both the Temperature Transmission Fire Test and the Integrity Fire Test of NFPA 275.~~

Delete without substitution:

~~**509.4.1.1 Type IV-B and IV-C construction.** Where Table 509.1 specifies a fire-resistance-rated separation, *mass timber* elements serving as *fire barriers* or *horizontal assemblies* in Type IV-B or IV-C construction shall be separated from the interior of the incidental use with an *approved* thermal barrier consisting of *gypsum board* that is not less than 1/2 inch (12.7 mm) in thickness or a material that is tested in accordance with and meets the acceptance criteria of both the Temperature Transmission Fire Test and the Integrity Fire Test of NFPA 275.~~

Reason: This code proposal attempts to fix something that slipped through the cracks and is now broken and confusing in Sections 508 and 509. It also updates section 2603.4 to be consistent with the definition of mass timber now found in Section 202 and clarifies the reference to heavy timber in 602.4 is now found in Section 2304.11.
The ad hoc committee on tall wood buildings did an outstanding job developing and submitting code changes to create three new types of construction: Types IV-A, IV-B and IV-C.

One of their proposals, G89-18, was developed at he last minute and flawed, but was still ultimately approved as modified. The modification somewhat fixed the change but did so in a way that just seems to create confusion and complicate the applicable portions of Sections 508 and 509 with no real benefit.

G89-18 as submitted required a thermal barrier such as 1/2" gypsum board or a "noncombustible equivalent" to cover up exposed wood in Type IV B or C construction when the mass timber is used as a fire barrier or horizontal assembly for separated uses or when serving as a fire barrier or horizontal assembly on the interior of incidental uses. The whole purpose of having exposed mass timber is to have exposed mass timber. The only place in Type IV B construction that exposed mass timber is allowed is where it is limited in area, and physically separated a distance away from other exposed mass timber far enough so that the exposed mass timber will burn out when the content burns out. Covering the exposed mass timber with 1/2" gypsum or a noncombustible equivalent kind of defeats the purpose of having exposed mass timber.

The reason statement for G89-18 stated the concern from the tall wood ad hoc committee: "The concern is that without any modifications to these provisions regulating separated occupancies and incidental uses, a fire barrier or horizontal assembly could be designed using mass timber that could comply with the fire resistance rating, but which would allow any exposed mass timber to contribute to the fuel load. This can occur in Types IV-B and IV-C construction." The reason statement for G89-18 went on to explain the intent to have the thermal barrier delay or prevent the ignition of the mass timber (that is definition of noncombustible protection not thermal barriers) and the reason statement also said the thermal barrier only needs to cover the exposed mass timber (which would make it no longer exposed???). It begs the question why provisions were developed allowing exposed mass timber.

G89-18 was approved as modified to become the current 2021 IBC language by incorporating a standard used for thermal barriers elsewhere in the code instead of as was originally proposed by the tall wood ad hoc committee. The code committee reason stated the modification "makes the proposal consistent with the current code". The language contained in the modification requires an alternate to 1/2" gypsum board specified for the thermal barrier to be a "material that is tested in accordance with and meets the acceptance criteria of both the Temperature Transmission Fire Test and the Integrity Fire Test of NFPA 275" .

When one searches the current code to see where this requirement for the stated NFPA 275 criteria for a thermal barrier is located, one need go no farther than section 2603.4 where thermal barriers are required to cover foam plastic insulation. In that section 1/2" gypsum **or heavy timber** is allowed to serve as a thermal barrier covering foam plastic insulation. In 2603.4.1.6, even 1/4" wood structural panel is deemed to comply to cover foam plastic in attics in lieu of a thermal barrier.

In Types IV-A, B and C construction foam plastic is not even allowed on the inside or the outside of the building as noncombustible protection is required. Mass timber is heavy timber by definition in Section 202.

Why do we need to protect something with a thermal barrier that is deemed to serve equivalently in other sections of the code as a thermal barrier? And this being required when the thing we typically protect from (foam plastic) is not even allowed in the Type IV-A, IV-B or IV-C construction in 602.4. Since heavy timber is allowed to serve equivalently as a thermal barrier why can't exposed mass timber protect itself? Why were these changes in G89-18 as submitted or as modified even needed?

The original code proposal reason said the tall wood building committee was worried about contribution of the mass timber to the fuel load.

Full scale tests were conducted for Type IV B construction at the ATF lab where the exposed wood area was limited and separated to show when limited it does not adversely contribute to the fuel. Numberous E-119 tests have been performed of exposed mass timber to show conformity with fire resistance rating as well as other methods allowed in the code to determine the fire resistance rating. The ATF lab testing also had a light frame noncombustible wall in the assembly clearly showing a single layer of 1/2" gypsum placed on nonbearing walls disappeared rapidly when the content fire burns without sprinkler protection. The testing also showed how the portions of unexposed wood protected with at least 2 layers of 5/8" type x gypsum or equivalent (noncombustible protection) was adequate to prevent or limit contribution of the mass timber to the fire load. In order to establish a base line as part of the ATF tests the contents were first covered 100% with 2 layers of 5/8" gypsum and the contents burned out. Then the test was run later with limited areas exposed again allowing the contents and exposed wood to burn out. The limited exposed areas in Type IV-B did not substantially increase the fire output and the combustion burned out even when first generation mass timber was used (the second generation mass timber adhesive now required performs better).

In Type IVC construction the mass timber is required to be of 2 hour construction but is allowed to be exposed throughout all areas except stair enclosures, shafts and concealed spaces as long as flame spread is met. Type IV-C was justified by the two hour fire resistance rating and by limited the height to that of Type IV HT.

Covering limited exposed mass timber in IV-B or some or all exposed mass timber in IV-C with 1/2" gypsum accomplishes nothing. There is no foam plastic to thermally protect and contribution of the mass timber was already addressed.

When exposed mass timber requires a fire resistance rating in Type IV-B and IV-C construction as a fire barrier or a horizontal assembly by definition in Section 202 in Sections 508 and 509 fire barriers and horizontal assemblies are serving to restrict the spread of fire as found in the definition and applicable sections. Change in temperature on the non fire side and lack of ignition of cotton waste acceptance criteria in E-119 or other applicable methods in Section 703.3 must be met to restrict the spread of fire in addition to the structural fire resistance requirement.

We are all grateful for the work the ad hoc committee did to develop tall wood provisions.

Again, this code proposal attempts to fix something that slipped through the cracks and is now broken and confusing in Sections 508 and 509. It also updates section 2603.4 to be consistent with the definition of mass timber now found in Section 202 and clarifies the reference to heavy timber in 602.4 is now found in Section 2304.11.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This code change proposal eliminates code language that is confusing.

G122-21 Part I

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: This proposal was disapproved based on the proposal would be a large reduction. The current wording is appropriate. (Vote: 9-5)

G122-21 Part I

Individual Consideration Agenda

Public Comment 1:

Proponents: Dennis Richardson, representing self (dennisrichardsonpe@yahoo.com) requests As Submitted

Commenter's Reason: G 122-21, Part I, was disapproved by a 9 to 5 vote of the General Committee with the committee reason stating it “would be a large reduction”.
First of all please note the term “noncombustible protection” which is akin but not exactly the same as the Canadian term “encapsulation” is far more robust than the “thermal barrier” requirement in IBC 508.4.4.1 and 509.4.4.1 which is proposed to be eliminated. “Noncombustible protection” has to do with the fire behavior remains unchanged by this proposal and public comment despite incorrect testimony to the contrary by Doug Evans and Marcelo Hirschler at the General Committee Hearing.

Apparently the large reduction the Committee reason authors referred to is the fire resistance rating but one can’t be sure what the reason is referring to as that statement is factually incorrect. Mass timber and Type IV A, B and C construction are new and many respected consultants do not fully understand the code provisions. There are separate requirements in Table 601 for overall fire resistance rating and also specific requirements for the use of noncombustible protection in 602.4.1.2, 602.4.2.2 and 602.4.3.5 and 602.4.3.6 to affect the fire behavior <u>which remain unchanged by this proposal and public comment</u>.

Also fire resistance rating of building elements remains unchanged in Table 602.1. It is unclear how removal a 15 minute thermal barrier “would be a larger reduction” of an overall minimum 2 hour or greater fire resistance rating and testing at the ATF lab confirmed the amount of exposed wood approved was acceptable from a fire behavior standpoint.

A member of the General Committee who was on the Ad Hoc for Tall Wood Construction also stated in error that the “thermal barrier” requirement was a progression with the IV C not requiring a “thermal barrier”, IV B requiring a “thermal barrier” for portions and IV A requiring a “thermal barrier” everywhere. If you read at 508.4.4.1 and 509.4.4.1 that is not correct. This would be true if the committee member had talked about “noncombustible protection” which is unaffected by this proposal and still is required to be 80 minutes for IV B and still required to be 40 minutes (where required) in type IV C (at shafts and concealed spaces in IV C).

Separately a member of the Ad Hoc on Tall Wood told me the reason they agreed to the G89-19 language (which was proposed by competing interests at the last day of the last Ad Hoc meeting before the code submittal deadline and after at least one member had left to catch his plane flight) added the language in IBC Sections 508.4.4.1 and 509.4.4.1 was because CLT and other mass timber was not already approved in the code as a fire barrier. That could not be farther from the truth and represents another great misunderstanding. IBC Sections 707.2 and 711.2.1 specifically allow Fire Barriers and Floor and Roof Assemblies to be “of materials permitted by the building type of construction”. Mass timber has passed numerous E-119 fire resistance tests as a fire barrier and as a horizontal assembly. Additionally full scale non E-119 fire behavior testing at the ATF lab helped determine how much mass timber can be exposed and still burn out and not create problems for the fire service. That amount was further increased this cycle by the General Committee approving G147-21 for Type IV B construction after great performance of exposed second-generation adhesive mass timber in fire tests conducted since the initial ATF lab tests.

Some of the 5 General Committee members that voted for G122-21 Part I with the elimination of this conflicting language do get it and pointed out “noncombustible protection” is the term developed by the Ad Hoc Committee as the noncombustible material that delays combustion and increases fire resistance rating of mass timber and approved in the code and is regulated by other sections of the code (602.4.2.2 in type IV B and 602.4.3.5 and 602.4.3.6 in type IV C).

“Noncombustible protection” is <u>NOT</u> being reduced by this proposal and public comment.

“Noncombustible protection” is <u>NOT</u> a “thermal barrier” designed to protect foam plastic.

Fortunately the Fire Safety Committee got it correct and voted 13-0 to approve G 122-21 Part II to include mass timber as a thermal barrier in Section 2603.4.

Tests at the ATF specifically checked whether exposed wood in limited quantities negatively affected the occupant or fire fighter safety. The burning of contents has a much greater effect than the contribution of the mass timber yet some competing interests continue to misrepresent this with incorrect facts and distortions. Mass timber was specifically tested and approved in the code to have a portion exposed wood in Type IV B and IV C.

The material (exposed mass timber) that is suggested to be in need of protection by a “thermal barrier”, itself meets the criteria to protect foam plastic as a “thermal barrier” and was determined by the Fire Safety Committee 13-0 in G 122-21 Part II (like heavy timber) to be a “thermal barrier”. The provisions in 508.4.4.1 and 509.4.4.1 are in conflict with the concept of “noncombustible protection” and do nothing but create confusion.

The provisions suggested to be eliminated in 508.4.4.1 and 509.4.4.1 have nothing to do with flame spread as was also erroneously suggested.

Please review the original reason statement in for G 122-21 which can be found after G 122-21 Part II and vote to overturn the General Committee 9 to 5 vote on G 122-21 Part 1. This proposal and public comment in no way changes the amount or locations of the minimum 80 minute noncombustible protection and 40 minute noncombustible protection where it is stipulated for Type IV B and IV C in 602.4.2.2 (type IV B) and 602.4.3.5 and 602.4.3.6 (type IV C).

Cost Impact: The net effect of the public comment and code change proposal will decrease the cost of construction
This change eliminates a requirement which is confusing and not needed.

NOTE: G122-21 PART II DID NOT RECEIVE A PUBLIC COMMENT AND IS REPRODUCED FOR INFORMATIONAL PURPOSES ONLY

G122-21 Part II

Proposed Change as Submitted

Proponents: Dennis Richardson, representing self (dennisrichardsonpe@yahoo.com)

2021 International Building Code

Revise as follows:

2603.4 Thermal barrier. Except as provided for in Sections 2603.4.1 and 2603.9, foam plastic shall be separated from the interior of a building by an approved thermal barrier of $^1/_2$-inch (12.7 mm) *gypsum wallboard*, *mass timber* or heavy timber in accordance with Section 2304.11 ~~602.4~~ or a material that is tested in accordance with and meets the acceptance criteria of both the Temperature Transmission Fire Test and the Integrity Fire Test of NFPA 275. Combustible concealed spaces shall comply with Section 718.

Reason: See Part 1.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
See Part 1.

G122-21 Part II

Public Hearing Results

Committee Action: **As Submitted**

Committee Reason: The committee thought including mass timber in section 2603.4, Thermal barrier, is a proper action. The proposal updates section 2603.4 to be consistent with the definition of mass timber now found in Section 202 and clarifies the reference to heavy timber in 602.4 is now found in Section 2304.11. (Vote: 13-0)

G122-21 Part II

G124-21

Proposed Change as Submitted

Proponents: Shane Nilles, City of Cheney, WA, representing Self (snilles@cityofcheney.org)

2021 International Building Code

Add new text as follows:

SECTION 419
LIVE/WORK UNITS

Revise as follows:

419.1 **~~508.5~~** **General~~Live/work units~~.** A *live/work unit* shall comply with Sections 419.1 ~~508.5~~ through 419.9 ~~508.5.11~~.

> **Exception:** *Dwelling or sleeping units* that include an office that is less than 10 percent of the area of the dwelling or sleeping unit ~~are permitted to be classified as *dwelling units* with accessory occupancies in accordance with Section 508.2~~.

419.1.1 **~~508.5.1~~** **Limitations.** The following shall apply to live/work areas:

1. The *live/work unit* is permitted to be not greater than 3,000 square feet (279 m^2) in area.
2. The nonresidential area is permitted to be not more than 50 percent of the area of each *live/work unit*.
3. The nonresidential area function shall be limited to the first or main floor only of the *live/work unit*.
4. Not more than five nonresidential workers or employees are allowed to occupy the nonresidential area at any one time.

419.2 **~~508.5.2~~** **Occupancies.** *Live/work units* shall be classified as a Group R-2 occupancy. Separation requirements found in Section~~s~~ 420 ~~and 508~~ shall not apply within the *live/work unit* where the *live/work unit* is in compliance with Section 419 ~~508.5~~. Nonresidential uses that would otherwise be classified as either a Group H or S occupancy shall not be permitted in a *live/work unit*.

> **Exception:** Storage shall be permitted in the *live/work unit* provided that the aggregate area of storage in the nonresidential portion of the *live/work unit* shall be limited to 10 percent of the space dedicated to nonresidential activities.

419.3 **~~508.5.3~~** **Means of egress.** Except as modified by this section, the*means of egress* components for a *live/work unit* shall be designed in accordance with Chapter 10 for the function served.

419.4 **~~508.5.4~~** **Egress capacity.** The egress capacity for each element of the*live/work unit* shall be based on the *occupant load* for the function served in accordance with Table 1004.5.

419.5 **~~508.5.5~~** **Spiral stairways.** *Spiral stairways*
that conform to the requirements of Section 1011.10 shall be permitted.

419.6 **~~508.5.6~~** **Vertical openings.** Floor openings between floor levels of a*live/work unit* are permitted without enclosure.

[F] 419.7 **~~508.5.7~~** **Fire protection.** The*live/work unit* shall be provided with a monitored *fire alarm* system where required by Section 907.2.9 and an *automatic sprinkler system* in accordance with Section 903.2.8.

419.8 **~~508.5.8~~** **Structural.** Floors within a*live/work unit* shall be designed for the *live loads* in Table 1607.1, based on the function within the space.

419.9 **~~508.5.9~~** **Accessibility.** *Accessibility*
shall be designed in accordance with Chapter 11 for the function served.

419.10 **~~508.5.10~~** **Ventilation.** The applicable*ventilation* requirements of the *International Mechanical Code* shall apply to each area within the *live/work unit* for the function within that space.

419.11 **~~508.5.11~~** **Plumbing facilities.** The nonresidential area of the*live/work unit* shall be provided with minimum plumbing facilities as specified by Chapter 29, based on the function of the nonresidential area. Where the nonresidential area of the *live/work unit* is required to be accessible by Section 1108.6.2.1, the plumbing fixtures specified by Chapter 29 shall be accessible.

SECTION ~~419~~ 429
ARTIFICIAL DECORATIVE VEGETATION

[F] ~~419.1~~ 429.1 Artificial decorative vegetation. Artificial decorative vegetation exceeding 6 feet (1830 mm) in height and permanently installed outdoors within 5 feet (1524 mm) of a building, or on the roof of a building, shall comply with Section 321.1 of the *International Fire Code.*

Exception: Artificial decorative vegetation located more than 30 feet (9144 mm) from the *exterior wall* of a building.

Reason: Live/work units was relocated last cycle from Section 419 to 508.5. This was part of an attempt to eliminate Chapter 4. Live/work units are Group R-2 without a separation between a person's living and work space. They should not be under Section 508, Mixed Use Buildings. They should be relocated back to Section 419.
The new section for Artificial Vegetation that was inserted in place of Section 419 is being relocated to the end of Chapter 4.
There is a correlative change to delete/relocate the rest of Section 508. This proposal would coordinate, or it could stand on it's own.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This is just a relocation, not a change in requirements.

Public Hearing Results

This proposal includes the following errata
The information note at the beginning of the code change is deleted.

Committee Action: **Disapproved**

Committee Reason: The proposal was disapproved as the current wording needs to say 'as is'. The committee suggested this topic be reviewed by BCAC. (Vote: 8-6)

Individual Consideration Agenda

Public Comment 1:

IBC: 310.4.3 (New), 419.1 , 508.1

Proponents: Mike Nugent, representing ICC Building Code Action Committee (bcac@iccsafe.org) requests As Modified by Public Comment

Modify as follows:

2021 International Building Code

310.4.3 Live/work units .
Live/work units shall comply with Section 419.

419.1 General . A *live/work unit* shall comply with Sections 419.1 through 419.9 .

Exception: *Dwelling ~~or sleeping~~ units* that include an office that is less than 10 percent of the area of the dwelling ~~or sleeping unit~~ units are permitted to be classified as *dwelling units* with accessory occupancies in accordance with Section 508.2.

508.1 General . Each portion of a building shall be individually classified in accordance with Section 302.1. Where a building contains more than one occupancy group, the building or portion thereof shall comply with the applicable provisions of Section 508.2, 508.3~~,~~ or 508.4 ~~or 508.5~~, or a combination of these sections.

Exceptions:

1. Occupancies separated in accordance with Section 510.
2. Where required by Table 415.6.5, areas of Group H-1, H-2 and H-3 occupancies shall be located in a *detached building* or structure.
3. Uses within live/work units, complying with Section 419, are not considered separate occupancies.

Commenter's Reason: The committee was split on if this section should have stayed in Chapter 4. Current Section 508.5.2 specifically says that live/work units are not a mixed use occupancy, so this should not be in a mixed occupancy section. G90-18 moved this Section from 419 to 508.5.

The modifications put back some of the clarifications that were removed by G90-18 and picks up a pointer to Live/work in Chapter 4. That would be consistent with Chapter 3 references to other sections in Chapter 4.
One committee member spoke against this change as consistent with the committee action on G121-21. Moving this section back to Chapter 4 is not related to that change.

Cost Impact: The net effect of the public comment and code change proposal will not increase or decrease the cost of construction
This is just a relocation, not a change in requirements.

Public Comment# 2683

G125-21

Proposed Change as Submitted

Proponents: Mike Nugent, Chair, representing ICC Building Code Action Committee (bcac@iccsafe.org)

2021 International Building Code

Revise as follows:

508.5 Live/work units. A *live/work unit* shall comply with Sections ~~508.5~~ 508.5.1 through 508.5.11. Live/work units complying with the requirements of Section 508.5.1 through 508.5.11 for the non-residential portion of the unit and that are within the scope of the *International Residential Code*, shall be permitted to be constructed in accordance with this code or the *International Residential Code*.

> **Exception:** *Dwelling or sleeping units* that include an office that is less than 10 percent of the area of the *dwelling unit* ~~are~~ shall be permitted to be classified as *dwelling units* with accessory occupancies in accordance with Section 508.2.

508.5.1 Limitations. The following shall apply to live/work areas:

1. The *live/work unit* is permitted to be not greater than 3,000 square feet (279 m^2) in area.
2. The nonresidential area is permitted to be not more than 50 percent of the area of each *live/work unit*.
3. The nonresidential area function shall be limited to the first or main floor only of the *live/work unit*.
4. Not more than five nonresidential workers or employees are allowed to occupy the nonresidential area at any one time.

508.5.2 Occupancies. *Live/work units* shall be classified as a Group R-2 occupancy. Separation requirements found in Sections 420 and 508 shall not apply within the *live/work unit* where the *live/work unit* is in compliance with Section 508.5. Nonresidential uses that would otherwise be classified as either a Group H or S occupancy shall not be permitted in a *live/work unit*.

> **Exception:** Storage shall be permitted in the *live/work unit* provided that the aggregate area of storage in the nonresidential portion of the *live/work unit* shall be limited to 10 percent of the space dedicated to nonresidential activities.

508.5.3 Means of egress. Except as modified by this section, the *means of egress* components for a *live/work unit* shall be designed in accordance with Chapter 10 for the function served.

508.5.4 Egress capacity. The egress capacity for each element of the *live/work unit* shall be based on the *occupant load* for the function served in accordance with Table 1004.5.

508.5.5 Spiral stairways. *Spiral stairways* that conform to the requirements of Section 1011.10 shall be permitted.

Revise as follows:

508.5.6 Vertical openings. Floor openings between floor levels of a *live/work unit* ~~are~~ shall be permitted without enclosure.

[F] 508.5.7 Fire protection. The *live/work unit* shall be provided with a monitored *fire alarm* system where required by Section 907.2.9 and an *automatic sprinkler system* in accordance with Section 903.2.8.

508.5.8 Structural. Floors within a *live/work unit* shall be designed for the *live loads* in Table 1607.1, based on the function within the space.

508.5.9 Accessibility. *Accessibility* shall be designed in accordance with Chapter 11 for the function served.

508.5.10 Ventilation. The applicable *ventilation* requirements of the *International Mechanical Code* shall apply to each area within the *live/work unit* for the function within that space.

508.5.11 Plumbing facilities. The nonresidential area of the *live/work unit* shall be provided with minimum plumbing facilities as specified by Chapter 29, based on the function of the nonresidential area. Where the nonresidential area of the *live/work unit* is required to be accessible by Section 1108.6.2.1, the plumbing fixtures specified by Chapter 29 shall be accessible.

Reason: The intent of the proposal is to coordinate the IRC and IBC scoping. IRC Section 101.2 Exception 1 allows for live/work units to be constructed under the IRC. However, the IBC does not state this option in IBC Section 101.2 or this section.

During the discussions, there were concerns that the current requirements for complying with the IRC and the IBC could be a conflict for several of the items listed, such as means of egress, fire protection, structural and accessibility. The addition of 'for the non-residential portion of the unit' should help clarify that the means of egress, fire protection, structural loading and plumbing facilities for the business/mercantile portion of the unit needs to look at the IBC for requirements.

This is one of a group of proposals intended to coordinate the scoping items in IBC Section 101.2 and IRC 101.2. While the proposals work

together, then also work separately. The proposal for coordination will be in Group B.
This proposal is submitted by the ICC Building Code Action Committee (BCAC).

BCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2020 the BCAC has held several virtual meetings open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the BCAC website at BCAC.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This is a coordination of scoping requirements and references in the IBC and IRC, not a change to construction requirements.

Staff Note: G125-21 and G126-21addresses requirements in a different or contradicting manner. The committee is urged to make their intentions clear with their actions on these proposals.

G125-21

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The proposal was disapproved as it still needs work since the wording is unclear. (Vote: 14-0)

Staff Analysis: G125-21 and G126-21addresses requirements in a different or contradicting manner. The committee is urged to make their intentions clear with their actions on these proposals.

G125-21

Individual Consideration Agenda

Public Comment 1:

IBC: 508.5

Proponents: Mike Nugent, representing ICC Building Code Action Committee (bcac@iccsafe.org) requests As Modified by Public Comment

Modify as follows:

2021 International Building Code

508.5 Live/work units . A *live/work unit* shall comply with Sections 508.5.1 through 508.5.11. Live/work units complying with the requirements of Section 508.5.1 through 508.5.11 for the non-residential portion of the unit and that are townhouses within the scope of the *International Residential Code*, shall be permitted to ~~be~~ have the residential portion be constructed in accordance with this code or the *International Residential Code* and Section 508.5.7 .

> **Exception:** *Dwelling ~~or sleeping~~ units* that include an office that is less than 10 percent of the area of the *dwelling unit* shall be permitted to be classified as *dwelling units* with accessory occupancies in accordance with Section 508.2.

Commenter's Reason: The primary intent of this proposal is to match the scoping allowances in the IRC. This public comment proposal addresses concerns raised during the testimony. Adding ‘townhouses’ and ‘residential portion’ in addition to ‘within the scope of the IRC’ emphasized the limitations for what can be constructed under the IRC and clarifies that this is not permitted for apartment buildings. (G126 Part 2 AM expanded on the fire protection requirements for live/work units in Section 508.5.7 and added the sprinkler requirements specific to live/work units constructed under the IRC.) The non-residential portion staying with the scope of the IBC will address the concerns raised for structural loads. The modification to the exception is strictly correlation – the main text is about dwelling units, so the exception should not include sleeping units.

Cost Impact: The net effect of the public comment and code change proposal will not increase or decrease the cost of construction
This is a coordination of scoping requirements and references in the IBC and IRC, not a change to construction requirements.

Public Comment# 2684

Public Comment 2:

IBC: 508.5

Proponents: Jeffrey Shapiro, representing Self (jeff.shapiro@intlcodeconsultants.com) requests As Modified by Public Comment

Replace as follows:

2021 International Building Code

508.5 Live/work units . ~~A~~ *Live/work unit s* shall comply with one of the following:

1. For a live/work unit located in a building constructed in accordance with this code, both the residential and non-residential portions of the live/work unit shall comply with Sections 508.5 through 508.5.11.
2. For a live/work unit located in a building constructed in accordance with the International Residential Code, the non-residential portion of the live/work unit shall comply with Sections 508.5.1 through 508.5.11, and the residential portion of the live/work unit shall be constructed in accordance with the International Residential Code and Section 508.5.7.

Exception: *Dwelling or sleeping units* that include an office that is less than 10 percent of the area of the *dwelling unit* are permitted to be classified as *dwelling units* with accessory occupancies in accordance with Section 508.2.

Commenter's Reason: This public comment represents an effort to coordinate and collaborate proposals G125 and G126, Part 1. I withdrew proposal G126, Part 1 in an effort to consolidate discussion of these items, but the online hearing format and the pressure to speed discussion prevented thorough consideration of this topic, including consideration of a floor modification that included this text. G126, Part 2 was approved, and it is important that the companion effort to clean up the remainder of the live/work provisions be completed.

Cost Impact: The net effect of the public comment and code change proposal will not increase or decrease the cost of construction
Intent of this public comment is to clarify existing code requirements.

Public Comment# 2981

G126-21 Part II

Proposed Change as Submitted

Proponents: Jeffrey Shapiro, representing Self (jeff.shapiro@intlcodeconsultants.com)

2021 International Building Code

Revise as follows:

[F] 508.5.7 Fire protection. ~~The~~
~~live~~ *Live/work* ~~*unit*~~ *units* constructed in accordance with this code shall ~~comply with be provided with a monitored *fire alarm* system where required by Section 907.2.9 and~~ be provided with all of the following:

1. An *automatic sprinkler system* in accordance with Section 903.3.1.1 or 903.3.1.2 ~~903.2.8~~.
2. *Smoke alarms* in accordance with Section 907.2.11.
3. Where required by Section 907.2.9.1, a manual *fire alarm system*.

Live/work units constructed in accordance with the *International Residential Code* shall be provided with an *automatic sprinkler system* and *smoke alarms*. The *automatic sprinkler system* shall comply with *International Residential Code* Section P2904, and *smoke alarms* shall comply with *International Residential Code* Section 314.

Reason: Currently, some live/work units are permitted to be constructed under the IRC, per the IRC scope, but the IRC scope references back to IBC Section 508.5 for additional specific requirements. So presumably, IRC live/work units are constructed to the IRC, except as modified by IBC Section 508.5. On the other hand, IBC live/work units are constructed to the IBC, including Section 508.5. This proposal more clearly states that approach.
In addition, the fire protection requirements have been edited to clarify the allowance to use fire protection requirements in the IRC for IRC live/work units. It does not appear that the intent of membership in establishing live/work provisions was requiring IRC live/work units to comply with IBC Group R2 fire protection requirements. Plus, the IBC fire protection requirements have been clarified/improved by directly referencing the two applicable sprinkler standards for Group R2 vs. sending the user to another code section to receive the references, and the requirement for smoke alarms has been added for completeness.

Regarding fire alarms for live/work units under the IBC, there are not and never have been any special live/work requirements. Instead, the requirements are based on the general Group R2 occupancy triggers and exceptions found in Section 907.2.9.1, which often won't require a fire alarm system for live/work units based on the exceptions. The reference to "monitored" systems has been dropped, as monitoring requirements will be determined by Section 907.

Cost Impact: The code change proposal will decrease the cost of construction
By clearly conveying that IRC live/work units do not have to meet IBC fire protection requirements, the cost of construction for live/work units may be reduced.

Staff Note: G125-21 and G126-21addresses requirements in a different or contradicting manner. The committee is urged to make their intentions clear with their actions on these proposals.

G126-21 Part II

Public Hearing Results

Committee Action: **As Modified**

Committee Modification:

[F] 508.5.7 Fire protection. *Live/work units* in buildings constructed in accordance with this code shall be provided with all of the following:

1. An *automatic sprinkler system* in accordance with Section 903.3.1.1 or 903.3.1.2 .
2. *Smoke alarms* in accordance with Section 907.2.11.
3. Where required by Section 907.2.9.1, a manual *fire alarm system*.

Live/work units in buildings constructed in accordance with the *International Residential Code* shall be provided with an *automatic sprinkler* *system* and *smoke alarms*. The *automatic sprinkler system* shall comply with *International Residential Code* Section P2904, and *smoke alarms* shall comply with *International Residential Code* Section 314.

Committee Reason: The committee stated that the reason for the approval of the modification was that it clarifies the requirement by specifying that the live work units are in buildings. The reason for the approval of the proposal is that it improves the intent of the requirements and gives the correct code citations for the various items in the list. (Vote: 14-0)

Staff Analysis: G125-21 and G126-21addresses requirements in a different or contradicting manner. The committee is urged to make their intentions clear with their actions on these proposals.

G126-21 Part II

Individual Consideration Agenda

Public Comment 1:

IBC: [F] 508.5.7

Proponents: Mike Nugent, representing ICC Building Code Action Committee (bcac@iccsafe.org) requests As Modified by Public Comment

Further modify as follows:

2021 International Building Code

[F] 508.5.7 Fire protection . *Live/work units* ~~in buildings~~ constructed in accordance with this code shall be provided with all of the following:

1. An *automatic sprinkler system* in accordance with Section 903.3.1.1 , ~~or~~ 903.3.1.2 or 903.3.1.3.
2. *Smoke alarms* in accordance with Section 907.2.11.
3. Where required by Section 907.2.9.1, a manual *fire alarm system*.

Live/work units ~~in buildings~~ constructed in accordance with the *International Residential Code* shall be provided with an *automatic sprinkler system* and *smoke alarms*. The *automatic sprinkler system* shall comply with *International Residential Code* Section P2904, and *smoke alarms* shall comply with *International Residential Code* Section 314.

Commenter's Reason: The modification to add 'in buildings' is not consistent with the remainder of the requirements for Live/work units. This brings up unnecessary questions about fire wall and separation requirements that do not affect this requirement. Townhouse are within the scope of an NFPA13D system, so this should not have been removed as an option simply because these townhouses are classified as Group R-2. Live/work units that are constructed with the IRC can use the system comparable to NFPA 13D. To have a higher level for IBC is not consistent application and would force many more live work units to the IRC.
This public comment is submitted by the ICC Building Code Action Committee (BCAC).

BCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2020 and 2021 the BCAC has held several virtual meetings open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the BCAC website at BCAC.

Cost Impact: The net effect of the public comment and code change proposal will decrease the cost of construction
By clearly conveying that IRC live/work units do not have to meet IBC fire protection requirements, the cost of construction for live/work units may be reduced.

Public Comment# 2685

NOTE: G126-21 PART I DID NOT RECEIVE A PUBLIC COMMENT AND IS REPRODUCED FOR INFORMATIONAL PURPOSES ONLY

G126-21 Part I

Proposed Change as Submitted

Proponents: Jeffrey Shapiro, representing Self (jeff.shapiro@intlcodeconsultants.com)

THIS IS A 2 PART CODE CHANGE. PART I WILL BE HEARD BY THE GENERAL CODE COMMITTEE. PART II WILL BE HEARD BY THE FIRE CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THESE COMMITTEES.

2021 International Building Code

Revise as follows:

508.5 Live/work units. In addition to other requirements of this code ~~A~~ *live/work* ~~unit~~ *units*shall comply with Sections 508.5 through 508.5.11.

~~**Exception**~~ **Exceptions**:

1. Dwelling or sleeping units that include an office that is less than 10 percent of the area of the dwelling unit are permitted to be classified as dwelling units with accessory occupancies in accordance with Section 508.2.
2. Live/work units complying with the *International Residential Code* shall not be required to comply with requirements of this code, other than requirements in Section 508.5.

Reason: Currently, some live/work units are permitted to be constructed under the IRC, per the IRC scope, but the IRC scope references back to IBC Section 508.5 for additional specific requirements. So presumably, IRC live/work units are constructed to the IRC, except as modified by IBC Section 508.5. On the other hand, IBC live/work units are constructed to the IBC, including Section 508.5. This proposal more clearly states that approach.
In addition, the fire protection requirements have been edited to clarify the allowance to use fire protection requirements in the IRC for IRC live/work units. It does not appear that the intent of membership in establishing live/work provisions was requiring IRC live/work units to comply with IBC Group R2 fire protection requirements. Plus, the IBC fire protection requirements have been clarified/improved by directly referencing the two applicable sprinkler standards for Group R2 vs. sending the user to another code section to receive the references, and the requirement for smoke alarms has been added for completeness.

Regarding fire alarms for live/work units under the IBC, there are not and never have been any special live/work requirements. Instead, the requirements are based on the general Group R2 occupancy triggers and exceptions found in Section 907.2.9.1, which often won't require a fire alarm system for live/work units based on the exceptions. The reference to "monitored" systems has been dropped, as monitoring requirements will be determined by Section 907.

Cost Impact: The code change proposal will decrease the cost of construction
By clearly conveying that IRC live/work units do not have to meet IBC fire protection requirements, the cost of construction for live/work units may be reduced.

Staff Note: G125-21 and G126-21addresses requirements in a different or contradicting manner. The committee is urged to make their intentions clear with their actions on these proposals.

G126-21 Part I

Public Hearing Results

Committee Action: **Withdrawn**

Staff Analysis: G125-21 and G126-21addresses requirements in a different or contradicting manner. The committee is urged to make their intentions clear with their actions on these proposals.

G126-21 Part I

G135-21

Proposed Change as Submitted

Proponents: Bill McHugh, The McHugh Company, representing National Fireproofing Contractors Association (bill@mc-hugh.us)

2021 International Building Code

Revise as follows:

TABLE 601 FIRE-RESISTANCE RATING REQUIREMENTS FOR BUILDING ELEMENTS (HOURS)

BUILDING ELEMENT	TYPE I		TYPE II		TYPE III		TYPE IV				TYPE V	
	A	B	A	B	A	B	A	B	C	HT	A	B
Primary structural frame[~~f~~ g] (see Section 202)	3[a, ~~b~~ c]	2[a, ~~b,~~ c, d]	1[~~b,~~ c, d]	0[~~e~~ d]	1[~~b,~~ c, d]	0	3[a]	2[a]	2[a]	HT	1[~~b,~~ c, d]	0
Bearing walls												
Exterior[~~e,~~ f, g]	3	2	1	0	2	2	3	2	2	2	1	0
Interior	3[a]	2[a]	1	0	1	0	3	2	2	1/HT[~~g~~ h]	1	0
Nonbearing walls and partitionsExterior	See Table 705.5											
Nonbearing walls and partitionsInterior[~~d~~ e]	0	0	0	0	0	0	0	0	0	See Section 2304.11.2	0	0
Floor construction and associated secondary structural members (see Section 202)	2	2	1	0	1	0	2	2	2	HT	1	0
Roof construction and associated secondary structural members (see Section 202)	1 1/2[b, c]	1[b,c, d]	1[b,c, d]	0[~~e~~ d]	1[b,c,d]	0	1 1/2[b]	1[b]	1[b]	HT	1[b,c,d]	0

For SI: 1 foot = 304.8 mm.

a. Roof supports: Fire-resistance ratings of primary structural frame and bearing walls are permitted to be reduced by 1 hour where supporting a roof only.

b. Where a roof is an occupiable space, the fire-resistance rating of the roof assembly shall be equal to or greater than the floor below.

~~b.~~ c. Except in Group F-1, H, M and S-1 occupancies and where the roof is an occupiable space, fire protection of structural members in roof construction shall not be required, including protection of primary structural frame members, roof framing and decking where every part of the roof construction is 20 feet or more above any floor immediately below. Fire-retardant-treated wood members shall be allowed to be used for such unprotected members.

~~c.~~ d. In all occupancies, heavy timber complying with Section 2304.11 shall be allowed for roof construction, including primary structural frame members, where a 1-hour or less *fire-resistance rating is required.*

~~d.~~ e. Not less than the fire-resistance rating required by other sections of this code.

~~e.~~ f. Not less than the fire-resistance rating based on fire separation distance (see Table 705.5).

~~f.~~ g. Not less than the fire-resistance rating as referenced in Section 704.10.

~~g.~~ h. Heavy timber bearing walls supporting more than two floors or more than a floor and a roof shall have a *fire resistance* rating of not less than 1 hour.

Reason: The purpose of this code proposal is to bring clear guidance to code users that the complete roof assembly is to be fire-resistance rated and not just the area under the occupiable space. This code proposal recognizes that the size of the occupied area can change after certificate of occupancy is granted. Providing the same degree of fire-resistance for the complete roof assembly gives occupants the same protection as if they were on the floor below. We know that the number of people located on a floor or roof can vary including things like events, amusement, meetings, or other reasons. This protects those on the rooftop just as if they were standing on a floor below.

Cost Impact: The code change proposal will increase the cost of construction
This code proposal will increase the cost of construction for the roof assembly by about $1.00 / SF of roof area.

G135-21

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The proposal was disapproved as the proposed new footnote was confusing and the committee recommended the proponent work with all involved to improve the proposal. (Vote: 14-0)

Individual Consideration Agenda

Public Comment 1:

IBC: TABLE 601

Proponents: Bill McHugh, representing National Fireproofing Contractors Association (bill@mc-hugh.us) requests As Modified by Public Comment

Further modify as follows:

2021 International Building Code

TABLE 601 FIRE-RESISTANCE RATING REQUIREMENTS FOR BUILDING ELEMENTS (HOURS)

BUILDING ELEMENT	TYPE I		TYPE II		TYPE III		TYPE IV				TYPE V	
	A	B	A	B	A	B	A	B	C	HT	A	B
Primary structural frame[g] (see Section 202)	3[a, c]	2[a, c, d]	1[c, d]	0[d]	1[c, d]	0	3[a]	2[a]	2[a]	HT	1[c, d]	0
Bearing walls												
Exterior[f, g]	3	2	1	0	2	2	3	2	2	2	1	0
Interior	3[a]	2[a]	1	0	1	0	3	2	2	1/HT[h]	1	0
Nonbearing walls and partitionsExterior	See Table 705.5											
Nonbearing walls and partitionsInterior[e]	0	0	0	0	0	0	0	0	0	See Section 2304.11.2	0	0
Floor construction and associated secondary structural members (see Section 202)	2	2	1	0	1	0	2	2	2	HT	1	0
Roof construction and associated secondary structural members (see Section 202)	1 1/2[b, c]	1[b,c, d]	1[b,c, d]	0[d]	1[b,c,d]	0	1 1/2[b]	1[b]	1[b]	HT	1[b,c,d]	0

For SI: 1 foot = 304.8 mm.

a. Roof supports: Fire-resistance ratings of primary structural frame and bearing walls are permitted to be reduced by 1 hour where supporting a roof only.

b. Where a roof is an occupiable space, the fire-resistance rating of the ~~roof~~ roof construction ~~assembly~~ shall be equal to or greater than the required rating of the floor below.

c. ~~Except in Group F-1, H, M and S-1 occupancies and where the roof is an occupiable space,~~ Where every part of the roof construction is 20 ft or more above the floor immediately below, fire protection of structural members in roof construction shall not be required, including protection of primary structural frame members, roof framing and ~~decking~~ decking ~~where every part of the roof construction is 20 feet or more above any floor immediately below.~~ except where any of the following conditions apply:

1. In Group F-1, H, M and S-1 occupancies.
2. Where the roof is occupiable.

Fire-retardant-treated wood members shall be allowed to be used for such unprotected members.

d. In all occupancies, heavy timber complying with Section 2304.11 shall be allowed for roof construction, including primary structural frame members, where a 1-hour or less *fire-resistance rating is required.*

e. Not less than the fire-resistance rating required by other sections of this code.

f. Not less than the fire-resistance rating based on fire separation distance (see Table 705.5).

g. Not less than the fire-resistance rating as referenced in Section 704.10.

h. Heavy timber bearing walls supporting more than two floors or more than a floor and a roof shall have a *fire resistance* rating of not less than 1 hour.

Commenter's Reason: During the Committee Action Hearings, the General Committee supported the concept behind this proposal. However, there was confusion with the word "Except" in conjunction with the word "and" separating the reference to the occupancies and occupiable space in the revised Footnote c. In order to avoid confusion, this public comment changes the format of Footnote c for a clearer section. Where any of the conditions stated in 1 and 2 apply, the allowance to leave the structural members in the roof construction unprotected when 20 ft or more above the floor below - does not apply. There is also a general clean up of b as well.

Cost Impact: The net effect of the public comment and code change proposal will increase the cost of construction
This code proposal will increase the cost of construction for the roof assembly by about $1.00 / SF of roof area.

Public Comment# 2887

G142-21

Proposed Change as Submitted

Proponents: Paul Coats, representing American Wood Council (pcoats@awc.org)

2021 International Building Code

Revise as follows:

602.3 Type III. Type III construction is that type of construction in which the *exterior walls* are of noncombustible materials and the interior *building elements* are of any material permitted by this code. ~~*Fire-retardant-treated wood* framing and sheathing complying with Section 2303.2 shall be permitted within exterior wall assemblies of a 2-hour rating or less.~~ Exterior walls complying with Section 602.3.1 or 602.3.2 shall be permitted.

Add new text as follows:

602.3.1 Fire-retardant-treated wood in exterior walls.
Fire-retardant-treated wood framing and sheathing complying with Section 2303.2 shall be permitted within exterior wall assemblies of a 2-hour fire-resistance rating or less.

602.3.2 Cross-laminated timber in exterior walls.
Cross-laminated timber (CLT) not less than 4 inches (102 mm) in thickness complying with Section 2303.1.4 and appurtenant heavy timber structural members shall be permitted within exterior wall assemblies with a 2-hour fire-resistance rating or less. The exterior side of the exterior walls shall be protected with noncombustible protection with a minimum assigned time of 40 minutes and shall comply with Section 722.7. Components of the exterior wall covering shall be of noncombustible material except water-resistive barriers complying with Section 1402.5.

Reason: Low-rise and mid-rise buildings are beginning to utilize cross-laminated timber (CLT) and other mass timber products. CLT walls are layers of solid-sawn or structural composite lumber bonded with structural adhesive to form a solid wood wall panel without concealed spaces, typically between 4 and 10.5 inches thick. CLT walls have exceptional fire resistance as demonstrated by the research and testing completed by the ICC Ad Hoc Committee on Tall Wood Buildings when the new mass timber construction types in the 2021 IBC were being considered.
Currently exterior load-bearing walls of Type III construction are required to be of 2-hour fire-resistance rated noncombustible construction, such as light gauge steel framing, or 2-hour fire-resistance rated fire-retardant-treated wood framing and sheathing. This proposal would permit load-bearing two-hour fire-resistance rated and protected mass timber in lieu of fire-retardant-treated wood framing for exterior walls in Type III construction if they are protected with noncombustible materials and comply with other requirements for exterior walls of Type IV-C construction (or the more restrictive requirements for Types IV-B and IV-A construction). For comparison, Type IV-C construction is permitted greater allowable areas than Type III and more stories above grade for many occupancies, including Groups R, S-1, M, B, A-3, and A-2.

Load-bearing exterior mass timber walls of Type IV-C construction are required to be two-hour fire-resistance rated with at least 40 minutes of noncombustible protection on the exterior side. In addition, except for a water-resistive barrier complying with the heat release, flame spread, and smoke-developed index limits of Section 602.4.3.1, combustible exterior wall coverings are prohibited. The combined requirements of a two-hour rating, a minimum noncombustible protection of 40 minutes on the exterior, and the prohibition of combustible materials on the exterior side will provide exterior wall performance that exceeds the existing alternatives for Type III construction.

The form of the proposal mirrors the current requirements in Section 602.4.4.2 for CLT in exterior walls of Type IV-HT construction. However, whereas Type IV-HT exterior walls require the mass timber to be protected on the exterior with 15/32-inch fire-retardant-treated wood, 1/2-inch gypsum board, or simply a noncombustible material of any thickness, under this proposal the two-hour exterior walls in Type III will be required to have at least 40 minutes of noncombustible protection on the exterior, and combustible exterior wall coverings are not permitted.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This is an additional alternative for exterior walls in Type III construction and therefore there is no mandate that will increase the cost of construction.

G142-21

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The proposal was disapproved due to concerns for special inspection requirements. (Vote: 14-0)

G142-21

Individual Consideration Agenda

Public Comment 1:

Proponents: David Tyree, representing AWC (dtyree@awc.org) requests As Submitted

Commenter's Reason: The Committee Reason was not helpful and actually not germane to the code change proposal. The Committee Reason referred to concerns over special inspection, which was not even a requirement being proposed in the modification. There is no justification to trigger special inspection of exterior wall construction in Type III construction. The other concern voiced by a committee member at the Committee Action Hearings tied the modification to a "blurring the lines" of Type III construction. The proposal would not exempt CLT exterior walls from meeting the fire-resistance rating requirements of Type III construction, and would also require noncombustible protection on the exterior surface. The performance of CLT in this application is equal to or better than that of the FRTW-framed or light-gage steel-framed exterior walls that are already permitted in Type III construction. Furthermore, this is analogous to the current allowance for use of CLT in exterior walls of Type IV-HT construction.

Cost Impact: The net effect of the public comment and code change proposal will not increase or decrease the cost of construction
This is an additional alternative for exterior walls in Type III construction and therefore there is no mandate that will increase the cost of construction.

Public Comment# 2301

G143-21

Proposed Change as Submitted

Proponents: Christopher Athari, Hoover Treated Wood Products, representing Hoover Treated Wood Products (cathari@frtw.com)

2021 International Building Code

Revise as follows:

602.4 Type IV. Type IV construction is that type of construction in which the *building elements* are *mass timber* or noncombustible materials and have *fire-resistance ratings* in accordance with Table 601. *Mass timber* elements shall meet the *fire-resistance-rating* requirements of this section based on either the *fire-resistance rating* of the *noncombustible protection*, the *mass timber*, or a combination of both and shall be determined in accordance with Section 703.2. The minimum dimensions and permitted materials for *building elements* shall comply with the provisions of this section and Section 2304.11. *Mass timber* elements of Types IV-A, IV-B and IV-C construction shall be protected with *noncombustible protection* applied directly to the *mass timber* in accordance with Sections 602.4.1 through 602.4.3. The time assigned to the *noncombustible protection* shall be determined in accordance with Section 703.6 and comply with Section 722.7.
Cross-laminated timber shall be labeled as conforming to ANSI/APA PRG 320 as referenced in Section 2303.1.4.

Exterior *load-bearing walls* and *nonload-bearing walls* shall be *mass timber*construction, or shall be of noncombustible construction.

Exception: Exterior *load-bearing walls* and *nonload-bearing walls* of Type IV-HT Construction in accordance with Section 602.4.4.

The interior *building elements*, including *nonload-bearing walls* and partitions, shall be of *mass timber*construction or of noncombustible construction.

~~Exception~~ Exceptions:

1. Interior building elements and nonload-bearing walls and partitions of Type IV-HT construction in accordance with Section 602.4.4.
2. Fire-retardant-treated wood complying with Section 2303.2 shall be permitted for use as interior nonload-bearing walls and partitions for Types IV-A, IV-B and IV-C construction.

Combustible concealed spaces are not permitted except as otherwise indicated in Sections 602.4.1 through 602.4.4. Combustible stud spaces within light frame walls of Type IV-HT construction shall not be considered concealed spaces, but shall comply with Section 718.

In buildings of Type IV-A, IV-B, and IV-C construction with an occupied floor located more than 75 feet (22 860 mm) above the lowest level of fire department access, up to and including 12 *stories* or 180 feet (54 864 mm) above *grade plane*, *mass timber* interior exit and elevator hoistway enclosures shall be protected in accordance with Section 602.4.1.2. In buildings greater than 12 *stories* or 180 feet (54 864 mm) above *grade plane*, interior exit and elevator hoistway enclosures shall be constructed of noncombustible materials.

Reason:
In Table 601, the hourly fire-resistance ratings for interior nonbearing walls and partitions in Types IV-A, IV-B, and IV-C are the same for the other construction types where fire-retardant-treated wood (FRTW) is permitted (ex. Type IIIA is also 0.)

The difference between FRTW and other materials used in a 0-hour-rated assembly is that through its chemical impregnation, smaller-diameter FRTW behaves like the larger-diameter heavy timber members when exposed to real-world fire conditions. This behavior helps explain why FRTW is already allowed in exterior wall assemblies in Type IV-HT construction and also can be used in lieu of noncombustible materials in certain applications in the code for Types I and II construction.

By allowing this exception, there will be no decrease in the minimum hourly fire-resistance rating by including FRTW for Types IV-A, IV-B, and IV-C construction as interior nonbearing walls and partitions, nor will there be any adverse impact to building or life safety**.**

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The code as it is written is unchanged and no extra requirements have been added. This just allows for another safe option that may be constructed.

G143-21

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The proposal was disapproved as this not part of the TWB ad hoc committee recommendations. (Vote: 13-1)

G143-21

Individual Consideration Agenda

Public Comment 1:

Proponents: Mike Eckhoff, representing Hoover Treated Wood Products, Inc. (meckhoff@frtw.com); Christopher Athari, representing Hoover Treated Wood Products (cathari@frtw.com) requests As Submitted

Commenter's Reason: Interior nonbearing walls and partitions for Types IV-A, IV-B, and IV-C have a 0-hour rating requirement in Table 601. This rating requirement is identical for other types of construction where fire-retardant-treated wood (FRTW) is already allowed for use in interior nonbearing walls and partitions e.g., Types I and II. Given that FRTW is allowed to be used in interior nonbearing walls and partitions in these more restrictive construction types, an allowance for using FRTW in interior nonbearing walls and partitions in Types IV-A, IV-B, and IV-C makes sense. Finally, the inclusion of FRTW also provides designers with an additional option that could also increase a project's ability to sequester additional carbon.

Cost Impact: The net effect of the public comment and code change proposal will not increase or decrease the cost of construction
The code as it is written is unchanged and no extra requirements have been added. This change would just allow for another safe option that may be used in construction.

Public Comment# 2891

G147-21

Proposed Change as Submitted

Proponents: Susan Jones, atelierjones, llc, representing atelierjones, llc (susan@atelierjones.com); Stephen DiGiovanni, representing Self (sdigiovanni@clarkcountynv.gov); Carl Baldassarra, Wiss Janney Elstner Associates, representing Self (cbaldassarra@wje.com)

2021 International Building Code

602.4.2.2 Interior protection. Interior faces of all *mass timber* elements, including the inside face of exterior *mass timber* walls and *mass timber* roofs, shall be protected, as required by this section, with materials complying with Section 703.3.

602.4.2.2.1 Protection time. *Noncombustible protection* shall contribute a time equal to or greater than times assigned in Table 722.7.1(1), but not less than 80 minutes. The use of materials and their respective protection contributions specified in Table 722.7.1(2) shall be permitted to be used for compliance with Section 722.7.1.

Revise as follows:

602.4.2.2.2 Protected area. Interior faces of *mass timber* elements, including the inside face of exterior *mass timber walls* and *mass timber roofs*, shall be protected in accordance with Section 602.4.2.2.1.

Exceptions: Unprotected portions of *mass timber*ceilings and walls complying with Section 602.4.2.2.4 and the following:

1. Unprotected portions of mass timber ceilings and walls complying with one of the following:
   1.1. Unprotected portions of *mass timber* ceilings, including attached beams, shall be permitted and shall be limited to an area less than or equal to ~~20~~ 100 percent of the floor area in any *dwelling unit* or *fire area.*
   1.2. Unprotected portions of *mass timber* walls, including attached columns, shall be permitted and shall be limited to an area less than or equal to 40 percent of the floor area in any *dwelling unit* or *fire area*.
   1.3. Unprotected portions of both walls and ceilings of *mass timber*, including attached columns and beams, in any *dwelling unit* or *fire area* shall be permitted in accordance with Section 602.4.2.2.3.
2. *Mass timber* columns and beams that are not an integral portion of walls or ceilings, respectively, shall be permitted to be unprotected without restriction of either aggregate area or separation from one another.

602.4.2.2.3 Mixed unprotected areas. In each *dwelling unit* or *fire area* , where both portions of ceilings and portions of walls are unprotected, the total allowable unprotected area shall be determined in accordance with Equation 6-1.

$$(U_{tc}/U_{ac}) + (U_{tw}/U_{aw}) \leq 1$$ **Equation 6-1**

where:
U_{tc} = Total unprotected *mass timber* ceiling areas.
U_{ac} = Allowable unprotected *mass timber* ceiling area conforming to Exception 1.1 of Section 602.4.2.2.2.
U_{tw} = Total unprotected *mass timber* wall areas.
U_{aw} = Allowable unprotected *mass timber* wall area conforming to Exception 1.2 of Section 602.4.2.2.2.

Revise as follows:

602.4.2.2.4 Separation distance between unprotected mass timber elements. In each *dwelling unit* or *fire area*, unprotected portions of *mass timber* walls ~~and ceilings~~ shall be not less than 15 feet (4572 mm) from unprotected portions of other walls ~~and ceilings, measured horizontally along the ceiling and from other unprotected portions of walls~~ measured horizontally along the floor.

Reason: The Ad-Hoc Committee on Tall Wood Buildings (TWB) was created by the Board of Directors of the International Code Council (ICC) to explore the science of tall wood buildings and take action on developing code changes for tall wood buildings. The TWB created several code change proposals with respect to the concept of tall buildings of mass timber in the last code cycle. All of the TWB proposals were approved.
The TWB decided, as it worked its way through data and research, that it would only incorporate criteria into the code that had bases in tests. When the fire test program at ATF was being developed, a determination was made regarding how much ceiling area and how much wall area and in which combinations could be left exposed in those tests. Limitations in the physical equipment (exhaust hood and exhaust duct connector) limited the amount of exposed MT material and led to a conservative calculation estimate which, for ceilings, became 20% of the floor area. Thus, the number that was incorporated into the text of the 2021 IBC reflected those limitations.

The proposed revisions above are based upon recently completed research conducted at the Research Institute of Sweden (RISE). These fire tests demonstrated that the proposed amounts of unprotected areas on the ceiling and walls, as a function of floor area, can be safely implemented while still achieving the performance objectives specified by the ICC Tall Wood Building Ad-Hoc Committee in the development of the tall building mass timber provisions in the 2021 I-codes. Specifically, Test 1 of the test series conducted at RISE involved a ceiling in which 100% of the area was unprotected mass timber. Tests 2 and 5 had unprotected mass timber on 100% of the ceiling area, in addition to unprotected areas on the two opposing side walls, equivalent to 78% of the floor area. These tests exhibited satisfactory performance in that no significant fire re-growth was observed and temperatures within the compartment decreased continuously from the time of the fully-developed phase until the end of the four-hour test.

The proposed increase of allowable unprotected area on the ceiling from 20% to 100% is consistent with the configurations tested in all of the RISE tests. Although the RISE data also justifies a higher percentage of unprotected area of the wall, this proposal leaves the limit at 40% of the floor area for the sake of conservatism. Videos of the tests performed at RISE may be viewed at the following link: https://www.ri.se/en/what-we-do/expertises/fire-safety-timber-buildings

Furthermore, all of the code proposals included in the work of the TWB were based on CLT products using an earlier edition of material standard PRG 320. During that code development process, being responsive to the concerns of the TWB, the industry demonstrated that the latest PRG-320 standard required a higher grade of adhesive to limit delamination during fire exposure. These RISE fire tests used the subsequent improvements in the code-referenced product standard for CLT (ANSI/APA PRG-320), resulting in enhancements to fire safety.

Cost Impact: The code change proposal will decrease the cost of construction
The prosed changes will decrease the cost of construction, by reducing the required amount of noncombustible protection on walls and ceilings in Type IV-B Construction.

G147-21

Public Hearing Results

Committee Action: **As Submitted**

Committee Reason: The proposal was approved as submitted since the provided preliminary RISE test report indicated that the test met or exceeded the requirements. (Vote: 9-5)

G147-21

Individual Consideration Agenda

Public Comment 1:

IBC: 602.4.2.2, 602.4.2.2.1, 602.4.2.2.2, 602.4.2.2.3, 602.4.2.2.4

Proponents: Shamim Rashid-Sumar, representing National Ready Mixed Concrete Association (ssumar@nrmca.org); Tim Earl, representing The Gypsum Association (tearl@gbhint.com); Larry Williams, representing Steel Framing Industry Association (williams@steelframingassociation.org) requests As Modified by Public Comment

Modify as follows:

2021 International Building Code

602.4.2.2 Interior protection . Interior faces of all *mass timber* elements, including the inside face of exterior *mass timber* walls and *mass timber* roofs, shall be protected, as required by this section, with materials complying with Section 703.3.

602.4.2.2.1 Protection time . *Noncombustible protection* shall contribute a time equal to or greater than times assigned in Table 722.7.1(1), but not less than 80 minutes. The use of materials and their respective protection contributions specified in Table 722.7.1(2) shall be permitted to be used for compliance with Section 722.7.1.

602.4.2.2.2 Protected area . Interior faces of *mass timber* elements, including the inside face of exterior *mass timber walls* and *mass timber roofs*, shall be protected in accordance with Section 602.4.2.2.1.

Exceptions: Unprotected portions of *mass timber*ceilings and walls complying with Section 602.4.2.2.4 and the following:

1. Unprotected portions of mass timber ceilings and walls complying with one of the following:

   1.1. Unprotected portions of *mass timber* ceilings, including attached beams, shall be permitted and shall be limited to an area less than or equal to ~~100 percent of~~ 20 percent of the floor area in any *dwelling unit* or *fire area.*

1.2. Unprotected portions of *mass timber* walls, including attached columns, shall be permitted and shall be limited to an area less than or equal to 40 percent of the floor area in any *dwelling unit* or *fire area.*

1.3. Unprotected portions of both walls and ceilings of *mass timber*, including attached columns and beams, in any *dwelling unit* or *fire area* shall be permitted in accordance with Section 602.4.2.2.3.

2. *Mass timber* columns and beams that are not an integral portion of walls or ceilings, respectively, shall be permitted to be unprotected without restriction of either aggregate area or separation from one another.

602.4.2.2.3 Mixed unprotected areas . In each *dwelling unit* or *fire area* , where both portions of ceilings and portions of walls are unprotected, the total allowable unprotected area shall be determined in accordance with Equation 6-1.

$$(U_{tc}/U_{ac}) + (U_{tw}/U_{aw}) \leq 1$$ **Equation 6-1**

where:
U_{tc} = Total unprotected *mass timber* ceiling areas.
U_{ac} = Allowable unprotected *mass timber* ceiling area conforming to Exception 1.1 of Section 602.4.2.2.2.
U_{tw} = Total unprotected *mass timber* wall areas.
U_{aw} = Allowable unprotected *mass timber* wall area conforming to Exception 1.2 of Section 602.4.2.2.2.

602.4.2.2.4 Separation distance between unprotected mass timber elements . In each *dwelling unit* or *fire area*, unprotected portions of *mass timber* walls and ceilings shall be not less than 15 feet (4572 mm) from unprotected portions of other walls and ceilings, measured horizontally along the ceiling and from other unprotected portions of walls measured horizontally along the floor.

Commenter's Reason: Proposal G-147 includes editorial revisions to provide clarity to Section 602.4.2.2 on interior protection for Type IV-B construction. Additionally, the proposal seeks to decrease the limitations of exposed ceiling area for Type IV-B construction that were originally developed by the ICC Ad Hoc Committee on Tall Wood Buildings. The proposal increases allowable unprotected areas on the ceiling from 20% to 100% based on preliminary results from ongoing research at the Research Institute of Sweden (RISE).
G-147 is recommended for Approval as Modified by Public Comment based on the following technical points:

1. As of the submission date for public comment, the RISE study on “Fire Safe Implementation of Visible Mass Timber in Tall Buildings” is not yet completed. As stated in the interim report, the full overview of all results has not yet been provided and will be documented at a later date. Many aspects of CLT design and firefighter operations are still under evaluation. These include, but are not limited to, the following:
   - Comparisons of the fire exposure measured on the front façade above ventilation openings of compartments. The interim report indicates that the exposure of these tests is expected to be statistically severe but has not yet been completed.
   - Mapping of the influence of increasing the surface area of exposed mass timber on the façade exposure. Results of this influence have not been shared or documented.
   - Description of locations where smoldering continued after the fires.
   - Assessing techniques for firefighters to locate and extinguish smoldering that is left after fire incidents.
   - Case studies on repairing of fire damaged CLT structural elements after fire incidents.
2. Preliminary results from the RISE tests demonstrate that compartments with certain quantities of exposed wood can exhibit continuous decay due to hotspots and embers after flashover. As per the interim report, the presence of two exposed wall surfaces in one corner should be avoided to ensure this. The 15-foot separation distance between unprotected portions of mass timber walls and ceilings currently required by the code is critical to this point.
3. There are noticeable differences in the test plans developed for the ATF lab tests versus the RISE tests. One such difference was that CLT walls in RISE tests 2,3, and 5 were encapsulated in three (3) layers of gypsum wallboard, while walls in the ATF lab tests were encapsulated in two (2) layers of gypsum wallboard. While the extra layer of gypsum provides additional protection, it exaggerates the results of the RISE tests considering Table 722.7.1(2) only requires 2 layers of 5/8-inch gypsum board to achieve the 80 minutes protection required for Type IV-B construction by Section 602.4.2.2.1.
4. The research project used for justification of the increase in unprotected ceiling area is owned by the American Wood Council and contracted to the research Institutes of Sweden. While the ATF lab tests were overseen by the Tall Wood Ad Hoc Committee with broad representation outside of the timber industry, the Steering Committee for the RISE project does not have comparable industry representation. To this point, an independent peer review of the test methodology and preliminary results has not been conducted.

In summary, a number of unanswered technical questions exist regarding the outcomes of the RISE study on “Fire Safe Implementation of Visible Mass Timber in Tall Buildings.” While the editorial revisions to G-147 are justifiable, the increase of allowable exposed ceiling area for Type IV-B construction is based on a study that is not yet complete and is inconsistent with the test parameters originally established by the Ad Hoc Committee on Tall Wood Buildings. Additionally, the expansion of exposed ceiling area from 20 percent to 100 percent of total ceiling area is premature based on the relatively recent addition of the tall wood building provisions to the code and the lack of building history for CLT structures in jurisdictions where the IBC has been adopted.

Recommend **APPROVAL AS MODIFIED BY PUBLIC COMMENT** for G147-21.

Cost Impact: The net effect of the public comment and code change proposal will not increase or decrease the cost of construction
The public comment will result in editorial changes to the code and will not increase the cost of construction.

Public Comment# 2697

Public Comment 2:

Proponents: Jason Smart, representing AWC (jsmart@awc.org); David Tyree, representing AWC (dtyree@awc.org) requests As Submitted

Commenter's Reason: We request approval as submitted, as recommended by the code development committee. The committee was correct that tests performed at the Research Institutes of Sweden (RISE) met or exceeded the fire safety performance objectives specified by the ICC Tall Wood Building Ad Hoc Committee. Most of the committee members studied the RISE test report and agreed that it justified approval of the proposal. To address the comment that reporting was not yet complete and the membership should wait until it is completed, please note the results and conclusions have been made available since before the CAH, and the final report is now available at the following link:

https://www.ri.se/en/what-we-do/expertises/fire-safety-of-timber-buildings

In response to a committee member that had reservations due to the limited history of buildings that have been constructed to date and concerns over how to repair fire damage the following is offered: 1) there are plenty of examples of exposed heavy timber construction in North America – certainly more than enough to provide ‘proof of concept,’ 2) part of the research conducted at RISE deals with the topic of how to repair a mass timber structure that has experienced a fire. The results of this study are also published in the final RISE report, available at the link above.

To help increase the comfort level in acceptance of the committee action and to address any remaining concerns, AWC has presented a webinar with Daniel Brandon, RISE, to discuss the test results, findings and conclusions of the research performed at RISE. This webinar may be viewed at the following link:

https://www.awc.org/education/main/lists/des-design-considerations/des612---expanding-mass-timber-opportunities-through-testing-and-code-development

We also felt the votes by the few committee members who voted against the motion to approve G147 may have been swayed by the opposition testimony provided at the Committee Action Hearings, so we are offering rebuttal to each of their concerns and comments as follows.

Opposition comment: It is too soon for this change. The Type IV-A, B and C mass timber provisions were just added to the 2021 IBC in the last cycle, and now we’re starting to pick these provisions apart with changes like G147, after all the work that the TWB Committee did with their evaluations. **Rebuttal:** Rather than ‘picking apart’ the provisions developed by the TWB Committee, this proposal is intended to complement it by addressing a factor that could not be addressed at the time of the ATF tests due to the fact that PRG 320-18-compliant CLT was not available at that time. Because PRG 320-18-compliant CLT was not available at the time of the tests performed at ATF, the exposed mass timber areas tested in that series had to be kept to a lower percentage than would have been otherwise justified had PRG 320-18-compliant CLT been used. So, in the absence of test data showing that the full ceiling area could be safely exposed where PRG 320-18-compliant CLT is used, the TWB Committee set the original ceiling area limits equivalent to what was tested in ATF Test 2. Now that we have the data that the TWB did not have at their disposal, based on testing performed on PRG 320-18-compliant CLT, which the 2021 IBC requires anyway, this proposal is perfectly logical, timely, prudent and justifiable.

Opposition comment: The TWB worked for over a year-and-a-half to develop their proposals, but this proposal is based on just one set of tests from Sweden. **Rebuttal:** The justification for the proposal in G147 is the result of two years’ worth of research by a team of world-renowned experts in fire science at the Research Institute of Sweden (RISE). It would be a misrepresentation to imply that this research was simply cobbled together in a haphazard manner.

Opposition comment: The RISE tests used a different fuel load basis than the ATF tests. **Rebuttal:** This is incorrect. Both the ATF tests and the RISE tests used approximately the same fuel load. The ATF tests used a fuel load of 550 MJ/m^2. The RISE tests used a fuel load of 560 MJ/m^2.

Opposition comment: The RISE tests were less severe than the E119 test that the other building materials must test to for fire resistance. **Rebuttal:** The tests performed at RISE were not “less severe”, they were *different* than a standard ASTM E119 exposure because they followed natural growth and decay curves. Moreover, in certain respects (such as during the fully developed phase), they actually resulted in a more severe exposure for temperature and heat flux exposure than would result from a standard ASTM E119 curve.

Opposition comment: Standardized test protocols should have been used, instead of the non-standard tests performed at RISE. **Rebuttal:** A multitude of tests have been performed on CLT, including standardized tests (such as horizontal and vertical ASTM E119 fire-resistance tests). The results from many of these tests are readily available on AWC’s website. As for why non-standard tests such as those performed at ATF and RISE were performed *in addition* to the standardized tests, the TWB Committee developed a set of six fire performance objectives at the outset of their work. They recognized early-on that it would not be possible to assess these fire performance objectives by simply performing standardized tests alone. This is why they developed the ATF test series: to determine whether the new mass timber construction types could meet their fire performance objectives. The TWB Fire Work Group determined that this assessment needed to be performed on a full scale structure which resulted in the two story structure of the test series. The configurations tested in the research at RISE were similar to the ATF tests in many respects (including fuel load density), with the primary differences being that 1) PRG 320-18-compliant CLT was used, and 2) commensurately larger areas of mass timber were exposed.

Opposition comment: It would be unsafe to allow an exposed mass timber area on a wall to intersect an exposed mass timber area on the ceiling. **Rebuttal:** All five of the RISE tests involved configurations in which exposed mass timber areas on the walls intersected exposed mass timber areas on the ceiling. These were not shown to be problem areas, and did not result in fire re-growth.

Opposition comment: This proposal would allow for 100% of the mass timber to be exposed on the ceiling, with the top 40% of the intersecting wall also exposed simultaneously. **Rebuttal:** This is incorrect. The options under Exception 1 to IBC Section 602.4.2.2.2 are mutually exclusive – only one of them can be applied for any particular fire area or dwelling unit. Because of this, it would not be permissible to have 100% of the ceiling exposed and simultaneously have exposed mass timber on the walls.

Opposition comment: The concern of delamination has not been completely resolved. **Rebuttal:** The Tall Wood Building (TWB) Committee's original concern over delamination has to do with fire re-growth, which could lead to a second flashover. While delamination led to this unacceptable fire performance in some of the tests performed using the previous generation of CLT, this concern is now addressed through qualification requirements in the CLT product standard (PRG 320-18). Now the CLT adhesive is required to be qualified under PRG 320-18, proving that it does not exhibit delamination which can cause fire re-growth leading to a second flashover. Compartment fire tests performed with this newer generation of CLT have also verified this superior fire performance. Not only has this concern been resolved, but the outcome of this resolution (i.e., the newer generation of CLT products) is what made it possible to meet the fire safety performance objectives in the more rigorous test configurations of the RISE test series.

Opposition comment: The RISE tests were conducted in open air, so how was the performance of the interior protection evaluated?" **Rebuttal:** Although the test structures were situated outside, in open air, the interior protection was inside the test structure in each test. Every building is ultimately located "outside" so this is a legitimate *full scale* test of a building, not just a system. This scenario is representative of a building fire in which the glazing has broken out in the openings. Except in the case of tempered glass, the glazing would typically break and fall out (either partially or completely) during a fully developed fire. By testing a configuration without any glazing in the openings, more oxygen is supplied to the fire during the growth phase, thereby allowing the fire to reach the fully developed phase sooner. This also eliminates a significant source of test variability related to the timing and degree to which the glazing would break out of the openings.

Bibliography: The final RISE report is now available at the following link:
https://www.ri.se/en/what-we-do/expertises/fire-safety-of-timber-buildings

Cost Impact: The net effect of the public comment and code change proposal will decrease the cost of construction
The prosed changes will decrease the cost of construction, by reducing the required amount of noncombustible protection on walls and ceilings in Type IV-B Construction.

Public Comment# 2292

Public Comment 3:

Proponents: Stephen Skalko, representing Precast Concrete Institute (svskalko@svskalko-pe.com) requests Disapprove

Commenter's Reason: The technical change for G147-21 was based on fire tests performed in Sweden as outlined in the Summary RISE Report 2020.94 - Fire Safe Implementation of Visible Mass Timber in Tall Buildings - Compartment Fire Testing, prepared by the Research Institute of Sweden. Of importance however is the parameters for compartment size and openings were based on a probabilistic study of compartments using only residential buildings in the U.K. These compartment sizes and percent of openings vary from those utilized by the ICC Ad-Hoc Committee on Tall Wood Buildings when their fire testing was performed at the ATF labs. To consider making changes to the requirements established in the IBC, compartment fire test should be performed on compartments of similar size and with opening parameters that are consistent with the original test parameters used as the basis for the present code requirements established by the ICC Ad-Hoc Committee on Tall Wood Buildings. Recommend Disapproval of G147-21.

Cost Impact: The net effect of the public comment and code change proposal will not increase or decrease the cost of construction
No change to code thus no impact to cost.

Public Comment# 2909

G154-21

Proposed Change as Submitted

Proponents: Christopher Athari, representing Hoover Treated Wood Products (cathari@frtw.com)

2021 International Building Code

Revise as follows:

603.1 Allowable materials. Combustible materials shall be permitted in buildings of Type I or II construction in the following applications and in accordance with Sections 603.1.1 through 603.1.3:

1. *Fire-retardant-treated wood* shall be permitted in:

    1.1. Nonbearing partitions where the required *fire-resistance rating* is 2 hours or less except in *shaft enclosures* within Group I-2 occupancies and *ambulatory care facilities.*

    1.2. Nonbearing *exterior walls* where fire-resistance-rated construction is not required.

    1.3. Roof construction, including girders, trusses, framing and decking.

    Exceptions:

    1. In buildings of Type IA construction exceeding two *stories above grade plane*, *fire-retardant-treated wood* is not permitted in roof construction where the vertical distance from the upper floor to the roof is less than 20 feet (6096 mm).
    2. Group I-2, roof construction containing *fire-retardant-treated wood* shall be covered by not less than a Class A*roof covering* or roof assembly, and the roof assembly shall have a *fire-resistance rating* where required by the construction type.

    1.4. Balconies, porches, decks and exterior *stairways* not used as required exits on buildings three *stories* or less above grade plane.

    <u>1.5. Floors, including trusses, framing and decking, of Type IIB construction where fire-resistance-rated construction is not required.</u>

2. Thermal and acoustical insulation, other than foam plastics, having a *flame spread index* of not more than 25.

    Exceptions:

    1. Insulation placed between two layers of noncombustible materials without an intervening airspace shall be allowed to have a *flame spread index* of not more than 100.
    2. Insulation installed between a finished floor and solid decking without intervening airspace shall be allowed to have a *flame spread index* of not more than 200.

3. Foam plastics in accordance with Chapter 26.
4. *Roof coverings* that have an A, B or C classification.
5. *Interior floor finish* and floor covering materials installed in accordance with Section 804.
6. Millwork such as doors, door frames, window sashes and frames.
7. *Interior wall and ceiling finishes* installed in accordance with Section 803.
8. *Trim* installed in accordance with Section 806.
9. Where not installed greater than 15 feet (4572 mm) above grade, show windows, nailing or furring strips and wooden bulkheads below show windows, including their frames, aprons and show cases.
10. Finish flooring installed in accordance with Section 805.
11. Partitions dividing portions of stores, offices or similar places occupied by one tenant only and that do not establish a *corridor* serving an *occupant load* of 30 or more shall be permitted to be constructed of *fire-retardant-treated* wood, 1-hour fire-resistance-rated construction or of wood panels or similar light construction up to 6 feet (1829 mm) in height.
12. *Stages* and *platforms* constructed in accordance with Sections 410.2 and 410.3, respectively.
13. Combustible *exterior wall coverings*, balconies and similar projections and bay or oriel windows in accordance with Chapter 14 and Section 705.2.3.1.

14. Blocking such as for handrails, millwork, cabinets and window and door frames.
15. Light-transmitting plastics as permitted by Chapter 26.
16. Mastics and caulking materials applied to provide flexible seals between components of *exterior wall* construction.
17. Exterior plastic *veneer* installed in accordance with Section 2605.2.
18. Nailing or furring strips as permitted by Section 803.15.
19. Heavy timber as permitted by Note c to Table 601 and Sections 602.4.4.4 and 705.2.3.1.
20. Aggregates, component materials and admixtures as permitted by Section 703.2.1.2.
21. Sprayed fire-resistant materials and intumescent and mastic fire-resistant coatings, determined on the basis of *fire resistance* tests in accordance with Section 703.2 and installed in accordance with Sections 1705.15 and 1705.16, respectively.
22. Materials used to protect penetrations in fire-resistance-rated assemblies in accordance with Section 714.
23. Materials used to protect *joints* in fire-resistance-rated assemblies in accordance with Section 715.
24. Materials allowed in the concealed spaces of buildings of Types I and II construction in accordance with Section 718.5.
25. Materials exposed within plenums complying with Section 602 of the International Mechanical Code.
26. Wall construction of freezers and coolers of less than 1,000 square feet (92.9 m^2), in size, lined on both sides with noncombustible materials and the building is protected throughout with an *automatic sprinkler system* in accordance with Section 903.3.1.1.
27. Wood nailers for parapet flashing and roof cants.

Reason: In Table 601, Type IIB floors have a “0” fire resistance rating. Fire-retardant-treated wood is allowed in Section 603 in several areas. The height limitations for many sprinklered occupancy groups for Type IIB are the same as IIIB, where untreated wood floors are allowed. Many floor decks are designed for diaphragm action, and fire-retardant-treated plywood is often used in this application but requires approval as an alternate by the AHJ. This code provision will provide design professionals with an additional option. Fire-retardant-treated wood floor trusses or framing should also be allowed.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This code proposal allows for another method to construct within Type II. All current methods are unchanged.

G154-21

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The proposal was disapproved as the proposal adds confusion on what is considered Type IIB construction. (Vote: 14-0)

G154-21

Individual Consideration Agenda

Public Comment 1:

Proponents: James Gogolski, representing Hoover Treated Wood Products, Inc. (jgogolski@frtw.com); Mike Eckhoff, representing Hoover Treated Wood Products, Inc. (meckhoff@frtw.com) requests As Submitted

Commenter's Reason: In Table 601, Type IIB floors have a "0" fire resistance rating. Fire-retardant-treated wood is allowed in Section 603 in several areas. The height limitations for many sprinklered occupancy groups for Type IIB are the same as IIIB, where untreated wood floors are allowed. In Type IIB construction, the roof system, framing and decking, can be fire-retardant-treated wood. Fires typically burn in an upward direction. So, the ceiling of a roof is similar to the ceiling of a floor. Moreover, in Section 603, untreated wood finish flooring may be used in Type I and II construction.
The Committee commented that since fire-retardant-treated wood is not a noncombustible product, it would add fuel load to the fire. For understanding how the code addresses fire flow, one would look to the fire flow requirements of Table B105.1(2) of the International Fire Code, Appendix B. The table does not differentiate between either Types IIA and IIIA or between Types IIB and IIIB. Despite one construction type being noncombustible and the other combustible, they share the same fire flow (water GPM) requirements. In other words, the IFC does not consider building material composition (fire loading) influential for fire-flow water demand. Therefore, this is a moot issue.

Many floor decks are designed for diaphragm action, and fire-retardant-treated plywood is often used in this application but requires approval as an alternative by the AHJ. This code provision will provide design professionals with an additional option.

Finally, as carbon sequestration is now a factor in design, and will be emphasized more into the future, wood and other carbon sequestered material will be demanded at an increasing rate.

Cost Impact: The net effect of the public comment and code change proposal will not increase or decrease the cost of construction
It provides another method to construct within Type II.

Public Comment# 2673

G155-21

Proposed Change as Submitted

Proponents: Christopher Athari, Hoover Treated Wood Products, representing Hoover Treated Wood Products (cathari@frtw.com); James Gogolski, representing Hoover Treated Wood Products (jgogolski@frtw.com)

2021 International Building Code

Revise as follows:

603.1 Allowable materials. Combustible materials shall be permitted in buildings of Type I or II construction in the following applications and in accordance with Sections 603.1.1 through 603.1.3:

1. *Fire-retardant-treated wood* shall be permitted in:

   1.1. Nonbearing partitions where the required *fire-resistance rating* is 2 hours or less except in *shaft enclosures* within Group I-2 occupancies and *ambulatory care facilities.*

   1.2. Nonbearing *exterior walls* where fire-resistance-rated construction is not required.

   1.3. Roof construction, including girders, trusses, framing and decking.

   Exceptions:

   1. In buildings of Type IA construction exceeding two *stories above grade plane*, *fire-retardant-treated wood* is not permitted in roof construction where the vertical distance from the upper floor to the roof is less than 20 feet (6096 mm).
   2. Group I-2, roof construction containing *fire-retardant-treated wood* shall be covered by not less than a Class A *roof covering* or roof assembly, and the roof assembly shall have a *fire-resistance rating* where required by the construction type.

   1.4. Balconies, porches, decks and exterior *stairways* not used as required exits on buildings three *stories* or less above grade plane.

   <u>1.5. Mezzanine floor construction and associated secondary members where the fire-resistance-rated floor assembly has the fire resistance of that required by the type of construction and is solidly filled with insulation or is constructed with fireblocking of fire-retardant-treated wood.</u>

2. Thermal and acoustical insulation, other than foam plastics, having a *flame spread index* of not more than 25.

   Exceptions:

   1. Insulation placed between two layers of noncombustible materials without an intervening airspace shall be allowed to have a *flame spread index* of not more than 100.
   2. Insulation installed between a finished floor and solid decking without intervening airspace shall be allowed to have a *flame spread index* of not more than 200.

3. Foam plastics in accordance with Chapter 26.
4. *Roof coverings* that have an A, B or C classification.
5. *Interior floor finish* and floor covering materials installed in accordance with Section 804.
6. Millwork such as doors, door frames, window sashes and frames.
7. *Interior wall and ceiling finishes* installed in accordance with Section 803.
8. *Trim* installed in accordance with Section 806.
9. Where not installed greater than 15 feet (4572 mm) above grade, show windows, nailing or furring strips and wooden bulkheads below show windows, including their frames, aprons and show cases.
10. Finish flooring installed in accordance with Section 805.
11. Partitions dividing portions of stores, offices or similar places occupied by one tenant only and that do not establish a *corridor* serving an *occupant load* of 30 or more shall be permitted to be constructed of *fire-retardant-treated* wood, 1-hour fire-resistance-rated construction or of wood panels or similar light construction up to 6 feet (1829 mm) in height.
12. *Stages* and *platforms* constructed in accordance with Sections 410.2 and 410.3, respectively.

13. Combustible *exterior wall coverings*, balconies and similar projections and bay or oriel windows in accordance with Chapter 14 and Section 705.2.3.1.
14. Blocking such as for handrails, millwork, cabinets and window and door frames.
15. Light-transmitting plastics as permitted by Chapter 26.
16. Mastics and caulking materials applied to provide flexible seals between components of *exterior wall* construction.
17. Exterior plastic *veneer* installed in accordance with Section 2605.2.
18. Nailing or furring strips as permitted by Section 803.15.
19. Heavy timber as permitted by Note c to Table 601 and Sections 602.4.4.4 and 705.2.3.1.
20. Aggregates, component materials and admixtures as permitted by Section 703.2.1.2.
21. Sprayed fire-resistant materials and intumescent and mastic fire-resistant coatings, determined on the basis of *fire resistance* tests in accordance with Section 703.2 and installed in accordance with Sections 1705.15 and 1705.16, respectively.
22. Materials used to protect penetrations in fire-resistance-rated assemblies in accordance with Section 714.
23. Materials used to protect *joints* in fire-resistance-rated assemblies in accordance with Section 715.
24. Materials allowed in the concealed spaces of buildings of Types I and II construction in accordance with Section 718.5.
25. Materials exposed within plenums complying with Section 602 of the International Mechanical Code.
26. Wall construction of freezers and coolers of less than 1,000 square feet (92.9 m^2), in size, lined on both sides with noncombustible materials and the building is protected throughout with an *automatic sprinkler system* in accordance with Section 903.3.1.1.
27. Wood nailers for parapet flashing and roof cants.

Reason: Many mezzanine floors are designed to carry heavy loads and as diaphragms to resist lateral forces. Plywood is ideally suited for these applications, and designers frequently want to use plywood in their mezzanine floor designs. Currently, in Types I and II construction, design professionals must seek approval from the AHJ through Section 104.11 and the alternative materials process.
Mezzanine floors do not contribute to either the building area or number of stories as regulated by Section 503.1. This is also the case for kiosks. Kiosks are allowed to be constructed of fire-retardant-treated wood in malls of any type of construction (see Section 402.6.2). By logical extension, mezzanine floors should be allowed to be constructed of fire-retardant-treated wood in Types I and II construction.

This code proposal does not alter any of the requirements in Section 505.2 for Mezzanines or the fire-resistance requirements for floor construction per Table 601. For example, in addition to being constructed of fire-retardant-treated wood elements (lumber framing, plywood sheathing, and fireblocking), a mezzanine floor in a Type IIA building would be required to have a 1-hour fire-resistance rating**.**

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal just adds another option to design professionals and clarifies for code officials. All current options in the code are unchanged.

G155-21

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The proposal was disapproved consistent with the committee action on G154 on the same code section. (Vote: 14-0)

G155-21

Individual Consideration Agenda

Public Comment 1:

IBC: SECTION 603, 603.1

Proponents: James Gogolski, representing Hoover Treated Wood Products, Inc. (jgogolski@frtw.com); Mike Eckhoff, representing Hoover Treated Wood Products, Inc. (meckhoff@frtw.com) requests As Modified by Public Comment

Modify as follows:

2021 International Building Code

SECTION 603
COMBUSTIBLE MATERIAL IN TYPES I AND II CONSTRUCTION

603.1 Allowable materials . Combustible materials shall be permitted in buildings of Type I or II construction in the following applications and in accordance with Sections 603.1.1 through 603.1.3:

1. *Fire-retardant-treated wood* shall be permitted in:

   1.1. Nonbearing partitions where the required *fire-resistance rating* is 2 hours or less except in *shaft enclosures* within Group I-2 occupancies and *ambulatory care facilities.*

   1.2. Nonbearing *exterior walls* where fire-resistance-rated construction is not required.

   1.3. Roof construction, including girders, trusses, framing and decking.

   Exceptions:

   1. In buildings of Type IA construction exceeding two *stories above grade plane*, *fire-retardant-treated wood* is not permitted in roof construction where the vertical distance from the upper floor to the roof is less than 20 feet (6096 mm).
   2. Group I-2, roof construction containing *fire-retardant-treated wood* shall be covered by not less than a Class A*roof covering* or roof assembly, and the roof assembly shall have a *fire-resistance rating* where required by the construction type.

   1.4. Balconies, porches, decks and exterior *stairways* not used as required exits on buildings three *stories* or less above grade plane.

   1.5 Mezzanine construction and associated secondary members where the assembly is solidly filled with insulation or is constructed with *fireblocking* of *fire-retardant-treated wood.*

2. Thermal and acoustical insulation, other than foam plastics, having a *flame spread index* of not more than 25.

   Exceptions:

   1. Insulation placed between two layers of noncombustible materials without an intervening airspace shall be allowed to have a *flame spread index* of not more than 100.
   2. Insulation installed between a finished floor and solid decking without intervening airspace shall be allowed to have a *flame spread index* of not more than 200.

3. Foam plastics in accordance with Chapter 26.
4. *Roof coverings* that have an A, B or C classification.
5. *Interior floor finish* and floor covering materials installed in accordance with Section 804.
6. Millwork such as doors, door frames, window sashes and frames.
7. *Interior wall and ceiling finishes* installed in accordance with Section 803.
8. *Trim* installed in accordance with Section 806.
9. Where not installed greater than 15 feet (4572 mm) above grade, show windows, nailing or furring strips and wooden bulkheads below show windows, including their frames, aprons and show cases.
10. Finish flooring installed in accordance with Section 805.
11. Partitions dividing portions of stores, offices or similar places occupied by one tenant only and that do not establish a *corridor* serving an *occupant load* of 30 or more shall be permitted to be constructed of *fire-retardant-treated* wood, 1-hour fire-resistance-rated construction or of wood panels or similar light construction up to 6 feet (1829 mm) in height.
12. *Stages* and *platforms* constructed in accordance with Sections 410.2 and 410.3, respectively.
13. Combustible *exterior wall coverings*, balconies and similar projections and bay or oriel windows in accordance with Chapter 14 and Section 705.2.3.1.

14. Blocking such as for handrails, millwork, cabinets and window and door frames.
15. Light-transmitting plastics as permitted by Chapter 26.
16. Mastics and caulking materials applied to provide flexible seals between components of *exterior wall* construction.
17. Exterior plastic *veneer* installed in accordance with Section 2605.2.
18. Nailing or furring strips as permitted by Section 803.15.
19. Heavy timber as permitted by Note c to Table 601 and Sections 602.4.4.4 and 705.2.3.1.
20. Aggregates, component materials and admixtures as permitted by Section 703.2.1.2.
21. Sprayed fire-resistant materials and intumescent and mastic fire-resistant coatings, determined on the basis of *fire resistance* tests in accordance with Section 703.2 and installed in accordance with Sections 1705.15 and 1705.16, respectively.
22. Materials used to protect penetrations in fire-resistance-rated assemblies in accordance with Section 714.
23. Materials used to protect *joints* in fire-resistance-rated assemblies in accordance with Section 715.
24. Materials allowed in the concealed spaces of buildings of Types I and II construction in accordance with Section 718.5.
25. Materials exposed within plenums complying with Section 602 of the International Mechanical Code.
26. Wall construction of freezers and coolers of less than 1,000 square feet (92.9 m^2), in size, lined on both sides with noncombustible materials and the building is protected throughout with an *automatic sprinkler system* in accordance with Section 903.3.1.1.
27. Wood nailers for parapet flashing and roof cants.

Commenter's Reason: Adds allowance for FRTW in mezzanine floor construction. Section 603 Combustible Material in Types I and II Construction.
Revise as follows:

603.1 Allowable materials.

1. Fire-retardant-treated wood shall be permitted in:

<u>1.5. Mezzanine construction and associated secondary members where the assembly is solidly filled with insulation or is constructed with *fireblocking* of *fire-retardant-treated wood.*</u>

Commenters reason:

Subsequent to the hearing, it was pointed out that the code does not require mezzanines to be constructed of fire resistance rated construction. This public comment removes this requirement and the term “floor” that is not included in the definition of mezzanine.

Many mezzanines are designed to carry heavy loads and act as diaphragms to resist lateral forces. Plywood is ideally suited for these applications and designers frequently use plywood in their mezzanine designs. All too frequently, design professionals are required to seek approval from some AHJs through Section 104.11, the alternative materials process.

This is not supported or otherwise required by the code. A mezzanine is defined as a level, not a floor. The code does not stipulate in Section 505, what materials are used to construct a mezzanine. Therefore, mezzanines can be constructed of fire-retardant-treated wood.

This code proposal does not alter any of the requirements in Section 505.2 for mezzanines. It provides clarity of what is permitted in construction types employing noncombustible materials.

Last April, the main concern of the Committee was that FRTW is not a noncombustible product and will add fuel to a fire. Regarding fire flow and fire loading concerns raised during the hearing: For understanding how the code addresses fire flow, one would look to the fire flow requirements of Table B105.1(2) of the International Fire Code, Appendix B. The table does not differentiate between either Types IIA and IIIA or between Types IIB and IIIB. Despite one construction type being noncombustible and the other combustible, they share the same fire flow (water GPM) requirements. In other words, the IFC does not consider building material composition (fire loading) influential for fire-flow water demand. Therefore, this is a moot issue.

Finally, as carbon sequestration is now a factor in design, and will be emphasized more into the future, wood and other carbon sequestered material will be demanded at an increasing rate.

Cost Impact: The net effect of the public comment and code change proposal will not increase or decrease the cost of construction
This proposal just adds another option to design professionals and provides clarity for code officials.

G162-21

Proposed Change as Submitted

Proponents: Thomas Bowles, EPA, representing EPA (bowles.thomas@epa.gov); Jane Malone, American Association of Radon Scientists and Technologists, representing American Association of Radon Scientists and Technologists (janemalonedc@gmail.com); David Kapturowski, representing Spruce Environmental Technologies, Inc. (dave@spruce.com); Ruth Mcburney, representing CRCPD (rmcburney@crcpd.org); Jonathan Wilson, representing National Center for Healthy Housing (jwilson@nchh.org); Kevin Stewart, American Lung Association, representing American Lung Association (Kevin.Stewart@Lung.org); Tobie Bernstein, representing Environmental Law Institute (bernstein@eli.org)

2021 International Building Code

Add new text as follows:

1202.7 Soil Gas Control: Educational Buildings.
Soil gas control systems shall be provided for in Group E educational buildings. Systems shall comply with ANSI-AARST CC1000.

Add new standard(s) as follows:

AARST

American Association of Radon Scientists and Technologists
527 N Justice Street
Hendersonville, NC 28739
USA

AARST ANSI-AARST CC-1000-2018:
Soil Gas Control Systems in New Construction of Buildings

Reason: · *The purpose of this proposed requirement is to protect students, faculty, and other staff from exposure to radon gas in school buildings which are not covered by the International Residential Code and are beyond the scope of the IRC's Appendix F.*
· *Several states (Maine, Nebraska, New Jersey, Oregon, Rhode Island) require soil gas control in schools.*

· *A nationwide survey of radon levels in schools estimates that nearly one in five has at least one schoolroom with a short-term radon level above the EPA action level of 4 pCi/L (picocuries per liter) - the level at which EPA recommends that schools take action to reduce the level.* Radon is present in indoor air everywhere, regardless of building type or radon zone. Radon-induced lung cancer takes 21,000 lives in the US each year. Chemical vapor is an increasingly documented hazard that also enters buildings from the soil and is increasingly a liability issue.

· It is more efficient and cost-effective to establish soil gas control from the ground up during construction than to retrofit a structure later to seal up the interface between structure and soil and position suction points, ventilation piping and other components.

· The standard included in this proposal has been vetted and approved by EPA and multiple regulatory states. In 2020, an addendum to ASHRAE 189.1 - 2017 was approved to incorporate a requirement for ANSI-AARST CC-1000 to replace the standard's existing soil gas requirement.

· More Background on Radon:

· Epidemiological studies confirm that radon increases the risk of lung cancer in the general population. Radon is the second leading cause of lung cancer – second only to smoking – and more significant than secondhand smoke. In the US alone, 21,000 lung cancer deaths each year are caused by radon exposure. 3 The World Health Organization estimates that between 3% and 14% of all lung cancer cases worldwide are caused by radon exposure. 4 The Surgeon General of the United States issued a Health Advisory in 2005 warning Americans about the health risk from exposure to radon in indoor air. Dr. Richard Carmona, the Nation's Chief Physician, urged Americans find out how much radon they might be breathing. Dr. Carmona also stressed the need to remedy the problem as soon as possible when the radon level is 4 pCi/L or more.Radon is a colorless and odorless gas that is a decay product of uranium and occurs naturally in soil and rock. The main source of high-level radon pollution in buildings is surrounding uranium-containing soil such as granite, shale, phosphate and pitchblende. Radon enters a building through cracks in walls, basement floors, foundations and other openings. There is no known threshold concentration below which radon exposure presents no risk. Even low concentrations of radon can result in a small increase in the risk of lung cancer.

The CC-1000 standard is posted for public access at **https://standards.aarst.org/CC-1000-2018/index.html**

Bibliography:

- The CC-1000 standard is posted for public access at **https://standards.aarst.org/CC-1000-2018/index.html**

Cost Impact: The code change proposal will increase the cost of construction
This proposal does not add a requirement to install a radon control system. The proposal will add incremental cost to construction where radon control systems are installed if the builder is not already following the standard practice.

According to the Home Innovation Research Labs' Radon-Resistant Construction Practices in New U.S. Homes, the average reported per-unit installation cost of an active radon system in a multifamily dwelling in 2018 was $845, lower than $865 in 2017 but higher than $757 in 2016. The same paper indicates that in 2018 the average multifamily dwelling had an average selling price of $229,260. The cost of a system for a nonresidential commercial building will range from $2500 to higher depending on the footprint, volume and type of HVAC system.

Staff Analysis: A review of the standard proposed for inclusion in the code, AARST CC1000-2018, with regard to the ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before March 20, 2021.

G162-21

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The proposal was disapproved. The AARST standard has suggestive language, not enforceable language. There is no specific directions for testing and it is not clear for how to comply. As written this would be required a radon system in all schools while maps show high risk only on specific areas and in these areas the testifiers said that radon was found in only 15% of the schools tested. (Vote 14-0)

G162-21

Individual Consideration Agenda

Public Comment 1:

IBC: 1202.7 (New)

Proponents: Jane Malone, representing American Assocation of Radon Scientists and Technologists; Kevin Stewart, representing American Lung Association (kevin.stewart@lung.org); David Kapturowski, representing Spruce Environmental Technologies, Inc. (dave@spruce.com); Thomas Bowles, representing Indoor Environments Division (bowles.thomas@epa.gov); Warren Friedman, representing Office of Lead Hazard Control and Healthy Homes (warren.friedman@hud.gov); Ruth McBurney, representing CRCPD (rmcburney@crcpd.org) requests As Modified by Public Comment

Replace as follows:

2021 International Building Code

<u>**1202.7 Soil gas control in Educational buildings** . Occupiable spaces in Group E occupancies shall have indoor radon levels below 4 picocuries per liter (pCi/L). Radon levels shall be determined by an approved testing method. Radon levels equal to or exceeding 4 pCi/L shall be reduced by an approved mitigation method. A radon test report indicating satisfactory test results shall be provided to the code official.</u>

Commenter's Reason: This comment responds to two of the Committee's reasons by omitting the applicable ANSI standard and adding general direction to use approved methods for testing and mitigation. The requirement to deliver a compliant test report to the code official is consistent with IRC Appendix F. Because radon has been found in buildings in all areas and thus exposes students and educators in all areas to risk of lung cancer, the proposed language does not limit the requirement to only some areas.

Cost Impact: The net effect of the public comment and code change proposal will increase the cost of construction
The cost of a system for a nonresidential commercial building will range from $2500 to higher depending on the footprint, volume and type of HVAC system.

Public Comment# 2822

G163-21

Proposed Change as Submitted

Proponents: Jane Malone, American Association of Radon Scientists and Technologists, representing American Association of Radon Scientists and Technologists; Thomas Bowles, representing EPA (bowles.thomas@epa.gov); Ruth Mcburney, representing CRCPD (rmcburney@crcpd.org); Jonathan Wilson, National Center for Healthy Housing, representing National Center for Healthy Housing (jwilson@nchh.org); Kevin Stewart, American Lung Association, representing American Lung Association (Kevin.Stewart@Lung.org); Tobie Bernstein, representing Environmental Law Institute (bernstein@eli.org); David Kapturowski, representing Spruce Environmental Technologies, Inc. (dave@spruce.com)

2021 International Building Code

Add new text as follows:

1202.7 Soil gas control systems.
Soil gas control systems shall be provided for in Group R-2 apartment buildings. Systems shall comply with ANSI-AARST CC-1000.

Add new standard(s) as follows:

AARST

American Association of Radon Scientists and Technologists
527 N Justice Street
Hendersonville, NC 28739
USA

AARST ANSI-AARST CC-1000-2018:
Soil Gas Control Systems in New Construction of Buildings

Reason: The purpose of this proposed requirement is to protect families from exposure to radon gas in apartments in multifamily buildings, which are not covered by the International Residential Code and are beyond the scope of the IRC's Appendix F.
Radon is present in indoor air everywhere, regardless of building type or radon zone. Radon-induced lung cancer takes 21,000 lives in the US each year. Chemical vapor is an increasingly documented hazard that also enters buildings from the soil. A requirement for soil gas control in multifamily housing will protect future occupants who will have no authority, capacity, or other means to address excessive radon levels in their homes. It is more efficient and cost-effective to establish soil gas control from the ground up during construction than to retrofit a structure later to seal up the interface between structure and soil and position suction points, ventilation piping and other components.

The awareness of the need to address radon in multifamily buildings is increasing. HUD's multifamily loan program (which finances construction of both market-rate and subsidized properties) requires soil gas control in all new multifamily construction according to ANSI-AARST CC-1000.[1] Several states (Illinois, Minnesota, New Jersey, Oregon, Washington) require soil gas control in the construction of multifamily buildings. Since 2017, the International Green Construction Code, in conjunction with the related standard ASHRAE 189.1, has required soil gas control in new green buildings.

The standard included in this proposal has been vetted and approved by EPA, multiple regulatory states and by HUD (as mentioned above). It can be reviewed at https://standards.aarst.org/CC-1000-2018/index.html. In 2020, an addendum to ASHRAE 189.1 - 2017 was approved to incorporate a requirement for ANSI-AARST CC-1000 to replace the standard's existing soil gas requirement.

More Background on Radon:

Epidemiological studies confirm that radon increases the risk of lung cancer in the general population. Radon is the second leading cause of lung cancer – second only to smoking – and more significant than secondhand smoke. In the US alone, 21,000 lung cancer deaths each year are caused by radon exposure. 3 The World Health Organization estimates that between 3% and 14% of all lung cancer cases worldwide are caused by radon exposure. 4 The Surgeon General of the United States issued a Health Advisory in 2005 warning Americans about the health risk from exposure to radon in indoor air. Dr. Richard Carmona, the Nation's Chief Physician, urged Americans find out how much radon they might be breathing. Dr. Carmona also stressed the need to remedy the problem as soon as possible when the radon level is 4 pCi/L or more.

Radon is a colorless and odorless gas that is a decay product of uranium and occurs naturally in soil and rock. The main source of high-level radon pollution in buildings is surrounding uranium-containing soil such as granite, shale, phosphate and pitchblende. Radon enters a building through cracks in walls, basement floors, foundations and other openings. There is no known threshold concentration below which radon exposure presents no risk. Even low concentrations of radon can result in a small increase in the risk of lung cancer.

[1] US Department of Housing and Urban Development, *Multifamily Accelerated Processing (MAP) Guide*, December 2020, page 9-36. Accessed at https://www.hud.gov/program_offices/housing/mfh/map/maphome

Cost Impact: The code change proposal will increase the cost of construction
According to the Home Innovation Research Labs' Radon-Resistant Construction Practices in New U.S. Homes, the average reported per-unit installation cost of an active radon system in a multifamily dwelling in 2018 was $845, lower than $865 in 2017 but higher than $757 in 2016. The same paper indicates that in 2018 the average multifamily dwelling had an average selling price of $229,260.

Staff Analysis: A review of the standard proposed for inclusion in the code, AARST CC1000-2018, with regard to the ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before March 20, 2021.

G163-21

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The proposal was disapproved for consistency with the committee action on G162-21. The AARST standard has suggestive language, not enforceable language. There is no specific directions for testing and is not clear for how to comply. As written this would be required in all Group R-2 to have a radon system while maps show high risk only on specific areas. This is in the International Green Code. If jurisdictions want to require testing, this would be better in an appendix for how to comply. (Vote 14-0)

G163-21

Individual Consideration Agenda

Public Comment 1:

IBC: 1202.7 (New)

Proponents: Jane Malone, representing American Assocation of Radon Scientists and Technologists; Jonathan Wilson, representing National Center for Healthy Housing (jwilson@nchh.org); Kevin Stewart, representing American Lung Association (kevin.stewart@lung.org); David Kapturowski, representing Spruce Environmental Technologies, Inc.; Thomas Bowles, representing Indoor Environments Division (bowles.thomas@epa.gov); Warren Friedman, representing Office of Lead Hazard Control and Healthy Homes (warren.friedman@hud.gov); Ruth McBurney, representing CRCPD (rmcburney@crcpd.org) requests As Modified by Public Comment

Replace as follows:

2021 International Building Code

1202.7 Soil gas control in Group R-2 apartment buildings . Occupiable spaces in Group R-2 apartment buildings shall have indoor radon levels below 4 picocuries per liter (pCi/L). Radon levels shall be determined by an approved testing method. Radon levels equal to or exceeding 4 pCi/L shall be reduced by an approved mitigation method. A radon test report indicating satisfactory test results shall be provided to the code official.

Commenter's Reason: This comment responds to two of the Committee's reasons by omitting the applicable ANSI standard and adding general direction to use approved methods for testing and mitigation. The requirement to deliver a compliant test report to the code official is consistent with IRC Appendix F.
Because radon has been found in buildings in all areas and thus exposes occupants in all areas to risk of lung cancer, the proposed language does not limit the requirement to only some areas.

Cost Impact: The net effect of the public comment and code change proposal will increase the cost of construction
According to the Home Innovation Research Labs' Radon-Resistant Construction Practices in New U.S. Homes, the average reported per-unit installation cost of an active radon system in a multifamily dwelling in 2018 was $845, lower than $865 in 2017 but higher than $757 in 2016. The same paper indicates that in 2018 the average multifamily dwelling had an average selling price of $229,260.

Public Comment# 2824

G164-21

Proposed Change as Submitted

Proponents: Jane Malone, American Association of Radon Scientists and Technologists, representing American Association of Radon Scientists and Technologists; Thomas Bowles, representing EPA (bowles.thomas@epa.gov); Ruth Mcburney, representing CRCPD (rmcburney@crcpd.org); Jonathan Wilson, National Center for Healthy Housing, representing National Center for Healthy Housing (jwilson@nchh.org); Kevin Stewart, American Lung Association, representing American Lung Association (Kevin.Stewart@Lung.org); Tobie Bernstein, representing Environmental Law Institute (bernstein@eli.org); David Kapturowski, representing Spruce Environmental Technologies, Inc. (dave@spruce.com)

2021 International Building Code

Add new text as follows:

1202.7 Soil gas control systems.
Soil gas control systems shall comply with ANSI-AARST CC1000.

Exception:
Radon control systems in one- and two-family dwellings and townhouses shall comply with Appendix F of the International Residential Code or ANSI-AARST RRNC.

Add new standard(s) as follows:

AARST

American Association of Radon Scientists and Technologists
527 N Justice Street
Hendersonville, NC 28739
USA

AARST ANSI-AARST CC1000-2018:
Soil Gas Control Systems in New Construction of Buildings

AARST ANSI-AARST RRNC 2020:
Rough-In of Radon Control Components In New Construction Of 1 & 2 Family Dwellings And Townhouses

Reason: · Several states (Illinois, Maine, Minnesota, Nebraska, New Jersey, Oregon, Rhode Island, Washington) require soil gas control in new buildings that cannot possibly be addressed through Appendix F of the International Residential Code, such as schools, child day care facilities, and multifamily housing. Even where there are no requirements, builders are including some form of soil gas control in buildings. The IBC lacks any meaningful provision to oversee soil gas control systems in larger buildings.

While an appendix has been used for this radioactive building hazard in the IRC, lack of appendix adoption in a jurisdiction has meant no enforcement on voluntary systems and no need to comply with standard practices. Placing the specification for how to build soil gas control in the body of the code does not establish a mandate for a soil gas control system; instead, it helps to ensure that those who choose, or are required by state or local policy, to include a soil gas control system adhere to the current professional standard and industry practice. The proposed new subsection 1202.7.1 will make the current standard for soil gas control in large buildings, ANSI-AARST CC-1000-2018 Soil Gas Control Systems in New Construction of Buildings, available as an enforcement tool for code officials and provide consistency among builders, architects, and developers and across jurisdictions.

Radon is present in indoor air everywhere, regardless of building type or radon zone. Radon-induced lung cancer takes 21,000 lives in the US each year. Chemical vapor is an increasingly documented hazard that also enters buildings from the soil.

It is more efficient and cost-effective to establish soil gas control from the ground up during construction than to retrofit a structure later to seal up the interface between structure and soil and position suction points, ventilation piping and other components.

The exception allows the use of Appendix F of the IRC, or the applicable current consensus standard ANSI-AARST RRNC 2020, for one- and two-family homes.
'he standards included in this proposal have been vetted and approved by EPA, multiple regulatory states, and HUD. In 2020, an addendum to ASHRAE 189.1 - 2017 was approved to incorporate a requirement for ANSI-AARST CC-1000 to replace the standard's existing soil gas requirement. The CC-1000 standard is posted for public access at **https://standards.aarst.org/CC-1000-2018/index.html.**

This proposal is one of six proposals that have been submitted to increase protection from radon this year. The following is noted to clarify how these proposals are inter-related.

Each proposal stands on its own, and It is the proponents' intent that:

(1) If all three proposed additions to Chapter 12 of the IBC (covering Method of soil gas control, educational building requirements, and apartment house requirements) are approved, they would be renumbered in a single new section that would read:

1202.7 Soil gas control systems. Soil gas control systems **s**hall comply with ANSI-AARST CC-1000.

Exception: Radon control systems in one- and two-family buildings shall comply with Appendix F of the International Residential Code or ANSI-AARST RRNC**.**

1202.7.1. Apartment houses. Soil gas control systems shall be provided for in Group R-2 apartment buildings.

1202.7.2. Educational buildings. Soil gas control systems shall be provided for in Group E educational buildings.

(2) If the IBC Chapter 12 proposals for apartment buildings and educational buildings are approved but not the Method one, these would be renumbered in a single new section that would read:

1202.7 Soil gas control systems. Soil gas control systems as required below shall comply with ANSI-AARST CC-1000.

1202.7.1. Apartment houses. Soil gas control systems shall be provided for in Group R-2 apartment buildings.

1202.7.2. Educational buildings. Soil gas control systems shall be provided for in Group E educational buildings.

(3) If the IBC Method proposal (new section 1202.7) is approved, the proposed Appendix to the IBC would be redundant.

(4) The proposed revision to IMC Section 512 is not redundant with the Method proposal (IBC proposed new section 1202.7) but instead ensures that the IMC and IBC are consistent and correlated about soil gas control.

Cost Impact: The code change proposal will increase the cost of construction
This proposal does not add a requirement to install a radon control system. The proposal will add incremental cost to construction where radon control systems are installed if the builder is not already following the standard practice.
According to the Home Innovation Research Labs' Radon-Resistant Construction Practices in New U.S. Homes, the average reported per-unit installation cost of an active radon system in a multifamily dwelling in 2018 was $845, lower than $865 in 2017 but higher than $757 in 2016. The same paper indicates that in 2018 the average multifamily dwelling had an average selling price of $229,260. The cost of a system for a nonresidential commercial building will range from $2500 to higher depending on the footprint, volume and type of HVAC system.

Staff Analysis: A review of the standard proposed for inclusion in the code, AARST RRNC-2020 and AARST CC1000-2018, with regard to the ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before March 20, 2021.

G164-21

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The proposal was disapproved based on the committee action on G162 and G163. The AARST standard has suggestive language, not enforceable language. There is no specific directions for testing and is not clear for how to comply. (Vote 14-0)

G164-21

Individual Consideration Agenda

Public Comment 1:

IBC: 1202.7 (New)

Proponents: Jane Malone, representing American Assocation of Radon Scientists and Technologists; Jonathan Wilson, representing National Center for Healthy Housing (jwilson@nchh.org); Kevin Stewart, representing American Lung Association (kevin.stewart@lung.org); David Kapturowski, representing Spruce Environmental Technologies, Inc. (dave@spruce.com); Thomas Bowles, representing Indoor Environments Division (bowles.thomas@epa.gov); Warren Friedman, representing Office of Lead Hazard Control and Healthy Homes (warren.friedman@hud.gov); Ruth McBurney, representing CRCPD (rmcburney@crcpd.org) requests As Modified by Public Comment

Replace as follows:

2021 International Building Code

1202.7 Soil Gas Control . Where a soil gas control system is provided, occupiable spaces shall have indoor radon levels below 4 picocuries per liter (pCi/L). Radon levels shall be determined by an approved testing method. Radon levels equal to or exceeding 4 pCi/L shall be reduced by an approved mitigation method. A radon test report indicating satisfactory test results shall be provided to the code official.

Commenter's Reason: This section would only apply where a soil gas control system is specified. This comment responds to Committee reasons by omitting the applicable ANSI standard and adding general direction to use approved methods for testing and mitigation. The requirement to deliver a compliant test report to the code official is consistent with IRC Appendix F.

Cost Impact: The net effect of the public comment and code change proposal will not increase or decrease the cost of construction
This proposal does not add a requirement to install a radon control system.
The proposal will add incremental cost to construction where radon control systems are installed if the builder is not already following approved methods.
According to the Home Innovation Research Labs' Radon-Resistant Construction Practices in New U.S. Homes, the average reported per-unit installation cost of an active radon system in a multifamily dwelling in 2018 was $845, lower than $865 in 2017 but higher than $757 in 2016. The same paper indicates that in 2018 the average multifamily dwelling had an average selling price of $229,260. The cost of a system for a nonresidential commercial building will range from $2500 to higher depending on the footprint, volume and type of HVAC system.

Public Comment# 2825

G165-21

Proposed Change as Submitted

Proponents: Tom Zaremba, representing Glazing Industry Code Committee (tzaremba@ralaw.com); Nicholas Resetar, Roetzel & Andress, representing National Glass Association (nresetar@ralaw.com)

2021 International Building Code

1204.1 General. Every space intended for human occupancy shall be provided with natural light by means of exterior glazed openings in accordance with Section 1204.2 or shall be provided with artificial light in accordance with Section 1204.3. Exterior glazed openings shall open directly onto a *public way* or onto a *yard* or *court* in accordance with Section 1205.

Add new text as follows:

1204.1.1 Classrooms.
In Group E occupancies, not less than 50 percent of all classrooms shall be provided with natural light in accordance with Section 1204.2. Artificial light in accordance with Section 1204.3 shall be permitted but shall not substitute for natural light.

Reason: The lighting requirements of Section 1204.1 are acceptable for most occupancies. However, classrooms in Group E-Occupancies are different from any other Occupancy type. Classrooms in E-Occupancies are used primarily for teaching children. During the long hours they spend in classrooms, children are not only learning, but their brains and psychological makeups are developing. To maximize their learning and growth potentials, children **need** natural daylight in classrooms where they are growing and being taught. For example, one study conducted over a one-year period found that both testing and behavioral outcomes are markedly improved when classrooms use natural light. It found that children in classrooms with natural daylighting progressed 20% faster on math testing and 26% faster on reading testing. The research also found that classrooms that provided students with greater amounts of natural light correlated to a 15% to 23% overall improvement in academic outcomes. Research clearly shows that children in classrooms need natural daylight for optimal development and performance. The adoption of this proposal will ensure that children attending class in our schools will have the best possible opportunity to grow and develop in classrooms lit by the natural light of the sun.

In the 2019 Group A development cycle, a similar proposal was brought forward. While the Committee was supportive of the concept, the proposal was, ultimately, unsuccessful. This proposal is different from the unsuccessful 2019 proposal. First and foremost, since it is unlikely that all classrooms can be located on exterior walls where natural daylight is easily accessed, this proposal limits its natural daylighting mandate to 50% of classrooms. Second, this proposal does **not** include I-4 Occupancies. Finally, this proposal is only intended to apply to new construction, not to any existing E-Occupancies.

Bibliography: Green Building Consultants - (The Benefits of Daylighting in Your Building) https://sigearth.com/the-benefits-of-daylighting-in-your-building/.
National Renewable Energy Laboratory - "Daylighting in Schools: Improving Student Performance and Health at a Price Schools Can Afford" - https://digital.library.unt.edu/ark:/67531/metade712249/

Journal of Educational and Instructional Studies in the World - "Impact of Daylighting on Student and Teacher Performance" - https://www.researchgate.net/publication/301284909_The_impact_of_daylighting_in_classrooms_on_students'_performance

International Conference on "Health, Biological and Life Science" - "Natural Light and Productivity: Analyze the Impacts of Daylighting on Students' and Workers' Health and Alertness" - http://scholar.google.com/scholar_url?
=https://www.researchgate.net/profile/Nastaran_Shishegar/publication/303484362_Natural_Light_and-Productivity_Analyzing_the_impacts_of_daylighting_on_students%27_and_Workers%27_Health_and_Alertness/links/5744aa1608ae9f741b407f8f.pdf&
Ny9YPt6-
10Ac&scisig=AAGBfm3QfVcmePDtLnHQ4m1DJyCGZ9b2tA&noss1=1&oi=sch10Ac&scisig=AAGBfm3QfVcmePDtLnHQ4m1DJyCGZ9v2tA&noss1=1&

National Renewable Energy Laboratory - "A Literature of the Effects of Natural Light on Building Occupants" - http://scholar.google.com/scholar_url?
url=https://www.osti.gov/servlets/purl/15000841&h1=en&sa=X&ei=3y3eX9aOK4fPmAGK94aACg&scisig=AAGBfm25rM8uusi4kS6H9KOyrtAUVr7FrQ&

Miassar Mohammed Bakri - University of Nottingham - "Daylighting Strategies in Educational Spaces" - https://www.researchgate.net/publication/288181980_DAYLIGHTING_STRATEGIES_IN_EDUCATIONAL_SPACES

Angela Read - Rochester Institute of Technology - "Integration of Daylighting into Educational (School) Building Design for Energy Efficiency, Health Benefit, and Mercury Emissions Reduction Using Heliodon for Physical Modeling" - http://scholarworks.rit.edu/cgi/viewcontent.cgi?article=10826&context=theses

Cost Impact: The code change proposal will increase the cost of construction
This proposal could increase the cost of construction if additional windows must be added to the building's exterior in order to comply with the proposal.

Staff Note: G165-21 and G166-21 addresses requirements in a different or contradicting manner. The committee is urged to make their intentions clear with their actions on these proposals.

G165-21

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The proposal was disapproved. Use of windows for light versus artificial light is a designers choice and not a minimum requirement that deals with health, safety or welfare. Natural light also varies based on time of the day, day of the year and weather. The improvements in test scores indicated in the reasons is suspect - if this is true why were there no school representative testifying? Requiring windows could conflict with the energy code requirements. G128-18 asked for 100% of classrooms - this is not better. The language could be read to also include all day care classrooms or school classrooms such as music rooms (acoustics concerns), shops and gyms. There is also the question if this would be applied to a change of occupancy, even in current school buildings being reconfigured. (Vote: 14-0)

Staff Analysis: G165-21 and G166-21 addresses requirements in a different or contradicting manner. The committee is urged to make their intentions clear with their actions on these proposals.

G165-21

Individual Consideration Agenda

Public Comment 1:

IBC: 1204.1.1, 1204.3

Proponents: Thomas Culp, representing representing self and the Aluminum Extruders Council (culp@birchpointconsulting.com); Nicholas Resetar, representing Glazing Industry Code Committee (nresetar@ralaw.com); Steven Rosenstock, representing Edison Electric Institute (srosenstock@eei.org); Tom Bratten, representing Stow-Munroe Falls, OH City School District (st_tbratten@smfcsd.org) requests As Modified by Public Comment

Further modify as follows:

2021 International Building Code

1204.1 General . Every space intended for human occupancy shall be provided with natural light by means of exterior glazed openings in accordance with Section 1204.2 or shall be provided with artificial light in accordance with Section 1204.3. Exterior glazed openings shall open directly onto a *public way* or onto a *yard* or *court* in accordance with Section 1205.

1204.1.1 Classrooms . In Group E occupancies, not less than 50 percent of all classrooms shall be provided with <u>both</u> natural light in accordance with Section 1204.2~~.~~ <u>and artificial</u> ~~Artificial~~ light in accordance with Section 1204.3 ~~shall be permitted but shall not substitute for natural lightlight.~~

<u>**Exception:**</u>

1. <u>Day care facilities within a different primary occupancy are not required to comply with this section.</u>
2. <u>Existing buildings undergoing alterations or a change of occupancy are not required to comply with this section.</u>

1204.3 Artificial light . Artificial light shall be provided that is adequate to provide an average illumination of <u>not less than</u> 10 footcandles (107 lux) over the area of the room at a height of 30 inches (762 mm) above the floor level.

Commenter's Reason: This public comment addresses issues raised by committee members and testifying opponents at the Committee Action Hearing by clarifying that the revised language only applies to newly constructed educational buildings and does not seek and/or intend to displace the use of artificial light. In addition, this public comment directly satisfies the Committee's concern that, despite numerous peer reviewed scholarly articles, no educators supported this proposal or confirmed the positive benefits to students related to the exposure to natural light and views. After voting to disapprove this proposal, the Committee commented that the utilization of natural or artificial light in schools should be left to a designer because this choice does not affect health, safety, or welfare. With all due respect to the Committee, exposing students to natural light and views empirically and quantifiably increase students' reading and math test scores, significantly improves academic outcomes, and promotes their behavioral and psychological wellbeing. These effects clearly relate to students' health, safety, and welfare. This phenomenon is even more pronounced as the COVID-19 pandemic exposed the pitfalls of subjecting students to less than optimal learning environments.

The Committee expressed concern that if these positive benefits were indeed real and substantial, educators should weigh in to confirm. In that regard, Superintendent Tom Bratten of Stow-Munroe Falls, Ohio City School District, a Northeast Ohio school district of over 5,100 students, agrees that additional daylighting and views is very beneficial not only to students, but educators alike. Anecdotally, Mr. Bratten confirms the findings of the various studies and academic literature as he has experienced the benefits of natural daylight and views firsthand. Mr. Bratten explains that, in an area with long winters and frequently dreary conditions, it is imperative that students and educators are exposed to natural light as often as possible. In fact, Mr. Bratten has advised that he fields requests for and is routinely looking for additional educational space that provides natural light and views. Mr. Bratten also believes, as an educator, that natural daylight in newly constructed schools should not be left to the decision of a single designer, but rather mandatory for benefit of all.

This public comment also addresses concerns raised by two prior opponents (who are now in support) that the original proposal could be misinterpreted to reduce or limit the use of artificial light, even though that was not the intent. This public comment clarifies the language in 1204.1.1 and 1204.3 to ensure that both artificial lighting and natural lighting will be provided.

Finally, the modified code language clarifies that it does not apply to daycare facilities within other building types such an office building, and that it would not apply to existing buildings or reconfigured spaces. As shown in the table below, the intended application is for new stand-alone educational buildings. Furthermore, only requiring compliance for 50% of classrooms provides the necessary flexibility for cases identified by the committee such as music rooms, shops, and gyms.

<u>Example</u> **<u>Covered?</u>**
New stand-alone school building - Yes
New stand-alone daycare building - Yes
Existing buildings and reconfigurations - No
Training center / tutoring center in an office building or strip mall (classified as Group B) - No
Classroom in church (classified as Group A-3) - No
Daycare in church (classified as Group A-3) - No
Daycare in office building (primary occupancy is Group B) - No
Daycare in home or apartment complex (primary occupancy is Group R) - No

Cost Impact: The net effect of the public comment and code change proposal will increase the cost of construction
The code change proposal will increase the cost of construction in the event glazing and/or glass construction materials are more costly than the alternative.

Public Comment# 2751

G170-21

Proposed Change as Submitted

Proponents: Cesar Lujan, National Association of Home Builders, representing National Association of Home Builders (clujan@nahb.org)

2021 International Building Code

1206.1 Scope. This section shall apply to common interior walls, partitions and floor/ceiling assemblies between adjacent *dwelling units* and *sleeping units* or between *dwelling units* and *sleeping units* and adjacent public areas.

1206.2 Airborne sound. Walls, partitions and floor-ceiling assemblies separating *dwelling units* and *sleeping units* from each other or from public or service areas shall have a sound transmission class of not less than 50 where tested in accordance with ASTM E90, or have a Normalized Noise Isolation Class (NNIC) rating of not less than 45 if field tested, in accordance with ASTM E336 for airborne noise. Alternatively, the sound transmission class of walls, partitions and floor-ceiling assemblies shall be established by engineering analysis based on a comparison of walls, partitions and floor-ceiling assemblies having sound transmission class ratings as determined by the test procedures set forth in ASTM E90. Penetrations or openings in construction assemblies for piping; electrical devices; recessed cabinets; bathtubs; soffits; or heating, ventilating or exhaust ducts shall be sealed, lined, insulated or otherwise treated to maintain the required ratings. This requirement shall not apply to entrance doors; however, such doors shall be tight fitting to the frame and sill.

1206.2.1 Masonry. The sound transmission class of concrete masonry and clay masonry assemblies shall be calculated in accordance with TMS 302 or determined through testing in accordance with ASTM E90.

Revise as follows:

1206.3 Impact Sound Transmission. Floor-ceiling assemblies between*dwelling units* and *sleeping units* or between a *dwelling unit* or *sleeping unit* and a public or service area within the structure shall have an impact insulation class rating of not less than 50 where tested in accordance with ASTM E492, or have a Normalized Impact Sound Rating (NISR) of not less than 45 if field tested in accordance with ASTM E1007. Alternatively, the impact insulation class of floor-ceiling assemblies shall be established by engineering analysis based on a comparison of floor-ceiling assemblies having impact insulation class ratings as determined by the test procedures in ASTM E492.

> **Exception:** Floor/ceiling assemblies between a dwelling unit or sleeping unit and a public or service area shall not be required to have an impact insulation rating, or have a normalized impact sound rating (NISR), where the ambient noise within any public or service space will be unaffected by impact noise from the dwelling unit or sleeping unit above.

Reason: Normalized Impact Sound Ratings (NISR) and impact insulation class (IIC) rate the structure-borne impact sound transmission between floor/ceiling assemblies, such as the sound of an object dropping on a floor. Impact sounds between dwelling units is mitigated by the requirements of the current code language to protect inhabitants from unwanted impact noise, as is airborne sound from adjacent spaces. Theoretically, an impact sound from a *dwelling unit* or *sleeping unit* would minimally affect a public or service area below since those spaces are either occupied and have various levels of noise from occupants/users (public area) or are not occupied spaces (service area). Examples include, but are not limited to arcades, bowling alleys, and other commercial and business uses.
This code change would only affect the requirements for impact sound and not the airborne sound requirements The airborne sound requirements in Section 1206.2 for floor/ceiling assemblies shall still apply to protect *dwelling units* and *sleeping units* located above a public or service area from sound transmission created by airborne sounds (i.e. sound from appliances, tv's, talking, etc).

Cost Impact: The code change proposal will decrease the cost of construction

The structure-borne sound requirements for floor/ceiling assemblies between *dwelling units* or *sleeping units* with public or service areas below, cost an average between $8,000 to $15,000 per dwelling unit if an IIC rating or NISR rating is required. The added exception is proposed language that would only affect the floor/ceiling assemblies where a dwelling unit or sleeping unit is located above a public or service area.

G170-21

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: This proposal was disapproved because the exception as written would be difficult to uniformly enforce and is too broad and ambiguous . Who would determine the allowance? How would the code official determine this if there is no planned tenant at the time of construction, or the tenant changes over time? (Vote: 12-1)

Individual Consideration Agenda

Public Comment 1:

IBC: 1206.3

Proponents: Cesar Lujan, representing National Association of Home Builders (clujan@nahb.org) requests As Modified by Public Comment

Modify as follows:

2021 International Building Code

1206.3 Impact Sound Transmission . Floor-ceiling assemblies between*dwelling units* and *sleeping units* or between a *dwelling unit* or *sleeping unit* and a public or service area within the structure shall have an impact insulation class rating of not less than 50 where tested in accordance with ASTM E492, or have a Normalized Impact Sound Rating (NISR) of not less than 45 if field tested in accordance with ASTM E1007. Alternatively, the impact insulation class of floor-ceiling assemblies shall be established by engineering analysis based on a comparison of floor-ceiling assemblies having impact insulation class ratings as determined by the test procedures in ASTM E492.

> **Exception:** Floor/ceiling assemblies between a dwelling unit or sleeping unit and a public or service area shall not be required to have an impact insulation rating~~, or have a normalized impact sound rating (NISR), where the ambient noise within any public or service space will be unaffected by impact noise from the dwelling unit or sleeping unit above.~~

Commenter's Reason:
The intent of the original proposal was to address the impact sound requirements of the floor/ceiling assembly between a dwelling or sleeping unit and a public or service area in order to reduce the cost of the required IIC rating, which ranges between $8,000 to $15,000 per dwelling unit. An exception was added that would not require an IIC rating for the floor/ceiling assembly when a dwelling unit is located above a public/service space below. The exception would only apply to the IIC rating for impact noise and not the sound transmission requirements for airborne sound.

The Code Action Committee expressed concern that part of the proposed exception was ambiguous and unenforceable since it would require a code official to judge which public/service tenants would occupy a commercial space at any given time, how they may be affected by impact noise from the dwelling unit above, and when the exception would apply.

This public comment modifies the proposed exception to remove the ambiguous language since it would be difficult to enforce, and to state that floor/ceiling assemblies between a dwelling unit or sleeping unit and a public or service area shall not be required to have an impact insulation rating. This would put the responsibility on the public/service tenant to provide and install noise control and sound isolating products in the ceiling assembly when needed and prior to occupancy.

Cost Impact: The net effect of the public comment and code change proposal will decrease the cost of construction
The proposed change in this public comment would reduce the cost of the required IIC rating, which ranges between $8,000 to $15,000 per dwelling unit.

Public Comment# 2698

G172-21

Proposed Change as Submitted

Proponents: Jake Pauls, representing Myself (bldguse@aol.com)

2021 International Building Code

Add new definition as follows:

STANCHION. An often vertical, tubular structure serving as a hand-grasped, point of control that is fixed between separate supporting structures such as surfaces or other railings, as opposed to being mounted, in cantilever fashion, on walls as occurs with conventional grab bars.

Add new text as follows:

1210.3 Grab bars and stanchions at bathtubs and showers in Groups R-1, R-2, R-3 and R-4.
Bathtubs in Groups R-1, R-2, R-3 and R-4 occupancies shall be provided with grab bars or stanchions complying with Section 1210.3.1, 12010.3.2 and 12010.3.4. Showers in Groups R-1, R-2, R-3 and R-4 shall be provided with a grab bar or stanchion complying with Section 1210.3.3 and 1210.3.4.

Exception:
Accessible units complying with ICC A117.1 Section 1102.11 are not required to comply with this section.

1210.3.1 Grab bar or stanchion at the access side to bathtubs and shower/bathtub combinations.
A grab bar or stanchion shall be provided at the access side to each bathtub and shower/bathtub combination in accordance with Section 1210.3.1.1 or 1210.3.1.2. Location dimensions, except as provided for spacing in Section 1210.3.4.2, are to the centerline of the grab bar or stanchion at the fixed end of its graspable tubing component complying with Section 1210.3.4.1.

1012.3.1.1 End wall grab bar.
A vertical grab bar on one end wall of the bathtub shall be provided between 9 inches (230 mm) and 12 inches (305 mm) horizontally, inward from the access side of the bathtub. The grab bar shall extend from 24 inches (610 mm) maximum to 60 inches (1524 mm) minimum above the finished floor.

1012.3.1.2 Bathtub access side, grab bar or stanchion.
A vertical grab bar or a vertical stanchion shall be provided within 2 inches (51 mm) maximum inward, and within 6 inches (152 mm) maximum outward, from the access side of the bathtub. The grab bar or stanchion shall be located 2 inches (51 mm) minimum, horizontally, from the centerline of any shower curtain rod installation. The grab bar or stanchion shall extend from 24 inches (610 mm) maximum to 60 inches (1524 mm) minimum above the finished floor.

1210.3.2 Grab bar and stanchion at the back wall, or non-access side, of bathtubs and shower/bathtub combinations.
A grab bar or stanchion shall be provided on the back wall, or non-access side of each bathtub and shower/bathtub combination in accordance with Section 1210.3.2.1 or 1210.3.2.2. Location dimensions, except as provided for spacing in Section1210.3.4.2, are to the centerline of the grab bar or stanchion at the fixed end of its graspable tubing component complying with Section 1210.3.4.1.

Exception:
For relatively deep bathtubs, where the required centerline height for the overall or lower end height exceeds 24 inches (610 mm) above the adjacent finished floor elevation, the centerline height shall be permitted to be 3 inches (76 mm) maximum above the bathtub rim height.

1210.3.2.1 Horizontal grab bar or stanchion.
A grab bar 36 inches (910 mm) minimum in length, centered, plus or minus two inches (51 mm), along the length of the bathtub, or a full-length stanchion installed between end walls. Its height above the bathtub rim shall be 8 inches (203 mm) minimum and 10 inches (255 mm) maximum.

1210.3.2.2 Diagonal grab bar.
A grab bar shall be installed in a diagonal position with its angle, to horizontal, 30 degrees minimum and 60 degrees maximum. The diagonal grab bar shall have the higher end located 12 inches (305 mm) maximum from the control end wall, measured horizontally. The lower end shall be 8 inches (203 mm) minimum and 10 inches (255 mm) maximum above the bathtub rim.

1210.3.3 Grab bar or stanchion at the access to showers.
A grab bar or stanchion shall be provided for the shower in accordance with Section 1210.3.3.1 or 1210.3.3.2. or 1210.3.3.3. Location dimensions, except as provided for spacing in Section 1210.3.4.2, are to the centerline of the grab bar or stanchion at the fixed end of its graspable tubing component complying with Section1210.3.4.1.

1210.3.3.1 At shower exterior.
A vertical grab bar or stanchion shall be provided outside of the shower compartment, adjacent to the access opening. The grab bar or stanchion shall extend from 24 inches (610 mm) maximum to 60 inches (1524 mm) minimum, measured vertically above the finished floor.

1210.3.3.2 For smaller shower interior.
For showers with interior plan dimensions, including diagonally between corners, 51 inches (1295 mm) maximum, a vertical grab bar shall be provided, interior to the shower compartment, 30 inches (762 mm) maximum, measured horizontally from the control wall on the side closest to the access opening. The grab bar shall extend from 24 inches (610 mm) maximum to 60 inches (1524 mm) minimum, measured vertically above the finished floor outside the shower.

1210.3.3.3 For larger shower interior.
For showers with any interior plan dimensions exceeding 51 inches (1295 mm), including diagonally between corners, a grab bar or stanchion located interior to the shower compartment shall be 30 inches (762 mm) maximum, measured horizontally to the access to the shower. If oriented vertically, the grab bar or stanchion shall extend from 24 inches (610 mm) maximum to 60 inches (1524 mm) minimum, measured vertically above the finished floor outside the shower. If oriented horizontally, the grab bar or stanchion shall have a length 36 inches (915 mm) minimum at a height, measured vertically above the finished floor outside the shower, of 48 inches (1220 mm) minimum and 60 inches (1524 mm) maximum.

1210.3.4 Grab bar and stanchion requirements.
Grab bars and stanchions, shall comply with Section 1210.3.4.1 through 1210.3.4.5.

1210.3.4.1 Cross section.
Grab bars and stanchions shall have a cross section complying with one of the following:

1. A circular cross section with an outside diameter of 1-1/4 inch (32 mm) minimum and 2 inches (51 mm) maximum.
2. A noncircular cross section complying with ICC A117.1.

1210.3.4.2 Spacing.
The space between a grab bar or stanchion and any adjacent surface, including the closest surfaces of fixed, sliding or swinging panel enclosure system provided to prevent water migration on the access side of a bathtub or shower, shall be 1-1/2 inches (38 mm) minimum.

1210.3.4.3 Surface Hazards.
Grab bars or stanchions and adjacent surfaces shall be free of sharp or abrasive elements. Edges shall be rounded.

1210.3.4.4 Structural characteristics.
Grab bars and stanchions shall be designed and constructed for the structural loading conditions set forth in Section 1607.9.2.

1210.3.4.5 Moisture.
Grab bars and stanchions, including mountings, shall be installed and sealed, or provided with permanent drainage such as weep holes for components subject to water intrusion, to protect structural elements from moisture.

Reason: SECTION 202. DEFINITIONS: Stanchion.
An often vertical, tubular structure serving as a hand-grasped, point of control that is fixed between separate supporting structures, surfaces or other railings as opposed to being mounted, in cantilever fashion, on walls as occurs with conventional grab bars.

Brief Introduction to, and Demonstrating Use of, Stanchions and Points of Control. Stanchions have a long history beginning—especially in a facility safety engineering sense—with transportation vehicles such as buses and many intensive-occupancy trains.

See examples below of early stanchions dating back about 100 to 200 years, as photographed in 2018 at the London Transport Museum in London. The first example is of one of the earliest stanchions, likely a wrought iron, vertically-oriented rod, on a horse-drawn, omnibus carrying up to 22 passengers. Next to it are examples of stanchions dating back about 100 years and, at the right side, about one year ago, in a Canadian light rail train car.



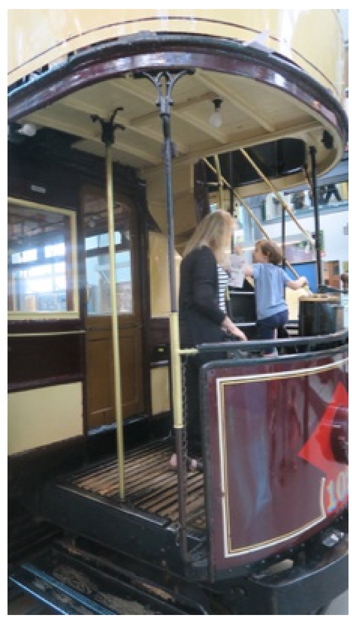
Not very long after the first example, such vehicles started carrying passengers on the roof level reached by a ladder in relatively rare examples and soon a helical stair became quite standard with relatively good railings on each side.

The central handrail for such helical stairs was often a nearly straight, vertical stanchion. Stair steps had more than a 50-degree pitch at the center of the stair width with risers sometimes well over a foot in height.

They were well equipped with handholds which were used by ascending and descending passengers often with three Points of Control, e.g., both hands on railings to either side and at least one foot planted on the small treads.

The sequence of photos below demonstrate not just the range of numbers of Points of Control achieved by adults and children on one of the historic trams (about a hundred years old) in the London Transport Museum. When examined carefully, the photos bring new realizations of what typical users of facilities provided with stanchions do with them and what that means for the technical details we will see in this proposal for grab bars and stanchions in the IBC.





The woman at the right is traversing a step height of 16 inches, as is the young boy. This is comparable to what is needed to step up and over a bathtub wall.

Stanchions predate the relatively recent conventional, wall-mounted grab bars (for which an early example is installed on the tram's end wall adjacent to the woman's left arm. Note that the woman has chosen to grasp a point on the stanchion, with her right hand, at a height that would be at the top of the very short-length grab bar and thus only marginally useful with her left hand.

The people in the sequence of photographs (above) taken at the London Museum, include a very young boy and his mother, traversing two steps each in excess of one foot rise—indeed, the second step is has a full 16 inch (406 mm) rise. Note the young boy's most-effective handholds are at the elevation of his head; both children and adults instinctively know how high the more effective points of control are. (Now if adults drafting and applying point of control would only apply the same lessons learned early in life at about age 12 months.) Moreover the boy maintains a minimum of three points of control in both ascent and descent—*to the full extent the available railings—mostly vertical stanchions—allow.* I was able to capture images of children, as well as some adults using the railings with the precarious underfoot challenges (comparable in a way to what bathers need to do). Note these photos were not staged in any way; the are completely spontaneous with absolutely no communication between camera operator and subjects photographed who were unaware of the photography.

The boy, shown in his ascent of the both stairs leading to the upper level seating, would have had difficulty if he had attempted to use the short grab bar instead of the full-length stanchion. He would only have been able to reach the grab bar from a position on the first tread, not from the ground level. Both of his hands are grasping a stanchion in the first photo; his left hand is at about the elevation of his head (and thus hidden from the camera's view). You can see this is the situation shown in the last of the three photos; his left hand is reaching for a head-height grasp on a stanchion to his left while his right hand is at about his shoulder height.

An important lesson, from the photo sequence above, is that stanchions provide more options for placement and more options for users to choose the points of control they perceive as important to their task and safety. In other words ordinary people, even of young age, are displaying skill in ergonomics (the science and technology of how people utilize things, systems, etc. available to them to perform tasks efficiently and safely).

Now, for purposes of this IBC proposal, along with grab bars, it should be clear that stanchions are reliable, indeed superior, time-tested means of providing for "points of control" and they provide options for location and length that greatly exceed what conventional grab bars can provide.

Comparing Points of Control Quantitatively.

Grab bars, handrails and stanchions are important building components (and some mobility aids such as walkers) providing—in combination with our hands and our feet—what are called (in ergonomics) "points of control" to maintain balance and aid in ambulation and other movement activities that are crucial to utilizing means of egress, for example, for safety generally (in both normal and emergency conditions) and which pose dangers of injurious falls, the leading source of injuries in most countries, including the USA.

Regarding ergonomics as a basis for regulating movement task safety, today, three points of control are the minimum acceptable standard for occupational settings in the USA for ladders, etc., including the minimal footholds and handholds that truck drivers (accessing and leaving their high-off-the-ground truck cabs) have learned to climb up and down safety by exercising, continuously, provision of three points of control; i.e., with only one extremity (or four) in motion at any one time. The table below describes the full range of points of control provided in several contexts.

Number of Points of Control Via Hands or Feet	≤1	1	2	3	3-4
Standard walker for older adult with altered gait.					✔
Occupational settings with risk of worker falls from heights. Also, stairs where users can use two handrails simultaneously, one on each side.				✔	
Stairs where users have only a single handrail. ***Grab bar(s) usable for bathtub/shower entry/egress.***			✔ ★		
Bathtubs/showers with slip resistant underfoot surfaces when wet.		✔			
Bathtubs/showers without slip resistant underfoot surfaces when wet, the common condition currently.	✔				

Having introduced some key terminology related to Points of Control, we move to the proposal for a new Section of requirements for the International Building Code in which, currently, the requirements for points of control for bathing and showering facilities exist in the lower left corner of the Table shown above. The proposal of several new requirements follows next, along with supplementary text expanding on what is being required, how the requirements can be implemented, and what are the benefits and costs of doing so (as NFPA 101 plus NFPA 5000) have been doing since 2018 and the *National Building Code of Canada* has parallel new requirements proposed (and formally, publicly reviewed) for its 2020 edition (which is slated for publication later in 2021, a delay brought on by the COVID-19 pandemic).

IBC SECTION

1210

TOILET AND BATHROOM REQUIREMENTS

. . . .

1210.3 Grab bars and stanchions at bathtubs and showers in Groups R-1, R-2 R-3 and R-4. Bathtubs in Groups R-1, R-2, R-3 and R-4 occupancies shall be provided with grab bars and/or stanchions complying with Section 1210.3.1, 12010.3.2 and 12010.3.4. Showers in Groups R-1, R-2, R-3 and R-4 shall be provided with a grab bar or stanchion complying with Section 1210.3.3 and 1210.3.4.

Exception: Accessible units complying with ICC A117.1 Section 1102.11 are not required to comply with this section.

A separate proposal for the IBC is being submitted as a “fall back” in the event ICC members are unhappy with these new requirements for grab bars and stanchions. It references the current requirements, for grab bars and stanchions, in NFPA 101 (and 5000), 2021 edition, after being first published in their 2018 editions. The NFPA requirements include broader scoping that extends what is proposed here for residential and includes all the residential settings listed here for the IBC as well as for the IRC which will be addressed in ICC’s Group B proposal review in 2022 (also for the 2024 edition for which this scoping is proposed for the IBC).

The largest number of approximately one million-plus professionally treated injuries annually in the USA, arising from fall events in bathing and showering facilities occur in residential settings.

See the extract from the best recent published paper on injury epidemiology involving consumer products, including the top two—stairs and bathtubs/showers—that are (or should be) regulated with improved building code requirements. The table below is extracted from Table 2 in the publication: Lawrence B, Spicer R, Miller T. A fresh look at the costs of non-fatal consumer product injuries. *Injury Prevention* 2015; **21**:23-29. It shows products that are covered by building codes; this accounts for the omission, in this extract, of products ranked between 13 and 27.

Note that the “bathtubs/showers” category does not include “Toilets” which has its own data; neither does the “bathtubs/showers” category include scald-related injuries for which CPSC/NEISS has a separate coding.

Table 2 Leading products involved in injury, ranked by non-fatal injury cost, 2009–2010 (2009 dollars)

Rank	Product	Annual total cost ($)	Percentage	Annual incidence	Mean cost ($)
1	Stairs	92 294 000 000	10.1	1 231 619	74 937
2	Floors	81 233 000 000	8.9	941 296	86 299
3	Beds	44 192 000 000	4.9	612 658	72 131
4	Bicycles	38 898 000 000	4.3	536 360	72 521
5	Football	27 127 000 000	3.0	467 575	58 016
6	Basketball	25 677 000 000	2.8	508 167	50 529
7	Chairs	22 377 000 000	2.5	335 180	66 761
8	Bathtubs/showers	19 723 000 000	2.2	262 849	75 037
9	Ladders	18 662 000 000	2.1	179 195	104 144
10	Exercise (w/o equipment)	16 135 000 000	1.8	211 682	76 224
11	Doors	15 914 000 000	1.7	334 868	47 522
12	Ceilings and walls	15 545 000 000	1.7	288 755	53 833
28	Toilets	6 691 000 000	0.7	77 675	86 145

The available data from US CPSC NEISS (National Electronic Injury Surveillance System) are not fine grained enough to assign injuries to the subgroups of R1, R2, R3, and R4 occupancies (along with the likely biggest culprit, one and two-family dwellings). Injury treatment professionals (who provide the basic data collection for NEISS) are already too busy and not trained in the arcane topic of occupancy classification to provide the fine-grained location data some might like to have. (The current COVID pandemic means this shortcoming is even more pronounced.)

Thus, more-basic criteria based on etiology, epidemiology, ergonomics and economics must be used. To make a long complex story short, the public health approach has to be founded on basic equity we deserve, with this daily or otherwise frequent exposure to dangers of baths and showers.

The most dangerous aspect of "exposure to dangers of baths and showers" occurs in only a relatively few seconds—the transfers into and out of bathtubs and showers, unlike exposure to stairs which accounts for many seconds per day per person. Thus exposure to injury per use, e.g., only as much as an average one bathtub or shower use per day per residential occupant must be recognized.

With such correction for exposure, the injury risk for bathtubs/showers is in the same league as stairs. This is the most important factor to be kept in mind when considering the scoping for the new grab bar and stanchion requirements, the sole focus of IBC section 1210.3. Moreover, as is clear in the epidemiological data provided with a breakdown by age of injured people.

Like all good public health practice, this includes a focus on two topics: epidemiology (incidence of injuries, for example, in the population) and etiology (causes of, and contributing factors to, injuries—our focus here). Etiology is substantially linked to the ergonomics involved in bathing, showering and the injury incidents associated with each due to two major factors, points of control and underfoot conditions.

This latter topic, *underfoot conditions*, is beyond the scope of the this proposal and, moreover, is currently most effectively addressed with non-IBC interventions, partly because the plumbing industry is even less well equipped, technologically, to address underfoot conditions, including slipping within, and in the vicinity of, bathtubs and showers.

Beyond the scope of this IBC change proposal are non-code solutions for solving the slipping problem at extremely modest cost and bather effort; this involves having a wet terry cloth towel between a bather's feet and the bathtub or shower's underfoot surface. This works more reliably than does almost any attempt to have an inherent slip-resistant surface manufactured into the underfoot bathtub or shower surface for which, the proponents extensive worldwide travels are very, very rarely found, for example, in hotel guest room bathrooms. If hotel operators, who are relatively risk conscious, cannot reliably provide slip-resistant bathing surfaces, what can we expect of ordinary residential occupants or building officials, very few of whom are sufficiently expert on slip resistance.

See the fourth framed figure, a table with fine-grained analysis, of CPSC/NEISS data for a 4-year period, by the Pacific Institute for Research and Evaluation, PIRE, reproduced below—as part of a set of 13 selected slides from the proponent's presentation at a world congress on ergonomics in 2018. This is very relevant to the issue of scoping of these proposed IBC requirements.

In relation to the 2018 presentation, solutions to the ergonomics challenges of bathing and showering safety were addressed by the proponent in a 2018 publication as well as the related presentation delivered at the (latest) 20th Triennial Congress of the International Ergonomics Association which are provided, to the extent possible this proposal. The citation to the formally published paper is:

Pauls, J. and Johnson, D.A. (2018). **Applying Ergonomics to Bathing Safety: Including adoption of unorthodox practices for slip-resistant underfoot surfaces of bathtubs plus showers and provision of effective points of control.** *Proceedings of the 20th Congress of the International Ergonomics Association (IEA2018),* Vol II, Springer, pp. 486-500.

To provide an overview of this scientific paper and full presentation on the ergonomics and epidemiology of the problem this proposal addresses, here follow 13 of the proposal-relevant slides from the 26 PowerPoint slides used in the formal presentation by the lead author (the proponent of this proposal) in Florence, Italy, in 2018. The full presentation can be delivered, at no cost, to any ICC Chapter in a one-hour Webinar by contacting Jake Pauls at bldguse@aol.com. Here follows a selection of the slides from 2018 to introduce the very large background for the full proposal. Presenting them here provides better readability for this proposal.

Applying Ergonomics to Bathing Safety:
Including adoption of unorthodox practices for slip-resistant underfoot surfaces of bathtubs plus showers and provision of effective points of control

Jake L. Pauls[1] and Daniel A. Johnson[2]
[1] Jake Pauls Consulting Services, Toronto, Canada
bldguse@aol.com
[2] Daniel A. Johnson, Inc., Olympia, WA, USA
dajinc1@mac.com

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1. Introduction to Epidemiology, Etiology and Economics of the Problem

. . . . Falls are a typical mechanism leading to injuries, many of which occurred with bather movement before, during and after bathing when combinations of four key dangers are present:

- Geometry of the impediments over which one must transfer (e.g., bathtub walls and high sills for dedicated showers)
- Hard, unforgiving surfaces
- Insufficient, effective points of control
- Slippery underfoot surfaces.

Showers & Tubs More Dangerous than Stairs per Unit of Exposure

. . . . A single step into or out of a bathtub imposes a higher risk of a misstep and fall than occurs in a person's typical single step on stair flight—which entails moving ones foot the height of two risers. Each entails traversing about 400 mm vertically. . . .

Growth of bathing-related falls versus those associated with stairs.

Bath and shower-related injuries in the US grew in the two decades between 1991 and 2010 by a factor of two for those resulting in an ED visit and by a factor of three for those resulting in hospital admission after first going to the ED.

For 2010, in the USA, there were about 263,000 ED-treated injuries associated with bathtubs and showers and about one million treated by medical personnel in all settings. . . . Toilet use involves some similar transfer issues to bathing with comparable mitigation measures, namely improving points of control. . . . Vulnerability of older adults [with their non-voluntary exposure] leads to larger proportions of older person injuries from toilet use [relative to use of bathtubs or stairs].

PIRE-calculated annual injuries in USA (2010-14) by treatment type and age

Bathtubs and Showers

			Hospital-admitted			
Age	Doc/Outp	ED	via ED	Direct	Total	%
00-09	37,421.8	43,503.5	1,167.9	620.3	82,713.5	
10-19	35,732.0	23,165.9	449.5	164.8	59,512.1	14
20-29	70,160.9	36,019.2	1,196.7	438.5	107,815.2	
30-39	111,471.0	36,842.1	1,355.1	394.4	150,062.6	59
40-49	128,771.0	37,902.7	2,180.3	666.2	169,520.2	
50-59	123,201.0	38,110.5	3,513.7	1,235.5	166,060.7	
60-69	70,778.2	24,719.1	4,742.3	1,571.3	101,811.0	
70-79	50,653.0	18,959.1	5,648.5	1,762.5	77,023.1	28
>=80	50,961.4	23,964.3	9,880.1	2,699.0	87,504.8	
Total	679,150.0	283,187.0	30,134.0	9,552.5	1,002,023.5	
%	68	28	3	1		

PIRE-calculated annual injuries in USA (2010-14) by treatment type and age

Toilets

			Hospital-admitted			
Age	Doc/Outp	ED	via ED	Direct	Total	%
00-09	8,189.7	7,788.1	200.2	79.0	16,257.0	
10-19	3,013.0	2,532.5	84.2	24.4	5,654.0	7
20-29	7,713.5	5,373.5	250.0	125.0	13,461.9	
30-39	15,319.0	5,987.9	459.1	125.2	21,891.2	34
40-49	19,713.9	6,995.6	1,055.7	391.1	28,156.3	
50-59	26,914.0	9,408.3	2,112.3	673.5	39,108.2	
60-69	30,101.1	10,529.7	3,840.1	1,318.7	45,789.6	
70-79	28,111.9	10,741.6	5,512.9	1,751.8	46,118.2	58
>=80	44,531.3	21,436.1	12,449.2	3,353.6	81,770.2	
Total	183,607.0	80,793.3	25,963.8	7,842.2	298,206.3	
%	62	27	9	3		

2 Practice Innovations Addressing 3 of the 4 Types of Dangers

2.1 Points of Control to Mitigate Transfers over Impediments

Points of control, usable simultaneously by one or both bather's hands, augment the limited and bare feet which are vulnerable to various missteps entering/using/exiting the bathtub or shower.

The costs of installing the two points of control (horizontal or diagonal and vertical) are comparable to the average USD280 societal cost of bathing and toileting-related injuries—expressed on an average, per-household basis—over a one-year period.

The economic bottom line: there is a close match in the annual societal cost-per household, of bathing and toileting-related fall injuries in the US and the cost of installing points of control, such as conventional grab bars and, as a cost-effective, more versatile innovation—*stanchions* (which are very common in buses, street cars and train cars).

See Figure 1 for both options shown simultaneously.

2.2 Hard, Unforgiving Surfaces, Including Those of Impediments

. . . . Dangers are geometry of the impediments one must traverse by stepping over (e.g., bathtub walls and high sills for shower enclosures) and hard, unforgiving surfaces (e.g., enamel surfaces of rigid tub walls, ceramic tiles on walls and floors, and metal water controls plus spouts).

Showers require careful attention to underfoot slip resistance that is often inherent in wet conditions, even with certain tiles and surface roughness treatments underfoot. . . . Unfortunately, for conventional bathtubs with their smooth surfaces, another approach to slip resistance is needed and this is the largest focus of this paper, especially as the recommended intervention is somewhat unorthodox, even heretical to some objecting to a virtually no-cost, simple solution to a complex problem.

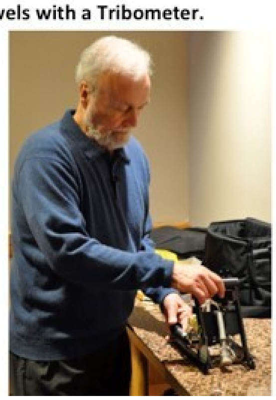
3. Provision of Effective Underfoot Slip Resistance

3.1 Recent and Current Safety Standard Situation

Efforts to deal with slippery underfoot surfaces of bathtubs with manufactured surface treatments have not been successful. . . .

Testing Slip Resistance of Terry Cloth Towels with a Tribometer.

The second author of this paper, who is certified in the use of a tribometer (the *Variable Incident Tribometer, VIT*) has, independently been testing comparable terry cloth towel samples with a smooth granite surface as well as a calibrated test tile of known slip resistance (SR) comparable to what a glazed enamel tub provides under dry, damp and sopping wet conditions.



4. Conclusions

Generally, the practice of using ordinary terry cloth towels to solve one of the main problems with bathing safety, along with installation of effective points of control—for example, using stanchions that integrate well with bathroom décor at low cost—should make bathing a less dangerous activity, at modest cost and low installation complexity in both new bathrooms and existing ones.

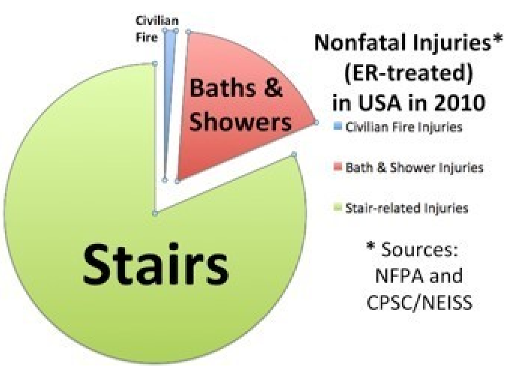
One bottom line is somewhat unorthodox, even heretical. Whereas in much of the work on slip resistance, water is considered an "enemy," it turns out that for slip resistance of smooth, wet surfaces typically found underfoot in a bathtub or shower, the combination of ordinary terry cloth towels and water is your "friend."

Solutions to the slipping and other problems for bathing—especially showering—can be elegant, counterintuitive, inexpensive and immediately at hand (or should we say also "at foot") in every bathroom. Such solutions are addressed in freely accessible videos and, increasingly, those solutions requiring structurally adequate installation of points of control are being enshrined in North American safety standards and building codes. Thus improved bathing safety could be a success story in applying ergonomics to heretofore inadequately addressed public health problems.

References (20 provided)

See www.bldguse.com for related videos on bathing safety and the IEA2018 Proceedings, Vol 2, for the full, 15-page paper.

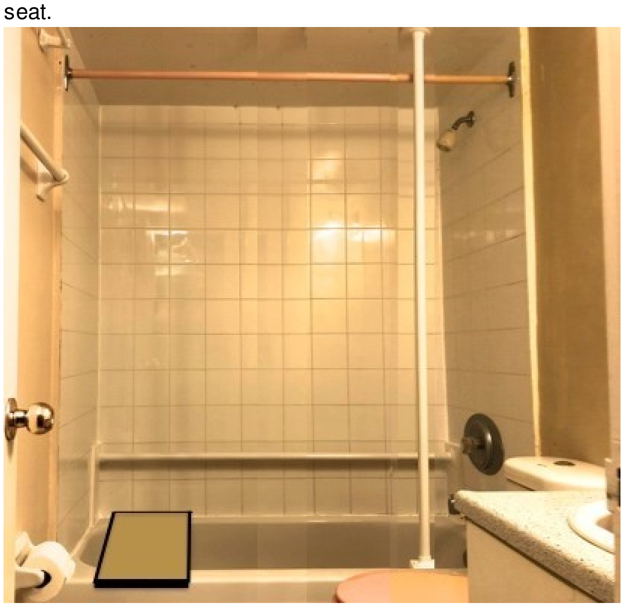
This overdue attention to this huge public health and safety problem is, significantly, the longstanding, official public policy position of the American Public Health Association (which the proponent has represented on ICC's Industry Advisory Committee since the late 1990s) and the Canadian Public Health Association. As well as being a longtime member of both Associations, the proponent is also a recipient of both Associations' public service awards for his work on model codes and safety standards committee for decades—now totaling over 280 Committee-years of experience, dating back to the 1970s, he has as a voting member on over a dozen national committees in the US alone. Before moving on scoping to technical requirements, there is one last exhibit, a pie chart showing the relative number of nonfatal injuries associated with bathtubs and showers relative to nonfatal stair-related injuries and nonfatal fire-related injuries.



The vast majority of issues that make up the agendas of ICC code development hearings are not associated with the number of injuries that relate to bathing and showering. This is a major reason for the scoping being broad; the problem is broad and involve over one million injured Americans annually who seek professional medical attention for their bathing and showering-related injuries.

Proposed IBC Technical Requirements for Bathtubs withPoints of Control Utilizing Grab Bars and Stanchions Front or Access Side of the Bathtub. Included within proposed section 1210.3.1, for the access (front) side of bathtubs, are five options, all premised on the assumption that the bathtub will be used for both immersion bathing and showering. The later involves some kind of water spray control barrier between the bathtub and the remainder of the bathroom which (at last in North American bathrooms) is designed to stay relatively dry. This can be as simple as an installed shower curtain rod or track over the tub's access side tub rim and manual sealing of the curtain (hung from the rod or track) before each shower at both the control end wall and the head end wall. Thus, at the end walls, an area several inches wide, horizontally, has to be kept free of wall mounted, conventional grab bars that interfere with such routine, yet critical sealing to capture all the shower spray water in the tub, not on the floor outside the tub. This is addressed in 1012.3.1.1 covering options for vertical grab bar, horizontally located ***inside*** the shower curtain rod or track and enclosure wall end framing area of each end wall. The graphic below shows all eight of the options from which a minimum of two are required by the proposed requirements for bathtubs. The eight options include two (grab bar) locations for each of two end walls plus one stanchion option for the entire length of the access side of the bathtub. The graphic shows such a stanchion option about midway along the bathtub length because that works best for the adjacent toilet for which the stanchion is an aid in stand-to-sit and sit-to-stand transfers. These front of tub access side options are discussed below the graphic.

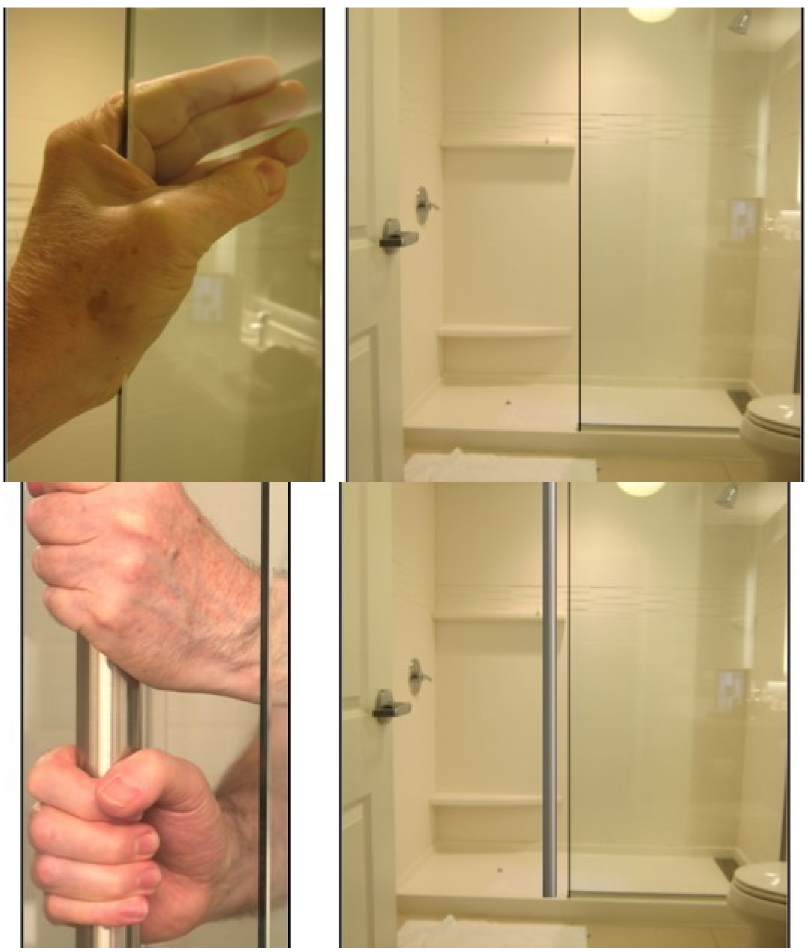
Note that the figure shows the (50-year old enamel steel) bathtub rim-mounted stanchion is outside of the shower curtain rod by 2 to 3 inches, so that the stanchion interferes in no way with the (not shown) shower curtain. Although the curtain is not a matter for IBC scoping, the installed shower curtain rod or track should be as the location is critical to performance of the bathtub or shower both in terms of water control—which is addressed already in IBC Section 1210—as well as in user safety from falls that IBC Section 1210 must now incorporate. Section 1012.3.1.2, covers the access-side option which is outside the shower curtain rod/track either approximately over the outer edge of the bathtub or within 6 inches (150 mm), horizontally, outside the bathtub footprint. Either a wall-mounted conventional grab bar or a stanchion can be located within this area, up to 6 inches (150 mm) away from the access side tub wall as well as the first two inches over the outer edge of the tub rim. Thus there are five options for a single required grab bar as well as multiple additional options for a vertical stanchion anywhere along the length of the access side tub wall. This provides maximum flexibility with bathroom layouts including double-duty service provided by a floor (or tub rim for steel bathtubs) lower mount-to-ceiling vertical stanchion if there is a toilet adjacent to the bathtub. For some users this stanchion will be the most used of all (eight) options included in the proposal package. Also, demonstrating the flexibility of placement with the access side, vertical stanchion is the figure below which has the rim-mounted stanchion (which could also be floor mounted for the same utility) shifted away from the center of the tub wall to allow a person using a head end, tub seat which means more bathtub rim length needs to be clear so ones legs can be easily lifted over the tub rim and into (or out of) the tub. There is also a wall-mounted grab bar located just outside the head end wall to assist with stand-to-sit and sit-to-stand transfers to/from the tub seat.



Although it would drastically affect the tub seat just described, there is also an option of installing rigid glazed panels, fixed, sliding or, more rarely, hinged to form an access side enclosure for the bathtub and manage the shower water capture. The installation and use of such an enclosure, also involves keeping end wall-mounted grab bars and the end-wall framing for the enclosure separated. This is specified in 1210.3.4.2 Spacing, which is addressed later near the end of the proposed technical requirements, the first group of which follow directly below. **1210.3.1 Grab bar or stanchion at the access side to bathtubs and shower/bathtub combinations.** A grab bar or stanchion shall be provided at the access side to each bathtub and shower/bathtub combination in accordance with Section 1210.3.1.1 or 1210.3.1.2. Location dimensions, except as provided for spacing in 1210.3.4.2, are to the centerline of the grab bar or stanchion at the fixed end of its graspable tubing component complying with 1210.3.4.1. **1012.3.1.1 End wall grab bar.** A vertical grab bar on one end wall of the bathtub shall be provided between 9 inches (230 mm) and 12 inches (305 mm) horizontally, inward from the access side of the bathtub. The grab bar shall extend from 24 inches (610 mm) maximum to 60 inches (1524 mm) minimum above the finished floor. **1012.3.1.2 Bathtub access side, grab bar or stanchion.** A vertical grab bar or a vertical stanchion shall be provided within 2 inches (51 mm) maximum inward, and within 6 inches (152 mm) maximum outward, from the access side of the bathtub. The grab bar or stanchion shall be located 2 inches (51 mm) minimum, horizontally, from the centerline of any shower curtain rod installation. The grab bar or stanchion shall extend from 24 inches (610 mm) maximum to 60 inches (1524 mm) minimum above the finished floor. **Back Wall or Non-access Side of the Bathtub.** Shifting attention now to the back wall or non-access side, there are three options there with a few the diagonal grab bar having multiple options with the slope angle permitted to be between 30 and 60 degrees to horizontal which could serve differing statures of users. The back wall options are shown in the graphics below.

1210.3.2 Grab bar and stanchion at the back wall, or non-access side, of bathtubs and shower/bathtub combinations. A grab bar or stanchion shall be provided on the back wall, or non-access side of each bathtub and shower/bathtub combination in accordance with Section 1210.3.2.1 or 1210.3.2.2. Location dimensions, except as provided for spacing in 1210.3.4.2, are to the centerline of the grab bar or stanchion at the fixed end of its graspable tubing component complying with 1210.3.4.1. **Exception:** For relatively deep bathtubs, where the required centerline height for the overall or lower end height exceeds 24 inches (610 mm) above the adjacent finished floor elevation, the centerline height shall be permitted to be 3 inches (76 mm) maximum above the bathtub rim height. **1210.3.2.1 Horizontal grab bar or stanchion.** A grab bar 36 inches (910 mm) minimum in length, centered, plus or minus two inches (51 mm), along the length of the bathtub, or a full-length stanchion installed between end walls. Its height above the bathtub rim shall be 8 inches (203 mm) minimum and 10 inches (255 mm) maximum. **1210.3.2.2 Diagonal grab bar.** A grab bar shall be installed in a diagonal position with its angle, to horizontal, 30 degrees minimum and 60 degrees maximum. The diagonal grab bar shall have the higher end located 12 inches (305 mm) maximum from the control end wall, measured horizontally. The lower end shall be 8 inches (203 mm) minimum and 10 inches (255 mm) maximum above the bathtub rim. It should be clear that the back wall (or non-access side) points of control are mostly intended for use in stand-to-sit and the more difficult to perform (with lower limb weakness and issues with postural hypotension), sit-to-stand transfers. The points of control are less used—with the exception of missteps that lead one to fall during tub entry or egress that might be mitigated with a (desperate) grab for something on the non-access side—for the challenge of stepping over the access side of the tub wall. One increasing situation is larger tubs that can be completely or relatively free-standing with no Immediately adjacent walls on any side of the tub. **Summing Up Bathtub Requirements.** To underline how minimal or flexible this code change proposal is, it only requires two points of control —*out of several options*—for bathtub users to enter and exit a bathtub which can have tub walls to surmount that exceed one foot in height (305 mm) with possibly slippery conditions under the weight-bearing foot. Currently that single point of control, under a person's weight-bearing foot, is all that is provided for bathtubs. This merits repetition: *the IBC currently permits one dubious point of control underfoot with no possibility of a hand providing a point of control because there are no grab bars or stanchions at hand*. **Lessons about "Reinforcement" ("Backing") Instead of Actual Installation of Points of Control.** There are many lessons in this proposal's use of many photos (which are but a tiny part of the proponent's image collection); one that has special relevance to the argument about providing only reinforcement for future grab bar installation and thus rely, into the future, on code rules which have begun to provide for this. However, the dimensions for installing such backing, based on (unlikely to be timely) future grab bar installations, were premised on a different paradigm or set of assumptions, namely to provide for future grab bars that, while perhaps working for non-ambulatory users who were relying upon seated-position-to-seated-position transfers into and out of bathtubs and transfer-type showers. Grab bars installed within the limits of such backing would all ambulatory users. Furthermore, they are often based on horizontal grab bar installations that are not as useful as vertical ones for *ambulatory* transfers over tub rims. Thus, instead of having the option of using conventional wall-mounted (into reinforcement or backing) grab bars for *ambulatory* users, especially taller adults, there will possibly be greater reliance on stanchion solutions which do not rely on cantilevered structures attached to walls (which might or might not have appropriate reinforcement) and needing to sustain loads of up to a few hundred pounds, possibly on screwed in attachments that will have substandard performance, for grab bars, if affected by water issues that are addressed at the end of this Reason statement.

Proposed IBC Technical Requirements for Showers withA Single Point of Control Utilizing a Grab Bar or Stanchion Although stand-alone showers are simpler than are combination bathtubs and showers, they are changing from the conventional small plan area showers to larger plan areas, including retrofit showers where there were formerly bathtubs. Those plan areas were often about 30 by 60 inches (762 by 1524 mm), a retrofit that is increasingly seeing in hotel guest rooms. An example follows of such a conversion before and after the retrofit of a floor-to-ceiling stanchion located at the side of the opening near the edge of the (safety) glass half panel on the access side of the shower. The upper photographs show, on the left side, the poor graspability of the edge of the glass panel, the only thing available as a point of control, albeit a relatively poor one. The lower photographs show the stainless steel stanchion (33 mm diameter) and both hands of a person preparing to exit the shower enclosure

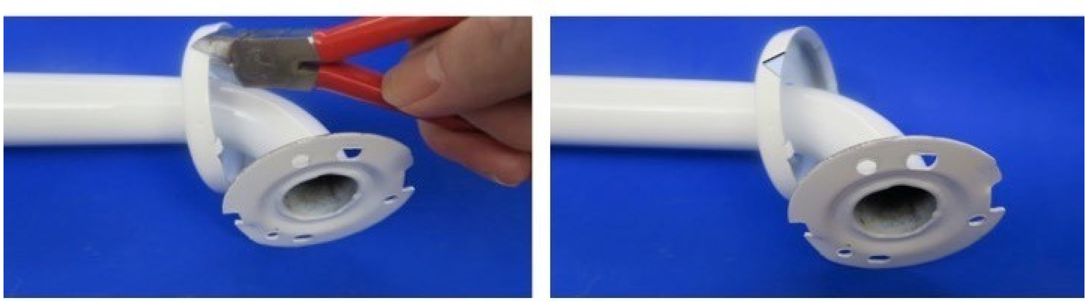


Note that the shower has the controls for the shower water convenient to the entry to the shower enclosure, one of the considerations for such larger showers, especially where the shower head is far away from the entry opening to limit water discharge onto the bathroom floor. The stanchion is located within 36 inches (762 mm), measured horizontally, from both the shower head (which was chosen—in this first proposal—as a reference point for locating the stanchion; another choice—triggered by an amendment to this proposal could reference this to the control or at least one of both). With the lengthened facility, it became clear that a horizontal bar might be more effective than a vertical one, for example to serve bathers needing to take a few steps to get from one end to the other, especially in showers with the (roughly) half-length (safety) glass barrier to help prevent water spray from ending up on the bathroom floor (as illustrated above). There is also (as the ICC ANSI A117 Committee, Accessible Bathing Task Group has started discussing) the problem of where controls for the shower water flow and temperature should be placed, i.e., near the entry end (the situation in the photos above) or at the shower head(s) end. Another consideration, beyond the scope of this code proposal is that, if a point of control for the toilet also becomes important, such a stanchion is also within reach of a person using the toilet.

Thus the stanchion, installed primarily for the shower, also serves stand-to-sit and sit-to-stand transfers associated with the toilet. This option was confirmed by the hotel guest at the time these photographs were taken (as documented in the photograph above). There are also many instances where, depending on the layout of a bathtub (including its controls) and an adjacent shower, a single grab bar or, more likely, a stanchion can serve both bathing/showering facilities. Below is one example (selected from many other bathroom settings in the proponent's photo library of new dwelling unit and hotel guest room bathrooms during the last decade. In this case, this is a hotel guest room which, contrary to the hotel chain's policy, had no grab was provided for either facility. This led to a meeting with the Manager on Duty to complain and point out how easy it would be to retrofit a grab bar or, easier still, a stanchion (similar to the one depicted here which was "installed" digitally). Such a grab bar would comply with both 1210.3.3.1 (for the shower) and 1210.3.1.2 (for the bathtub).

Generally, there is a need for some of the current developments with showers to have the benefit of focused discussions by other experts in both the field of ergonomics as well as the accessibility field. Discussions have already begun with interested members of the previously mentioned A117 Accessible Bathing Task Group who recognize the benefits of what is proposed here for ambulatory users has a benefit for ongoing considerations of bathing and showering facilities for those not capable of ambulation. Some of this rethinking of ICC A117.1 requirements will continue to occur as this proposal goes to the CAH part of the ICC process and as amendments are possible subsequently. With that background to showers, here are the currently proposed requirements for showers as addressed in the IBC. **1210.3.3 Grab bar or stanchion at the access to showers.** A grab bar or stanchion shall be provided for the shower in accordance with Section 1210.3.3.1 or 1210.3.3.2. or 1210.3.3.3. Location dimensions, except as provided for spacing in 1210.3.4.2, are to the centerline of the grab bar or stanchion at the fixed end of its graspable tubing component complying with 1210.3.4.1. **1210.3.3.1 At Shower Exterior.** A vertical grab bar or stanchion shall be provided outside of the shower compartment, adjacent to the access opening. The grab bar or stanchion shall extend from 24 inches (610 mm) maximum to 60 inches (1524 mm) minimum, measured vertically above the finished floor. **1210.3.3.2 For Smaller Shower Interior.** For showers with interior plan dimensions, including diagonally between corners, 51 inches (1295 mm) maximum, a vertical grab bar shall be provided, interior to the shower compartment, 36 inches (910mm) maximum, measured horizontally from the control wall on the side closest to the access opening. The grab bar shall extend from 24 inches (610 mm) maximum to 60 inches (1524 mm) minimum, measured vertically above the finished floor outside the shower. **1210.3.3.3 For Larger shower Interior.** For showers with any interior plan dimensions exceeding 51 inches (1295 mm), including diagonally between corners, a grab bar or stanchion located interior to the shower compartment shall be 36 inches (915 mm) maximum, measured horizontally to the access to the shower. If oriented vertically, the grab bar or stanchion shall extend from 24 inches (610 mm) maximum to 60 inches (1524 mm) minimum, measured vertically above the finished floor outside the shower. If oriented horizontally, the grab bar or stanchion shall have a length 36 inches (915 mm) minimum at a height, measured vertically above the finished floor outside the shower, of 48 inches (1220 mm) minimum and 60 inches (1524 mm) maximum. The final section, 12.3.4. deals with mostly well-established details based on the current ICC A117.1 or IBC Section 1210. **1210.3.4 Grab bar and stanchion requirements.** Grab bars and stanchions, shall comply with Section 1210.3.4.1 through 1210.3.4.5. With following requirements almost entirely consistent with the parallel A117.1 requirements, the only reason statement needed is for two matters, both tiny but important details. First, unlike A117.1, the clearance between walls and grab bars is 1.5 inches (38 mm) minimum, not 1.5 inches absolute. The latter is an error in A117.1 that will be corrected, I hope, in the next (2024) edition. The majority of users' hands will slip through a 1.5-inch opening and the danger, when bearing down onto a grab bar, of ones hand slipping into the space and breaking bones in ones forearm is not reduced by the absolute criterion rather than a minimum. See the photos below illustrating how even the hand of a large male, admittedly of advanced age (with some shrinkage of muscle mass),c an slip through a 1.5-inch (38 mm) space. While this results in minor bruising of a very small area of the back of ones hand, there is a benefit to the hand not being jammed in the space as the area of the hand and wrist just above the hand is not an area one wants to injure, as with fracture(s). Having the hand go through the space and then having the arm caught nearer the elbow provides some protection from fracture due to the muscle mass in the upper forearm and the larger bones there.

Bottom line, one does not want to injure ones hand or wrist when "bearing down" on a (horizontal) grab bar with a grab bar that only nominally meets the 1.5-inch (38 mm), absolute spacing rule that must now be reconsidered in A117.1. Hence this draft for mainstreamed grab bars refers to the 1.5 inches as a "minimum" for good reason. **1210.3.4.1 Cross section.** Grab bars and stanchions shall have a cross section complying with one of the following:1. A circular cross section with an outside diameter of 1-1/4 inch (32 mm) minimum and 2 inches (51 mm) maximum.2. A noncircular cross section complying with ICC A117.1. **1210.3.4.2 Spacing.** The space between a grab bar or stanchion and any adjacent wall surface, shall be 1-1/2 inches (38 mm) minimum. **1210.3.4.3 Surface Hazards.** Grab bars or stanchions and adjacent surfaces shall be free of sharp or abrasive elements. Edges shall be rounded. **1210.3.4.4 Structural Characteristics.** Grab bars and stanchions shall be designed and constructed for the structural loading conditions set forth in Section 1607.8.2. **1210.3.4.5 Moisture.** G rab bars and stanchions, including mountings, shall be installed and sealed, or provided with permanent drainage (such as weep holes) for components subject to water intrusion, to protect structural elements from moisture. Aside from the clearance space issue in 1210.3.4, the other new detail is in the existing requirements in IBC 1210 with the addition of the "drainage" detail (in 1210.3.4.5 Moisture) which deals with a common problem with many conventional grab bars which trap water in the bottom third or so of the snap on caps over the fixing plates for screws into the wall. Water flowing along the grab bar can readily enter the void behind the caps and be trapped there indefinitely causing corrosion of the screws and deterioration of the wall materials resulting failure of the screws, especially to pull out forces on the grab bar. Sealing does not solve this problem. Drainage through weep holes or even prying the bottom of the cap away from the wall can mitigate this water entry/accumulation issue. (The latter solution is one the proponent practices in many of the hotels in which he is a guest and an investigator of water deterioration of conventional grab bar fixing systems. This is after describing the problem, among others, to the highest management leaders of the very large hotel chain for which he is a "Titanium" member.) A simple procedure for some minor "surgery" on the offending grab bar caps is illustrated below. Simple cut out a small triangle of the cap edge so water can escape after it (invariably) gets inside the cap by flowing through the typically oversized hole in the cap where the tubing passes through. The full justification (to be provided separately as it is largely consistent with what was submitted in the prior cycle.) will show what can collect and grow behind such caps. Below is shown the readily available tool for creating a permanent drainage hole in the relatively thin metal sheet material formed into the cap shape. The last photo depicts the "V" notch which should be on the bottom edge of the cap when it is installed.



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Approximately 50 internationally-produced scientific and technical references, on bathing/showering safety, were compiled by the proponent, in

2016, for an American Public Health Association (APHA) draft policy highlighting, especially two Canadian research studies that also are addressed in video presentations by Principal Investigators (Dr. Nancy Edwards, Dr. Alison Novak) for the research and posted, for free streaming viewing at, https://vimeo.com/164239941 Accessed January 8, 2018. Additional videos covering technical aspects of bathing and showering safety (including cost impact and benefit issues*) are found at the following links (all of which are available, with descriptions, at www.bldguse.com, the proponent's Professional Practice Website, Accessed January 8, 2018.).

https://vimeo.com/237294479

https://vimeo.com/239276202 *

https://vimeo.com/197742277

https://vimeo.com/193507768

https://vimeo.com/173883358

https://vimeo.com/175101448 *

https://vimeo.com/117572176

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Cost Impact: The code change proposal will increase the cost of construction
This proposal, if adopted, will increase the cost of construction but the payback period is only a few years.

The order of magnitude of such increase, covering two full, three-piece bathrooms with one bathing facility in each, is on the order of a hundred dollars, more specifically in the low hundreds, e.g., 300 to 400 per one-family dwelling and half as much for apartments, hotel rooms, etc. Against these additional costs, which should be amortized over approximately a 15-year period (if not longer), the societal injury costs averted annually are approximately $150, per family, with a break-even point reached in a few years.

On a societal scale, in the USA, the estimated annual number of injuries nearly a decade ago led to over one million professional medical visits (second only to stairs at over four million such visits annually in the USA). About 90 percent of the injuries occur in residential settings, but the breakdown of injury occurrences, for ICC occupancy groupings of R1, R2, R3 and R4, is not available. (More-detailed information can be seen in a more authoritative form in the video of world injury economics expert, Dr. Ted Miller, from Maryland, presenting at the World Public Health Congress in Melbourne, in 2017. This is available on a video streaming freely at https://vimeo.com/channels/866600/239276202).

The injury reduction benefits assumed in this analysis do not cover the much larger daily benefits of enhanced usability and ability to have, for example, a daily shower, which increases in value with the user's age. For example, at 78, proponent Jake Pauls values the daily “hedonistic” benefit (a standard term used in cost-benefit analysis) of each morning shower—facilitated with a single stanchion—at about a dollar per day or $365 per year. The stanchion parts cost only about $40 and DIY installation took about an hour. My total benefit per year, not even assuming any injury averted, exceeds my costs.

The COVID epidemic has likely increased the injury toll, perhaps also the need for therapeutic baths and showers, as it has also greatly increased home usage by all family members. It has also complicated, immensely, the availability of consultations with medical professionals with resulting increase in fall consequences, e.g., leading to physical disabilities. Reduced mobility also increases balance issues and falls generally in the entire population. It will be years before we have authoritative studies and impact analyses on what has happened in 2020 due to the pandemic which is expected to continue well into 2021.

G172-21

Public Hearing Results

This proposal includes the following errata

1210.3.4.4 Structural characteristics. Grab bars and stanchions shall be designed and constructed for the structural loading conditions set forth in Section ~~1607.8.2~~ 1607.9.2.

Committee Action: **Disapproved**

Committee Reason: This proposal was disapproved because the committee had several concerns. Have there been any dwelling or sleeping units constructed with the proposed grab bar configurations so that the increase in safety can be verified? Have their been any studies or empirical evidence that indicate that this will significantly improve safety? Requiring the installation in all bathrooms in all Group R units is going too far - perhaps blocking so that residents can add grab bars based on need. The choices for grab bar installation should be based on individual residents needs and choices, which may not be this configuration. The locations specified can be an issue with the different types of tubs and showers on the market for design and structural strength. There is a concern about the grab bar location conflicting with the shower curtains so that water would end up on the room floor, thus creating a slip and fall hazard. (Vote: 14-0)

G172-21

Individual Consideration Agenda

Public Comment 1:

IBC: SECTION 202, 1210.3, 1210.3.4.4

Proponents: Stan Harbuck, representing American Public Health Association (he@xmission.com) requests As Modified by Public Comment

Replace as follows:

2021 International Building Code

STANCHION . An often vertical, tubular structure serving as a hand-grasped, point of control that is fixed between separate supporting structures such as surfaces or other railings, as opposed to being mounted, in cantilever fashion, on walls as occurs with conventional grab bars.

1210.3 Grab bars and stanchions at bathtubs and showers in Groups R-1, R-2, R-3 and R-4 . Where grab bars or stanchions are provided for bathtubs and showers in Groups R-1, R-2, R-3 and R-4 occupancies, such grab bars and stanchions shall comply with NFPA 101, Chapter 24.

Exception: Grab bars and stanchions in Accessible units shall complying with ICC A117.1 1102.11 are not required to comply with this section.

1210.3.1 Structural characteristics of grab bars and stanchions . Grab bars and stanchions shall be designed, constructed and installed for the structural loading conditions set forth in Section 1607.9.2.

Commenter's Reason: For this Public Comment REASON statement, refer first to the background as provided with the very detailed, full REASON statement for proposal G172-21. This Comment will not repeat the earlier-provided information although there are some edited extracts used here from the Proposal IBC G172-21 REASON statement. This comment does borrow extensively from the public comment submitted by Proponent, Jake Pauls, that seeks Public Comment Hearing (PCH) action of "As submitted" rather than the simpler option of utilizing the established requirements of NFPA 101 for grab bars and stanchions for bathtubs and showers as sought in this public comment (submitted by a home inspector —a*nd teacher of home inspection*—serving on the NFPA Residential Occupancies Technical Committee and Chair of NFPA's Manufactured Housing Technical Committee).
There are two public comments being offered – As Modified and As Submitted. The basic REASON, behind overturning Committee action, is that—compared with the record for the Committee Action Hearing—there is far more multifaceted, justification provided with Proposal G172-21 as replaced with the established, detailed requirements in NFPA 101 or, as provided with a separate detailed comment, with "*Approval as Submitted*" as an equally appropriate—and perhaps more acceptable to ICC members—inclusion of the detailed technical requirements in the IBC. Both comments respond with detailed, forensic quality information to the criticisms expressed during the Committee Action Hearing. The information extends the detail in the REASON provided with Proposal G172-21, including a very extensive Bibliography and very supportive Impact statement of large benefits versus very low cost impact—with a payback period on the order of a few years. These extensive details are presented with each of the two public comments.

The following treatment might resemble a forensic examination. *This is intended and healthy for the ICC process and products.* The matter of bathing and showering safety—*and related model code requirements*—might, someday, be resolved in the courts. The consequences to public health and safety are simply too great not to be argued with all the checks and balances*, plus respect for evidence*, that are at the core of legal proceedings. The Proponent of the code change G172-21, Jake Pauls, has testified under oath about 170 times with a comparable number of court-acceptable reports prepared in 40 years where such work represents a minority of his professional duties during that period. (For example, among his many worldwide advisory roles, he served, for two Olympic Games, as the lead advisor on spectator safety.) Forensic quality and detailed evidence are thus at the core of his 54-year professional safety career that led, in 2017, to the University of Greenwich (the world leader in research on people movement in buildings) conferring his Honorary Doctor of Science Degree.

For this Comment there is an update with a recent (Spring 2021) analysis of voluntary measures that people have taken when coping with relatively dangerous bathtubs and showers, among a few comparable dangers (such as stairs and toilets). This helps to understand why we have a current toll of over a million professionally treated injuries, annually in the US, associated with bathtub/shower use and why the injury toll is not even higher. In large part—*with the exception of toilets*, people are limiting their exposure to these relatively dangerous facilities that are more dangerous—*on an exposure-corrected basis*—than are stairs (on which about 90 percent of the injurious, stair-related falls occur in homes) that injure over four million people annually in the US to the extent of leading to professional medical attention and imposing annual societal costs exceeding 100 billion dollars annually for stairs alone with over 20 billion dollars annual societal cost for bathtub and shower-related injuries (not including hot water scalds); toilets are associated with a somewhat lower injury cost of several billion dollars annually in the USA. These annual US cost estimates were for a period about a decade ago (Ref. Lawrence B, Spicer R, Miller T. A fresh look at the costs of non-fatal consumer product injuries. *Injury Prevention* 2015; 21:23-29).

The Comment then continues with a formal response, including some rebuttal to the *published* report of Committee statements at the Committee Action Hearing (CAH) as well as Committee members' *actual* comments as transcribed from the ICC Web site record. The comments, as transcribed from ICC recordings, were not completely, or even sufficiently, similar to the published report to satisfy the standard to which the Proponent of the code change, Jake Pauls, is accustomed and, very reasonably, should be expected of the ICC process. They are, in the professional opinion of the Proponent of the code change, worthy of pursuing in a separate formal objection, including within the Industry Advisory Committee (on which he has long represented the American Public Health Association), and via an Appeal to the ICC Board of Directors.

Voluntary Measures Now Being Taken by Adults To Limit or Avoid, If Possible, Uses of Relatively Dangerous Facilities

First it should be very clear that, based on US CPSC/NEISS data, these uses of dangerous facilities occur almost entirely in residential settings. Hence the proposed scoping—*R1, R2, R3, R4*— is valid. The most dangerous facilities, regulated by codes—*including the I-Codes and, more specifically, IBC Chapters 10 (on stairs) and 12 (in relation to Proposal G172-21)*—are:

· stairs (for traversing different floor levels);

· showers and bathtubs (for external cleansing); and

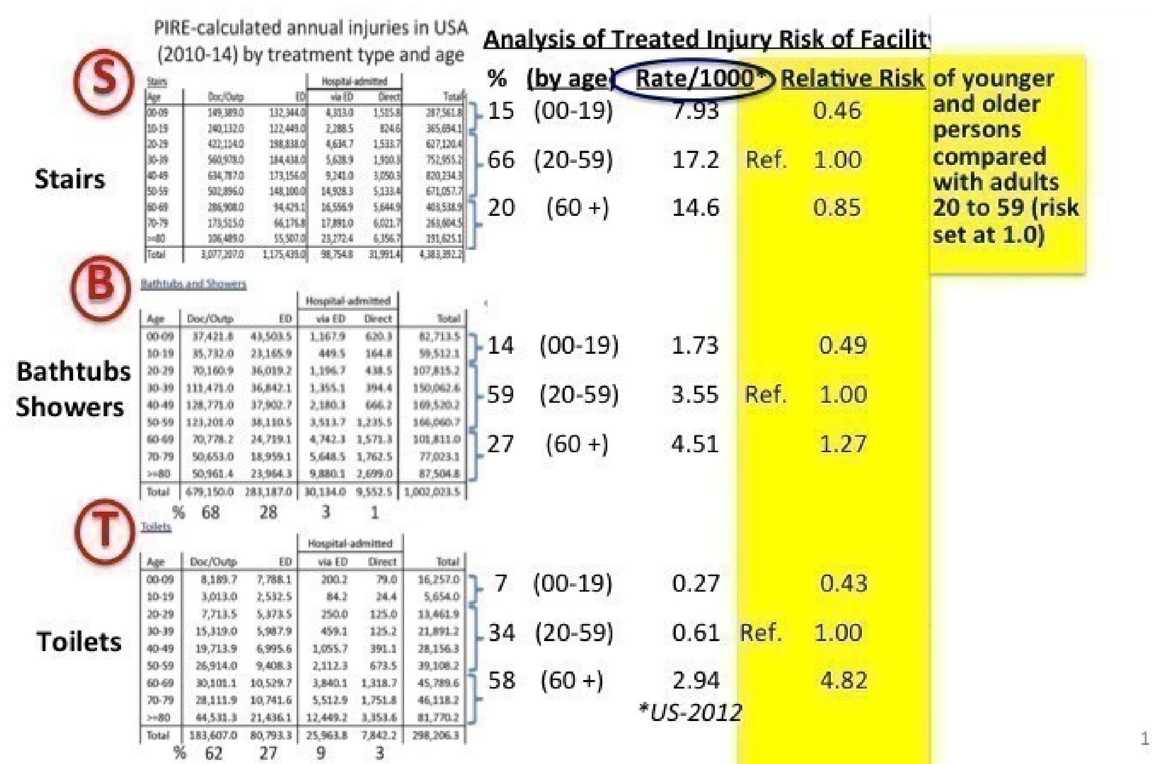
· toilets (for elimination of bodily wastes).

The following is based on an analysis performed early in 2021 by Dr. Jake Pauls, Proponent of the code change G172-21, presented to a Canadian Commission on Building and Fire Codes (CCBFC) Standing Committee (responsible for grab bar and stanchion requirements in the *National Building Code of Canada*). *Voluntary avoidance of use* of the first two of the above list of three relatively dangerous facilities, found in most residential settings, helps to explain population and age-corrected injury data based on nonfatal injuries professionally treated in settings. The treatment contexts range from doctor' offices, medical centers, emergency departments, and admitted patient wards of hospitals. (In relation to the deliberations in Canada, note that the USA has bathtub, shower and toilet design and installation practices very comparable to those in Canada. The USA has a superior injury treatment documentation system with US CPSC/NEISS.)

Here follows a graphic (Figure 1) from the recent PowerPoint Presentation, of 194 slides, to Canadian safety and codes authorities) with, on the left side, tables of non-fatal injury treatment data for stairs, bathtubs/shower and toilets for the USA annually during 2010-14 using US-CPSC/NEISS data as analyzed by Dr. Bruce Lawrence at the Pacific Institute for Research and Evaluation (PIRE) in Maryland. He and his colleagues at PIRE were also the authors of the injury cost paper published in the highly regarded journal, *Injury Prevention,* 2015, cited above.

While the tables' data (in Figure 1) are in small font (with two of the three, in larger size, provided in the Proposal Reason statement), pay attention to the more-readable, middle and (yellow-highlighted) right side summations of the injury data expressed as relative risks for the three injury sites by three age groups, 0-19, 20-59, plus 60-and-older. The relative risks are normalized with the middle-age group set at a reference risk of 1.0 for each of the three facility groups: stairs, bathtub/showers and toilets. (For those interested in the totals for ***annual*** treatments averaged over the period 2010-2014—the bottom line on the leftmost column of each facility table—were: stairs - 4,390,022; bathtubs & showers - 1,002,023; toilets - 298,206. By comparison, US nonfatal fire-related injuries, in the last decade, are estimated to be in the 10,000 to 20,000 range or about 0.3 percent of the nonfatal injury toll due to stairs, bathtubs/showers and toilets (as illustrated in the pie chart provided in the Proposal Reason statement—about 2/3 into the text of the statement).

Figure 1.


PIRE-calculated annual injuries in USA (2010-14) by treatment type and age

Stairs

Age	Doc/Outp	ED	Hospital-admitted via ED	Hospital-admitted Direct	Total
00-09	149,389.0	132,344.0	4,313.0	1,515.8	287,561.8
10-19	240,132.0	122,449.0	2,288.5	824.6	365,694.1
20-29	422,114.0	198,838.0	4,634.7	1,533.7	627,120.4
30-39	560,978.0	184,438.0	5,628.9	1,910.3	752,955.2
40-49	634,787.0	173,156.0	9,241.0	3,050.3	820,234.3
50-59	502,896.0	148,100.0	14,928.3	5,133.4	671,057.7
60-69	286,908.0	94,429.1	16,556.9	5,644.9	403,538.9
70-79	173,515.0	66,176.8	17,891.0	6,021.7	263,604.5
>=80	106,489.0	55,507.0	23,272.4	6,356.7	191,625.1
Total	3,077,207.0	1,175,439.0	98,754.8	31,991.4	4,383,392.2

Bathtubs and Showers

Age	Doc/Outp	ED	Hospital-admitted via ED	Hospital-admitted Direct	Total
00-09	37,421.8	43,503.5	1,167.9	620.3	82,713.5
10-19	35,732.0	23,165.9	449.5	164.8	59,512.1
20-29	70,160.9	36,019.2	1,196.7	438.5	107,815.2
30-39	111,471.0	36,842.1	1,355.1	394.4	150,062.6
40-49	128,771.0	37,902.7	2,180.3	666.2	169,520.2
50-59	123,201.0	38,110.5	3,513.7	1,235.5	166,060.7
60-69	70,778.2	24,719.1	4,742.3	1,571.3	101,811.0
70-79	50,653.0	18,959.1	5,648.5	1,762.5	77,023.1
>=80	50,961.4	23,964.3	9,880.1	2,699.0	87,504.8
Total	679,150.0	283,187.0	30,134.0	9,552.5	1,002,023.5
%	68	28	3	1	

Toilets

Age	Doc/Outp	ED	Hospital-admitted via ED	Hospital-admitted Direct	Total
00-09	8,189.7	7,788.1	200.2	79.0	16,257.0
10-19	3,013.0	2,532.5	84.2	24.4	5,654.0
20-29	7,713.5	5,373.5	250.0	125.0	13,461.9
30-39	15,319.0	5,987.9	459.1	125.2	21,891.2
40-49	19,713.9	6,995.6	1,055.7	391.1	28,156.3
50-59	26,914.0	9,408.3	2,112.3	673.5	39,108.2
60-69	30,101.1	10,529.7	3,840.1	1,318.7	45,789.6
70-79	28,111.9	10,741.6	5,512.9	1,751.8	46,118.2
>=80	44,531.3	21,436.1	12,449.2	3,353.6	81,770.2
Total	183,607.0	80,793.3	25,963.8	7,842.2	298,206.3
%	62	27	9	3	

Note that, for stairs and bathtubs/showers, the relative risk rates (per 1000 population) for the two older age groupings (20-59 and 60-plus) are relatively similar (within same order of magnitude). However for toilets, the only facility category for which use cannot be voluntarily avoided by older persons (i.e., 60-plus), their relative risk of injuries is much higher (by nearly a factor of five).

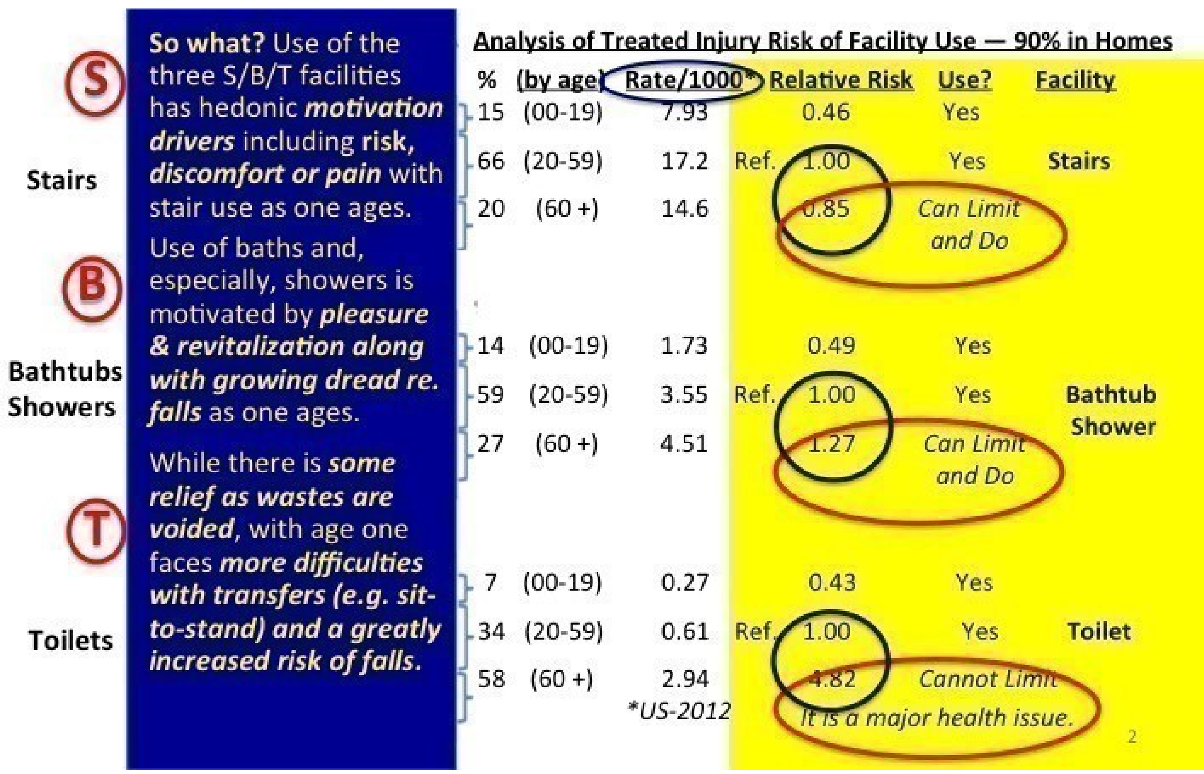
What this means is that people older than about 60 (and other adults not yet in the 60-plus age group) achieve improved safety with stairs and bathtubs/showers by limiting, avoiding or foregoing use (technically termed "exposure")—*something they cannot do with toilets*. Thus vulnerable bathtub and shower users and inadequate safety provisions—e.g., facilities lacking functional grab bars and stanchions—lead to substantial avoidance of use as we age. *Also, note that the age group accounting for the majority of professionally treated injuries involving stairs and bathtubs/showers is not people over 60, but the 20-59 age group!*

Note here that older people might be falling—*with injuries*—less often, but their injuries are more serious and require more intensive—*and expensive*—medical attention.

The takeaway message here is that we need to do a much better job of making bathing and showering facilities more-usable as well as safer for everybody if we want older persons to use the facilities to enjoy the health and other benefits they offer.

Waiting until home occupants get older is simply not a good strategy for installation of grab bars and other devices providing at least two points of control—three for in-tub, immersion bathing. We have to design *for all, at all stages of life*. The next graphic (Figure 2), also from Dr. Pauls' PowerPoint presentation to Canadian codes and safety experts early in 2021, provides a summary of the psychological aspects or implications of these use and safety data, plus analyses.The arguments made by opposing participants at the Committee Action Hearings (CAH)—as described below, as well as some of the committee members, whose remarks are reproduced in even more detail below, are clearly not helping to reduce the large injury toll. Moreover, they perpetuate avoidance of use as the main—*indeed virtually no-choice*—strategy for coping with clearly inadequate built environment facilities built to the minimum standards of the *I-Codes*.

Figure 2



FORMAL RESPONSE, INCLUDING REBUTTAL TO THE *PUBLISHED* REPORT

OF COMMITTEE STATEMENTS AT THE COMMITTEE ACTION HEARINGS (CAH)

AS WELL AS COMMITTEE MEMBERS' *ACTUAL* COMMENTS

How Did the IBC General Committee Hearing Deal with Proposal G172-21? A Detailed Account

Public Testimony Portion. Included in the following are the points brought up by the opposition and the rebuttal to those comments (the latter being extended beyond the very limited opportunities provided in, and unique to, ICC's CAH process (compared with other current model code development procedures used in the USA and Canada):

Time Analysis. The 14 voting members of the IBC General Committee heard 24 minutes of testimony on G172-21 of which about half a minute was direct testimony by the Proponent with the remainder of his time reserved for rebuttal, plus about two additional minutes (for balance) granted for rebuttal by the Moderator. This totaled about five minutes overall—almost all for the Proponent's rebuttal testimony—for the only testimony coming from the proponent side.

Opposing testimony by seven people occupied about 12.5 minutes after which two Committee members posed one question each for the Proponent, with very short, one-sentence, to-the-point answers by the Proponent. Then there were was an additional 4 minutes for rebuttal from four opponents. Summing up, of the total 24 minutes of testimony, less than a quarter of the time was permitted for Proponent testimony and rebuttal.

Here follow synoptic accounts of the testimony by the seven opponents followed by equally synoptic accounts of rebuttal testimony in opposition by four opponents (indicated as "Opposition comments").

Post-hearing comments by the Proponent are shown immediately following, indicated as "Proponent Rebuttal."

§ **Matt Sigler** (at the time of the CAH, with the Plumbing Manufacturers Institute)

Opposition comment: Many installations have prefab walls, which are not designed for grab bars

Proponent Rebuttal: In the rare cases that they incorporate something like a grab bar, they would not meet any standard nor are they ergonomically designed—i.e., to function adequately.

Opposition comment: Thus consumer choice is limited.

Proponent Rebuttal: A situation for which industry is largely to blame.

Opposition comment: CPSC/NEISS data lack detail re. "accidents", e.g., alcohol or drug use while bathing and other medical issues

Proponent Rebuttal: All of these are quite acceptable—*if not also necessary in pandemic and normal times*—in residential settings, but the underlying assumption in industry attitudes is we do not need to cater to people—*as they are*—in their homes and we do not do anything to address the well-documented dangers (as well documented by research listed in the Bibliography) of industry's products—neither of which are defensible positions in a court of law where it can be shown that the dangers to users—*and-countermeasures*—have been well identified in publicly available documents for nearly five decades in the USA (e.g., in the Abt Associates document published in 1975 and cited as number 11 in the Bibliography provided with proposal IBC G172-21).

Opposition comment: The proposal's 1.5-inch minimum clearance between a grab bar and the adjacent surface does not comply with ANSI A117.1 which has maintained an absolute 1.5-inch requirement for grab bars

Proponent Rebuttal: Although the text shows it as an absolute dimension, a relevant A117.1 figure shows it *as a minimum* and despite making this a minimum for handrails years ago; a revision is expected for the next edition (per the Jake Pauls' recent formal proposal to A117)—the one relevant to this edition of the IBC. See also the series of photos within the Proponent's Reason for G172-21 which demonstrates that the absolute 1.5-inch criterion makes no sense in terms of safety for users.]

Opposition comment: No bathtub on the market is designed for fixing a stanchion "into the rim."

Proponent Rebuttal: Yes, sometimes changes must made in manufacturing processes to better accommodate safety in the code. But if changes are the obstacle here, then why ever try to increase safety. The proposal is clear that fixing a stanchion to a bathtub rim is restricted to steel construction bathtubs which are still available (at very reasonable price, without special order) on the market and, furthermore, the Proponent of the code change, Jake Pauls, does not advocate attaching a stanchion "*into*" the tub rim of any type of construction. That is neither the only, nor best way of fixing a stanchion to a steel bathtub rim which, even if the industry's switch to lesser-quality, plastic or fiberglass tubs persists. Industry cannot prevent users from sitting on the more-easily deformed plastic bathtub rim imposing a load much higher than that imposed by users securing an upper-body "point of control" which transmits a load to the tub rim. (Note that the IBC, Chapter 16, applies the 250-pound load requirement to seats—effectively the bathtub rim on which users can sit—the same load assigned for grab bars.)

Also, see the comment elsewhere also addressing testing stanchion fixing with modern RTV adhesive that easily withstands a load transmitted, in shear force (per sq. in.), to the rim surface that is more effective—by a multiple of about six—with an adhesive-attached (9 sq.in.) plate than is possible with all the screws (typically about 6 provided with conventional plumbing industry grab bars) into solid-framing backing in the surrounding walls. The latter is difficult to accomplish with some grab bars and conventional '2 by 4' framing. The installation for rim *surface* mounting is more robust than what is currently achieved with conventional grab bars even before the latter suffer serious deterioration, from poor water protection, such has been widely documented by the Proponent of the code change in many of the grab bar-equipped guest rooms he encountered (pre-Pandemic) around the world. The bathtub industry needs to worry less about its warranties being violated—which sitting users can easily and completely innocently do—and more about the well-documented, real dangers of their inadequate designs and choices of materials. See the accompanying Bibliography including the many videos also listed there on bathing safety. These constitute "Actual Notice" as a legal concept established by the courts.

§ **Margo Thompson** (Multifamily Construction Council)

Opposition comment: Two or three grab bars are unreasonable.

Proponent Rebuttal: It is not unreasonable to have one bar for a shower and two—not three—bars for a tub at an installed cost of a few hundred dollars in an overall residential unit cost of a few hundred thousand dollars. This provides, on average per household, an annual injury prevention benefit of a comparable amount of a few thousand dollars. (See authoritative video at https://vimeo.com/channels/1362334 — as listed in the accompanying Bibliography).]

Opposition comment: Tenants do not want "accessibility" features and, if features thus recognized exist in their unit, they will expect to pay less.

Proponent Rebuttal: No proof is shown for this opposition comment. In addition leaving a decision on safety up to an aesthetic or attraction concern represents misplaced priorities. Also, poorer residents are clearly aware of their precarious financial position if unbudgeted medical costs are incurred and, even more important, such costs do not begin to include the much larger costs in reduced quality of life—*including loss of ability to work*—that a serious fall can precipitate.

Opposition comment: ~~Members~~ believe installation of such features should be only at the request of the tenant or owner-occupant.

Proponent Rebuttal: Making safety items optional defeats the purpose of having a code to promote safe surroundings. If you asked prospective buyers or tenants if they really wanted to have tempered glass in code required locations around stairways, etc. and told them that they could get a lower price or rental rate if they were willing to go without, would that be an acceptable option to propose to the public?

Opposition comment: Members are already putting blocking behind all tubs and showers.

Proponent Rebuttal: No evidence is provided for this and it certainly is not on every building because it is not required. Also, this can represent a waste if the design doesn't have to meet a standard that limits the need for specific locations for blocking. In addition, many grab bar manufacturers require the attachment screws to go into a stud. Another opponent pointed out that most bathtub installations and shower installations have plastic surrounds/enclosures that do not accommodate subsequent grab bar installation, even with blocking installed behind these relatively flimsy membranes that, if penetrated, could result in water entry to areas otherwise kept dry and less vulnerable to damage. Most important, all the requirements currently leading to all the blocking/backing/reinforcement for future grab bar installation is based not on safety but on accessibility, particularly for people approaching the bathtub in a wheeled device and transferring to/from a bathtub-supported seat. Grab bars intended for this function are wrong in orientation and height for ambulatory transfers; they are not designed to prevent falls to ambulatory users. (See also further details, below, in a rebuttal pertinent to transfers and role of retrofitting using "blocking.")

§ **Ceasar Luhan** (National Association of Home Builders)

Opposition comment: Why all R occupancies, both transient and permanent occupancy?

Proponent Rebuttal: Actually while it may seem more conspicuous that more transient residences would more logically require grab bars because many different individuals will be using a home. It is also true that the more permanent residence the more the need for grab bars since, as we get older, sooner or later, we need to have grab bars. Problems of bathtub and shower-related injuries are endemic in residential facilities of all types; thus the countermeasures should be equally broadly applied in model codes and safety standards. NFPA 5000 and NFPA 101 have, since 2018 editions, had grab bar requirements applying to all new residential plus board and care facilities, among others, for all showers and bathtubs.

Opposition comment: Only standard tub/shower designs taken into account with the proposed requirements.

Proponent Rebuttal: This is incorrect; many configurations and wall-and-no-wall boundary situations examined. The requirements have been carefully drafted for the current IBC proposal, as well as in revisions proposed for the 2024 editions of the NFPA documents PLUS that other ANSI-approved document, ICC A117.1 which has a package submitted for the current cycle of changes that is consistent with not only Proposal G-172-21, but with fine tuning submitted for NFPA documents PLUS the requirements that have been proposed for the National Building Code of Canada for all occupancies with bathtubs and showers (and which has had a Task Group including participation from top experts as well as builders) for about a decade. All of these—especially in the US—have tried to address nonconventional bathtub and shower designs, e.g., designs not bounded by walls—for which some of the many option (e.g., diagonally oriented, wall-mounted grab for the back wall) are not a good choice; for these there are other options including some that are a lot more aesthetically acceptable and achievable than some of the high-priced industry solutions to water delivery devices (illustrated in the 294-slide presentation the Proponent, Dr. Pauls, gave to a recent meeting of a key Canadian code committee; two slides from the Canadian presentation are reproduced, above, in this Reason statement).]

Opposition comment: There are problems posed with A117.1 current requirements.

Proponent Rebuttal: Proposals were submitted for the next edition of A117.1 recently under the new heading of "ambulatory accessible" facilities that take, as their precedent the long-established "ambulatory accessible toilet compartments" requirements..

Opposition comment: Grab bars are already readily available for purchase.

Proponent Rebuttal: Yes, and before tempered glass was required tempered glass was available for purchase but its installation rate was nowhere near what it became once required by code. Also, many of the available grab bars are not suitable for use in wet conditions. Moreover, they rely on difficult-to-achieve adequate and reliable fixing with the provided screw-based hardware which does not address moisture problems inherent with the currently provided cover plates.

Opposition comment: “Very much an overreach.”

Proponent ~~*~~Rebuttal: Not anymore than other safety provisions in the code which are typically less risky to occupants than bathtubs, etc. are. (The overreach here is in the way a number of ICC residential codes have managed to usurp the benefits of using an ANSI consensus standard, including limiting one proposal per person under certain circumstances. Or a code standard that is considered a template for states to adopt for the residential codes, Failure to provide an ANSI consensus method is also much of the overreach by blocking a level playing field for the development of code standards.)

By way of background, the code change proponent’s, Jake Pauls, highest degree is an HonDSc and he has over 300 committee-years of service on US standards and codes committees (about half of which have been as the lead voting representative of the American Public Health Association); thus his scoping decisions are based on evidence as much as possible—a key tenet of public health. Others have different insights on what is “reasonable” and what is “overreach.” What is their “evidence” and how do they reconcile their “evidence” with the published injury toll of over one million, nonfatal, medically treated injuries annually in the US due to bathtubs and showers, with about 90 percent of these occurring in residential settings? (See the REASON statement for this evidence.) This toll exceeds nonfatal fire-related injuries by two orders of magnitude (e.g., a factor between 50 and 100 as illustrated in the pie chart provided in the REASON statement).

§ **Jim Kendzel** (ASA)

Opposition comment: A117 is an industry consensus standard and the issue was already covered.

Proponent Rebuttal. Note that the code change Proponent, Jake Pauls, has submitted proposals to A117 to add the relevant, *new* requirements for “ambulatory accessible” bathtubs and showers. Also other discussion herein addresses this issue.

§ **Steven M.** (American Institute of Building Design)

Opposition comment: Has seen this proposal develop over the years. He complained that the stanchion examples in the proposal were only on moving vehicles and the IBC covered R occupancies that were not in motion when occupants using them.

Proponent Rebuttal: Likewise, the photos only show the vehicles when not in motion. The occupants are the ones in motion and the grab bars are there to help them move safely in a well-established dangerous area.

Opposition comment: Grab bars can easily be added afterwards.

Proponent Rebuttal: Retrofitting grab bars is relatively difficult in comparison to stanchions which are much more versatile in terms of subsequent installation; none of the installations with which the code change Proponent, Jake Pauls, has worked, entailed holes in wall for screw attachment—as would be the case with conventional grab bars.

§ **Misty Guard** (Regulosity LLC)

Opposition comment: Structural load requirement was not being addressed.

Proponent Rebuttal: This was explicitly addressed with a mandatory reference to the IBC Chapter 16 requirement, re. 250-pounds, specific to grab bars and seats.

Opposition comment: For stanchions, load on surrounds exceeds structural capacity.

Proponent Rebuttal: Proponent has not encountered this and has the equipment needed to apply 250 pound loads to stanchions he has installed for both bathtubs and showers.

Opposition comment: The “Shelf”, which is a horizontal surface filling the space between the top of a bathtub and the nearest room wall or a part of a podium in which the tub is placed, does not have load capacity.

Proponent Rebuttal: If it has not been designed for a 250-pound vertical load, how is the tub which it helps to support, with both horizontal and vertical load support, going to be able to withstand the weight of the water, plus occupant(s) in the tub, especially a large, multi-person tub (such as with some with multiple water jets). The load imposed through the grab bar or stanchion fixed to this tub surround is lower than these other loads; furthermore, these installations are often placed next to a wall or walls (as with a corner design which provides additional lateral support to the tub) and conventional grab bars can be readily attached to these walls adjacent to the open sides of the tub. Another option is a floor-to-ceiling stanchion. Some upper body “points of control” are going to be very important for users of such large tub installations which often have high tub walls relative to finished floor level. Such large tubs pose many challenges (which Jake Pauls has managed as a user of such installations in premium-price hotel rooms he has occupied as a paying guest in hotels worldwide. Provision of grab bars or stanchions is a minor cost and engineering consideration relative to other challenges associated with these large installations.

§ **Tom Zuzik,** Representing NOMMA (National Ornamental & Miscellaneous Metals Association)

Opposition comment: Stanchions are used, in the context of pedestrian barriers, as the vertical structural members—e.g., metal posts—supporting secondary, sloping, horizontal and secondary vertical members, typically of metal.

Proponent Rebuttal: None of these are grab bars or stanchions in the roles they play as single handheld members for grabbing by the hand(s) as part of transfers to/from/within bathing/showering facilities.

Rebuttal Testimony by Those Opposed to Proposal

§ **Tom Zuzik**, Representing NOMMA (National Ornamental & Miscellaneous Metals Association)

Opposition comment: Code is a minimum; items are not needed for all people. Safety versus accessibility briefly noted.

Proponent Rebuttal: This is not a matter of “safety” *versus/or* “accessibility.” The scope is both safety in use *and* usability of bathing/showering facilities *for everyone*. Also, the evidence suggests that safety and usability interact strongly for many adults; see Figure 2 for quantitative evidence of this interaction in the USA. Moreover, the importance of such safety is shown by its existence in NFPA 101.

Matt Sigler, (at the time of the CAH) Plumbing Manufacturers Institute, PMI

Opposition comment: In Canada there was a recent rejection (in spring 2021), by Provincial and Territorial code authorities, of code changes, at National level, on grab bars and stanchions for bathtubs and showers.

Proponent Rebuttal: The meetings of “Provincial and Territorial code authorities”—unlike deliberations on *National Building Code of Canada* (NBCC) code change proposals, for its 2020 edition—were ***not*** conducted in an open, public fashion where all parties could observe and participate. Before these recent nonpublic meetings of P/T code authorities, there have been years of open, national meetings started after a proposal on grab bars for home bathtubs and showers was submitted—***in 2007*** by Dr. Nancy Edwards —and was addressed in many open, public meeting of the NBCC committee responsible for housing, along with its Grab Bar Task Groups.

Opposition comment: Blocking is sufficient as a solution to bathing safety.

Proponent Rebuttal: Note that some grab bar manufacturers are requiring grab bars to be connected to studs. Blocking is not sufficient. Indeed, no fall has ever been prevented or mitigated by blocking because the necessary grab bar is not installed and, if installed, it is likely in the wrong place for safety as opposed to accessibility (again in relation to transfers by non-ambulatory people from a wheeled device to/from a seat in a tub or shower). As noted above, such grab bars are neither intended for, nor sufficiently effective, for ambulatory users; see comments above on this.

Opposition comment: People do not want grab bars.

Proponent Rebuttal: No documentation of this has been provided. In addition, if you ask the average member of the public if they were willing to pay for tempered glass instead of regular glass and show them a photo of each one so that it was very difficult to see the difference, it’s very likely that they would all say they’d rather pay less for a home or rental without tempered glass. Studies reported in scientific publications (listed in the Bibliography) report a nuanced response by members of the public. A lot depends on the quality and placement of such grab bars as well as the age of the users (which was noted in comments elsewhere in this Comment Reason statement), Avoidance of bathing, partly due to the perceived dangers involved, starts in younger adults, not just the elderly.

Evidence supports the contention that bathtubs and showers—as discussed elsewhere in this Public Comment—*are more dangerous on a use-exposure basis than are stairs (in residential settings)*. Such insights about bathtubs and showers date back to the first large US study in the mid 1970s, published in 1975 (and listed in the accompanying Bibliography for this Proposal and Comment: “11. A systematic program to reduce the incidence and severity of bathtub and shower area injuries."

§ **Misty Guard** Regulosity LLC

Opposition comment: Stanchions are not suitable for in-rim mounting on plastic plumbing products; they are not designed for the loads involved.

Proponent Rebuttal: The Proponent of stanchion mounting on—*not into*—bathtub rims, Jake Pauls, agrees that the relatively poor rigidity and strength of plastic tubs is not suited to such loads—possibly also the live loads from a heavy bather sitting on a tub rim (as discussed elsewhere in this comment). Thus, while the inability of one line of products to meet the 250-pound minimum load established by the IBC in Chapter 16, specifically for grab bars (and, now, stanchions which function as grab bars) should not have to be called out in a code requirement, especially a modern code that claims to use performance language. In any event, the proposals now being submitted for standards such as ICC A117.1, will specify that stanchion mounting on tub rims is only for steel tubs that should have no problem meeting IBC's 250-pound criterion.

§ **Margo Thompson** National Multihousing Council

Opposition comment: 'Me too' testimony.

Proponent Rebuttal: None

Input by IBC-General Committee Members During the Public Hearing Portion on G172-21

Here follows, in chronological order what IBC-G Committee Members asked by way of question, of the proponent, during the public testimony portion of the CAH., starting with Henry J. Kelly, CCPM, CCI, CCC, GRI, Representing the National Association of Home Builders:

"Mr. Pauls, your proposal is very detailed as to what will be required if approved. My question is how many units that have been built or retrofitted currently contain all the grab bars and stanchions as you propose in sections 1210.3 to 1210.3.4.5?" As the question was worded clearly in terms of "How many,"

Dr. Pauls' reply was, correctly, "I don't know," to which he could have added, realistically, that such expertise exists, if at all, within the housing industry and he would defer to such expertise on this particular question.

This was followed by a question by Lieutenant Michael Pokorny, Montgomery County Fire & Rescue, asked:

"Mr. Pauls, in Section 1210.3.4.4 you talk about structure—the stanchion being capable of structural loading set forth in Section 1607.8.2 and this section has to do with Fire Department vehicle loading. Is that what your intention is?

Dr. Pauls' reply, "The reference was provided by ICC staff so, if I am in error, I apologize for not checking it personally." (The reference used, 1607.8.2, was the correct one, in relation to grab bar loads, in the IBC, *2018 edition*, available to Dr. Pauls.)

Generally, on both questions, the first thing an expert on any subject should know is when to defer to the knowledge and expertise held by others.

Committee Action

Following the public testimony portion of the CAH, the Committee Action included a motion for Disapproval accompanied by the following comments by a small fraction of the Committee members. This occupied nearly the same length of time as allotted to the Proponent, Jake Pauls. Some of the Committee input appeared to be, effectively, in the form of testimony for which no rebuttal was possible (except in this public comment). The virtual hearing format also did not have any clearly apparent mechanism for a "point of order" to be made if new information was introduced in the Committee Action portion of the Hearing on G172-21. (This would have re-opened public testimony if the Moderator agreed that new information had been introduced.)

Three Committee members spoke, as follows.

(1) Henry J. Kelly, CCPM, CCI, CCC, GRI, Representing the National Association of Home Builders, (after making the motion for disapproval):

Committee member reason: "When I questioned the Proponent, he did not know if any of the units currently that have been built or have been retrofitted, that would require with all of the things that he proposes in 1210.3 through 1210.3.4.5, would solve the problem. If he does not know if they exist, then there's been no studies done and there's no empirical evidence that what he proposes will solve the problem and we shouldn't be adopting anything in the Code that there is no evidence this it will solve the problem."

Proponent Rebuttal: This was not the question asked during the public hearing portion when this committee member asked, specifically, "How many units that have been built or retrofitted currently contain all the grab bars and stanchions as you propose in sections 1210.3 to 1210.3.4.5?" Dr. Pauls' reply, correctly, was "I don't know."]

The exact *quantitative* question he originally asked was, "how many units. . . ," not "if any of the units. . . ." The correct answer to the first question—on narrowly specified quantity—was, correctly, "**I don't know**" and the correct answer to his rephrased, *yes* or *no* question was, "**Yes, those based on the criteria and background information set out in the proposal**." There was no mechanism (including a point of order) for reopening the public portion of the hearing. Moreover, there was specific, pertinent, published insights in some of the Canadian studies behind this answer, *to the latter question*, listed in the Bibliography provided with the initial proposal and highlighted again below with a listing of (numbered) titles only.

(2) Micah Chappell, MBA, CBO, Code Development Manager, Seattle Department of Construction and Inspections:

Committee member reason: "I just want to commend Mr. Pauls for bringing this proposal through on a regular basis for Code cycles. It just goes too far every time that's been mentioned several times. I do think he should come back with a portion. As one of the opponents talked about, there is a problem of not having backing when these things are necessary to install by choice. And maybe that's the proposal he needs to start with. This just goes too far."

(3) Eirene Knott, MCP, CBO, CFM, Director of Code Services, BRR Architecture:

Committee member reason: "One of the proponents provided the statement that this—the Code is a minimum standard and this requirement is going to raise that level of expectation of what a minimum standard is and I believe it goes beyond this. The second point I want to make is (that) my mother is somebody who is a fall risk and she made a choice to put her own grab bars within her own house, none of which were in the locations where Mr. Pauls is suggesting. So I don't believe this is ready for prime time."

Commenter Rebuttal: Many individuals sit on these code committees as experts. Expertise is the core of the development of good quality standards.

Proponent Rebuttal to All Three Committee Members Commenting: All of these Committee comments warrant responses which, given the current, highly limited testimony time in ICC hearings, can only be addressed—within the ICC process—in written public comments such as this one. For example, as there are two very different types of transfers—a *transfer from/to a wheeled mobility device* and *ambulatory transfers,* the bathing safety experts (as they are identified in the Bibliography for example) agree that the latter call for a minimum of two grab bars or stanchions. Within recent deliberations (over a decade or more) in multiple code development bodies, the frequent references to backing (blocking or reinforcement) have ***not*** been based on future provision of grab bars for *ambulatory transfers*; they are based on *transfers from/to wheeled mobility devices*. The two functions are very different.

Moreover, ambulatory transfers cover two dangerous aspects: (1) stepping over elevated—plus possibly slippery—surfaces and (2) stand-to-sit and sit-to-stand transfers also involving slippery surfaces. The originally submitted proposal, G172-21, address the two types of "points of control" appropriate for both the access side of a bathtub or shower—where vertical grab bars or stanchions are most useful—and, in the case of tubs, the non access side (with the latter being especially relevant for the stand-to-sit and sit-to-stand transfers where *bilateral*, upper body points of control are very relevant. Moreover, as ambulatory transfers can be facilitated entirely by stanchions, there may be no need for holes to be made in bathtub surrounds. Thus "backing" is not a necessary prerequisite for future installation. Proposal G172-21 illustrates two stanchion options (along with six, wall-mounted, grab bar options) that completely meet the minimum requirements proposed. (The relevant illustration is just below the pie chart graphic.)

There were a couple of comments on ~~l~~evel of expectation leading to many avoidable injuries (as well as leading to reduced or avoided uses of bathtubs as addressed by the Proponent, Jake Pauls); it is clearly within the scope of the IBC to "raise expectations" to reduce the predictable and largely preventable million or so professionally treated injuries annually in the USA as well as to better facilitate the billions (with a "b") of uses of bathtubs and showers annually in the USA. Surely this is a "prime time" for ICC members and its code development process to respond positively.

Rebuttal Responses to the Committee Reasons in the Report of Hearing

Committee Reason (as reported by ICC). This statement is as follows except that, here (for clarity), sentences are separated, plus numbered, *and a comment has been added in italics about the accuracy, relevance, etc. of the summation.*

1. "This proposal was disapproved because the committee had several concerns."

Proponent Response: *Only items 2, 3, 4, and 5 were noted as reasons explicitly expressed by committee members; the other items came from opposition testimony which the Committee did not mention as reasons for disapproval.*

2. "Have there been any dwelling or sleeping units constructed with the proposed grab bar configurations so that the increase in safety can be verified?"

Proponent Response: This single, hugely-complex question posed by Committee member, NAHB representative, Henry Kelly (and underlining for emphasis): "<u>My question is how many units that have been built or retrofitted currently contain all the grab bars and stanchions as you propose in sections 1210.3 to 1210.3.4.5?</u>" The answer to Mr. Kelly's original question, was—correctly and appropriately, "I don't know." (The question, as originally asked reminds one of the historical practice in some parts of the US to have persons of color—seeking the right to vote in an election—

compelled to answer a question about how many jelly beans were inside a large jar.) As an expert who occasionally has to testify under oath, “I do not know” is a correct—and sufficient—answer to an impossible-to-answer question which was for “how many,” not the rephrasing of the question here as, “ Have there been any. . . ?”

If supportive evidence were needed, reference would be made to the Canadian studies referenced in the Bibliography which date back a couple of decades.

3. **“Have their been any studies or empirical evidence that indicate that this will significantly improve safety?”**

Proponent Response: Yes, see the excerpted titles, below, of a large number of studies that were included, numbered, in the Bibliography listing in this proposal (and earlier ones submitted to ICC for the 2018 editions of the IBC and IRC).

Moreover, see the recorded meetings of experts that go well beyond the published research studies in providing state-of-the-art presentations by Dr. Nancy Edwards and Dr. Alison Novak plus discussions with other injury prevention experts from Canada and the USA. For links to these freely streaming videos see section below, updating the Bibliography

See also—after the general comments below—several excerpts from Bibliography item 30, published a decade ago, that provides a good summary of what was learned about use and performance of grab bars as well as attitudes of tested adults about their intention to install grab bars such as the ones used in the tests.

4. “**Requiring the installation in all bathrooms in all Group R units is going too far — perhaps blocking so that residents can add grab bars based on need.”**

Proponent Response: As mentioned previously, stud placement is critical. Replacing studs in an existing building is not a practical retrofit for a grab bars and will represent multiples of the cost of installing the studs appropriately in the first place so the grab bars can be appropriately placed.

Generally, misconceptions about blocking need a powerful rebuttal, particularly the claim that “blocking” is the solution. First, the blocking still being specified for accessibility (by A117.1 and various codes), is not proposed for safety of ambulatory bathers who need points of control based on standing transfers. The blocking-facilitated grab bars are intended for transfers by wheel-using, seated persons needing to shift from a wheelchair seat to another seat in a bathtub or shower enclosure (and vice versa). The grab bars that make sense for such accessibility-related transfers are not high enough, suitably placed, and often vertically oriented to assist ambulatory users.

All of the currently installed blocking will only rarely be put into use, even for assistance to non-ambulatory bathers, let alone ambulatory users. Grab bars of incorrect position, orientation, height, etc. will be of limited use for the latter. Finally—for all situations—how easy will it be to find out if, and where, blocking has been installed and how is such blocking to be used in connection with all the recently and currently installed plastic surrounds for bathtubs and showers that the plumbing industry claims cannot have grab bars installed due to the flimsy nature—until reinforced—of the surrounds/enclosures. There is also the concern for water intrusion with the holes that must penetrate such membrane materials.

Both in Canada and the US, opponents have been outspoken about unsuitability, for grab bar installation, of industry’s products, whether plastic or fiberglass tubs and surrounds/enclosures. It turns out that the older ones bathtub is—likely with enamel-steel fabrication and with a structurally superior, tile (on solid backing) surround—the easier it might be to provide both the needed stanchions and/or, in some cases, conventional grab bars. The stanchions, for example, do not rely on blocking in either of the apartments where the Proponent, Dr. Pauls, has offices (in Toronto and in Maryland). Again, the IBC already requires provision for a 250-pound load for seats serving bathing and showering and that would include the bathtub rim in many cases.

5. **“The choices for grab bar installation should be based on individual residents needs and choices, which may not be this configuration.”**

Proponent Response: The proposed requirements, like those specified in established requirements in both the 2018 and 2021 editions of NFPA 101 and NFPA 5000, do not call for “this configuration.” Like what is proposed for ICC codes, there are multiple options that address various bathroom layouts and surroundings of the bathtub. Also, in treating stanchions and conventional grab bars as equally acceptable in the options, there is added choice about visual appearance which is especially discreet with stanchions which blend into the décor in a more-architectural fashion rather than looking institutional and an afterthought. Stanchions are also much more likely to serve other important usability and safety functions, notably for use of toilets located adjacent to bathtubs or showers. Conventional grab bars are not as versatile for such dual uses as are stanchions.

6. **“The locations specified can be an issue with the different types of tubs and showers on the market for design and structural strength.”**

Proponent Response: Wrong, the options include all manner of tub and shower shapes and sizes plus adjacent construction. Also, enamel steel bathtubs are still available and in stock at stores selling the more-expensive, less-durable plastic designs.

Furthermore, there is no need to install stanchions “into” bathtub rims. The same stores that sell steel bath tubs also sell the coated steel tubing and matching surface-mounted fixings needed—and structurally adequate—to mount the lower end of a stanchion “on” a bathtub rim, not “into” the rim using widely available, modern RTV adhesives (such as widely used in automobiles, even for water pumps) that have the strength to meet the 250-pound loading—in all directions—to satisfy the IBC structural requirement, even in very wet conditions. Dr. Pauls has such an installation in his Toronto apartment which has served well for years, on a 50-year old steel bathtub. It easily passed a structural load test exceeding 300 pounds, sustained for hours and directed laterally to serve as the toughest test of the adhesive-based mounting “onto” the bathtub rim.

7. **“There is a concern about the grab bar location conflicting with the shower curtains so that water would end up on the room floor, thus creating a slip and fall hazard.”**

Proponent Response: This concern was both raised and solved by the G172 proposal with the very careful use of particular lateral locations of the vertical grab bar options for the control-end or head-end walls. The grab bars are thus clear of the standard shower curtain rod/track location over, or at, the inside wall of the bathtub at the approach side.

Getting into the details addressed: the issue had been thoroughly dealt with by the proposal in specifying vertical grab bar centerlines (in Section 1210.3.1): “between 9 inches (230 mm) and 12 inches (305 mm) horizontally, inward from the access side of the bathtub” or “within 2 inches (51 mm) maximum inward, and within 6 inches (152 mm) maximum outward, from the access side of the bathtub. The grab bar or stanchion shall be located 2 inches (51 mm) minimum, horizontally, from the centerline of any shower curtain rod/track installation.” Thus a minimum of 7 inches (178 mm) of lateral area was reserved for the shower curtain rod/track or other enclosure system (e.g., sliding safety glass panels in a metal frame) that effectively address the danger of water ending up on the bathroom floor. Also, these protection measures are easy for bathing users to undertake.

PROPONENT’S GENERAL COMMENTS in Response to “Disapproval” Vote.

As noted previously, below are selected, excerpted portions of a large number of studies that were included, numbered, in the Bibliography listing in this proposal (and earlier ones submitted to ICC for the 2018 editions of the IBC and IRC), See also the links for several listed, streaming videos that go well beyond the published research studies in providing very accessible, state-of-the-art presentations by Dr. Nancy Edwards and Dr. Alison Novak (two world experts in safety of bathing and grab bar effectiveness studies) plus discussions with other injury prevention experts from Canada and the USA including five highly knowledgeable members of A117 and NFPA committees plus relevant ICC staff. (All 11 participants in the March 10, 2016 meeting are identified in the three-part video with the first part accessible at https://vimeo.com/channels/866600/167609881.)

From Bibliography item 30, come the following relevant quotations that address some of the criticisms made by Committee members quoted above. (the full citation for this item is: Guitard P, Sveistrup H, Edwards N, Lockett D. **Use of different bath grab bar configurations following a balance perturbation**. *Assistive Technology* 2011;23:205-15.

". . . . the vertical bar was by far the bar most often used by participants to regain their balance when entering/exiting the tub during platform perturbed transfers. . . . Overall, older adults used grab bars to regain their balance (alone or in combination with a surrounding structure) in 212 of the 425 instances where they were present (49.8%). Older adults found grab bars to be very helpful, felt comfortable using bars, and felt safer when grab bars were present. Most participants indicated they would eventually install the grab bars tested (84.3% for CSA, 70% for OCC), . . . Younger adults also reported an increased sense of security in the presence of grab bars. . . . Nine percent of younger adults and 8% of older adults felt there was no difference in their sense of security when entering/exiting the tub in the presence or absence of grab bars. . . . Interestingly, 23 participants (41.8%) recommended grab bars to family members, colleagues, and/or friends. . . ."

". . . . The vertical bar was most often used when entering and exiting the bathtub. . . . Our results support the need for two grab bars to ensure safety during all phases of bathing, as recommended in previous studies (Aminzadeh *et al*., 2000; Sveistrup *et al.,* 2006). **Building codes should be revised to require a minimum of two bath grab bars to ensure safety during bath transfers and prevent falls: one adjacent to the rim on the side wall to facilitate entry/exit and one on the back wall to help during sitting and standing in the tub. . . "**

Bold added here as this pertains to the heart of the issue in this proposal and related comments. It is also the most direct rebuttal to those speaking at the ICC CAH, who argue that Dr. Pauls' proposal goes too far. The evidence from research reported here and in the other sources, some of which are described next (in video and text formats) supports Dr. Pauls’ position and it is up to those opposed to his position that, now, need to come up with evidence as opposed to mere opinion or conjecture.

For this reason—*and others*, Dr. Pauls, the Proponent of IBC G172-21 once again extends an offer of free technical presentations to, and related discussion within, ICC Chapters that wish to have a virtual presentation and discussion opportunity on the topic of how the I-codes can better address bathroom safety, in addition to stairway safety. This is especially important during 2021 as the ICC A117 Committee will also be processing a proposal to add new requirements to ICC-A117.1 dealing with ambulatory accessible bathing, showering and toileting facilities, a proposal submitted by Dr. Pauls, the longest serving Individual Member of the A117 Committee. Education of voting members of ICC is, ultimately, the best way to improve use of building codes as a key method of preserving, to a reasonable degree, the wellbeing and safety of the public—*including the families of ICC members.*

(From the slightly updated REASON statement): Approximately 50 internationally-produced scientific and technical references, on bathing/showering safety, were compiled by the Proponent, Jake Pauls, in 2016, for an American Public Health Association (APHA) draft policy highlighting, especially two Canadian research studies that also are addressed in three video presentations by Principal Investigators (Dr. Nancy Edwards, Dr. Alison Novak) for the research and posted, for free streaming viewing, starting at, https://vimeo.com/channels/866600/167609881, Accessed July 2, 2021. Beyond the three videos from the March 2016 meeting of experts, additional videos covering technical aspects of bathing and showering safety (including cost impact ~~and~~ benefit issues) are found at the following links (all of which are available, with descriptions, at http://www.bldguse.com/VideoPage.html, the Proponent’s Professional Practice Website, This selection, from a subset of about a dozen videos, of about 30 at the site, was accessed July 2, 2021.):

https://vimeo.com/237294479

https://vimeo.com/197742277

https://vimeo.com/193507768

https://vimeo.com/173883358

https://vimeo.com/175101448

Selected publication titles, especially related to this Comment

(from Proposal Bibliography and other cited references with in the Proposal and Comment text)

1. Access to bathtub grab bars: evidence of a policy gap.

3. Nonfatal Bathroom Injuries Among Persons Aged ≥15 Years United States, 2008.

4. Development and evaluation of an instrument to measure seniors’ attitudes toward the use of bathroom grab bars.

5. Utilization of bathroom safety devices, patterns of bathing and toileting, and bathroom falls in a sample of community living older adults.

11. A systematic program to reduce the incidence and severity of bathtub and shower area injuries.

14. Practice Guideline for Prevention of Falls in Older Persons.

15. Risk factors for falls among elderly persons living in the community.

17. A population-based study of environmental hazards in the homes of older persons.

18. Environmental hazards and the risk of nonsyncopal falls in the homes of community-living older persons.

19. Prevalence of selected risk and protective factors for falls in the home.

20. Unintentional injuries in the home in the United States.

21. Home environmental hazards and the risk of fall injury events among community-dwelling older persons.

23. Patterns of use of different toilet grab bar configurations by community-living older adults Research Highlight.

24. Evaluation of bath grab bar placement for older adults.

27. Biomechanical investigation of grab bar use and balance control during bathing transfers.

28. Predictors of bath grab-bar use among community living older adults.

29. Evaluation of bath grab bar placement for older adults.

30. Use of different bath grab bar configurations following a balance pertubation

34. Characteristics of gait in stepping over obstacles.

37. Injury Prevention: What works? A Summary of cost-outcome analysis for injury prevention programs.

38. Interventions for preventing falls in elderly people.

39. Modification of the home environment for the reduction of injuries

40. Home safety education and provision of safety equipment for injury prevention.

41. Formulating a programme of repairs to structural home injury hazards in New Zealand.

42. Home modifications to reduce injuries from falls in the Home Injury Prevention Intervention (HIPI) study: a cluster-randomized controlled trial.

45. Check for Safety: A home fall prevention checklist for older adults.

--. Effect of bathroom aids and age on balance control during bathing transfers.

--. The Evaluation of Vertical Pole Configuration and Location on Assisting the Sit-to-Stand Movement in Older Adults with Mobility Limitations.

--. Toilet Grab-Bar Preference and Center of Pressure Deviation During Toilet Transfers in Healthy Seniors, Seniors With Hip Replacements, and Seniors Having Suffered a Stroke

--. A fresh look at the costs of non-fatal consumer product injuries.

Bibliography: See the very extensive bibliography provided with proposal G172-21 (with key documents listed, by title only, above); there are only three additional references for that listing of references on the problems of, and solutions to, injuries and flawed performance (in terms of usability as well as progress with model building code development) of bathtubs and showers as addressed by this comment.

Lawrence, B., Spicer, R., Miller, T. (2015) **A fresh look at the costs of non-fatal consumer product injuries.** *Injury Prevention. 21*, 23-9
Pauls, J.L. and Johnson, D.A (2018). **Applying Ergonomics to Bathing Safety: Including adoption of unorthodox practices for slip-resistant underfoot surfaces of bathtubs plus showers and provision of effective points of control.** *Proceedings of the 20th Congress of the International Ergonomics Association (IEA2018),* Vol II, Springer, pp. 486-500.

Pauls, J.L. and Johnson, D.A (2021). **Why, How, and How Effectively Do USA and Canadian Building Codes Address Two Leading Fall Sites in Homes?** *Proceedings of the 21st Congress of the International Ergonomics Association (IEA2021),* Vol V, Springer, pp. 674-681.

Cost Impact: The net effect of the public comment and code change proposal will increase the cost of construction
While the "net effect" includes a very modest increase in the cost of dwelling unit construction—on the order of 0.001 (one in a thousand) of the overall unit construction cost of a unit, the payback of this investment should be realized within a few years of occupancy in terms of reduced societal cost of injuries, to the occupants, from falls associated with bathing and showering in bathtubs and showers. Thus, for the vast majority of the time (say a few decades) the unit is occupied, there is only net payback on the investment.Beyond the significant reduction of injuries, there is a larger benefit to the well-being of the occupants in terms of reduced anxiety with some critical, relatively dangerous aspects of showering and bathing, namely the transfers in and out of the facility and, in the case of tubs especially, there are extraordinary challenges both underfoot conditions and with general need for postural control when people transfer between standing and sitting or, (with bathtubs) even lying down in the water-filled tub and, even more challenging, vice versa with transfers back to an upright posture with which one can step out of the facility.

For many occupants, especially in middle age, there will be increasing anxiety about, and even danger of, very serous injuries that, while averted for a time, have a growing probability of occurring. One common response is to reduce bathing and showering, especially with bathtubs. In other words, the cost of injuries—beyond direct pocketbook cost of comfort and safety—rises over time. Grab bars and stanchions—with their costs being almost entirely in the initial acquisition and installation—are an increasingly valuable investment for an individual and his/her co-occupants of the residential unit.

Thus over the life of a bathing/showering facility, the benefit-to-cost ratio is effectively reduced to the point where the initial acquisition and installation cost approaches nearly zero. Hence it could be argued that the best single response to the ICC's question for this little-to-no-cost impact section is "there is no cost impact" there is only benefit and that benefit grows over time as the value of well-being increases for each individual over time and the cost of recovering well-being—within the healthcare system, especially in the USA, increases faster than do construction costs.

Finally, it is important that, of two submitted Public Comments, the one referencing NFPA 101 for grab bar and stanchion installation, in a requested change to the IBC, calls for—*not a requirement that something be done*—but, rather, that if one decides to install a grab bar or stanchion, that it satisfies evidence-based selection and installation criteria published in the well-established, highly-respected ANSI standard for life safety in buildings and structures, i.e., NFPA 101, *Life Safety Code*. A related comment seeks Approval as Submitted.

Note that the author of this cost impact statement, and the Proponent of G172-21, Jake Pauls, is a member of the ICC Industry Advisory Committee

Task Group on Cost Impact and he has been involved with benefit-cost impact issues for decades in a professional capacity including being a member of the International Benefit-Cost Analysis Society based in the USA. He also serves on several NFPA 101 committees and is a longest serving member on at least two of its Technical committees including those most responsible for the grab bar and stanchion requirements in NFPA 101 and NFPA 5000. He is also the longest serving Individual Member of the ANSI-approved A117 Committee for which ICC is the current Secretariat. A117,1 also has proposals for “Ambulatory Accessible” bathtubs and showers that parallel those in the above-noted ANSI-approved standard, NFPA 101.

Public Comment# 2502

Public Comment 2:

Proponents: Jake Pauls, representing Myself (bldguse@aol.com) requests As Submitted

Commenter's Reason: For this Public Comment REASON statement, refer first to the background as provided with the very detailed, full REASON statement for proposal G172-21. This Comment will not repeat the earlier-provided information although there are some edited extracts used here from the Proposal IBC G172-21 REASON statement.
There are two public comments being offered – As Modified and As Submitted. The basic REASON, behind overturning Committee action, is that—compared with the record for the Committee Action Hearing—there is far more multifaceted, justification provided with Proposal G172-21 with “*Approval as Submitted*”—and perhaps more acceptable to ICC members—inclusion of the detailed technical requirements in the IBC, or as provided with a separate detailed comment, and as equally appropriate, as replaced with the established, detailed requirements in NFPA 101. Both comments respond with detailed, forensic quality information to the criticisms expressed during the Committee Action Hearing. The information extends the detail in the REASON provided with Proposal G172-21, including a very extensive Bibliography and very supportive Impact statement of large benefits versus very low cost impact—with a payback period on the order of a few years. These extensive details are presented with each of the two public comments.

The following treatment might resemble a forensic examination. *This is intended and healthy for the ICC process and products.* The matter of bathing and showering safety—*and related model code requirements*—might, someday, be resolved in the courts. The consequences to public health and safety are simply too great not to be argued with all the checks and balances*, plus respect for evidence*, that are at the core of legal proceedings. I have testified under oath about 170 times with a comparable number of court-acceptable reports prepared in 40 years where such work represents a minority of his professional duties during that period. (For example, among ~~his~~ my many worldwide advisory roles, I have served, for two Olympic Games, as the lead advisor on spectator safety.) Forensic quality and detailed evidence are thus at the core of my 54-year professional safety career that led, in 2017, to the University of Greenwich (the world leader in research on people movement in buildings) conferring an Honorary Doctor of Science Degree.

For this Comment there is an update with a recent (Spring 2021) analysis of voluntary measures that people have taken when coping with relatively dangerous bathtubs and showers, among a few comparable dangers (such as stairs and toilets). This helps to understand why we have a current toll of over a million professionally treated injuries, annually in the US, associated with bathtub/shower use and why the injury toll is not even higher. In large part—*with the exception of toilets*, people are limiting their exposure to these relatively dangerous facilities that are more dangerous—*on an exposure-corrected basis*—than are stairs (on which about 90 percent of the injurious, stair-related falls occur in homes) that injure over four million people annually in the US to the extent of leading to professional medical attention and imposing annual societal costs exceeding 100 billion dollars annually for stairs alone with over 20 billion dollars annual societal cost for bathtub and shower-related injuries (not including hot water scalds); toilets are associated with a somewhat lower injury cost of several billion dollars annually in the USA. These annual US cost estimates were for a period about a decade ago (Ref. Lawrence B, Spicer R, Miller T. A fresh look at the costs of non-fatal consumer product injuries. *Injury Prevention* 2015; 21:23-29).

The Comment then continues with a formal response, including some rebuttal to the *published* report of Committee statements at the Committee Action Hearing (CAH) as well as Committee members’ *actual* comments as transcribed from the ICC Web site record. The comments, as transcribed from ICC recordings, were not completely, or even sufficiently, similar to the published report to satisfy the standard to which I am accustomed and, very reasonably, should be expected of the ICC process. They are, in my professional opinion, worthy of pursuing in a separate formal objection, including within the Industry Advisory Committee (on which I have long represented the American Public Health Association), and via an Appeal to the ICC Board of Directors.

Voluntary Measures Now Being Taken by Adults To Limit or Avoid, If Possible, Uses of Relatively Dangerous Facilities

First it should be very clear that, based on US CPSC/NEISS data, these uses of dangerous facilities occur almost entirely in residential settings. Hence the proposed scoping—*R1, R2, R3, R4*— is valid. The most dangerous facilities, regulated by codes—*including the I-Codes and, more specifically, IBC Chapters 10 (on stairs) and 12 (in relation to Proposal G172-21)*—are:

· stairs (for traversing different floor levels);

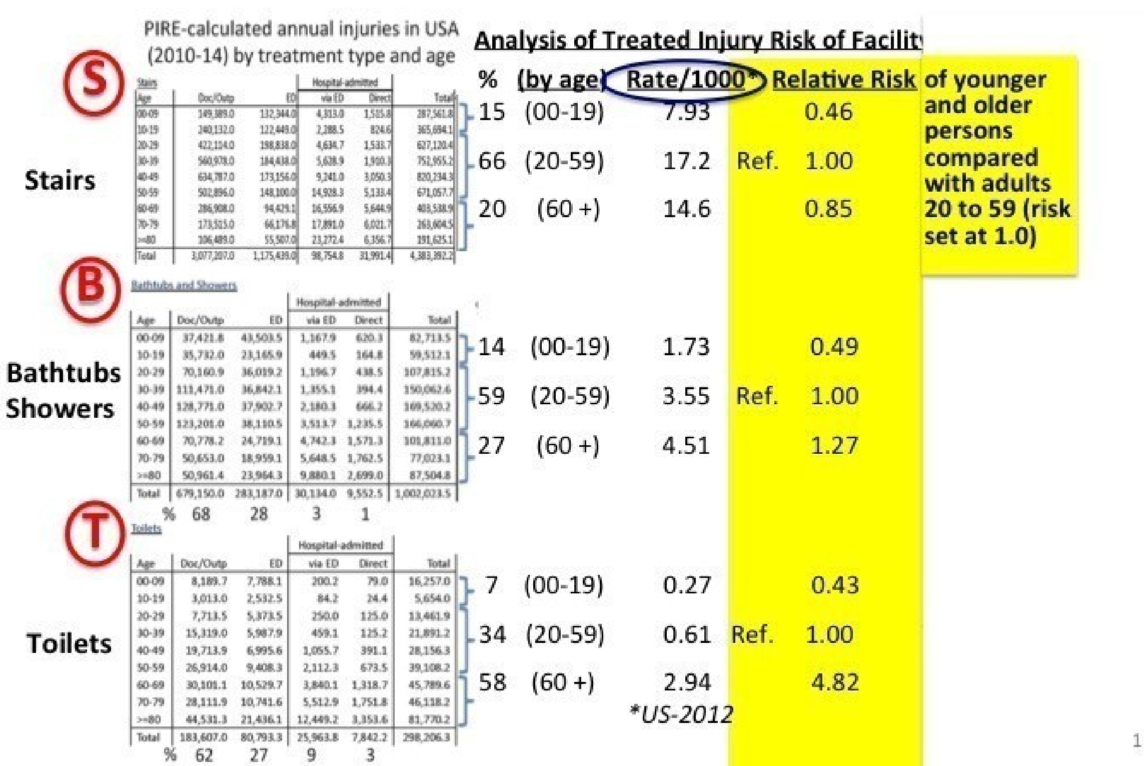
· showers and bathtubs (for external cleansing); and

· toilets (for elimination of bodily wastes).

The following is based on an analysis performed early in 2021 by myself–and–presented to a Canadian Commission on Building and Fire Codes (CCBFC) Standing Committee (responsible for grab bar and stanchion requirements in the *National Building Code of Canada*). *Voluntary avoidance of use* of the first two of the above list of three relatively dangerous facilities, found in most residential settings, helps to explain population and age-corrected injury data based on nonfatal injuries professionally treated in settings. The treatment contexts range from doctor' offices, medical centers, emergency departments, and admitted patient wards of hospitals. (In relation to the deliberations in Canada, note that the USA has bathtub, shower and toilet design and installation practices very comparable to those in Canada. The USA has a superior injury treatment documentation system with US CPSC/NEISS.)

Here follows a graphic (Figure 1) from the recent PowerPoint Presentation, of 194 slides, to Canadian safety and codes authorities) with, on the left side, tables of non-fatal injury treatment data for stairs, bathtubs/shower and toilets for the USA annually during 2010-14 using US-CPSC/NEISS data as analyzed by Dr. Bruce Lawrence at the Pacific Institute for Research and Evaluation (PIRE) in Maryland. He and his colleagues at PIRE were also the authors of the injury cost paper published in the highly regarded journal, *Injury Prevention,* 2015, cited above.

While the tables' data (in Figure 1) are in small font (with two of the three, in larger size, provided in the Proposal Reason statement), pay attention to the more-readable, middle and (yellow-highlighted) right side summations of the injury data expressed as relative risks for the three injury sites by three age groups, 0-19, 20-59, plus 60-and-older. The relative risks are normalized with the middle-age group set at a reference risk of 1.0 for each of the three facility groups: stairs, bathtub/showers and toilets. (For those interested in the totals for ***annual*** treatments averaged over the period 2010-2014—the bottom line on the leftmost column of each facility table—were: stairs - 4,390,022; bathtubs & showers - 1,002,023; toilets - 298,206. By comparison, US nonfatal fire-related injuries, in the last decade, are estimated to be in the 10,000 to 20,000 range or about 0.3 percent of the nonfatal injury toll due to stairs, bathtubs/showers and toilets (as illustrated in the pie chart provided in the Proposal Reason statement—about 2/3 into the text of the statement). **Figure 1.**



Note that, for stairs and bathtubs/showers, the relative risk rates (per 1000 population) for the two older age groupings (20-59 and 60-plus) are relatively similar (within same order of magnitude). However for toilets, the only facility category for which use cannot be voluntarily avoided by older persons (i.e., 60-plus), their relative risk of injuries is much higher (by nearly a factor of five).

What this means is that people older than about 60 (and other adults not yet in the 60-plus age group) achieve improved safety with stairs and bathtubs/showers by limiting, avoiding or foregoing use (technically termed "exposure")—*something they cannot do with toilets*. Thus vulnerable bathtub and shower users and inadequate safety provisions—e.g., facilities lacking functional grab bars and stanchions—lead to substantial avoidance of use as we age. *Also, note that the age group accounting for the majority of professionally treated injuries involving stairs and bathtubs/showers is not people over 60, but the 20-59 age group!*

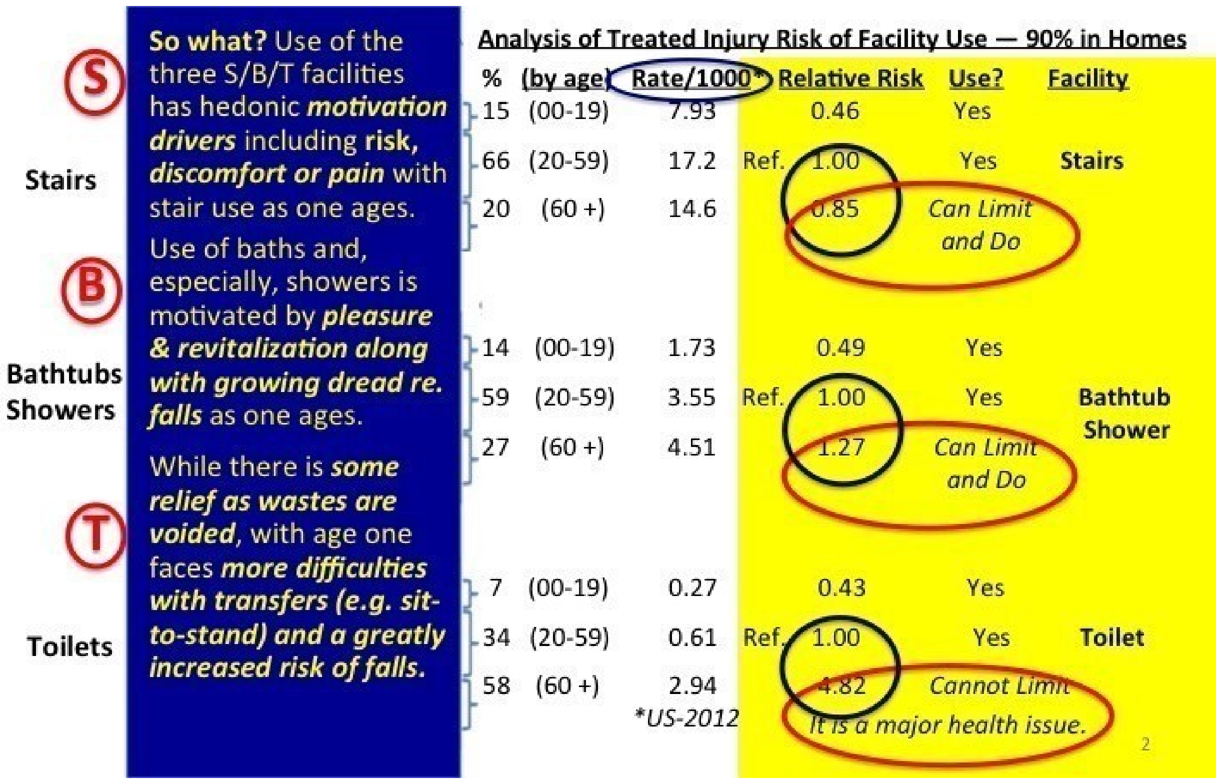
Note here that older people might be falling—*with injuries*—less often, but their injuries are more serious and require more intensive—*and* *expensive*—medical attention.

The takeaway message here is that we need to do a much better job of making bathing and showering facilities more-usable as well as safer for everybody if we want older persons to use the facilities to enjoy the health and other benefits they offer.

Waiting until home occupants get older is simply not a good strategy for installation of grab bars and other devices providing at least two points of control—three for in-tub, immersion bathing. We have to design *for all, at all stages of life*. The next graphic (Figure 2), also from my PowerPoint presentation to Canadian codes and safety experts early in 2021, provides a summary of the psychological aspects or implications of these use and safety data, plus analyses.

The arguments made by opposing participants at the Committee Action Hearings (CAH)—as described below, as well as some of the committee members, whose remarks are reproduced in even more detail below, are clearly not helping to reduce the large injury toll. Moreover, they perpetuate avoidance of use as the main—*indeed virtually no-choice*—strategy for coping with clearly inadequate built environment facilities built to the minimum standards of the *I-Codes.*

Figure 2



FORMAL RESPONSE, INCLUDING REBUTTAL TO THE *PUBLISHED* REPORT

OF COMMITTEE STATEMENTS AT THE COMMITTEE ACTION HEARINGS (CAH)

AS WELL AS COMMITTEE MEMBERS' *ACTUAL* COMMENTS

How Did the IBC General Committee Hearing Deal with Proposal G172-21? A Detailed Account

Public Testimony Portion. Included in the following are the points brought up by the opposition and the rebuttal to those comments (the latter being extended beyond the very limited opportunities provided in, and unique to, ICC's CAH process (compared with other current model code development procedures used in the USA and Canada):

Time Analysis. The 14 voting members of the IBC General Committee heard 24 minutes of testimony on G172-21 of which about half a minute was direct testimony by myself as Proponent, with the remainder of my time reserved for rebuttal, plus about two additional minutes (for balance) granted for rebuttal by the Moderator. This totaled about five minutes overall—almost all for my rebuttal testimony—for the only testimony coming from the proponent side.

Opposing testimony by seven people occupied about 12.5 minutes after which two Committee members posed one question each, with very short, one-sentence, to-the-point answers. Then there were was an additional 4 minutes for rebuttal from four opponents. Summing up, of the total 24 minutes of testimony, less than a quarter of the time was permitted for Proponent testimony and rebuttal.

Here follow synoptic accounts of the testimony by the seven opponents followed by equally synoptic accounts of rebuttal testimony in opposition by four opponents (indicated as "Opposition comments").

Post-hearing comments by the Proponent are shown immediately following, indicated as "Proponent Rebuttal."

§ **Matt Sigler** (at the time of the CAH, with the Plumbing Manufacturers Institute)

Opposition comment: Many installations have prefab walls, which are not designed for grab bars

Proponent Rebuttal: In the rare cases that they incorporate something like a grab bar, they would not meet any standard nor are they ergonomically designed—i.e., to function adequately.

Opposition comment: Thus consumer choice is limited.

Proponent Rebuttal: A situation for which industry is largely to blame.

Opposition comment: CPSC/NEISS data lack detail re. "accidents", e.g., alcohol or drug use while bathing and other medical issues

Proponent Rebuttal: All of these are quite acceptable—*if not also necessary in pandemic and normal times*—in residential settings, but the underlying assumption in industry attitudes is we do not need to cater to people—*as they are*—in their homes and we do not do anything to address the well-documented dangers (as well documented by research listed in the Bibliography) of industry's products—neither of which are defensible positions in a court of law where it can be shown that the dangers to users—*and-countermeasures*—have been well identified in publicly available documents for nearly five decades in the USA (e.g., in the Abt Associates document published in 1975 and cited as number 11 in the Bibliography provided with proposal IBC G172-21).

Opposition comment: The proposal's 1.5-inch minimum clearance between a grab bar and the adjacent surface does not comply with ANSI A117.1 which has maintained an absolute 1.5-inch requirement for grab bars

Proponent Rebuttal: Although the text shows it as an absolute dimension, a relevant A117.1 figure shows it *as a minimum* and despite making this a minimum for handrails years ago; a revision is expected for the next edition (per my recent formal proposal to A117)—the one relevant to this edition of the IBC. See also the series of photos within the Proponent's Reason for IBC G172-21 which demonstrates that the absolute 1.5-inch criterion makes no sense in terms of safety for users.]

Opposition comment: No bathtub on the market is designed for fixing a stanchion "into the rim."

Proponent Rebuttal: Yes, sometimes changes must made in manufacturing processes to better accommodate safety in the code. But if changes are the obstacle here, then why ever try to increase safety. The proposal is clear that fixing a stanchion to a bathtub rim is restricted to steel construction bathtubs which are still available (at very reasonable price, without special order) on the market and, furthermore, the proposal does not advocate attaching a stanchion "*into*" the tub rim of any type of construction. That is neither the only, nor best way of fixing a stanchion to a steel bathtub rim which, even if the industry's switch to lesser-quality, plastic or fiberglass tubs persists. Industry cannot prevent users from sitting on the more-easily deformed plastic bathtub rim imposing a load much higher than that imposed by users securing an upper-body "point of control" which transmits a load to the tub rim. (Note that the IBC, Chapter 16, applies the 250-pound load requirement to seats—effectively the bathtub rim on which users can sit—the same load assigned for grab bars.)

Also, see the comment elsewhere also addressing testing stanchion fixing with modern RTV adhesive that easily withstands a load transmitted, in shear force (per sq. in.), to the rim surface that is more effective—by a multiple of about six—with an adhesive-attached (9 sq.in.) plate than is possible with all the screws (typically about 6 provided with conventional plumbing industry grab bars) into solid-framing backing in the surrounding walls. The latter is difficult to accomplish with some grab bars and conventional '2 by 4' framing. The installation for rim *surface* mounting is more robust than what is currently achieved with conventional grab bars even before the latter suffer serious deterioration, from poor water protection, such has been widely documented by me in many of the grab bar-equipped guest rooms I have encountered (pre-Pandemic) around the world. The bathtub industry needs to worry less about its warranties being violated—which sitting users can easily and completely innocently do—and more about the well-documented, real dangers of their inadequate designs and choices of materials. See the accompanying Bibliography including the many videos also listed there on bathing safety. These constitute "Actual Notice" as a legal concept established by the courts.

§ **Margo Thompson** (Multifamily Construction Council)

Opposition comment: Two or three grab bars are unreasonable.

Proponent Rebuttal: It is not unreasonable to have one bar for a shower and two—not three—bars for a tub at an installed cost of a few hundred dollars in an overall residential unit cost of a few hundred thousand dollars. This provides, on average per household, an annual injury prevention benefit of a comparable amount of a few thousand dollars. (See authoritative video at https://vimeo.com/channels/1362334 — as listed in the accompanying Bibliography).]

Opposition comment: Tenants do not want "accessibility" features and, if features thus recognized exist in their unit, they will expect to pay less.

Proponent Rebuttal: No proof is shown for this opposition comment. In addition leaving a decision on safety up to an aesthetic or attraction concern represents misplaced priorities. Also, poorer residents are clearly aware of their precarious financial position if unbudgeted medical costs are incurred and, even more important, such costs do not begin to include the much larger costs in reduced quality of life—*including loss of ability to work*—that a serious fall can precipitate.

Opposition comment: Members-believe installation of such features should be only at the request of the tenant or owner-occupant.

Proponent Rebuttal: Making safety items optional defeats the purpose of having a code to promote safe surroundings. If you asked prospective buyers or tenants if they really wanted to have tempered glass in code required locations around stairways, etc. and told them that they could get a lower price or rental rate if they were willing to go without, would that be an acceptable option to propose to the public?

Opposition comment: Members are already putting blocking behind all tubs and showers.

Proponent Rebuttal: No evidence is provided for this and it certainly is not on every building because it is not required. Also, this can represent a waste if the design doesn't have to meet a standard that limits the need for specific locations for blocking. In addition, many grab bar manufacturers require the attachment screws to go into a stud. Another opponent pointed out that most bathtub installations and shower installations have plastic surrounds/enclosures that do not accommodate subsequent grab bar installation, even with blocking installed behind these relatively flimsy membranes that, if penetrated, could result in water entry to areas otherwise kept dry and less vulnerable to damage. Most important, all the requirements currently leading to all the blocking/backing/reinforcement for future grab bar installation is based not on safety but on accessibility, particularly for people approaching the bathtub in a wheeled device and transferring to/from a bathtub-supported seat. Grab bars intended for this function are wrong in orientation and height for ambulatory transfers; they are not designed to prevent falls to ambulatory users. (See also further details, below, in a rebuttal pertinent to transfers and role of retrofitting using "blocking.")

§ **Ceasar Luhan** (National Association of Home Builders)

Opposition comment: Why all R occupancies, both transient and permanent occupancy?

Proponent Rebuttal: Actually while it may seem more conspicuous that more transient residences would more logically require grab bars because many different individuals will be using a home. It is also true that the more permanent residence the more the need for grab bars since, as we get older, sooner or later, we need to have grab bars. Problems of bathtub and shower-related injuries are endemic in residential facilities of all types; thus the countermeasures should be equally broadly applied in model codes and safety standards. NFPA 5000 and NFPA 101 have, since 2018 editions, had grab bar requirements applying to all new residential plus board and care facilities, among others, for all showers and bathtubs.

Opposition comment: Only standard tub/shower designs taken into account with the proposed requirements.

Proponent Rebuttal: This is incorrect; many configurations and wall-and-no-wall boundary situations examined. The requirements have been carefully drafted for the current IBC proposal, as well as in revisions proposed for the 2024 editions of the NFPA documents PLUS that other ANSI-approved document, ICC A117.1 which has a package submitted for the current cycle of changes that is consistent with not only Proposal G-172-21, but with fine tuning submitted for NFPA documents PLUS the requirements that have been proposed for the National Building Code of Canada for all occupancies with bathtubs and showers (and which has had a Task Group including participation from top experts as well as builders) for about a decade. All of these—especially in the US—have tried to address nonconventional bathtub and shower designs, e.g., designs not bounded by walls—for which some of the many option (e.g., diagonally oriented, wall-mounted grab for the back wall) are not a good choice; for these there are other options including some that are a lot more aesthetically acceptable and achievable than some of the high-priced industry solutions to water delivery devices (illustrated in the 294-slide presentation I gave to a recent meeting of a key Canadian code committee; two slides from the Canadian presentation are reproduced, above, in this Reason statement).]

Opposition comment: There are problems posed with A117.1 current requirements.

Proponent Rebuttal: Proposals were submitted for the next edition of A117.1 recently under the new heading of "ambulatory accessible" facilities that take, as their precedent the long-established "ambulatory accessible toilet compartments" requirements..

Opposition comment: Grab bars are already readily available for purchase.

Proponent Rebuttal: Yes, and before tempered glass was required tempered glass was available for purchase but its installation rate was nowhere near what it became once required by code. Also, many of the available grab bars are not suitable for use in wet conditions. Moreover, they rely on difficult-to-achieve adequate and reliable fixing with the provided screw-based hardware which does not address moisture problems inherent with the currently provided cover plates.

Opposition comment: “Very much an overreach.”

Proponent Rebuttal: Not anymore than other safety provisions in the code which are typically less risky to occupants than bathtubs, etc. are.

By way of background, my highest degree is an HonDSc and I have over 300 committee-years of service on US standards and codes committees (about half of which have been as the lead voting representative of the American Public Health Association); thus my scoping decisions are based on evidence as much as possible—a key tenet of public health. Others have different insights on what is “reasonable” and what is “overreach.” What is their “evidence” and how do they reconcile their “evidence” with the published injury toll of over one million, nonfatal, medically treated injuries annually in the US due to bathtubs and showers, with about 90 percent of these occurring in residential settings? (See the REASON statement for this evidence.) This toll exceeds nonfatal fire-related injuries by two orders of magnitude (e.g., a factor between 50 and 100 as illustrated in the pie chart provided in the REASON statement).

§ **Jim Kendzel** (ASA)

Opposition comment: A117 is an industry consensus standard and the issue was already covered.

Proponent Rebuttal. Note that I have submitted proposals to A117 to add the relevant, *new* requirements for “ambulatory accessible” bathtubs and showers. Also other discussion herein addresses this issue.

§ **Steven M.** (American Institute of Building Design)

Opposition comment: Has seen this proposal develop over the years. He complained that the stanchion examples in the proposal were only on moving vehicles and the IBC covered R occupancies that were not in motion when occupants using them.

Proponent Rebuttal: Likewise, the photos only show the vehicles when not in motion. The occupants are the ones in motion and the grab bars are there to help them move safely in a well-established dangerous area.

Opposition comment: Grab bars can easily be added afterwards.

Proponent Rebuttal: Retrofitting grab bars is relatively difficult in comparison to stanchions which are much more versatile in terms of subsequent installation; none of the installations with which I have worked, entailed holes in wall for screw attachment—as would be the case with conventional grab bars.

§ **Misty Guard** (Regulosity LLC)

Opposition comment: Structural load requirement was not being addressed.

Proponent Rebuttal: This was explicitly addressed with a mandatory reference to the IBC Chapter 16 requirement, re. 250-pounds, specific to grab bars and seats.

Opposition comment: For stanchions, load on surrounds exceeds structural capacity.

Proponent Rebuttal: I have not encountered this and I have the equipment needed to apply 250 pound loads to stanchions <u>I have</u> installed for both bathtubs and showers.

Opposition comment: The “Shelf”, which is a horizontal surface filling the space between the top of a bathtub and the nearest room wall or a part of a podium in which the tub is placed, does not have load capacity.

Proponent Rebuttal: If it has not been designed for a 250-pound vertical load, how is the tub which it helps to support, with both horizontal and vertical load support, going to be able to withstand the weight of the water, plus occupant(s) in the tub, especially a large, multi-person tub (such as with some with multiple water jets). The load imposed through the grab bar or stanchion fixed to this tub surround is lower than these other loads; furthermore, these installations are often placed next to a wall or walls (as with a corner design which provides additional lateral support to the tub) and conventional grab bars can be readily attached to these walls adjacent to the open sides of the tub. Another option is a floor-to-ceiling stanchion. Some upper body “points of control” are going to be very important for users of such large tub installations which often have high tub walls relative to finished floor level. Such large tubs pose many challenges (which I have managed as a user of such installations in premium-price hotel rooms I have occupied as a paying guest in hotels worldwide). Provision of grab bars or stanchions is a minor cost and engineering consideration relative to other challenges associated with these large installations.

§ Tom Zuzik, Representing NOMMA (National Ornamental & Miscellaneous Metals Association)

Opposition comment: Stanchions are used, in the context of pedestrian barriers, as the vertical structural members—e.g., metal posts—

supporting secondary, sloping, horizontal and secondary vertical members, typically of metal.

Proponent Rebuttal: None of these are grab bars or stanchions in the roles they play as single handheld members for grabbing by the hand(s) as part of transfers to/from/within bathing/showering facilities.

Rebuttal Testimony by Those Opposed to Proposal

§ **Tom Zuzik**, Representing NOMMA (National Ornamental & Miscellaneous Metals Association)

Opposition comment: Code is a minimum; items are not needed for all people. Safety versus accessibility briefly noted.

Proponent Rebuttal: This is not a matter of "safety" *versus/or* "accessibility." The scope is both safety in use *and* usability of bathing/showering facilities *for everyone*. Also, the evidence suggests that safety and usability interact strongly for many adults; see Figure 2 for quantitative evidence of this interaction in the USA. Moreover, the importance of such safety is shown by its existence in NFPA 101.

Matt Sigler, (at the time of the CAH) Plumbing Manufacturers Institute, PMI

Opposition comment: In Canada there was a recent rejection (in spring 2021), by Provincial and Territorial code authorities, of code changes, at National level, on grab bars and stanchions for bathtubs and showers.

Proponent Rebuttal: The meetings of "Provincial and Territorial code authorities"—unlike deliberations on *National Building Code of Canada* (NBCC) code change proposals, for its 2020 edition—were ***not*** conducted in an open, public fashion where all parties could observe and participate. Before these recent nonpublic meetings of P/T code authorities, there have been years of open, national meetings started after a proposal on grab bars for home bathtubs and showers was submitted—***in 2007*** by Dr. Nancy Edwards —and was addressed in many open, public meeting of the NBCC committee responsible for housing, along with its Grab Bar Task Groups.

Opposition comment: Blocking is sufficient as a solution to bathing safety.

Proponent Rebuttal: Note that some grab bar manufacturers are requiring grab bars to be connected to studs. Blocking is not sufficient. Indeed, no fall has ever been prevented or mitigated by blocking because the necessary grab bar is not installed and, if installed, it is likely in the wrong place for safety as opposed to accessibility (again in relation to transfers by non-ambulatory people from a wheeled device to/from a seat in a tub or shower). As noted above, such grab bars are neither intended for, nor sufficiently effective, for ambulatory users; see comments above on this.

Opposition comment: People do not want grab bars.

Proponent Rebuttal: No documentation of this has been provided. In addition, if you ask the average member of the public if they were willing to pay for tempered glass instead of regular glass and show them a photo of each one so that it was very difficult to see the difference, it's very likely that they would all say they'd rather pay less for a home or rental without tempered glass. Studies reported in scientific publications (listed in the Bibliography) report a nuanced response by members of the public. A lot depends on the quality and placement of such grab bars as well as the age of the users (which was noted in comments elsewhere in this Comment Reason statement), Avoidance of bathing, partly due to the perceived dangers involved, starts in younger adults, not just the elderly.

Evidence supports the contention that bathtubs and showers—as discussed elsewhere in this Public Comment—*are more dangerous on a use-exposure basis than are stairs (in residential settings)*. Such insights about bathtubs and showers date back to the first large US study in the mid 1970s, published in 1975 (and listed in the accompanying Bibliography for this Proposal and Comment: "11. A systematic program to reduce the incidence and severity of bathtub and shower area injuries."

§ **Misty Guard** Regulosity LLC

Opposition comment: Stanchions are not suitable for in-rim mounting on plastic plumbing products; they are not designed for the loads involved.

Proponent Rebuttal: I support the stanchion mounting on—*not into*—bathtub rims. I agree that the relatively poor rigidity and strength of plastic tubs is not suited to such loads—possibly also the live loads from a heavy bather sitting on a tub rim (as discussed elsewhere in this comment). Thus, while the inability of one line of products to meet the 250-pound minimum load established by the IBC in Chapter 16, specifically for grab bars (and, now, stanchions which function as grab bars) should not have to be called out in a code requirement, especially a modern code that claims to use performance language. In any event, the proposals now being submitted for standards such as ICC A117.1, will specify that stanchion mounting on tub rims is only for steel tubs that should have no problem meeting IBC's 250-pound criterion.

§ **Margo Thompson** National Multihousing Council

Opposition comment: ‘Me too’ testimony.

Proponent Rebuttal: None

Input by IBC-General Committee Members During the Public Hearing Portion on G172-21

Here follows, in chronological order what IBC-G Committee Members asked by way of question, of the proponent, during the public testimony portion of the CAH., starting with Henry J. Kelly, CCPM, CCI, CCC, GRI, Representing the National Association of Home Builders:

“Mr. Pauls, your proposal is very detailed as to what will be required if approved. My question is how many units that have been built or retrofitted currently contain all the grab bars and stanchions as you propose in sections 1210.3 to 1210.3.4.5?” As the question was worded clearly in terms of “How many,” my reply was, correctly, “I don’t know,” to which he could have added, realistically, that such expertise exists, if at all, within the housing industry and he would defer to such expertise on this particular question.

This was followed by a question by Lieutenant Michael Pokorny, Montgomery County Fire & Rescue, asked:

“Mr. Pauls, in Section 1210.3.4.4 you talk about structure—the stanchion being capable of structural loading set forth in Section 1607.8.2 and this section has to do with Fire Department vehicle loading. Is that what your intention is? My reply, “The reference was provided by ICC staff so, if I am in error, I apologize for not checking it personally.” (The reference used, 1607.8.2, was the correct one, in relation to grab bar loads, in the IBC, *2018 edition*, available to me.)

Generally, on both questions, the first thing an expert on any subject should know is when to defer to the knowledge and expertise held by others.

Committee Action

Following the public testimony portion of the CAH, the Committee Action included a motion for Disapproval accompanied by the following comments by a small fraction of the Committee members. This occupied nearly the same length of time as allotted to me as the Proponent. Some of the Committee input appeared to be, effectively, in the form of testimony for which no rebuttal was possible (except in this public comment). The virtual hearing format also did not have any clearly apparent mechanism for a “point of order” to be made if new information was introduced in the Committee Action portion of the Hearing on G172-21. (This would have re-opened public testimony if the Moderator agreed that new information had been introduced.)

Three Committee members spoke, as follows.

(1) Henry J. Kelly, CCPM, CCI, CCC, GRI, Representing the National Association of Home Builders, (after making the motion for disapproval):

Committee member reason: “When I questioned the Proponent, he did not know if any of the units currently that have been built or have been retrofitted, that would require with all of the things that he proposes in 1210.3 through 1210.3.4.5, would solve the problem. If he does not know if they exist, then there’s been no studies done and there’s no empirical evidence that what he proposes will solve the problem and we shouldn’t be adopting anything in the Code that there is no evidence this it will solve the problem.”

Proponent Rebuttal: This was not the question asked during the public hearing portion when this committee member asked, specifically, “How many units that have been built or retrofitted currently contain all the grab bars and stanchions as you propose in sections 1210.3 to 1210.3.4.5?” My reply, correctly, was “I don’t know.”]

The exact *quantitative* question he originally asked was, “how many units. . . ,” not “if any of the units. . . .” The correct answer to the first question—on narrowly specified quantity—was, correctly, “**I don’t know**” and the correct answer to his rephrased, *yes* or *no* question was, “**Yes, those based on the criteria and background information set out in the proposal**.” There was no mechanism (including a point of order) for reopening the public portion of the hearing. Moreover, there was specific, pertinent, published insights in some of the Canadian studies behind this answer, *to the latter question*, listed in the Bibliography provided with the initial proposal and highlighted again below with a listing of (numbered) titles only.

(2) Micah Chappell, MBA, CBO, Code Development Manager, Seattle Department of Construction and Inspections:

Committee member reason: “I just want to commend Mr. Pauls for bringing this proposal through on a regular basis for Code cycles. It just goes too far every time that’s been mentioned several times. I do think he should come back with a portion. As one of the opponents talked about, there is a problem of not having backing when these things are necessary to install by choice. And maybe that’s the proposal he needs to start with. This just goes too far.”

(3) Eirene Knott, MCP, CBO, CFM, Director of Code Services, BRR Architecture:

Committee member reason: "One of the proponents provided the statement that this—the Code is a minimum standard and this requirement is going to raise that level of expectation of what a minimum standard is and I believe it goes beyond this. The second point I want to make is (that) my mother is somebody who is a fall risk and she made a choice to put her own grab bars within her own house, none of which were in the locations where Mr. Pauls is suggesting. So I don't believe this is ready for prime time."

Commenter Rebuttal: Many individuals sit on these code committees as experts. Expertise is the core of the development of good quality standards.

Proponent Rebuttal to All Three Committee Members Commenting: All of these Committee comments warrant responses which, given the current, highly limited testimony time in ICC hearings, can only be addressed—within the ICC process—in written public comments such as this one. For example, as there are two very different types of transfers—a *transfer from/to a wheeled mobility device* and *ambulatory transfers,* the bathing safety experts (as they are identified in the Bibliography for example) agree that the latter call for a minimum of two grab bars or stanchions. Within recent deliberations (over a decade or more) in multiple code development bodies, the frequent references to backing (blocking or reinforcement) have ***not*** been based on future provision of grab bars for *ambulatory transfers*; they are based on *transfers from/to wheeled mobility devices*. The two functions are very different.

Moreover, ambulatory transfers cover two dangerous aspects: (1) stepping over elevated—plus possibly slippery—surfaces and (2) stand-to-sit and sit-to-stand transfers also involving slippery surfaces. The originally submitted proposal, IBC G172-21, address the two types of "points of control" appropriate for both the access side of a bathtub or shower—where vertical grab bars or stanchions are most useful—and, in the case of tubs, the non access side (with the latter being especially relevant for the stand-to-sit and sit-to-stand transfers where *bilateral*, upper body points of control are very relevant. Moreover, as ambulatory transfers can be facilitated entirely by stanchions, there may be no need for holes to be made in bathtub surrounds. Thus "backing" is not a necessary prerequisite for future installation. Proposal G172-21 illustrates two stanchion options (along with six, wall-mounted, grab bar options) that completely meet the minimum requirements proposed. (The relevant illustration is just below the pie chart graphic.)

There were a couple of comments on ~~l~~level of expectation leading to many avoidable injuries (as well as leading to reduced or avoided uses of bathtubs as addressed by my proposal); it is clearly within the scope of the IBC to "raise expectations" to reduce the predictable and largely preventable million or so professionally treated injuries annually in the USA as well as to better facilitate the billions (with a "b") of uses of bathtubs and showers annually in the USA. Surely this is a "prime time" for ICC members and its code development process to respond positively.

Rebuttal Responses to the Committee Reasons in the Report of Hearing

Committee Reason (as reported by ICC). This statement is as follows except that, here (for clarity), sentences are separated, plus numbered, *and a comment has been added in italics about the accuracy, relevance, etc. of the summation.*

1. "**This proposal was disapproved because the committee had several concerns."**

Proponent Response: *Only items 2, 3, 4, and 5 were noted as reasons explicitly expressed by committee members; the other items came from opposition testimony which the Committee did not mention as reasons for disapproval.*

2. **"Have there been any dwelling or sleeping units constructed with the proposed grab bar configurations so that the increase in safety can be verified?"**

Proponent Response: This single, hugely-complex question posed by Committee member, NAHB representative, Henry Kelly (and underlining for emphasis): "<u>My question is how many units that have been built or retrofitted currently contain all the grab bars and stanchions as you propose in sections 1210.3 to 1210.3.4.5?</u>" The answer to Mr. Kelly's original question, was—correctly and appropriately, "I don't know." (The question, as originally asked reminds one of the historical practice in some parts of the US to have persons of color—seeking the right to vote in an election—compelled to answer a question about how many jelly beans were inside a large jar.) As an expert who occasionally has to testify under oath, "I do not know" is a correct—and sufficient—answer to an impossible-to-answer question which was for "<u>how many</u>," not the rephrasing of the question here as, "<u>Have there been any. . . ?</u>"

If supportive evidence were needed, reference would be made to the Canadian studies referenced in the Bibliography which date back a couple of decades.

3. **"Have their been any studies or empirical evidence that indicate that this will significantly improve safety?"**

Proponent Response: Yes, see the excerpted titles, below, of a large number of studies that were included, numbered, in the Bibliography listing in this proposal (and earlier ones submitted to ICC for the 2018 editions of the IBC and IRC).

Moreover, see the recorded meetings of experts that go well beyond the published research studies in providing state-of-the-art presentations by

Dr. Nancy Edwards and Dr. Alison Novak plus discussions with other injury prevention experts from Canada and the USA. For links to these freely streaming videos see section below, updating the Bibliography.

See also—after the general comments below—several excerpts from Bibliography item 30, published a decade ago, that provides a good summary of what was learned about use and performance of grab bars as well as attitudes of tested adults about their intention to install grab bars such as the ones used in the tests.

4. “**Requiring the installation in all bathrooms in all Group R units is going too far — perhaps blocking so that residents can add grab bars based on need.”**

Proponent Response: Generally, misconceptions about blocking need a powerful rebuttal, particularly the claim that “blocking” is the solution. First, the blocking still being specified for accessibility (by A117.1 and various codes), is not proposed for safety of ambulatory bathers who need points of control based on standing transfers. The blocking-facilitated grab bars are intended for transfers by wheel-using, seated persons needing to shift from a wheelchair seat to another seat in a bathtub or shower enclosure (and vice versa). The grab bars that make sense for such accessibility-related transfers are not high enough, suitably placed, and often vertically oriented to assist ambulatory users.

All of the currently installed blocking will only rarely be put into use, even for assistance to non-ambulatory bathers, let alone ambulatory users. Grab bars of incorrect position, orientation, height, etc. will be of limited use for the latter. Finally—for all situations—how easy will it be to find out if, and where, blocking has been installed and how is such blocking to be used in connection with all the recently and currently installed plastic surrounds for bathtubs and showers that the plumbing industry claims cannot have grab bars installed due to the flimsy nature—until reinforced—of the surrounds/enclosures. There is also the concern for water intrusion with the holes that must penetrate such membrane materials.

Both in Canada and the US, opponents have been outspoken about unsuitability, for grab bar installation, of industry’s products, whether plastic or fiberglass tubs and surrounds/enclosures. It turns out that the older ones bathtub is—likely with enamel-steel fabrication and with a structurally superior, tile (on solid backing) surround—the easier it might be to provide both the needed stanchions and/or, in some cases, conventional grab bars. The stanchions, for example, do not rely on blocking in either of the apartments where I have offices (in Toronto and in Maryland). Again, the IBC already requires provision for a 250-pound load for seats serving bathing and showering and that would include the bathtub rim in many cases.

5. **“The choices for grab bar installation should be based on individual residents needs and choices, which may not be this configuration.”**

Proponent Response: The proposed requirements, like those specified in established requirements in both the 2018 and 2021 editions of NFPA 101 and NFPA 5000, do not call for “this configuration.” Like what is proposed for ICC codes, there are multiple options that address various bathroom layouts and surroundings of the bathtub. Also, in treating stanchions and conventional grab bars as equally acceptable in the options, there is added choice about visual appearance which is especially discreet with stanchions which blend into the décor in a more-architectural fashion rather than looking institutional and an afterthought. Stanchions are also much more likely to serve other important usability and safety functions, notably for use of toilets located adjacent to bathtubs or showers. Conventional grab bars are not as versatile for such dual uses as are stanchions.

6. **“The locations specified can be an issue with the different types of tubs and showers on the market for design and structural strength.”**

Proponent Response: Wrong, the options include all manner of tub and shower shapes and sizes plus adjacent construction. Also, enamel steel bathtubs are still available and in stock at stores selling the more-expensive, less-durable plastic designs.

Furthermore, there is no need to install stanchions “into” bathtub rims. The same stores that sell steel bath tubs also sell the coated steel tubing and matching surface-mounted fixings needed—and structurally adequate—to mount the lower end of a stanchion “on” a bathtub rim, not “into” the rim using widely available, modern RTV adhesives (such as widely used in automobiles, even for water pumps) that have the strength to meet the 250-pound loading—in all directions—to satisfy the IBC structural requirement, even in very wet conditions. I have such an installation in my Toronto apartment which has served well for years, on a 50-year old steel bathtub. It easily passed a structural load test exceeding 300 pounds, sustained for hours and directed laterally to serve as the toughest test of the adhesive-based mounting “onto” the bathtub rim.

7. **“There is a concern about the grab bar location conflicting with the shower curtains so that water would end up on the room floor, thus creating a slip and fall hazard.”**

Proponent Response: This concern ~~-~~was both raised and solved by the G172 proposal with the very careful use of particular lateral locations of the vertical grab bar options for the control-end or head-end walls. The grab bars are thus clear of the standard shower curtain rod/track location over, or at, the inside wall of the bathtub at the approach side.

Getting into the details addressed: the issue had been thoroughly dealt with in specifying vertical grab bar centerlines (in Section 1210.3.1): “between 9 inches (230 mm) and 12 inches (305 mm) horizontally, inward from the access side of the bathtub” or “within 2 inches (51 mm) maximum inward, and within 6 inches (152 mm) maximum outward, from the access side of the bathtub. The grab bar or stanchion shall be located

2 inches (51 mm) minimum, horizontally, from the centerline of any shower curtain rod/track installation.” Thus a minimum of 7 inches (178 mm) of lateral area was reserved for the shower curtain rod/track or other enclosure system (e.g., sliding safety glass panels in a metal frame) that effectively address the danger of water ending up on the bathroom floor. Also, these protection measures are easy for bathing users to undertake.

PROPONENT’S GENERAL COMMENTS in Response to “Disapproval” Vote.

As noted previously, below are selected, excerpted portions of a large number of studies that were included, numbered, in the Bibliography listing in this proposal (and earlier ones submitted to ICC for the 2018 editions of the IBC and IRC), See also the links for several listed, streaming videos that go well beyond the published research studies in providing very accessible, state-of-the-art presentations by Dr. Nancy Edwards and Dr. Alison Novak (two world experts in safety of bathing and grab bar effectiveness studies) plus discussions with other injury prevention experts from Canada and the USA including five highly knowledgeable members of A117 and NFPA committees plus relevant ICC staff. (All 11 participants in the March 1002016 meeting are identified in the three-part video with the first part accessible at https://vimeo.com/channels/866600/167609881.)

From Bibliography item 30, come the following relevant quotations that address some of the criticisms made by Committee members quoted above. (the full citation for this item is: Guitard P, Sveistrup H, Edwards N, Lockett D. **Use of different bath grab bar configurations following a balance perturbation**. *Assistive Technology* 2011;23:205-15.

". . . . the vertical bar was by far the bar most often used by participants to regain their balance when entering/exiting the tub during platform perturbed transfers. . . . Overall, older adults used grab bars to regain their balance (alone or in combination with a surrounding structure) in 212 of the 425 instances where they were present (49.8%). Older adults found grab bars to be very helpful, felt comfortable using bars, and felt safer when grab bars were present. Most participants indicated they would eventually install the grab bars tested (84.3% for CSA, 70% for OCC), . . . Younger adults also reported an increased sense of security in the presence of grab bars. . . . Nine percent of younger adults and 8% of older adults felt there was no difference in their sense of security when entering/exiting the tub in the presence or absence of grab bars. . . . Interestingly, 23 participants (41.8%) recommended grab bars to family members, colleagues, and/or friends. . . ."

". . . . The vertical bar was most often used when entering and exiting the bathtub. . . . Our results support the need for two grab bars to ensure safety during all phases of bathing, as recommended in previous studies (Aminzadeh *et al*., 2000; Sveistrup *et al.,* 2006). **Building codes should be revised to require a minimum of two bath grab bars to ensure safety during bath transfers and prevent falls: one adjacent to the rim on the side wall to facilitate entry/exit and one on the back wall to help during sitting and standing in the tub. . . "**

Bold added here as this pertains to the heart of the issue in this proposal and related comments. It is also the most direct rebuttal to those speaking at the ICC CAH, who argue that my proposal goes too far. The evidence from research reported here and in the other sources, some of which are described next (in video and text formats) supports **my** position and it is up to those opposed to my position that, now, need to come up with evidence as opposed to mere opinion or conjecture.

For this reason—*and others*, I once again extends an offer of free technical presentations to, and related discussion within, ICC Chapters that wish to have a virtual presentation and discussion opportunity on the topic of how the I-codes can better address bathroom safety, in addition to stairway safety. This is especially important during 2021 as the ICC A117 Committee will also be processing a proposal to add new requirements to ICC-A117.1 dealing with ambulatory accessible bathing, showering and toileting facilities, a proposal submitted by me, the longest serving Individual Member of the A117 Committee. Education of voting members of ICC is, ultimately, the best way to improve use of building codes as a key method of preserving, to a reasonable degree, the wellbeing and safety of the public—*including the families of ICC members.*

(From the slightly updated REASON statement): Approximately 50 internationally-produced scientific and technical references, on bathing/showering safety, were compiled by me, in 2016, for an American Public Health Association (APHA) draft policy highlighting, especially two Canadian research studies that also are addressed in three video presentations by Principal Investigators (Dr. Nancy Edwards, Dr. Alison Novak) for the research and posted, for free streaming viewing, starting at, https://vimeo.com/channels/866600/167609881, Accessed July 2, 2021. Beyond the three videos from the March 2016 meeting of experts, additional videos covering technical aspects of bathing and showering safety (including cost impact and benefit issues) are found at the following links (all of which are available, with descriptions, at http://www.bldguse.com/VideoPage.html

my Professional Practice Website, This selection, from a subset of about a dozen videos, of about 30 at the site, was accessed July 2, 2021.):

https://vimeo.com/237294479

https://vimeo.com/197742277

https://vimeo.com/193507768

https://vimeo.com/173883358

https://vimeo.com/175101448

Selected publication titles, especially related to this Comment

(from Proposal Bibliography and other cited references with in the Proposal and Comment text)

1. Access to bathtub grab bars: evidence of a policy gap.

3. Nonfatal Bathroom Injuries Among Persons Aged ≥15 Years United States, 2008.

4. Development and evaluation of an instrument to measure seniors' attitudes toward the use of bathroom grab bars.

5. Utilization of bathroom safety devices, patterns of bathing and toileting, and bathroom falls in a sample of community living older adults.

11. A systematic program to reduce the incidence and severity of bathtub and shower area injuries.

14. Practice Guideline for Prevention of Falls in Older Persons.

15. Risk factors for falls among elderly persons living in the community.

17. A population-based study of environmental hazards in the homes of older persons.

18. Environmental hazards and the risk of nonsyncopal falls in the homes of community-living older persons.

19. Prevalence of selected risk and protective factors for falls in the home.

20. Unintentional injuries in the home in the United States.

21. Home environmental hazards and the risk of fall injury events among community-dwelling older persons.

23. Patterns of use of different toilet grab bar configurations by community-living older adults Research Highlight.

24. Evaluation of bath grab bar placement for older adults.

27. Biomechanical investigation of grab bar use and balance control during bathing transfers.

28. Predictors of bath grab-bar use among community living older adults.

29. Evaluation of bath grab bar placement for older adults.

30. Use of different bath grab bar configurations following a balance pertubation

34. Characteristics of gait in stepping over obstacles.

37. Injury Prevention: What works? A Summary of cost-outcome analysis for injury prevention programs.

38. Interventions for preventing falls in elderly people.

39. Modification of the home environment for the reduction of injuries

40. Home safety education and provision of safety equipment for injury prevention.

41. Formulating a programme of repairs to structural home injury hazards in New Zealand.

42. Home modifications to reduce injuries from falls in the Home Injury Prevention Intervention (HIPI) study: a cluster-randomised controlled trial.

45. Check for Safety: A home fall prevention checklist for older adults.

--. Effect of bathroom aids and age on balance control during bathing transfers.

--. The Evaluation of Vertical Pole Configuration and Location on Assisting the Sit-to-Stand Movement in Older Adults with Mobility Limitations.

--. Toilet Grab-Bar Preference and Center of Pressure Deviation During Toilet Transfers in Healthy Seniors, Seniors With Hip Replacements, and Seniors Having Suffered a Stroke

--. A fresh look at the costs of non-fatal consumer product injuries.

Bibliography: See the very extensive bibliography provided with proposal G172-21 (with key documents listed, by title only, above); there are only three additional references for that listing of references on the problems of, and solutions to, injuries and flawed performance (in terms of usability as well as progress with model building code development) of bathtubs and showers as addressed by this comment.

Lawrence, B., Spicer, R., Miller, T. (2015) **A fresh look at the costs of non-fatal consumer product injuries.** *Injury Prevention. 21*, 23-9
Pauls, J.L. and Johnson, D.A (2018). **Applying Ergonomics to Bathing Safety: Including adoption of unorthodox practices for slip-resistant underfoot surfaces of bathtubs plus showers and provision of effective points of control.** *Proceedings of the 20th Congress of the International Ergonomics Association (IEA2018),* Vol II, Springer, pp. 486-500.

Pauls, J.L. and Johnson, D.A (2021). **Why, How, and How Effectively Do USA and Canadian Building Codes Address Two Leading Fall Sites in Homes?** *Proceedings of the 21st Congress of the International Ergonomics Association (IEA2021),* Vol V, Springer, pp. 674-681.

Cost Impact: The net effect of the public comment and code change proposal will increase the cost of construction
While the "net effect" includes a very modest increase in the cost of dwelling unit construction—on the order of 0.001 (one in a thousand) of the overall unit construction cost of a unit, the payback of this investment should be realized within a few years of occupancy in terms of reduced societal cost of injuries, to the occupants, from falls associated with bathing and showering in bathtubs and showers. Thus, for the vast majority of the time (say a few decades) the unit is occupied, there is only net payback on the investment.

Beyond the significant reduction of injuries, there is a larger benefit to the well-being of the occupants in terms of reduced anxiety with some critical, relatively dangerous aspects of showering and bathing, namely the transfers in and out of the facility and, in the case of tubs especially, there are extraordinary challenges both underfoot conditions and with general need for postural control when people transfer between standing and sitting or, (with bathtubs) even lying down in the water-filled tub and, even more challenging, vice versa with transfers back to an upright posture with which one can step out of the facility.

For many occupants, especially in middle age, there will be increasing anxiety about, and even danger of, very serous injuries that, while averted for a time, have a growing probability of occurring. One common response is to reduce bathing and showering, especially with bathtubs. In other words, the cost of injuries—beyond direct pocketbook cost of comfort and safety—rises over time. Grab bars and stanchions—with their costs being almost entirely in the initial acquisition and installation—are an increasingly valuable investment for an individual and his/her co-occupants of the residential unit.

Thus over the life of a bathing/showering facility, the benefit-to-cost ratio is effectively reduced to the point where the initial acquisition and installation cost approaches nearly zero. Hence it could be argued that the best single response to the ICC's question for this little-to-no-cost impact section is "there is no cost impact" there is only benefit and that benefit grows over time as the value of well-being increases for each individual over time and the cost of recovering well-being—within the healthcare system, especially in the USA, increases faster than do construction cost.

Note that I am a member of the ICC Industry Advisory Committee Task Group on Cost Impact and he has been involved with benefit-cost impact issues for decades in a professional capacity including being a member of the International Benefit-Cost Analysis Society based in the USA. I also serve on several NFPA 101 committees and is a longest serving member on at least two of its Technical committees including those most responsible for the grab bar and stanchion requirements in NFPA 101 and NFPA 5000. I am also the longest serving Individual Member of the ANSI-approved A117 Committee for which ICC is the current Secretariat. A117.1 also has proposals for "Ambulatory Accessible" bathtubs and showers that parallel those in the above-noted ANSI-approved standard, NFPA 101.

Public Comment# 2975

G174-21

Proposed Change as Submitted

Proponents: Bryan P. Holland, MCP, CStd., National Electrical Manufacturers Association, representing National Electrical Manufacturers Association (bryan.holland@nema.org)

2021 International Building Code

Add new definition as follows:

GERMICIDAL IRRADIATION. The use of radiant energy to inactivate bacteria, mold spores, fungi, or viruses.

UPPER-ROOM AIR. The air in the room located above the occupied portion of the room that is subject to ultraviolet germicidal irradiation.

Revise as follows:

1201.1 Scope. The provisions of this chapter shall govern ventilation, temperature control, lighting, *yards* and *courts*, sound transmission, room dimensions, surrounding materials , ~~and~~ rodentproofing , and *germicidal irradiation* associated with the interior spaces of buildings.

Add new text as follows:

1210.4 Required disinfection.
Germicidal irradiation for disinfection shall be provided in employee and public toilet facilities in accordance with Section 1211.

SECTION 1211
GERMICIDAL IRRADIATION

1211.1 General.
The provisions of this section shall specify where *germicidal irradiation* for disinfection is required and shall apply to the design, installation, and operation of *germicidal irradiation* luminaires.

1211.2 Required spaces.
Germicidal irradiation for room disinfection shall be required in the following locations:

1. For all occupancies: employee and public toilet facilities.
2. For Group A-1 occupancies with multiple daily performances.
3. For Group A-2 occupancies.
4. For Group A-3 occupancies in buildings, or portions thereof, with occupant load factor of 15 square feet per occupant or less.
5. For Group B occupancies.
   5.1. Where patient care is rendered.
   5.2. In buildings, or portions thereof, with occupant load factor of 15 square feet per occupant or less.
6. For Group E and I-4 Occupancies.
   Exception: Within dwelling units.
7. For common areas in Group I-1, I-2 and I-3 occupancies in buildings, or portions thereof, with occupant load factor of 15 square feet per occupant or less.
8. For common areas in Group R-1, R-2 and R-4 with an occupant load of 50 or more.

1211.3 Installation requirements.
Luminaires and systems shall be installed in accordance with Section 1211.3.1 and 1211.3.2.

1211.3.1 Safe Installation.
Germicidal irradiation luminaires and systems shall be listed and installed in accordance with Chapter 27, and manufacturer installation instructions, design requirements, and equipment markings. Consideration shall include suitability for occupied or unoccupied locations.

1211.3.2 Mounting conditions.
Luminaires for *germicidal irradiation* for *upper-room air* disinfection shall be mounted at the height specified in the manufacturer installation instructions, equipment markings and product listings.

1211.4 Ventilation requirements for germicidal irradiation for upper-room air disinfection.
Ventilation for the building shall be provided in accordance with Section 1202. Additional air-mixing may be required for effective germicidal irradiation

for upper-room air disinfection.

1211.5 General lighting.
Luminaires that emit *germicidal irradiation* shall be permitted to be installed as lighting for general illumination only where permitted by the product listing and indicated in the manufacturer installation instructions.

Reason: This code proposal will:
1. Increase building occupant health and safety from pathogens
2. Address safe installation and use in building spaces
3. Provide application flexibility for building design practitioners
4. Maintain simple enforceability for code officials

This proposal introduces provisions for building and building room disinfection through germicidal irradiation, which is not currently in the International Building Code. Current attention to healthy and well building environments, along with public health concerns of transmitted diseases, necessitates the IBC's need for germicidal irradiation.

Germicidal irradiation delivers the ability to inactivate human pathogens such as germs, fungi, mold spores, bacteria, viruses, harmful to humans. Various germicidal irradiation technologies have been available and used successfully in buildings for decades. Buildings such as hospitals, restaurants and grocery stores, commonly use germicidal irradiation as a disinfection process, reducing the risk of pathogen and disease spread in and from these environments. Examples of some germicidal irradiation techniques are upper air ultra-violet and air duct ultra-violet irradiation.

This code proposal ensures proper and safe installation of germicidal irradiation in buildings, while providing building design practitioners flexibility in determination and use of disinfection techniques most appropriate for a building's specific use. Building classifications and spaces required to utilize germicidal irradiation are selected based on criteria including:

- Occupant Load Factor of 15 square feet per occupant, or less
- occupant turn-over
- occupant load of 50 or more for R-1, R-2, and R-4 Classifications
- prevalence of high-touch surfaces
- spaces with immune-compromised occupants
- high pathogen load shed

The Occupant Load Factor of 15 square feet per occupant is selected to identify the spaces that most benefit from germicidal irradiation disinfection due to high occupant density.

This proposal requires that devices be listed and identified for germicidal irradiation, and requires installation adherence with manufacturer's installation instructions, Chapter 27 (NFPA-70), product listings and equipment markings. This ensures building occupant safety is maintained by restricting germicidal irradiation exposure to levels deemed acceptable by safety certification agencies.

Many studies and papers are available supporting the effectiveness and safe use of germicidal irradiation techniques in buildings, listed in the following bibliography.

Bibliography: Studies on germicidal irradiation disinfection effectiveness

Livingston SH, Cadnum JL, Benner KJ, Donskey CJ (2020) Efficacy of an ultraviolet-A lighting system for continuous decontamination of health care-associated pathogens on surfaces. Am. J. Infect. Control 48: 337-339. https://www.ajicjournal.org/article/S0196-6553(19)30746-1/pdf

'Irradiation with UV light kills SARS-CoV-2', NEWS Medical, June 8 2020 https://www.news-medical.net/news/20200608/Irradiation-with-UV-light-kills-SARS-CoV-2.aspx

Rutala R, Kanamori J, Gergen MF, Sickbert-Bennet EE, Sexton DJ, Anderson DJ, Laux J, Weber DJ (2018) Antimicrobial activity of a continuous visible light disinfection system. Infect. Control & Hosp. Epidem. 39: 1250-1253. https://www.ncbi.nlm.nih.gov/pubmed/30160225

Murrell LJ, Hamilton EK, Johnson HB, Spenser M (2019) Influence of a visible-light continuous environmental disinfection system on microbial contamination and surgical site infections in an orthopedic operating room. Am. J. Infect. Control 47: 804-810. https://www.ajicjournal.org/article/S0196-6553(18)31146-5/pdf

Wekhof A. Disinfection with flash lamps [J]. PDA J Pharmaceut Sci Technol, 2000, 4 (3): 264–267.

Takeshita K, Yamanaka H, Sameshima T, et al. Sterilization effect of pulsed light on various microorganisms [J]. Journal of Antibacterial & Antifungal Agents Japan, 2002, 30.

Wang T, MacGregor SJ, Anderson JG., et al. Pulsed ultra-violet inactivation spectrum of Escherichia coli [J]. Water Research, 2005, 39 (13): 2921–2925.

Welch D, Buonanno M, Grilj V, et al. Far-UVC light: A new tool to control the spread of airborne-mediated microbial diseases [J]. Scientific Reports, 2018, 8: 2752, pp 1–7.

Yamano N, Kunisada M, Kaidzu S, et al. Long-term effects of 222 nm ultraviolet radiation C sterilizing lamps on mice susceptible to ultraviolet radiation [J]. Photochemistry and Photobiology, 2020. (open access)

Ushio. White Paper: Care 222® in the workplace: Testing effectiveness of long-range surface infection prevention.

Manuela Buonanno, David Welch, Igor Shuryak & David J. Brenner Far-UVC light (222 nm) efficiently and safely inactivates airborne human coronaviruses, Scientific Reports, 2020, 10:10285 | https://doi.org/10.1038/s41598-020-67211-2

Xiong P, Hu J. Inactivation/reactivation of antibiotic-resistant bacteria by a novel UVA/LED/TiO2 system [J]. Water Research, 2013, 47 (13): 4547–4555.

Nunayon S, Zhang H H, Lai A C K. Comparison of disinfection performance of UVC-LED and conventional upper-room UVGI systems [J]. Indoor Air, 2020, 30: 180–191.Mathebula T, Leuschner F W, Chowdhury S P. The Use of UVC-LEDs for the Disinfection of Mycobacterium Tuberculosis [C]// 2018 IEEE PES/IAS PowerAfrica, Cape Town, 2018, pp. 739–744.

Ali S, Yui S, Muzslay M, et al. Comparison of two whole-room ultraviolet irradiation systems for enhanced disinfection of contaminated hospital patient rooms [J]. Journal of Hospital Infection, 2017, 97 (2): 180–184.

Safety Standards and Whitepaper references

IEC 62471:2006 Photobiological safety of lamps and lamp systems

ICNIRP Guidelines On limits of exposure to Ultraviolet radiation of wavelengths between 180 nm and 400 nm (incoherent optical radiation) published in: HEALTH PHYSICS 87(2):171-186; 2004

IEC 62471-2 TR ed 1.0 – Photobiological safety of lamps and lamp systems. Part 2: Guidance on manufacturing requirements relating to non-laser optical radiation safety

UL 867 – Standard for Safety for Electrostatic Air Cleaners, UL 867

UL 1598/CSA C22.2 No. 250.0 – Standard for Safety for Luminaires

UL/ IEC 61010-1 - Safety requirements for electrical equipment for measurement, control and laboratory use – General Requirements

UL 8750 -Standard for Safety for LED Equipment

UL 8802 Outline of investigation for Germicidal Systems

Global Lighting Association (GLA) Position statement on UV-C Germicidal Irradiation, May 2020, UVC Safety Guidelines

GLA Applications statement on UV-C Germicidal Irradiation, September 2020, Germicidal UV-C irradiation sources, products and applications

Cost Impact: The code change proposal will increase the cost of construction
Benefits noted above are expected to increase the cost of construction by requiring a germicidal irradiation system in the listed occupancies.

Staff Note: G173-21 and G174-21 addresses requirements in a different or contradicting manner. The committee is urged to make their intentions clear with their actions on these proposals.

G174-21

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: This proposal was disapproved. Germicidal irradiation is one method to address the health issues raised, and should not be mandated. Designers need to be able to use multiple options to address issues. Many of these systems are portable equipment and are not a building element. This needs a standards reference for compliance - NFPA 70 does not seem to have any specific information for these systems. Some studies say that UV light can be hazardous to people' eyes - this type of system needs to be studied further. (Vote 12-1)

Staff Analysis: G173-21 and G174-21 addresses requirements in a different or contradicting manner. The committee is urged to make their intentions clear with their actions on these proposals.

G174-21

Individual Consideration Agenda

Public Comment 1:

IBC: 1201.1, 1210.4, SECTION 1211, APPENDIX P (New), SECTION P101 (New), P101.1 (New), SECTION P102 (New), P102.1 (New), (New), 202 (New), SECTION P103 (New), P103.1 (New), SECTION P104 (New), P104.1 (New), P104.1.1 (New), P104.1.2 (New), P104.2 (New), P104.3 (New)

Proponents: Bryan Holland, representing National Electrical Manufacturers Association (bryan.holland@nema.org) requests As Modified by Public Comment

Modify as follows:

2021 International Building Code

1201.1 Scope . The provisions of this chapter shall govern ventilation, temperature control, lighting, *yards* and *courts*, sound transmission, room dimensions, surrounding materials~~,~~ and rodent proofing~~, and *germicidal irradiation*~~ associated with the interior spaces of buildings.

~~**1210.4 Required disinfection** . *Germicidal irradiation* for disinfection shall be provided in employee and public toilet facilities in accordance with Section 1211.~~

~~SECTION 1211~~
~~GERMICIDAL IRRADIATION~~

APPENDIX P
GERMICIDAL IRRADIATION

SECTION P101
GENERAL

P101.1 ~~**1211.1**~~ **General .** The provisions of this section shall specify where germicidal irradiation for disinfection is required and shall apply to the ~~design,~~ installation~~, and operation~~ of germicidal irradiation luminaires and systems.

SECTION P102
DEFINITIONS

P102.1 General . The following words and terms shall, for the purpose of this appendix, have the meanings shown herein. Refer to Chapter 2 of this code for general definitions.

GERMICIDAL IRRADIATION . The use of radiant energy to inactivate bacteria, mold spores, fungi, or viruses.

UPPER-ROOM AIR . The air in the room located above the occupied portion of the room that is subject to ultraviolet germicidal irradiation.

SECTION P103
LOCATION

P103.1 ~~**1211.2**~~ **Required spaces .** Germicidal irradiation luminaires and systems for room disinfection shall be required in the following locations:

1. For all occupancies: employee and public toilet facilities.
2. For Group A-1 occupancies with multiple daily performances.
3. For Group A-2 occupancies.
4. For Group A-3 occupancies in buildings, or portions thereof, with occupant load factor of 15 square feet per occupant or less.
5. For Group B occupancies.
   5.1. Where patient care is rendered.
   5.2. In buildings, or portions thereof, with occupant load factor of 15 square feet per occupant or less.
6. For Group E and I-4 Occupancies.
   Exception: Within dwelling units.
7. For common areas in Group I-1, I-2 and I-3 occupancies in buildings, or portions thereof, with occupant load factor of 15 square feet per occupant or less.
8. For common areas in Group R-1, R-2, and R-4 with an occupant load of 50 or more.

SECTION P104
INSTALLATION REQUIREMENTS

P104.1 ~~**1211.3**~~ **Installation requirements .** Germicidal irradiation luminaires ~~Luminaires~~ and systems shall be installed in accordance with Section P104.1.1 ~~1211.3.1~~ and P104.1.2 ~~1211.3.2~~.

P104.1.1 ~~**1211.3.1**~~ **Safe installation .** Germicidal irradiation luminaires and systems shall be listed and where germicidal irradiation systems employ ultraviolet radiation, they shall comply with UL 8802. Germicidal irradiation systems shall be installed in accordance with Chapter 27, ~~and~~ the manufacturer's ~~manufacturer~~ installation instructions, ~~design requirements,~~ and equipment markings. Consideration shall include the suitability for use in occupied or unoccupied locations.

P104.1.2 ~~**1211.3.2**~~ **Mounting conditions .** Luminaires and systems for germicidal irradiation for upper-room air disinfection shall be mounted at the height specified in the manufacturer's installation instructions, equipment markings, and product listings.

P104.2 ~~**1211.4**~~ **Ventilation requirements for germicidal irradiation for upper-room air disinfection .** Ventilation for the building shall be provided in accordance with Section 1202. Additional air-mixing ~~may~~ shall be required for effective germicidal irradiation for upper-room air disinfection.

P104.3 ~~**1211.5**~~ **General lighting .** Luminaires that emit germicidal irradiation shall be permitted to be installed as lighting for general illumination only where permitted by the product listing and indicated in the manufacturer's installation instructions.

Commenter's Reason: For the reasons stated below and in the substantiation that accompanied our original proposal (G174-21), germicidal irradiation is an important tool to help ensure the health and safety of building occupants. Accordingly, we suggest this mandatory language be included in a voluntary appendix to allow Authorities Having Jurisdiction the ability to adopt the requirements as mandatory at their discretion. The requirements outlined in this public comment:
1. Increase building occupant health and safety from pathogens

2. Address safe installation and use in building spaces

3. Provide application flexibility for building design practitioners

4. Maintain simple enforceability for code officials

This comment introduces provisions for building and building room disinfection through germicidal irradiation, which is not currently in the International Building Code. Current attention to healthy and well building environments, along with public health concerns of transmitted diseases, necessitates the IBC's need for germicidal irradiation.

Germicidal irradiation delivers the ability to inactivate human pathogens such as germs, fungi, mold spores, bacteria, viruses, harmful to humans. Various germicidal irradiation technologies have been available and used successfully in buildings for decades. Buildings such as hospitals, restaurants, and grocery stores, commonly use germicidal irradiation as a disinfection process, reducing the risk of pathogen and disease spread in and from these environments. Examples of some germicidal irradiation techniques are upper air ultra-violet and air duct ultra-violet irradiation.

This comment to the original proposal ensures proper and safe installation of germicidal irradiation in buildings, while providing building design practitioners flexibility in determination and use of disinfection techniques most appropriate for a building's specific use. Building classifications and spaces required to utilize germicidal irradiation are selected based on criteria including:

· Occupant Load Factor of 15 square feet per occupant, or less

· Occupant turn-over

· Occupant load of 50 or more for R-1, R-2, and R-4 Classifications

· Prevalence of high-touch surfaces

· Spaces with immune-compromised occupants

· High pathogen load shed

The Occupant Load Factor of 15 square feet per occupant is selected to identify the spaces that most benefit from germicidal irradiation disinfection due to high occupant density.

This comment ensures luminaires and systems are to be listed and identified for germicidal irradiation, and requires installation adherence with manufacturer's installation instructions, Chapter 27 (NFPA-70), product listings and equipment markings. This ensures building occupant safety is maintained by restricting germicidal irradiation exposure to levels deemed acceptable by safety certification agencies.

Many studies and papers are available supporting the effectiveness and safe use of germicidal irradiation techniques in buildings, listed in the original proposal bibliography.

Cost Impact: The net effect of the public comment and code change proposal will not increase or decrease the cost of construction
This public comment will not increase or decrease the cost of construction unless the new appendix is adopted by the local jurisdiction as a mandatory requirement. In this case, the cost of construction will be increased to cover the expenses associated with equipment acquisition, design of the system, and installation of the system.

Public Comment# 2533

Public Comment 2:

IBC: 202 (New), 1201.1, 1210.4, SECTION 1211 (New), 1211.1 (New), 1211.2 (New), 1211.3 (New), 1211.4 (New), 1211.5 (New)

Proponents: Megan Hayes, representing NEMA (megan.hayes@nema.org) requests As Modified by Public Comment

Replace as follows:

2021 International Building Code

GERMICIDAL IRRADIATION . The use of radiant energy to inactivate bacteria, mold spores, fungi, or viruses.

UPPER-ROOM AIR . The air in the room located above the occupied portion of the room that is subject to ultraviolet germicidal irradiation.

SECTION 1201
GENERAL

1201.1 Scope . The provisions of this chapter shall govern ventilation, temperature control, lighting, yards and courts, sound transmission, room dimensions, surrounding materials~~, and~~ rodentproofing , and germicidal irradiation associated with the interior spaces of buildings.

SECTION 1210
TOILET AND BATHROOM REQUIREMENTS

1210.4 Germicidal irradiation . Where germicidal irradiation luminaires and systems are provided in employee and public toilet facilities, they shall be installed in accordance with Section 1211.

SECTION 1211
GERMICIDAL IRRADIATION

1211.1 Installation requirements . Where germicidal irradiation luminaires and systems are provided, they shall be installed in accordance with

Sections 1211.2 through 1211.5.

1211.2 Safe installation . Germicidal irradiation luminaires and systems shall be listed. Germicidal irradiation systems employing ultraviolet radiation shall comply with UL 8802. Germicidal irradiation systems shall be installed in accordance with Chapter 27, the manufacturer's installation instructions, and equipment markings. Consideration shall include the suitability for use in occupied or unoccupied locations.

1211.3 Mounting conditions . Germicidal irradiation luminaires and systems for upper-room air disinfection shall be mounted at the height specified in the manufacturer's installation instructions, equipment markings, and product listings.

1211.4 Ventilation requirements for germicidal irradiation for upper-room air disinfection . Ventilation for the building shall be provided in accordance with Section 1202. Additional air-mixing shall be required for effective germicidal irradiation for upper-room air disinfection.

1211.5 General lighting . Luminaires that emit germicidal irradiation shall be permitted to be installed as lighting for general illumination only where permitted by the product listing and indicated in the manufacturer's installation instructions.

Commenter's Reason: For the reasons stated below, in the substantiation that accompanied our original proposal (G174-21), germicidal irradiation is an important tool to help ensure the health and safety of building occupants. Accordingly, we suggest that the IBC contain voluntary provisions to allow germicidal irradiation equipment installation. The requirements outlined in this public comment:

1. Increase building occupant health and safety from pathogens

2. Address safe installation and use in building spaces

3. Provide application flexibility for building design practitioners

4. Maintain simple enforceability for code officials

This comment introduces provisions for building and building room disinfection through germicidal irradiation, which is not currently in the International Building Code. Current attention to healthy and well building environments, along with public health concerns of transmitted diseases, necessitates the IBC's need for germicidal irradiation.

Germicidal irradiation delivers the ability to inactivate human pathogens such as germs, fungi, mold spores, bacteria, viruses, harmful to humans. Various germicidal irradiation technologies have been available and used successfully in buildings for decades. Buildings such as hospitals, restaurants, and grocery stores, commonly use germicidal irradiation as a disinfection process, reducing the risk of pathogen and disease spread in and from these environments. Examples of some germicidal irradiation techniques are upper air ultra-violet and air duct ultra-violet irradiation.

This comment to the original proposal ensures proper and safe installation of germicidal irradiation in buildings, while providing building design practitioners flexibility in determination and use of disinfection techniques most appropriate for a building's specific use.

This comment ensures luminaires and systems are to be listed and identified for germicidal irradiation, and requires installation adherence with manufacturer's installation instructions, Chapter 27 (NFPA-70), product listings and equipment markings. This ensures building occupant safety is maintained by restricting germicidal irradiation exposure to levels deemed acceptable by safety certification agencies.

Many studies and papers are available supporting the effectiveness and safe use of germicidal irradiation techniques in buildings, listed in the original proposal bibliography.

Cost Impact: The net effect of the public comment and code change proposal will not increase or decrease the cost of construction
This public comment will not increase or decrease the cost of construction as the language is permissive in nature and simply provides technical guidance and pointers to applicable standards where germicidal irradiation equipment is installed by design consideration.

Public Comment# 2537

G176-21

Proposed Change as Submitted

Proponents: Jonathan Roberts, UL LLC, representing UL LLC (jonathan.roberts@ul.com)

2021 International Building Code

Add new text as follows:

SECTION 2703
LIGHTNING PROTECTION SYSTEMS

2703.1 General.
Where provided, lightning protection systems shall comply with Sections 2703.2 through 2703.3.

2703.2 Installation.
Lightning protection systems shall be installed in accordance with NFPA 780 or UL 96A. UL 96A shall not be utilized for buildings used for the production, handling, or storage of ammunition, explosives, flammable liquids or gases, and other explosive ingredients including dust.

2703.2.1 Surge protection.
Where lightning protection systems are installed, surge protective devices shall also be installed in accordance with NFPA 70 and either NFPA 780 or UL 96A, as applicable.

2703.3 Interconnection of systems.
All lightning protection systems on a building or structure shall be interconnected in accordance with NFPA 780 or UL 96A, as applicable.

Add new standard(s) as follows:

UL

UL LLC
333 Pfingsten Road
Northbrook, IL 60062

UL 96A-2016	Standard for Installation Requirements for Lightning Protection Systems

NFPA

National Fire Protection Association
1 Batterymarch Park
Quincy, MA 02169-7471

NFPA 780-20	Standard for the Installation of Lightning Protection Systems

Reason:
- Requirements pertaining to Lightning Protection Systems are **not** currently found within the building code.
- This code change does not require the installation of lighting protection systems, but simply provides guidance to those that are installing lighting protection.
- NFPA 780 and UL 96A are two standards that are widely used within the industry, and are currently used for installations but are not very well known to code officials. These standards are in harmony with the provisions of the National Electrical Code, NFPA 70.
- UL 96A can be used for the installation and inspection of many lightning protection systems but the standard has limitations and these are identified in this proposal.
- This proposal is simply intended to provide the code official with assistance in addressing the installation of these types of systems if they are installed.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
These standards are already used with installations today so there would not be any change in the cost of construction.

Staff Analysis: A review of the standard proposed for inclusion in the code, UL 96A-2016, with regard to the ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before March 20, 2021. UL 780-17 is currently referenced in the 2021 IFC. This is a new edition and a new occurrence of the reference.

Staff Note: G175-21 and G176-21 addresses requirements in a different or contradicting manner. The committee is urged to make their intentions clear with their actions on these proposals.

G176-21

Public Hearing Results

Committee Action: **As Submitted**

Committee Reason: This proposal was approved as the committee felt that this provided direction and criteria if you wanted to add a lightning protection systems. The committee preferred this to the mandatory requirements in G175-21. (Vote: 13-0)

Staff Analysis: G175-21 and G176-21 addresses requirements in a different or contradicting manner. The committee is urged to make their intentions clear with their actions on these proposals.

G176-21

Individual Consideration Agenda

Public Comment 1:

IBC: 2701.1, 2703.2.1, 2703.3

Proponents: Bryan Holland, representing National Electrical Manufacturers Association (bryan.holland@nema.org); Megan Hayes, representing NEMA (megan.hayes@nema.org) requests As Modified by Public Comment

Further modify as follows:

2021 International Building Code

2701.1 Scope . The provisions of this chapter and NFPA 70 shall govern the design, construction, erection and installation of the electrical components, appliances, equipment and systems used in buildings and structures covered by this code. The International Fire Code, the International Property Maintenance Code and NFPA 70 shall govern the use and maintenance of electrical components, appliances, equipment and systems. The International Existing Building Code and NFPA 70 shall govern the alteration, repair, relocation, replacement and addition of electrical components, appliances, or equipment and systems. <u>Lightning protection systems shall comply with Section 2703.</u>

2703.2.1 Surge protection . Where lightning protection systems are installed, surge ~~protective devices~~ <u>protection</u> shall also be installed in accordance with NFPA 70 and either NFPA 780 or UL 96A, as applicable.

2703.3 Interconnection <u>and bonding</u> of systems . All lightning protection systems on a building or structure shall be interconnected <u>and bonded</u> in accordance with NFPA 780 or UL 96A, as applicable.

Commenter's Reason: This public comment adds a pointer to the new Section 2703 on Lightning Protection Systems in the scope of Chapter 27 under section 2701.1 which is missing from the original proposal. Under 2703.2.1, the terms “protective device” are replaced with “protection” as surge protection recognized in the NFPA 70, NFPA 780, and UL 96A includes surge-protective devices, surge protectors, and surge arresters. The current language is not inclusive of all three surge protection technologies that are required or permitted to be installed with a lightning protection system. And under 2703.3, the terms “and bonding” are added to the section title along with the terms “and bonded” to the section requirement to ensure all lightning protection systems installed on a building or structure are both mechanically (interconnected) and electrically (bonded) together to form a single system of protection against the hazard of lightning.

Cost Impact: The net effect of the public comment and code change proposal will not increase or decrease the cost of construction
This public comment just adds clarity to the approved proposal and does not increase the cost of construction as the overall code change does not mandate the installation of a lightning protection system but rather points the user of the code to the proper codes and standards where a lightning protection system is going to be installed by design consideration.

Public Comment# 2526

G177-21

Proposed Change as Submitted

Proponents: Kevin Brinkman, representing National Elevator Industry, Inc. (klbrinkman@neii.org)

2021 International Building Code

Revise as follows:

3001.2 Emergency elevator communication systems ~~for the deaf, hard of hearing and speech impaired.~~ An emergency elevator ~~two-way~~ communication system shall be provided~~. The system shall provide~~ that includes both visual ~~visible text~~ and audible communication modes ~~that meet all of the following~~ complying with the requirements in ASME A17.1/CSA B44.~~:~~

1. ~~When operating in each mode, include a live interactive system that allows back and forth conversation between the elevator occupants and emergency personnel.~~
2. ~~Is operational when the elevator is operational.~~
3. ~~Allows elevator occupants to select the text-based or audible mode depending on their communication needs to interact with emergency personnel.~~

Reason: The title was modified because this communication system needs to be useable by all people, not just the deaf, hard of hearing and speech impaired.
Added "elevator" to clarify that this applies to the communication system in the elevator since the title is not part of the requirement.

Deleted "two-way" for consistency with ASME A17.1/CSA B44 language.

The communication system is part of the elevator system requirements and the technical criteria for the communication system is provided in ASME A17.1/B44 Safety Code for Elevators and Escalators. As part of the elevator system, the communication system is inspected by elevator inspectors; therefore, the requirements belong in the elevator code. The requirements as currently written in the IBC are no longer needed because the elevator code contains significantly more detailed requirements to make the system accessible to the deaf, hard of hearing, and speech impaired. This proposal retains the base requirement for the system in the IBC but references the technical requirements in ASME A17.1-2019/CSA B44:19 elevator code which is referenced in IBC Chapter 35. The requirements in ASME A17.1-2019/CSA B44:19 were developed for consistency with the guidelines in the ADA Title III which is the regulation specifically for effective communication with the deaf, hard of hearing and speech impaired.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The proposal will neither increase nor decrease the cost of construction because the requirements in the A17.1-2019/CSA B44:19 code already need to be complied with per Section 3001.3 Referenced Standards.

G177-21

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: This proposal was disapproved because the committee felt that the revised text could be read to just apply to emergency elevators rather than all elevators. The language in the proposal should emphasize that the two-way communication in the elevator car is for everyone, including persons who have speaking or hearing disabilities. All of the testifiers seem to have the same intent - they need to work together to resolve the conflicts in the current language. ASME A17.1 has included criteria for these systems. The proposal needs to provide more specific direction. (Vote: 14-0)

G177-21

Individual Consideration Agenda

Public Comment 1:

IBC: 3001.2

Proponents: Kevin Brinkman, representing National Elevator Industry, Inc. (klbrinkman@neii.org) requests As Modified by Public Comment

Replace as follows:

2021 International Building Code

3001.2 Elevator emergency ~~Emergency elevator~~ communication systems ~~for the deaf, hard of hearing and speech impaired~~ . An elevator emergency two-way communication system shall be provided~~. The system shall provide visible text~~ that includes both visual and audible communication modes ~~that meet all of the following requirements~~ complying with the requirements in ASME A17.1/CSA B44. They system shall provide a means to enable authorized personnel to verify:

1. The presence of someone in the car.
2. That the person(s) is trapped.

Once an entrapment is verified, the system shall enable authorized personnel to:

1. Determine if assistance is needed. ~~When operating in each mode, include a live interactive system that allows back and forth conversation between the elevator occupants and emergency personnel.~~
2. Communicate when help is on the way. ~~Is operational when the elevator is operational.~~
3. Communicate when help arrives on site. ~~Allows elevator occupants to select the text-based or audible mode depending on their communication needs to interact with emergency personnel.~~

Commenter's Reason: This code requirement was first introduced in the 2018 edition and it was revised in the 2021 edition in an effort to clarify the requirements; however, as written it does not provide the necessary technical requirements to ensure consistent implementation. Consistent implementation is vital to making the system usable by all people, not just those with hearing or speech loss. Traditionally, the building code has provided the scoping for elevators and the technical criteria for the elevators has been in the ASME A17.1/CSA B44 Safety Code for Elevators and Escalators (elevator code). The 2019 edition of the elevator code includes significant changes to address the concerns raised by the proponent of the original code change to the IBC and provides the needed technical guidance for the elevator manufacturer and the elevator inspection to ensure consistent implementation. The ASME committee that developed the requirements invited the proponent of the original IBC requirement and other members representing the disability community to participate in the code process. The resulting requirements were chosen in order to serve the broadest number of people who may not be able to communicate verbally. Suggestions for ASL and other methods were not as desirable because they would be limited to a small portion of the potential users. As written, the elevator code requirements also make the system more accessible to people who may speak a different language or who cannot speak for any due to a medical condition.
A key element of the new ASME requirements is the provision for a means (video) to show the entire floor area of the car. The concern raised by the proponent and with entrapments in the past that were not immediately answered because there was no response from the car. These concerns are alleviated by the visual means because the authorized person at the call center can see that someone is in the car and immediately dispatch help. This means would verify the presence of the person whether they could speak or not, including identifying someone who has suffered a medical situation and may be lying on the floor. The ASME requirements also provide for a means to ask question and receive responses from the persons in the car usually both audio and visual means. This can be in the form of questions with “yes” or “no” answers that can be answered by pressing the appropriate button or by providing a means in the car to text answers. The attached sheet shows one example of how this is currently being addressed in the field. The current language in 3001.2 only requires the system to be operational when the elevator is operational. Most entrapments occur because the elevator goes out of service but based on the 3001.2 language the system is not required to be functional at that time. The ASME language requires the system to be operational 24 hours per day/7 days a week which corrects this issue. .

Elevator emergency communication systems have been in the elevator code for many years. It is important to note that the intent of the system is to notify authorized personnel who can take action in case of an elevator entrapment. It is not designed for lengthy conversation. The communication system is required to be directed to authorized personnel 24 hours per day/7 days a week. The system must automatically relay the building location and elevator car number to authorized personnel without input from the passenger. The system is also required to do a daily self-check to ensure it is operating properly. The system does not automatically direct calls to the 911 system because the sheer volume of calls would overwhelm that system. Authorized personnel at call centers receive tens of millions of calls per year. Studies have shown that over 90% of these calls are nuisance calls (accidental due to crowded elevators, kids playing pranks, etc.).

The revised proposal below addresses concerns raised by opponents and the committee to the previous NEII proposal while providing more guidance for designers and building officials. It also aligns with the requirements in the elevator code. Specifically, this revised proposal:

· Updates the title to clarify that the system is for use by all passengers, not just those with hearing or speech loss.

· Relocates the word “elevator” before emergency two-way communications in the title and the text based on a concern expressed by the committee member that it could be perceived to only apply to emergency elevators, even though the original title had “elevator” after “emergency”.

· Retains “two-way” based on a concern raised by one of the opponents even though it is already addressed in the elevator code.

· Adds specific functions that the system must be able to provide to assess whether someone is in the car and that they are entrapped. Also provides the capability to determine if assistance is needed, to communicate when help is on the way and when help has arrived on site. These are the basic steps that are needed to assess the situation and take appropriate action.

· Directs users of the code to the elevator code requirements for a more detailed description of the system requirements.

Two-Way Elevator Emergency Communications Visual Device

For compliance to the latest codes

The device gives riders the option to communicate visually by answering on-screen questions.

The Two-Way Emergency Communications Visual Device easily integrates into your Schindler elevator.

Two-Way Emergency Communications Visual Device

The ASME A17.1-2019 and IBC 2018 codes require in-elevator two-way emergency communication systems for the hearing impaired.

The Two-Way Emergency Communications Visual Device is easily integrated into your Schindler elevator during the construction process and complies with these codes.

Easy-to-use interface

In the event of an emergency, riders can call for help using the call/phone button inside the elevator on the Two-Way Emergency Communications Visual Device.

Once the call is made, riders have the option to communicate with dispatchers via standard voice communications, or visually by answering questions that appear on the device's easy-to-read screen.

To answer the Yes or No questions on the device, riders simply use its red and green buttons.

Video camera for visual assessment inside the elevator

The Two-Way Emergency Communications Visual Device also includes a video camera that becomes activated when a rider makes a call for help using its call/phone button. The video camera quickly provides dispatchers a visual assessment of the situation inside of the elevator.

Programmable connectivity

The device can be programmed to connect to the Schindler Customer Service Network, or to another point of contact as designated by the building owner or operations manager.

For more information, please contact your Schindler sales representative.

We Elevate

Schindler
us.schindler.com

Cost Impact: The net effect of the public comment and code change proposal will not increase or decrease the cost of construction
The proposal will neither increase nor decrease the cost of construction because the requirements in the A17.1-2019/CSA B44:19 code already need to be complied with per Section 3001.3 Referenced Standards and the proposal is clarifying requirements to ensure more consistent implementation.

Public Comment# 2617

G179-21

Proposed Change as Submitted

Proponents: Kevin Brinkman, representing National Elevator Industry, Inc. (klbrinkman@neii.org)

2021 International Building Code

3001.1 Scope. This chapter governs the design, construction, installation, *alteration* and repair of elevators and conveying systems and their components.

Add new text as follows:

3001.2 Structural Design Considerations.
Passenger elevators and escalators exposed to outdoor environments shall comply with Sections 1608, 1609, and 1614.

Revise as follows:

3001.3 ~~3001.5~~ Change in use. A change in use of an elevator from freight to passenger, passenger to freight, or from one freight class to another freight class shall comply with Section 8.7 of ASME A17.1/CSA B44.

3001.4 ~~3001.3~~ Referenced standards. Except as otherwise provided for in this code, the design, construction, installation, alteration, repair and maintenance of elevators and conveying systems and their components shall conform to the applicable standard specified in Table3001.4 ~~3001.3~~ and ASCE 24 for construction in *flood hazard areas* established in Section 1612.3.

TABLE 3001.4 ~~3001.3~~ ELEVATORS AND CONVEYING SYSTEMS AND COMPONENTS

TYPE	STANDARD
Automotive lifts	ALI ALCTV
Belt manlifts	ASME A90.1
Conveyors and related equipment	ASME B20.1
Elevators, escalators, dumbwaiters, moving walks, material lifts	ASME A17.1/CSA B44, ASME A17.7/CSA B44.7
Industrial scissor lifts	ANSI MH29.1
Platform lifts, stairway chairlifts, wheelchair lifts	ASME A18.1

3001.5 ~~**3001.4**~~ **Accessibility.** Passenger elevators required to be accessible or to serve as part of an*accessible* means of egress shall comply with Sections 1009 and 1110.8.

3001.6 ~~**3001.2**~~ **Emergency elevator communication systems for the deaf, hard of hearing and speech impaired.** An emergency two-way communication system shall be provided. The system shall provide visible text and audible modes that meet all of the following requirements:

1. When operating in each mode, include a live interactive system that allows back and forth conversation between the elevator occupants and emergency personnel.
2. Is operational when the elevator is operational.
3. Allows elevator occupants to select the text-based or audible mode depending on their communication needs to interact with emergency personnel.

Reason: To ensure outdoor elevator and escalator installations address the appropriate design conditions for the environments they may be exposed to. There have been many cases in south Florida where high wind loads were not considered in the design and installation of outdoors escalators and elevators, since it is not currently addressed. Additionally, in other areas, snow and ice loads should be considered.
The reorganization of the section is simply to group like items together.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The proposal will not change the cost of construction since it is only intended to call attention to existing requirements.

G179-21

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: This proposal was disapproved because the requirements for exterior elevator design needs to apply to all elevators, not just passenger elevators. (Vote: 10-4)

G179-21

Individual Consideration Agenda

Public Comment 1:

IBC: 3001.2

Proponents: Kevin Brinkman, representing National Elevator Industry, Inc. (klbrinkman@neii.org) requests As Modified by Public Comment

Further modify as follows:

2021 International Building Code

3001.2 Structural Design Considerations . ~~Passenger elevators~~ Elevators and escalators exposed to outdoor environments shall comply with Sections 1608, 1609, and 1614.

Commenter's Reason: This is an important change to ensure that architects and designers are aware of the requirements when installing elevator and escalator equipment outdoors. This change will not increase the cost of construction since the provisions already apply; however, it may save significant costs by preventing rework or replacement if the requirements are missed during the design process. Manufacturers and elevator inspectors have seen many cases where this has been an issue.
The one technical concern expressed during the CAH was that the proposed language would limit it to “passenger” elevators. The proposed further modification to remove the word “passenger” from the added text addresses that concern.

A question was raised regarding the renumbering during the Committee Action Hearings (CAH). The renumbering was done by ICC staff to group similar topics. The proposed change is adding a new section on Structural Design Considerations but does not alter the language in any of the other provisions.

Cost Impact: The net effect of the public comment and code change proposal will not increase or decrease the cost of construction
There would be no change in the cost of construction since the referenced sections already apply; however, the proposal could prevent the requirements from being missed which may avoid potential rework costs.

Public Comment# 2599

G181-21 Part I

Proposed Change as Submitted

Proponents: Kevin Brinkman, representing National Elevator Industry, Inc. (klbrinkman@neii.org)

THIS IS A 2 PART CODE CHANGE. PART I WILL BE HEARD BY THE GENERAL CODE COMMITTEE. PART II WILL BE HEARD BY THE FIRE CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THESE COMMITTEES.

2021 International Building Code

SECTION 3005
MACHINE ROOMS

Revise as follows:

3005.2 ~~Venting~~ Environment. Elevator machine rooms, machinery spaces that contain the driving machine, and control rooms or spaces that contain the operation or motion controller for elevator operation shall be provided with a natural or mechanical means ~~an independent *ventilation* or air-conditioning system to protect against the overheating of the electrical equipment. The system shall be~~ capable of maintaining temperatures and humidity within the range established for the elevator equipment as provided by the manufacturer.

Reason: Changed the titles of 3003.1.4 and 3005.2 to use a title consistent with 902.1.3. Clarification of the title to Section 3005 to reflect the content of the section. Modified the language in 3005.2 to reflect and align with the language used in ASME A17.1/CSA B44. Made changes in 3003.1.4 to correlate with the changes to 3005.2. There are cases, where the normal air exchange between the equipment location and building environment will be adequate to maintain the temperature and humidity within the specified range. In other cases, mechanical means would be required to maintain the specified range. The specified range is determined by the elevator equipment manufacturer. See also corresponding proposal for IFC 604.3.4.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The proposal will not change the cost of construction since the changes are better aligning the language and requirements between the IBC and the elevator codes.

G181-21 Part I

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: This proposal was disapproved because the committee was concerned that natural ventilation would allow for smoke to enter the cab. Removing the requirement to be an independent system will allow the use of the building's ventilation and mixing the air. (Vote: 14-0)

G181-21 Part I

Individual Consideration Agenda

Public Comment 1:

IBC: 3005.2

Proponents: Kevin Brinkman, representing National Elevator Industry, Inc. (klbrinkman@neii.org) requests As Modified by Public Comment

Replace as follows:

2021 International Building Code

3005.2 ~~Venting~~ Temperature and Humidity Control . Elevator machine rooms, machinery spaces that contain the driving machine, and control rooms or spaces that contain the operation or motion controller for elevator operation shall be provided with an independent *ventilation*, ~~or~~ air-conditioning , or other means ~~to protect against the overheating of the electrical equipment. The system shall be~~ capable of maintaining temperatures and humidity within the range established for the elevator equipment as provided by the manufacturer.

Exception: An independent means is not required where the temperature and humidity in the room or space can be maintained within the specified range under all operating conditions without an independent means.

Commenter's Reason: The current title and language is misleading because the real purpose is to maintain the temperature and humidity in the room or space for proper operation of the elevator equipment. This may be done with ventilation, air condition or other means, including natural means. The following proposals updates the title to reflect the real purpose and revises the language to retain “independent” based on comments received during the Committee Action Hearing. As noted in the original proposal, humidity control is also important so that was added to the proposal and the range should be established by the equipment manufacture because it can vary based on the system design and components.

Cost Impact: The net effect of the public comment and code change proposal will not increase or decrease the cost of construction
The proposal and comment will not increase or decrease the cost because it is intended to clarify language and align the language with other codes.

Public Comment# 2605

G181-21 Part II

Proposed Change as Submitted

Proponents: Kevin Brinkman, representing National Elevator Industry, Inc. (klbrinkman@neii.org)

2021 International Fire Code

Revise as follows:

604.3.4 ~~Machine room ventilation~~ Environment. Where standby power is connected to elevators and an environmental control means is provided per Section 3005.2 of the International Building Code, the ~~machine room ventilation or air conditioning~~ environmental control means shall be connected to the standby power source.

2021 International Building Code

SECTION 3003
EMERGENCY OPERATIONS

Revise as follows:

[F] 3003.1.4 ~~Venting~~ Environment. Where standby power is connected to elevators~~,~~ and an environmental control means is provided per Section 3005.2, the ~~machine room ventilation or air conditioning~~ environmental control means shall be connected to the standby power source.

Reason: Changed the titles of 3003.1.4 and 3005.2 to use a title consistent with 902.1.3. Clarification of the title to Section 3005 to reflect the content of the section. Modified the language in 3005.2 to reflect and align with the language used in ASME A17.1/CSA B44. Made changes in 3003.1.4 to correlate with the changes to 3005.2. There are cases, where the normal air exchange between the equipment location and building environment will be adequate to maintain the temperature and humidity within the specified range. In other cases, mechanical means would be required to maintain the specified range. The specified range is determined by the elevator equipment manufacturer. See also corresponding proposal for IFC 604.3.4.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The proposal will not change the cost of construction since the changes are better aligning the language and requirements between the IBC and the elevator codes.

G181-21 Part II

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The proposal was disapproved with concern with the need to specifically match the language with ASME A17.1/CSA B44 and the affect it will have on enforcement. Also it was noted that Part I of this proposal was disapproved. (Vote: 10-4)

G181-21 Part II

Individual Consideration Agenda

Public Comment 1:

IBC: [F] 3003.1.4; IFC: 604.3.4

Proponents: Kevin Brinkman, representing National Elevator Industry, Inc. (klbrinkman@neii.org) requests As Modified by Public Comment

Replace as follows:

2021 International Building Code

[F] 3003.1.4 ~~Venting~~ Temperature and Humidity Control . Where standby power is connected to elevators and a temperature and humidity control means is provided per Section 3005.2, the ~~machine room *ventilation* or air conditioning~~ temperature and humidity control means shall be connected to the standby power source.

2021 International Fire Code

604.3.4 ~~Machine room ventilation~~ Temperature and Humidity Control . Where standby power is connected to elevators and a temperature and humidity control means is provided per Section 3005.2 of the *International Building Code*, the ~~machine room ventilation or air conditioning~~ temperature and humidity control means shall be connected to the standby power source.

Commenter's Reason: The current title and language are misleading because the real purpose is to provide standby power for the means to maintain the temperature and humidity in the room or space for proper operation of the elevator equipment. This public comment to modify the proposal correlates with the public comment and proposal for IBC 3005.2. This revised proposals also address an editorial correction to the referenced code section in the original proposal.

Cost Impact: The net effect of the public comment and code change proposal will not increase or decrease the cost of construction
The proposal will not change the cost of construction since the changes are better aligning the language and requirements between other sections of the IBC and other codes.

Public Comment# 2609

G185-21

Proposed Change as Submitted

Proponents: Curtis Gonzales, Smoke Guard, Inc., representing Smoke Guard, Inc. (curtis.gonzales@smokeguard.com); Amanda Hickman, representing SmokeGuard, Inc. (amanda@thehickmangroup.com)

2021 International Building Code

Add new definition as follows:

SMOKE PROTECTIVE CURTAIN ASSEMBLY FOR HOISTWAY. An automatic closing smoke and draft control curtain assembly.

Revise as follows:

3006.3 Hoistway opening protection. Where Section 3006.2 requires protection of the elevator hoistway door opening, the protection shall be provided by one of the following:

1. An enclosed elevator lobby shall be provided at each floor to separate the elevator hoistway *shaft enclosure* doors from each floor by *fire partitions* in accordance with Section 708. In addition, doors protecting openings in the elevator lobby enclosure walls shall comply with Section 716.2.2.1 as required for *corridor* walls. Penetrations of the enclosed elevator lobby by ducts and air transfer openings shall be protected as required for *corridors* in accordance with Section 717.5.4.1.
2. An enclosed elevator lobby shall be provided at each floor to separate the elevator hoistway *shaft enclosure* doors from each floor by *smoke partitions* in accordance with Section 710 where the building is equipped throughout with an *automatic sprinkler system* installed in accordance with Section 903.3.1.1 or 903.3.1.2. In addition, doors protecting openings in the *smoke partitions* shall comply with Sections 710.5.2.2, 710.5.2.3 and 716.2.6.1. Penetrations of the enclosed elevator lobby by ducts and air transfer openings shall be protected as required for *corridors* in accordance with Section 717.5.4.1.
3. Additional doors shall be provided at each elevator hoistway door opening in accordance with Section 3002.6. Such ~~door~~ doors shall comply with the smoke and draft control door assembly requirements in Section 716.2.2.1.1 when tested in accordance with UL 1784 without an artificial bottom seal.
4. The elevator hoistway shall be pressurized in accordance with Section 909.21.
5. A *smoke protective curtain assembly for hoistways* shall be provided at each elevator hoistway door opening in accordance with Section 3002.6. Such curtain assemblies shall comply with the smoke and draft control requirements in Section 716.2.2.1.1 when tested in accordance with UL 1784 without an artificial bottom seal. Such curtain assemblies shall be equipped with a control unit listed to UL 864. Such curtain assemblies shall comply with section 2.11.6.3 of ASME A17.1/CSA B44. Installation and maintenance shall be in accordance with NFPA 105

Reason: *Smoke protective curtain assemblies for hoistways* are recognized and regulated in NFPA 105 Chapter 9 (2019). There are multiple manufactures of these assemblies in the market. These products have been in the market for 25 years with tens of thousands of successful installations. Smoke protective curtain assemblies provide a proven means for smoke and draft control at the hoistway door that enables design freedom and innovation. Smoke protective curtain assemblies for hoistways should be allowed to provide smoke and draft protection where enclosed elevator lobbies are not required.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The cost of this option for hoistway opening protection is offset by the cost of other forms of protection. As such, the cost of construction for adding option five does not raise or lower the cost of construction.

G185-21

Public Hearing Results

Committee Action: **As Submitted**

Committee Reason: The proposal was approved as this modification allows for smoke protective curtain assemblies to be used at elevator doors to meet the smoke protection requirements for rated corridors. The UL 864 listing for the controller is appropriate. Some committee members felt this option was already permitted as an alternative to Section 3006.3 Item 3. (Vote: 8-7)

G185-21

Individual Consideration Agenda

Public Comment 1:

IBC: SECTION 202, 3006.3

Proponents: Amanda Hickman, representing SmokeGuard, Inc. (amanda@thehickmangroup.com) requests As Modified by Public Comment

Modify as follows:

2021 International Building Code

SMOKE PROTECTIVE CURTAIN ASSEMBLY ~~FOR HOISTWAY~~. ~~An automatic closing~~ A listed smoke and draft control curtain assembly consisting of a curtain coil, control unit, and parameter sealing system.

3006.3 Hoistway opening protection. Where Section 3006.2 requires protection of the elevator hoistway door opening, the protection shall be provided by one of the following:

1. An enclosed elevator lobby shall be provided at each floor to separate the elevator hoistway *shaft enclosure* doors from each floor by *fire partitions* in accordance with Section 708. In addition, doors protecting openings in the elevator lobby enclosure walls shall comply with Section 716.2.2.1 as required for *corridor* walls. Penetrations of the enclosed elevator lobby by ducts and air transfer openings shall be protected as required for *corridors* in accordance with Section 717.5.4.1.
2. An enclosed elevator lobby shall be provided at each floor to separate the elevator hoistway *shaft enclosure* doors from each floor by *smoke partitions* in accordance with Section 710 where the building is equipped throughout with an *automatic sprinkler system* installed in accordance with Section 903.3.1.1 or 903.3.1.2. In addition, doors protecting openings in the *smoke partitions* shall comply with Sections 710.5.2.2, 710.5.2.3 and 716.2.6.1. Penetrations of the enclosed elevator lobby by ducts and air transfer openings shall be protected as required for *corridors* in accordance with Section 717.5.4.1.
3. Additional doors shall be provided at each elevator hoistway door opening in accordance with Section 3002.6. Such doors shall comply with the smoke and draft control door assembly requirements in Section 716.2.2.1.1 when tested in accordance with UL 1784 without an artificial bottom seal.
4. The elevator hoistway shall be pressurized in accordance with Section 909.21.
5. ~~A~~ An *automatic closing smoke protective curtain assembly* ~~*for hoistways*~~ shall be provided at each elevator hoistway door opening in accordance with Section 3002.6. Such smoke protective curtain assemblies shall comply with the smoke and draft control requirements in Section 716.2.2.1.1 when tested in accordance with UL 1784 without an artificial bottom seal. Such smoke protective curtain assemblies shall be equipped with a control unit listed to UL 864. Such smoke protective curtain assemblies shall comply with section 2.11.6.3 of ASME A17.1/CSA B44. Installation and maintenance shall be in accordance with NFPA 105

Commenter's Reason: The committee approved this proposal. However, there were comments made regarding the definition and so we offer this public comment to satisfy the feedback that was received during the hearing. Smoke protective curtain assemblies for hoistways are recognized and regulated in NFPA 105 Chapter 9 (2019). There are multiple manufactures of these assemblies in the market. These products have been in the market for 25 years with tens of thousands of successful installations. Smoke protective curtain assemblies provide a proven means for smoke and draft control at the hoistway door that enables design freedom and innovation. Smoke protective curtain assemblies for hoistways working in conjunction with fire resistive rated hoistway doors should be allowed to provide smoke and draft protection where enclosed elevator lobbies are required.

Cost Impact: The net effect of the public comment and code change proposal will not increase or decrease the cost of construction
This comment is editorial and will not affect the cost of construction.

Public Comment# 2859

G191-21

Proposed Change as Submitted

Proponents: Marcelo Hirschler, GBH International, representing self (mmh@gbhint.com)

2021 International Building Code

Revise as follows:

3105.2 Design and construction. *Awnings* and *canopies* shall be designed and constructed to withstand wind or other lateral *loads* and *live loads* as required by Chapter 16 with due allowance for shape, open construction and similar features that relieve the pressures or loads. Structural members shall be protected to prevent deterioration. *Awnings* shall have frames of noncombustible material, *fire-retardant-treated wood*, or heavy timber complying with Section 2304.11~~, or 1-hour construction with combustible or noncombustible covers~~ and shall be either fixed, retractable, folding or collapsible.

Reason: The statement that the awnings or canopies shall be constructed with "combustible or noncombustible materials" is meaningless since there is no other option for a material: it is either combustible or it is noncombustible. The requirement for the frame of an awning to comply with a fire resistance rating (which is what 1-hour construction means) is not an adequate requirement for two reasons. Firstly, fire resistance ratings are intended to assess (as the IBC definition states): "The period of time a building element, component or assembly maintains the ability to confine a fire, continues to perform a given structural function, or both, as determined by the tests, or the methods based on tests, prescribed in Section 703." Secondly, fire resistance ratings are applied to "assemblies of masonry units" and similar assemblies but not to individual materials which are not separating one compartment from another one.
The section contains all the appropriate requirements in terms of structural performance, including the fact that wind and other loads must be able to be withstood.

The awnings being regulated are not separating compartments and, therefore, requiring a fire resistance rating is not appropriate.

Pictures of awnings illustrate the issue:

For information, the first section of the scope of the test used to assess fire resistance ratings (ASTM E119) reads as follows:

1.1 The test methods described in this fire-test-response standard are applicable to assemblies of masonry units and to composite assemblies of structural materials for buildings, including loadbearing and other walls and partitions, columns, girders, beams, slabs, and composite slab and beam assemblies for floors and roofs. They are also applicable to other assemblies and structural units that constitute permanent integral parts of a finished building.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
No additional requirements are being added.

G191-21

Public Hearing Results

Committee Action: **As Submitted**

Committee Reason: The proposal was approved as submitted based on the provided reason statement. The committee did express concerns that additional justification would be beneficial. (Vote: 8-7)

G191-21

Individual Consideration Agenda

Public Comment 1:

IBC: 3105.2

Proponents: Jonathan Siu, representing Washington Association of Building Officials Technical Code Development Committee; Micah Chappell, representing Washington Association of Building Officials (micah.chappell@seattle.gov) requests As Modified by Public Comment

Further modify as follows:

2021 International Building Code

3105.2 Design and construction . *Awnings* and *canopies* shall be designed and constructed to withstand wind or other lateral *loads* and *live loads* as required by Chapter 16 with due allowance for shape, open construction and similar features that relieve the pressures or loads. Structural members shall be protected to prevent deterioration. *Awnings* shall have frames of noncombustible material, *fire-retardant-treated wood*, ~~or~~ heavy timber complying with Section 2304.11 , or 1-hour construction, and shall be either fixed, retractable, folding or collapsible.

Commenter's Reason: This public comment restores the option of 1-hour construction for awning frames, which was removed in the original proposal. It will leave intact the deletion of the text referring to combustible or non-combustible covers (is there any other kind?)
The reason statement for FS29 says that the fire rating is "inappropriate" because awnings don't serve to separate compartments. We don't understand this rationale for eliminating the option of providing rated construction. Framing in other structures such as steel moment frames (beams and columns) do not serve to separate compartments, yet the elements are required to have a fire-resistance rating in Table 601.

More importantly, under the current code, the 1-hour construction is just one of several options that a designer can utilize--the designer can choose framing that is non-combustible, fire-retardant treated wood, or heavy timber. 1-hour construction is easily equivalent (or better, in some cases) than the other three listed methods, so there is no technical reason why it should not be an option.

While there is some technical merit in deleting the combustible/noncombustible language, if the membership does not want to make a change for such a minor editorial issue (which is the ultimate result if this proposal is approved as modified by this public comment), we would recommend voting for Disapproval for the whole code change proposal.

Cost Impact: The net effect of the public comment and code change proposal will not increase or decrease the cost of construction
Although it could be argued that by eliminating an option the original code change might increase the cost of construction in some cases, restoring that option via this public comment will result in no technical change to the code provisions from the previous code edition, and therefore, no increase or decrease in the cost of construction.

Public Comment# 2382

G193-21

Proposed Change as Submitted

Proponents: Larry Sherwood, on behalf of Sustainable Energy Action Committee, representing Interstate Renewable Energy Council (Larry@irecusa.org); Kevin Reinertson, representing California Fire Chiefs Association FPO (kevin.reinertson@fire.ca.gov); Benjamin Davis, CA Solar & Storage Association, representing CA Solar & Storage Association (ben@calssa.org); Joseph H. Cain, P.E., Solar Energy Industries Association (SEIA), representing SEIA (JoeCainPE@gmail.com)

2021 International Building Code

Add new definition as follows:

PHOTOVOLTAIC (PV) PANEL SYSTEM, GROUND-MOUNTED. . An independent photovoltaic (PV) panel system without useable space underneath, installed directly on the ground.

PHOTOVOLTAIC (PV) SUPPORT STRUCTURE, ELEVATED. . An independent photovoltaic (PV) panel support structure designed with useable space underneath with minimum clear height of 7 feet 6 inches (2286 mm), intended for secondary use such as providing shade or parking of motor vehicles.

Add new text as follows:

3111.3.5 Elevated photovoltaic (PV) support structures.
Elevated PV support structures shall comply with either 3111.3.5.1 or 3111.3.5.2.

Exception: *Elevated PV support structures* that are installed over agricultural use.

3111.3.5.1 PV panels installed over open-grid framing or non-combustible deck.
Elevated PV support structures with PV panels installed over open-grid framing or over a noncombustible deck shall have PV panels tested, *listed*, and *labeled* with a fire type rating in accordance with UL 1703 or with both UL 61730-1 and UL 61730-2. Photovoltaic panels marked “not fire rated” shall not be installed on *elevated PV support structures*.

3111.3.5.2 PV panels installed over a roof assembly.
Elevated PV support structures with a PV panel system installed over a roof assembly shall have a fire classification in accordance with Section 1505.9.

Revise as follows:

~~3111.3.5~~ 3111.3.6 Ground-mounted photovoltaic (PV) panel systems. Ground-mounted photovoltaic panel systems shall be designed and installed in accordance with Chapter 16 and the *International Fire Code*.

~~3111.3.5.1~~ 3111.3.6.1 Fire separation distances. Ground-mounted photovoltaic panel systems shall be subject to the *fire separation distance* requirements determined by the local jurisdiction.

Reason: The primary purpose of this proposal is to establish appropriate fire testing and listing criteria for overhead photovoltaic (PV) support structures that could have people or vehicles in the space beneath them. Sometimes referred to as “solar shade structures,” they are most commonly constructed over vehicle parking spaces of surface parking lots, are sometimes built on the uppermost level of parking garages, but could be built in a variety of locations with or without cars parked beneath.
Overhead PV structures are referenced in 2021 IBC Section 1607.14.4, and in 2019 California Building Code Section 503.1, but without any definitions.

In 2021 IBC Section 1607.14.4.3, these structures are described as “Structures with open grid framing and without a roof deck or sheathing supporting photovoltaic panel systems.”

In 2019 California Building Code Section 503.1, Exception 2, these structures are described as: “… solar photovoltaic panels supported by a structure with no use underneath…” In Exception 3, there is a more-specific description by location: “… solar photovoltaic panels supported by a structure over parking stalls …”

Ground-mounted photovoltaic panel systems are referenced in the 2021 I-codes, in IBC Sections 1607.4.4 and 3111.3.5; in IRC Section R324.7; and in IFC Section 1205.5.

For the proposed definition of Elevated PV Support Structure note the minimum height threshold of 7’-6” is consistent with IBC 1003.2.

Most PV panels in the marketplace have been fire tested and assigned a “type rating” in accordance with UL 1703. However, some PV panels might not have that fire testing, and could be marked “not fire rated.” This proposal clarifies that PV panels marked “not fire rated” cannot be used on elevated/overhead PV structures that could have people or cars beneath them, with or without a full roof assembly.

Where elevated PV structures have PV panels mounted over open-grid framing with no roof deck or sheathing cannot achieve a “fire classification” because there is no combustible roof covering to ignite in a UL 2703 spread-of-flame or burning brand test. Therefore, it is sufficient protection to install only type-rated modules. The same is true when PV panels are installed directly over noncombustible metal sheathing without a stand-off mounting system.

Where elevated PV structures have a roof assembly and PV panels are rooftop mounted over that roof assembly, then those structures must have a fire classification according to Section 1505.9.There are several different stakeholder groups that will benefit from this proposal.

This proposal was prepared by the Sustainable Energy Action Committee (SEAC), a forum for all stakeholders (including, but not limited to, AHJs, designers, engineers, contractors, first responders, manufacturers, suppliers, utilities, and testing labs) to collaboratively identify and find solutions for issues that affect the installation and use of solar energy systems, energy storage systems, demand response, and energy efficiency. The purpose is to facilitate the deployment and use of affordable, clean and renewable energy in a safe, efficient, and sustainable manner.

All recommendations from SEAC are approved by diverse stakeholders through a consensus process.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
It encourages the use of solar without adversely impacting safety.

Staff Note: G192-21 and G193-21 addresses requirements in a different or contradicting manner. The committee is urged to make their intentions clear with their actions on these proposals.

G193-21

Public Hearing Results

Committee Action: **As Submitted**

Committee Reason: The proposal was approved as submitted per the provided reason statement. The proposal represents an extension coordinate effort of those involved. (Vote: 13-1)

Staff Analysis: G192-21 and G193-21 addresses requirements in a different or contradicting manner. The committee is urged to make their intentions clear with their actions on these proposals.

G193-21

Individual Consideration Agenda

Public Comment 1:

Proponents: C Ray Allshouse, City of Shoreline, WA, representing Washington Association of Building Officials Technical Code Development Committee (rallshouse@shorelinewa.gov); Micah Chappell, representing Washington Association of Building Officials (micah.chappell@seattle.gov) requests Disapprove

Commenter's Reason: Reason Statement. This proposal was touted as further clarification to that which was proposed by G104-21. However, G104 was ultimately unanimously rejected by the Committee largely based on concerns that it went well beyond the California Building Code from which it was modeled, but also because it exempted installations of rooftop PV panels from constituting a story. G104 included language under subsection 503.1.1.2 that appeared to allow use underneath that would otherwise constitute a story. Specifically, a flat roof is included under a “roof slope < 2:12”. Rejection of G104 was largely founded on a need to roll it back to the California scope to avoid this consequence.
The Committee approval by a 13-1 margin of G193 flies in the face of their earlier action and direction on G104. Of major concern to WABO TCD is that by the proposed definition, Elevated PV Support Structures include “…useable space…intended for secondary use such as ***providing shade or*** parking of motor vehicles” [emphasis ours]. This is the same flaw we pointed out in testimony against G104. G193 provides language that would be construed as potentially allowing rooftop “solar shade structures” over uses that should and ought to be a story. For example, our members have seen project proposals with solar panel arrays “shading” all or a portion of an occupied/occupiable roof on multi-story apartment buildings. While the text in G193-21 does not specifically exempt these spaces from the story count, having this text in the definition is likely to cause confusion and conflicts between designers and regulators.

Cost Impact: The net effect of the public comment and code change proposal will not increase or decrease the cost of construction

No change to code.

Public Comment# 2405

G196-21

Proposed Change as Submitted

Proponents: John-Jozef Proczka, representing self (john-jozef.proczka@phoenix.gov)

2021 International Building Code

Add new text as follows:

3115.3 Intermodal shipping container physical identification.
Intermodal shipping containers shall have the physical markings and data plate required by Sections 3115.3.1 and 3115.3.2 and verified by an approved agency. A report of the verification process and findings shall be provided to the building owner and building official.

Where approved by the building official, the markings and existing data plate are permitted to be removed from the intermodal shipping containers before they are repurposed for use as buildings or structures or as a part of buildings or structures.

Revise as follows:

~~3115.3~~ 3115.3.1 Intermodal shipping container ~~information~~ data plate. *Intermodal shipping containers* shall bear an existing plate labelled as "CSC SAFETY APPROVAL" in English or French containing the following information. ~~as required by ISO 6346 CSC and verified by an approved agency. A report of the verification process and findings shall be provided to the building owner.~~

1. ~~Manufacturer's name or identification number.~~ Abbreviated country of approval, abbreviated approval agency, and approval agency reference number.
2. Date manufactured.
3. ~~Safety approval number.~~
4. ~~3.~~ Manufacturer's Identification number.
5. ~~4.~~ Maximum operating gross mass ~~or weight~~ (kg) (lbs).
6. ~~5.~~ Allowable stacking load for 1.8G (kg) (lbs).
7. ~~6.~~ Transverse racking test force (Newtons).
8. ~~7.~~ ~~Valid~~ Required maintenance examination date.

~~Where approved by the *building official*, the markings and existing data plate are permitted to be removed from the intermodal shipping containers before they are repurposed for use as buildings or structures or as a part of buildings or structures.~~

Add new text as follows:

3115.3.2 Intermodal shipping container markings.
Intermodal shipping containers shall have markings, separate from the data plate, containing the following information. Refer to Figure 3115.3.2 for an example layout of the markings.

1. An owner code consisting of three letters.
2. An equipment category identifier that shall be the letter U. This equipment category identifier is grouped with and immediately follows the owner code.
3. A six digit serial number.
4. A check digit in a box.
5. A two digit size code.
6. A type code of two letters. The first letter shall be G, V, U, B, or S. This type code is grouped with and immediately follows the size code.
7. Maximum gross mass (kgs) (lbs).
8. Tare mass (kgs) (lbs).

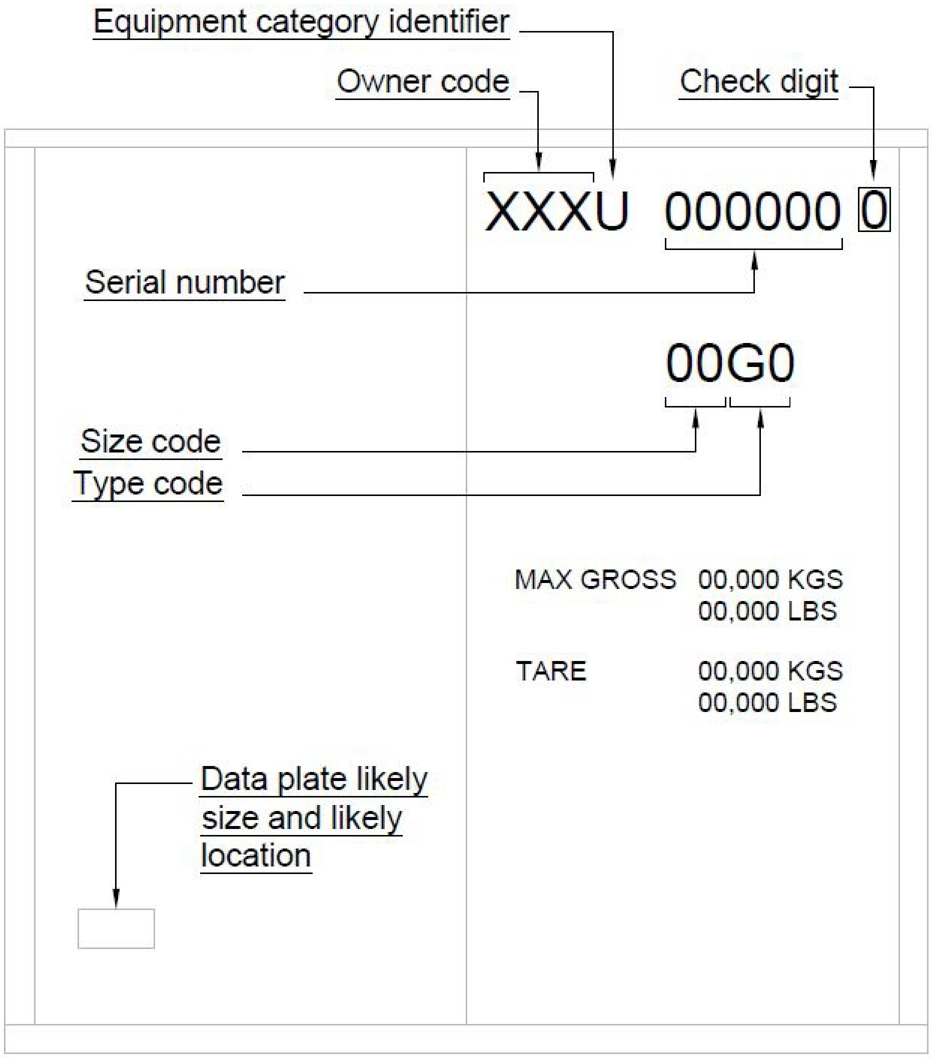


FIGURE 3115.3.2 MARKING IDENTIFICATION AND LIKELY LAYOUT

3115.4 Protection against decay and termites. Wood structural floors of *intermodal shipping containers* shall be protected from decay and termites in accordance with the applicable provisions of Section 2304.12.1.1.

3115.5 Under-floor ventilation. The space between the bottom of the floor joists and the earth under any *intermodal shipping container*, except spaces occupied by basements and cellars, shall be provided with ventilation in accordance with Section 1202.4.

3115.6 Roof assemblies. *Intermodal shipping container* roof assemblies shall comply with the applicable requirements of Chapter 15.

Exception: Single-unit, stand-alone intermodal shipping containers not attached to, or stacked vertically over, other intermodal shipping containers, buildings or structures.

3115.7 Joints and voids. Joints and voids that create concealed spaces between connected or stacked *intermodal shipping containers* at fire-resistance-rated walls, floor or floor/ceiling assemblies and roofs or roof/ceiling assemblies shall be protected by an approved *fire-resistant joint system* in accordance with Section 715.

Revise as follows:

3115.8 Structural. Intermodal shipping containers that conform tointernational standards that test certain structural properties of the containers~~ISO 1496-1~~, as identified by the required markings in Section 3115.3.2, and are repurposed for use as buildings or structures, or as a part of buildings or structures, shall be designed in accordance with Chapter 16 ,and the material specific chapters, ~~and~~ except for the provisions specifically stated in Section 3115.8.1 through 3115.8.4.3 ~~this section~~.

3115.8.1 Foundations and stacking. *Intermodal shipping containers* repurposed for use as a permanent building or structure shall be supported on foundations, other *intermodal shipping containers*, or other supporting structures designed and constructed in accordance with Chapters 16 through 23.

3115.8.1.1 Anchorage. *Intermodal shipping containers* shall be anchored to foundations or other supporting structures as necessary to provide a continuous load path for all applicable design and environmental *loads* in accordance with Chapter 16.

Delete without substitution:

~~**3115.8.2 Welds.** New welds and connections shall be equal to or greater than the original connections.~~

Revise as follows:

~~**3115.8.3**~~ **3115.8.2 Structural design.** The structural design for the *intermodal shipping containers* repurposed for use as a building or structure, or as part of a building or structure, shall comply with Section ~~3115.8.4~~ 3115.8.3 or ~~3115.8.5~~ 3115.8.4.

~~**3115.8.4**~~ **3115.8.3 Detailed design procedure.** A structural analysis meeting the requirements ofChapter 16, the applicable material chapters, and Section 3115.8.3.1 through 3115.8.3.4.2 ~~this section~~ shall be provided to the *building official* to demonstrate the structural adequacy of the intermodal shipping containers.

Exception: Intermodal shipping containers designed in accordance with Section 3115.8.4 ~~3115.8.5.~~

~~**3115.8.4.1**~~ **3115.8.3.1 Steel Material properties.** Structural material properties for existing *intermodal shipping container* steel components shall be established by Section 2202.~~material testing where the steel grade and composition cannot be identified by the manufacturer's designation as to manufacture and mill test.~~

~~**3115.8.4.2**~~ **3115.8.3.2 Seismic design parameters.** The seismic force-resisting system shall be designed and detailed in accordance with one of the following:

1. Where all or portions of the ~~corrugated~~ profiled steel panel container sides are considered to be the vertical seismic force-resisting system, design and detailing shall be in accordance with AISI S100 ~~the~~ and ASCE 7, Table 12.2-1 requirements for ~~light-frame bearing-wall systems with shear panels of all other materials.~~ steel systems not specifically detailed for for seismic resistance, excluding cantilever column systems.
2. Where portions of the ~~corrugated~~ profiled steel panel container sides are retained, but are not considered to be the vertical seismic force-resisting system, an independent seismic force-resisting system shall be selected, designed and detailed in accordance with ASCE 7, Table 12.2-1.
3. Where portions of the ~~corrugated~~ profiled steel panel container sides are retained and integrated into a vertical seismic force-resisting system other than as permitted by Item 1, seismic design parameters shall be developed from testing and analysis in accordance with Section 104.11 and ASCE 7, Section 12.2.1.1 or 12.2.1.2.

~~**3115.8.4.3**~~ **3115.8.3.3 Allowable shear value.** The allowable shear values for the*intermodal shipping container* ~~corrugated~~ profiled steel ~~sheet~~ panel side walls and end walls shall be demonstrated by testing and analysis accordance with Section 104.11. Where penetrations are made in the side walls or end walls designated as part of the lateral force-resisting system, the penetrations shall be substantiated by rational analysis.

Exceptions: The allowable shear values shall be obtained from Section 3115.8.4.3 where the seismic design category is A, and the following two items are met:

1. The *intermodal shipping container* top and bottom rails, corner fittings, and columns or any portion thereof are not notched, cut, or removed in any manner.
2. The *intermodal shipping container* is erected in a level and horizontal position with the floor located at the bottom.

Add new text as follows:

3115.8.3.4 Tested structural components.
Where they are not altered, the structural components identified in Section 3115.8.3.4.1 and 3115.8.3.4.2 can be used with the load combinations of Section 1605.3 based on the testing performed during the *intermodal shipping container* certification process. This certification shall have been verified by the data plate and markings in Section 3115.3.

The components names are labeled in Figure 3115.8.3.4.

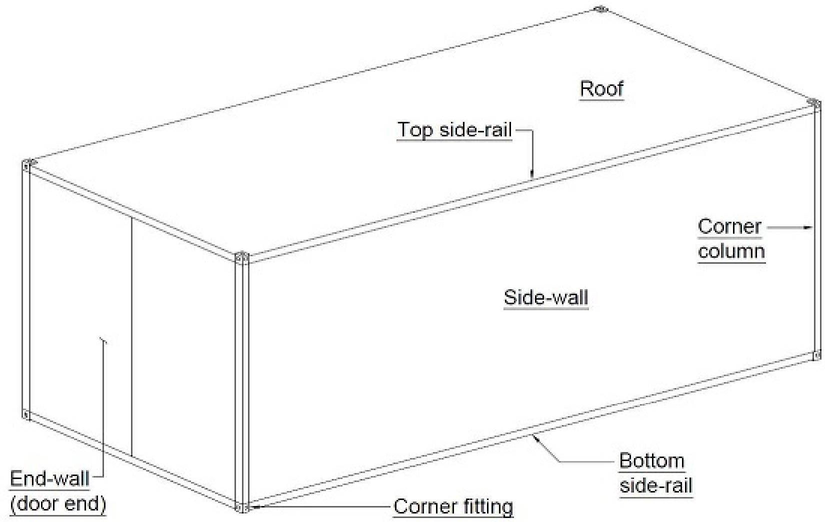


FIGURE 3115.8.3.4 CONTAINER ELEMENT IDENTIFICATION

3115.8.3.4.1 Floors.
Where the floor is not structurally altered from its state as a shipping container, the allowable superimposed out-of-plane design load for the floor is permitted to be calculated in accordance with Equation 31-1. The design load of the bottom rails to span from corner to corner shall not be obtained using similar methods. The ability for the floors and bottom rails to sustain these out-of-plane loads in combination with other forces shall be determined by the structural analysis.

Exceptions:

1. The capacity of the shipping container bottom side rails, in their original vertical orientation, to span from corner to corner under gravity loads can be obtained from Equation 31-2, where the floor, walls directly above, top rail directly above, corner columns, and roof are not structurally altered from their state as a shipping container.
2. The capacity of the shipping container bottom end rails, in their original vertical orientation, to span from corner to corner under gravity loads can be obtained from Equation 31-3, where the floor, walls directly above, top rail directly above, corner columns, and roof are not structurally altered from their state as a shipping container.

$q_a = 0.8(R-T)/(LW)$ **(Equation 31-1)**
where:

q_a = Allowable superimposed design load using ASD load combinations, in lb/ft^2 (kg/m^2)

R = Maximum gross mass, as marked on the container and its CSC Safety Approval Plate, in lbs (kgs)

T = Tare mass, as marked on the container and its CSC Safety Approval Plate, in lbs (kgs)

L = Interior floor length dimension of the shipping container, in feet (meters)

W = interior floor width dimension of the shipping container, in feet (meters)

$w_a = 0.8(R-T)/W$ **(Equation 31-2)**
where:

w_a = Allowable superimposed design load using ASD load combinations, in lb/ft (kg/m)

The other variables are defined as in Equation 31-1.

$w_a = 0.8(R-T)/L$ **(Equation 31-3)**
where:

The variables are defined as in Equation 31-1 and 31-2.

3115.8.3.4.2 Side-wall and end-wall.
Where the side-wall is not structurally altered from its state as a shipping container, the allowable out-of-plane design load for the side-wall is

permitted to be calculated in accordance with Equation 31-4. The ability for the side-wall to sustain these out-of-plane loads in combination with other forces shall be determined by the structural analysis.

Where the end-wall is not structurally altered from its state as a shipping container, the allowable out-of-plane design load for the end-wall is permitted to be calculated in accordance with Equation 31-5. The ability for the end-wall to sustain these out-of-plane loads in combination with other forces shall be determined by the structural analysis.

$q_a = 0.24(R-T)/HL$ **(Equation 31-4)**

where:

H = The interior height dimension of the wall, in feet (meters)

The other variables are defined as in equation 31-1.

$q_a = 0.16(R-T)/HW$ **(Equation 31-5)**

where:

The variables are defined as in Equation 31-1 and 31-4.

Revise as follows:

3115.8.4 ~~3115.8.5~~ Simplified structural design of single-unit containers. Single-unit*intermodal shipping containers* conforming to the limitations of Section 3115.8.5.1 shall be permitted to be designed in accordance with the simplified structural design provisions of Section 3115.8.5.2.

3115.8.4.1 ~~3115.8.5.1~~ Limitations. The use of Section 3115.8.5 is subject to the following limitations:

1. The *intermodal shipping container* shall be a single-unit, stand-alone unit supported on a foundation and shall not be in contact with or supporting any other shipping container or other structure.
2. The *intermodal shipping container* top and bottom rails, corner castings, and columns or any portion thereof shall not be notched, cut, or removed in any manner.
3. The *intermodal shipping container* shall be erected in a level and horizontal position with the floor located at the bottom.
4. The *intermodal shipping container* shall be located in Seismic Design Category A, B, C or D.

~~3115.8.5.2~~ 3115.8.4.2 Simplified structural design. Where permitted by Section~~3115.8.5.1~~ 3115.8.4.1, single-unit, stand-alone intermodal shipping containers shall be designed using the following assumptions for the ~~corrugated~~ profiled steel panel shear walls:

1. The appropriate detailing requirements contained in Chapters 16 through 23.
2. Response modification coefficient, R = 2.
3. Overstrength factor, $\Omega_0 = 2.5$.
4. Deflection amplification factor, $C_d = 2$.
5. Limits on structural height, $h_n = 9.5$ feet (2900 mm).

~~3115.8.5.3~~ 3115.8.4.3 Allowable shear. The allowable shear for the ~~corrugated~~ profiled steel panel side walls (longitudinal) and end walls (transverse) for wind design and seismic design using the coefficients of Section ~~3115.8.5.2~~ 3115.8.4.2 shall be in accordance with Table ~~3115.8.5.3~~ 3115.8.4.3, provided that all of the following conditions are met:

1. The total linear length of all openings in any individual side wall or end wall shall be limited to not more than 50 percent of the length of that side wall or end wall, as shown in Figure ~~3115.8.5.3(1)~~ 3115.8.4.3(1).
2. Any full-height wall length, or portion thereof, less than 4 feet (305 mm) shall not be considered as a portion of the lateral force-resisting system, as shown in Figure ~~3115.8.5.3(2)~~ 3115.8.4.3(2) .
3. All side walls or end walls used as part of the lateral force-resisting system shall have an existing or new boundary element on all sides to form a continuous load path, or paths, with adequate strength and stiffness to transfer all forces from the point of application to the final point of resistance, as shown in Figure ~~3115.8.5.3(3)~~ 3115.8.4.3(3).
4. Where openings are made in container walls, floors or roofs, for doors, windows and other openings:

4.1 The openings shall be framed with steel elements that are designed in accordance with Chapters 16 and 22.

4.2 The cross section and material grade of any new steel element shall be equal to or greater than the steel element removed.

5. A maximum of one penetration not greater than 6 inches (152 mm) in diameter for conduits, pipes, tubes or vents, or not greater than 16 square inches (10 323 mm^2) for electrical boxes, is permitted for each individual 8-foot (2438 mm) length of lateral force-resisting wall. Penetrations located in walls that are not part of the lateral force-resisting system shall not be limited in size or quantity. Existing *intermodal shipping container* vents shall not be considered a penetration, as shown in Figure ~~3115.8.5.3(4)~~ 3115.8.4.3(4).
6. End wall doors designated as part of the lateral force-resisting system shall be welded closed.

TABLE ~~3115.8.5.3~~ 3115.8.4.3 ALLOWABLE SHEAR VALUES FOR INTERMODAL SHIPPING CONTAINER ~~CORRUGATED~~ PROFILED STEEL PANEL WALLS FOR WIND OR SEISMIC LOADING

~~CONTAINER DESIGNATION~~[b]	CONTAINER DIMENSION (nominal length)	~~CONTAINER DIMENSION (nominal height)~~	ALLOWABLE SHEAR VALUES (PLF)[~~a,~~ e]	
			Side Wall	End Wall
~~1EEE~~	45 feet	~~9.5 feet~~	75	843
~~1EE~~		~~8.5 feet~~		
~~1AAA~~	40 feet	~~9.5 feet~~	84	
~~1AA~~		~~8.5 feet~~		
~~1A~~		~~8.0 feet~~		
~~1AX~~		~~< 8.0 feet~~		
~~1BBB~~	30 feet	~~9.5 feet~~	112	
~~1BB~~		~~8.5 feet~~		
~~1B~~		~~8.0 feet~~		
~~1BX~~		~~< 8.0 feet~~		
~~1CC~~	20 feet	~~8.5 feet~~	168	
~~1C~~		~~8.0 feet~~		
~~1CX~~		~~< 8.0 feet~~		
~~1D~~	~~10 feet~~	~~8.0 feet~~	~~337~~	
~~1DX~~		~~< 8.0 feet~~		

For SI: 1 foot = 304.8 mm.

~~a.~~ ~~The allowable strength shear for the side walls and end walls of the intermodal shipping containers are derived from ISO 1496-1 and reduced by a factor of safety of 5.~~

~~b.~~ ~~Container designation type is derived from ISO 668.~~

~~c.~~ a. Limitations of Section 3115.8.4.1 ~~3115.8.5.1~~ shall apply.

Delete without substitution:

ISO

International Organization for Standardization
Chemin de Blandonnet 8 CP 401 1214 Vernier
Geneva, Switzerland

~~**ISO 668—2013**~~	~~Series 1 Freight Containers—Classifications, Dimensions and Ratings~~
~~ISO 1496-1—2013~~	~~Series 1 Freight Containers—Specification and Testing - Part 1: General Cargo Containers for General Purposes~~
~~ISO 6346—1995~~	~~Freight Containers—Code, Identification and Marking with Amendment 3 - 2012~~

Reason: Intermodal international shipping containers are primarily governed by two standards that would affect portions of how they behave structurally: The International Maritime Organization's (IMO) International Convention for Safe Containers (CSC) of 1972, amended in 1993, and ISO 1496-1. ISO 6346 contains the marking requirements for containers that meet various ISO standards, including 1496-1.
Re 3115.3: Both CSC and ISO 6346 require different physical identifiable information to be present on the container. The CSC requires the data plate, and ISO 6346 requires much larger markings, that are usually painted on. Both need to be present in order to verify both CSC and 1496-1 have been met.

Re 3115.3.1: This section is adjusted to remove the reference to ISO 6346 for the data plate, which was both incorrect and unnecessary, as the user of the code does not need to actually read CSC or ISO 6346 to verify the items written.

Re 3115.3.2: This section is added such that the requirements that ISO 6346 requires be marked on the containers are verified, and have the correct type code, such that conformance to ISO 1496-1 can be determined by these markings.

Re 3115.8: The reference to ISO 1496-1 is removed, as the user of the code does not need to read ISO 1496-1, as it does not contain information that is used for design in this code. The user is informed that the markings that were required in 3115.3.2 verify that international standards have been met. The inclusion of the material specific chapters, is that many of the components of shipping containers cannot be structurally verified purely by the tests that have been conducted as part of the international certification process, so they would need to be analyzed in accordance with the steel and wood chapters. The final statement is in recognition that Section 3115 is modifying the provisions found elsewhere in the code that, unless specifically stated, would still apply.

Re 3115.8.1: Clarifying that containers can be stacked

Re 3115.8.2: The statement on welds could have multiple interpretations, and doesn't seem to add any value with any of them. It would require welds to be held to some vague and arbitrary standard of equality to existing welds. If this section was intended for weld replacements, or weld fixes, it should be modified as such, but its purpose would still seem dubious. It could also be interpreted that every weld taking place on a container would need to meet this vague equality requirement, which once again doesn't seem to have a purpose.

Re 3115.8.4: The inclusion of the material specific chapters, is that many of the components of shipping containers cannot be structurally verified purely by the tests that have been conducted as part of the international certification process, so they would need to be analyzed in accordance with the steel and wood chapters.

Re 3115.8.4.1: The requirements of Section 2202 already have provisions for identifying unknown steel, and so they should not be recreated or differently stated.

Re 3115.8.4.2: The sides of containers do not meet the definition for *light-frame construction* as used in the IBC or in the AISI standards, so they should not be using light-frame construction methods.They are cold-formed steel profiled panels, as such AISI S100, which invokes AISI S310 for profiled steel panels being used as diaphragms is therefore the correct reference. All of their components are steel, as required by the definition of intermodal shipping containers, so its clearly follows that they are steel systems which have not been detailed for seismic resistance. This would be in line with AISI S310 design methods as invoked by AISI S100.

Re 3115.8.4.3: A name change to be consistent with the AISI standards governing profiled steel deck diaphragm panels, AISI S100 and AISI S310. The exception proposed follows the logic used to justify the floor tested components, as the static racking strength in the longitudinal and transverse directions has been verified by tests in accordance with ISO 1496-1.

Re 3115.8.4.4: As the containers have already undergone certification that involves structural testing they can be trusted for their structural capacity in certain specific ways. The challenge comes with cutting parts out of them, or leaving their doors open, as is done when converting them into buildings. Therefore, the components that can be trusted must only be done so under certain circumstances, as laid out in this section. With some clever deductive reasoning the provisions of this section could potentially be expanded.

Re 3115.8.4.4.1: One of the easiest components of the certified containers to trust based on their testing are the floor members that typically span from side-wall to side-wall. These floors have had two primary tests conducted on them as required by both CSC and ISO 1496-1: Being loaded such that the total mass of the container and its contents reaches two times the maximum gross mass marked on the containers, and having a 16 kip 2 wheeled vehicle driven around inside of them all while only supported from their corner fittings, that project further down than their side rails. As such, equation 31-1 recognizes the tested capacity of the floors, with factors of safety. The value that the floor is required to hold during its tests is 2(R-T). As such the allowance for 0.8(R-T) is using a factor of safety of 2.5, as used for tested components in 1709.3.1. The international standard for serviceability that these containers meet is: no permanent deformation that would render them incapable of being used for their designed purpose, as such factor of safety of 2.5 should suffice for maintaining serviceability under live loading scenarios, even though the containers have never had proper serviceability limit states in accordance with the IBC. The allowance for the bottom side rails to span is similar to the floor members themselves, however the bottom side rails are braced against buckling by the adjacent floors and walls above, so the adjacent members become critical components. The bottom side rails are also aided to a very large extent in their spanning capabilities by acting as deep beams with the walls and top rail above. Therefore, their capacity can only be relied on in the cases where all of their bracing and composite action bestowing components have remained in place.

Re 3115.8.4.4.2: Similar to the floors, the walls of the containers have been tested under the international standards that the containers are certified to. The side walls are tested under a load equal to 0.6 times the mass of the net contents multiplied by the acceleration due to gravity. This is further reduced here by a factor of safety of 2.5.
The end walls are tested under a load equal to 0.4 times the mass of the net contents multiplied by the acceleration due to gravity. This is further reduced here by a factor of safety of 2.5.

Re 3115.8.5.2 and 3115.8.5.3: Simply a name change to be consistent with the AISI standards governing profiled steel deck diaphragm panels, AISI S100 and AISI S310.

Re Table 3115.8.5.3: Containers that are 10 feet long, with designations of 1D or 1DX have not been tested to transverse or longitudinal racking force resistance, in accordance with ISO 1496-1, so they cannot be trusted to have this strength, and are removed from the table. The container designation and container height provide no useful information, and are also removed.

Re ISO Standard 668, 1496-1, and 6346: The code does not require the user to go to these reference standards in order to design a building or structure, as such their inclusion as referenced standards is inconsistent with how the other reference standards are used, where they provide design information to be used in conjunction with the IBC.

Bibliography: CSC (1996), *International Convention for Safe Containers,* CSC, International Maritime Organization, 4 Albert Embanklment, London SE1 7SR, United Kingdom of Great Britain and Northern Ireland.
ISO (2013), *Series 1 freight containers - Specification and testing - Part 1: General cargo containers for general purposes,* ISO 1496-1, International Organization for Standardization, Chemin de Blandonnet 8, CP 401-1214 Vernier, Geneva, Switzerland

ISO (1995), *Freight containers - Coding, identification and marking,* ISO 6346, International Organization for Standardization, Chemin de Blandonnet 8, CP 401-1214 Vernier, Geneva, Switzerland

AISI (2020), *North American Specification for the Design of Cold-Formed Steel Structural Members,* AISI S100-16 w/S2-20, American Iron and Steel Institute, 25 Massachusettes Avenue, NW, Suite 800, Washington, DC 20001

AISI (2020), *North American Specification for the Design of Profiled Steel Diaphragm Panels,* AISI S310-20, American Iron and Steel Institute, 25 Massachusettes Avenue, NW, Suite 800, Washington, DC 20001

Cost Impact: The code change proposal will decrease the cost of construction
By recognizing some of the tests that containers have already been certified to under international standards, some of the structural components do not need to be verified by material testing or structural investigation.

G196-21

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The proposal was disapproved as the proposal has inconsistencies. The committee encouraged the proponent to review with and propose future updates. (Vote: 14-0)

G196-21

Individual Consideration Agenda

Public Comment 1:

IBC: 3115.8.1, 3115.8.1.1, 3115.8.1.2 (New)

Proponents: John-Jozef Proczka, representing self (john-jozef.proczka@phoenix.gov); Truong Huynh, City of Long Beach, representing ICC Los Angeles Basin Chapter (truong.huynh@longbeach.gov); Jon-Paul Cardin, representing American Iron and Steel Institute (jcardin@steel.org) requests As Modified by Public Comment

Replace as follows:

2021 International Building Code

3115.8.1 Foundations <u>and supports</u> . *Intermodal shipping containers* repurposed for use as a permanent building or structure shall be supported on foundations or other supporting structures designed and constructed in accordance with Chapters 16 through 23.

3115.8.1.1 Anchorage . *Intermodal shipping containers* shall be anchored to foundations or other supporting structures as necessary to provide a continuous load path for all applicable design and environmental *loads* in accordance with Chapter 16.

<u>**3115.8.1.2 Stacking .** *Intermodal shipping containers* used to support stacked units shall comply with Section 3115.8.4.</u>

Commenter's Reason: The original intent was not to prohibit stacking. Stacking of intermodal shipping containers was never clearly addressed in the 2021 IBC. This proposal clarifies that stacking is allowed and which section is required for the design of stacked containers.

Cost Impact: The net effect of the public comment and code change proposal will not increase or decrease the cost of construction
Simply clarification that stacking is allowed under the detailed structural design procedure

G198-21

Proposed Change as Submitted

Proponents: Julie Furr, Rimkus Consulting Group, Inc., representing Federal Emergency Management Agency/Applied Technology Council - Seismic Code Support Committee (jfurr@rimkus.com); Kelly Cobeen, Wiss Janney Elstner Associates, Inc., representing Federal Emergency Management Agency/Applied Technology Council - Seismic Code Support Committee (kcobeen@wje.com); Michael Mahoney, Federal Emergency Management Agency, representing Federal Emergency Management Agency (mike.mahoney@fema.dhs.gov); Ronald LaPlante, representing Federal Emergency Management Agency/Applied Technology Council - Seismic Code Support Committee (ron.laplante@dgs.ca.gov)

2021 International Building Code

Revise as follows:

3115.8.2 Welds. The strength of new ~~New~~ welds and connections shall be no less ~~equal to or greater~~ than the strength provided by the original connections. All new welds and connections shall be designed and constructed in accordance with Chapters 16, 17, and 22.

3115.8.4 Detailed design procedure. A structural analysis meeting the requirements of this section shall be provided to the*building official* to demonstrate the structural adequacy of the intermodal shipping containers.

Exception: Structures using an intermodal ~~Intermodal~~ shipping container ~~containers~~ designed in accordance with Section 3115.8.5.

3115.8.4.2 Seismic design parameters. The seismic force-resisting system shall be designed and detailed in accordance with ASCE 7 and one of the following:

1. Where all or portions of the corrugated steel container sides are considered to be the seismic force-resisting system, design and detailing shall be in accordance with the ASCE 7, Table 12.2-1 requirements for light-frame bearing-wall systems with shear panels of all other materials. ASCE 7 seismic provision exceptions, related to light-frame construction, shall not apply to the design of structures using intermodal shipping containers. The allowable shear values shall be determined in accordance with Section 3115.8.4.3.
2. Where all or portions of the corrugated steel container sides are ~~retained, but are~~ not considered to be part of the seismic force-resisting system, an independent seismic force-resisting system shall be selected~~, designed~~ and detailed in accordance with ASCE 7, Table 12.2-1.
3. Where all or portions of the corrugated steel container sides are retained and integrated into a seismic force-resisting system other than as permitted by Item 1, seismic design parameters shall be developed from testing and analysis in accordance with Section 104.11 and ASCE 7, Section 12.2.1.1 or 12.2.1.2.

3115.8.5.3 Allowable shear. The allowable shear for the corrugated steel side walls (longitudinal) and end walls (transverse) for wind design and seismic design using the coefficients of Section 3115.8.5.2 shall be in accordance with Table 3115.8.5.3, provided that all of the following conditions are met:

1. The total linear length of all openings in any individual side wall or end wall shall be limited to not more than 50 percent of the length of that side wall or end wall, as shown in Figure 3115.8.5.3(1).
2. Any full-height wall length, or portion thereof, less than 4 feet (305 mm) shall not be considered as a portion of the lateral force-resisting system, as shown in Figure 3115.8.5.3(2).
3. All side walls or end walls used as part of the lateral force-resisting system shall have an existing or new boundary element on all sides to form a continuous load path, or paths, with adequate strength and stiffness to transfer all forces from the point of application to the final point of resistance, as shown in Figure 3115.8.5.3(3). The existing door interlocking mechanism shall not be considered as a component of the required load path.
4. Where openings are made in container walls, floors or roofs, for doors, windows and other openings:

   4.1 The openings shall be framed with steel elements that are designed in accordance with Chapters 16 and 22.

   4.2 The cross section and material grade of any new steel element shall be equal to or greater than the steel element removed.
5. A maximum of one penetration not greater than 6 inches (152 mm) in diameter for conduits, pipes, tubes or vents, or not greater than 16 square inches (10 323 mm^2) for electrical boxes, is permitted for each individual 8-foot (2438 mm) length of lateral force-resisting wall. Penetrations located in walls that are not part of the lateral force-resisting system shall not be limited in size or quantity. Existing *intermodal shipping container* vents shall not be considered a penetration, as shown in Figure 3115.8.5.3(4).
6. End wall doors designated as part of the lateral force-resisting system shall be welded closed~~.~~ around the full perimeter of the door panels.

Reason: Section 3115.8.2 is not clear as to what welds and connections this applies to, nor does it clarify what is meant by “equal to or greater than” (strength, size, or other). This change clarifies that it is the “strength” of the welds and connections that should be assessed for equivalency. The proposed language clarifies that new welds shall comply with minimum design standards as already specified elsewhere in the IBC.
Section 3115.8.4.2 is modified to include direct reference to ASCE 7 to capture the seismic design provisions, such as combination of seismic force-

resisting systems, regardless of which of the 3 design items are selected. The first proposed change to Item 1 is to not permit simplified and relaxed requirements in ASCE 7, intended specifically for light-frame construction, to be applied to steel shipping containers since these containers may not exhibit similar seismic response characteristics as light-frame construction. The second proposed change to Item 1 is to tie the system seismic parameters to the system capacity by direct reference to Section 3115.8.4.3. This is also intended to further clarify that the allowable shear values contained in the simplified procedure shown in Table 3115.8.5.3 are not intended to be permitted with the detailed design procedure. The proposed changes in Items 2 and 3 are editorial to be consistent with Item 1.

Section 3115.8.5.3 is modified to ensure that the allowable shear in Table 3115.8.5.3 for the end wall with doors is based on an adequate load path between the door panels and boundary elements, as determined by established design theory. The perimeter welds of the end door panels are to be designed per Section 3115.8.2 and may be continuous or intermittent as required by design. These changes further clarify that the original mechanical locking mechanisms shall not be relied upon to function as a lateral force-resisting system component of the repurposed shipping container.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
These changes are editorial in nature and intended to clarify the design requirements.

G198-21

Public Hearing Results

Committee Action: **As Modified**

Committee Modification:

3115.8.5.3 Allowable shear. The allowable shear for the corrugated steel side walls (longitudinal) and end walls (transverse) for wind design and seismic design using the coefficients of Section 3115.8.5.2 shall be in accordance with Table 3115.8.5.3, provided that all of the following conditions are met:

1. The total linear length of all openings in any individual side wall or end wall shall be limited to not more than 50 percent of the length of that side wall or end wall, as shown in Figure 3115.8.5.3(1).
2. Any full-height wall length, or portion thereof, less than 4 feet (305 mm) shall not be considered as a portion of the lateral force-resisting system, as shown in Figure 3115.8.5.3(2).
3. All side walls or end walls used as part of the lateral force-resisting system shall have an existing or new boundary element on all sides to form a continuous load path, or paths, with adequate strength and stiffness to transfer all forces from the point of application to the final point of resistance, as shown in Figure 3115.8.5.3(3). The existing door interlocking mechanism shall not be considered as a component of the required load path.
4. Where openings are made in container walls, floors or roofs, for doors, windows and other openings:

   4.1 The openings shall be framed with steel elements that are designed in accordance with Chapters 16 and 22.

   4.2 The cross section and material grade of any new steel element shall be equal to or greater than the steel element removed.

5. A maximum of one penetration not greater than 6 inches (152 mm) in diameter for conduits, pipes, tubes or vents, or not greater than 16 square inches (10 323 mm^2) for electrical boxes, is permitted for each individual 8-foot (2438 mm) length of lateral force-resisting wall. Penetrations located in walls that are not part of the lateral force-resisting system shall not be limited in size or quantity. Existing *intermodal shipping container* vents shall not be considered a penetration, as shown in Figure 3115.8.5.3(4).
6. End wall doors designated as part of the lateral force-resisting system shall be intermittently welded closed around the full perimeter of the door panels.

Committee Reason: The proposal was approved as modified by Furr-2 based on the committee actions on G197. The proposal, and modification, coordinate and clarify the welding, shear and seismic provisions. The proposal adds a pointer to ASCE 7 seismic provisions. The modification Furr-2 clarifies intermediate welding for Section 3115.8.5.3 item #6. (Vote: 14-0)

G198-21

Individual Consideration Agenda

Public Comment 1:

IBC: 3115.8.4.2, 3115.8.4.1, 3115.8.4.3

Proponents: Julie Furr, representing Federal Emergency Management Agency/Applied Technology Council - Seismic Code Support Committee (jfurr@rimkus.com); Truong Huynh, City of Long Beach, representing ICC Los Angeles Basin Chapter (truong.huynh@longbeach.gov); Jon-Paul Cardin, representing American Iron and Steel Institute (jcardin@steel.org); John-Jozef Proczka, representing self (john-jozef.proczka@phoenix.gov); Michael Mahoney, representing Federal Emergency Management Agency (mike.mahoney@fema.dhs.gov) requests As Modified by Public Comment

Further modify as follows:

2021 International Building Code

3115.8.4.2 Seismic design parameters . The seismic force-resisting system shall be designed and detailed in accordance with ASCE 7 and one of the following:

1. Where all or portions of the corrugated steel container sides are considered to be the seismic force-resisting system, design and detailing shall be in accordance with AISI S100 and,~~the~~ ASCE 7, Table 12.2-1 requirements for steel systems not specifically detailed for seismic resistance, excluding cantilever column systems.~~light-frame bearing wall systems with shear panels of all other materials. ASCE 7 seismic provision exceptions, related to light-frame construction, shall not apply to the design of structures using intermodal shipping containers. The allowable shear values shall be determined in accordance with Section 3115.8.4.3.~~
2. Where all or portions of the corrugated steel container sides are not considered to be part of the seismic force-resisting system, an independent seismic force-resisting system shall be selected and detailed in accordance with ASCE 7, Table 12.2-1.
3. Where all or portions of the corrugated steel container sides are retained and integrated into a seismic force-resisting system other than as permitted by Item 1, seismic design parameters shall be developed from testing and analysis in accordance with Section 104.11 and ASCE 7, Section 12.2.1.1 or 12.2.1.2.

3115.8.4.1 Material properties . Structural material properties for existing *intermodal shipping container* steel components shall be established by Section 2202. ~~material testing where the steel grade and composition cannot be identified by the manufacturer's designation as to manufacture and mill test~~.

3115.8.4.3 Allowable shear value . The allowable shear values for the *intermodal shipping container* corrugated steel sheet panel side walls and end walls shall be determined in accordance with the design approach selected in Section 3115.8.4.2. ~~demonstrated by testing and analysis accordance with Section 104.11.~~ Where penetrations are made in the side walls or end walls designated as part of the lateral force-resisting system, the penetrations shall be substantiated by rational analysis.

Commenter's Reason: This modification addresses two issues that have posed barriers to effective use of the Detailed Design Procedure, pertaining to how users must determine allowable shear values. This change was developed in collaboration with industry representatives and multiple interested parties.
As currently written:

1. Users must determine allowable shear capacities of the profiled steel panels by testing.
2. Users must comply with ASCE 7 seismic provisions for light-frame bearing wall systems, which are only applicable to light-frame stud and wood sheathing/gypsum board shear wall assemblies.

As modified:

1. Users are provided the option to use established industry standard methodologies to determine allowable shear capacities, requiring testing only if those methodologies are not applicable.
2. Users are directed to AISI S100, which is directly applicable to profiled steel panel shear wall assemblies.

Cost Impact: The net effect of the public comment and code change proposal will decrease the cost of construction
This change reduces mandatory material testing requirements under the detailed design procedure.

Public Comment# 2267

G199-21 Part I

Proposed Change as Submitted

Proponents: Jeffrey Shapiro, representing Self (jeff.shapiro@intlcodeconsultants.com)

THIS IS A 2 PART CODE CHANGE. PART I WILL BE HEARD BY THE GENERAL CODE COMMITTEE. PART II WILL BE HEARD BY THE FIRE CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THESE COMMITTEES.

2021 International Building Code

SECTION 3301
GENERAL

Revise as follows:

3301.1 Scope. The provisions of this chapter shall govern safety during construction and the protection of adjacent public and private properties. Fire safety during construction shall also comply with the applicable provisions of Chapter 33 of the International Fire Code.

3301.2
Storage and placement of construction equipment and materials
. Construction equipment and materials shall be stored and placed so as not to endanger the public, the workers or adjoining property for the duration of the construction project.

[BS]
3301.3 ~~3301.2.1~~
Roof ~~Structural and construction~~ loads. Structural roof components shall be capable of supporting the roof-covering system and the material and equipment*loads* that will be encountered during installation of the system.

3301.4 ~~3302.1~~
Maintenance of exits, existing structural elements, fire protection devices and sanitary safeguards~~Alterations, repairs and additions~~. Required *exits*, existing structural elements, fire protection devices and sanitary safeguards shall be maintained at all times during *alterations*, *repairs* or *additions* to any building or structure.

Exceptions:

1. Where such required elements or devices are being altered or repaired, adequate substitute provisions shall be made.
2. Maintenance of such elements and devices is not required where the existing building is not occupied.

3301.5 ~~3302.2~~
Removal of waste materials~~Manner of removal~~. Waste materials shall be removed in a manner that prevents injury or damage to persons, adjoining properties and public rights-of-way.

Delete without substitution:

~~**3302.3 Fire safety during construction.** Fire safety during construction shall comply with the applicable requirements of this code and the applicable provisions of Chapter 33 of the International Fire Code.~~

Revise as follows:

SECTION 3302
OWNER'S RESPONSIBILITY FOR FIRE PROTECTION~~CONSTRUCTION SAFEGUARDS~~

Add new text as follows:

3302.1 Site Safety Plan.
The owner or owner's authorized agent shall be responsible for the development, implementation and maintenance of an approved, written site safety plan establishing a fire prevention program at the project site applicable throughout all phases of the construction, repair, alteration or demolition work. The plan shall be submitted and approved before a building permit is issued, Any changes to the plan shall address the requirements of this chapter and other applicable portions of the International Fire Code, the duties of staff, and staff training requirements. The plan shall be submitted for approval in accordance with the *International Fire Code.*

3302.1.1 Components of site safety plans.
Site safety plans shall include the following as applicable:

1. Name and contact information of site safety director.
2. Documentation of the training of the site safety director and fire watch personnel.
3. Procedures for reporting emergencies.
4. Fire department vehicle access routes.
5. Location of fire protection equipment, including portable fire extinguishers, standpipes, fire department connections and fire hydrants.
6. Smoking and cooking policies, designated areas to be used where approved, and signage locations in accordance with the *International Fire Code.*
7. Location and safety considerations for temporary heating equipment.
8. Hot work permit plan.
9. Plans for control of combustible waste material.
10. Locations and methods for storage and use of flammable and combustible liquids and other hazardous materials.
11. Provisions for site security and, where required, for a fire watch.
12. Changes that affect this plan.
13. Other site-specific information required by the *International Fire Code*.

3302.2 Site safety director.
The owner shall designate a person to be the site safety director. The site safety director shall be responsible for ensuring compliance with the site safety plan. The site safety director shall have the authority to enforce the provisions of this chapter and other provisions as necessary to secure the intent of this chapter. Where guard service is provided in accordance with the International Fire Code, the site safety director shall be responsible for the guard service.

3302.3 Daily fire safety inspection.
The site safety director shall be responsible for completion of a daily fire safety inspection at the project site. Each day, all building and outdoor areas shall be inspected to ensure compliance with the inspection list in this section. The results of each inspection shall be documented and maintained on-site until a certificate of occupancy has been issued. Documentation shall be immediately available on-site inspection and review.

1. Any contractors entering the site to perform hot work each day have been instructed in the hot work safety requirements in the *International Fire Code*, and hot work is performed only in areas approved by the site safety director.
2. Temporary heating equipment is maintained away from combustible materials in accordance with the equipment manufacturer's instructions.
3. Combustible debris, rubbish and waste material is removed from the building in areas where work is not being performed.
4. Temporary wiring does not have exposed conductors.
5. Flammable liquids and other hazardous materials are stored in locations that have been approved by the site safety director when not involved in work that is being performed.
6. Fire apparatus access roads required by the *International Fire Code* are maintained clear of obstructions that reduce the width of the usable roadway to less than 20 feet (6096 mm).
7. Fire hydrants are clearly visible from access roads and are not obstructed.
8. The location of fire department connections to standpipe and in-service sprinkler systems are clearly identifiable from the access road and such connections are not obstructed.
9. Standpipe systems are in service and continuous to the highest work floor, as specified in Section 3311.
10. Portable fire extinguishers are available in locations required by Sections 3309 and for roofing operations in accordance with the *International Fire Code.*
11. Where a fire watch is required, fire watch records complying with the International Fire Code are up-to-date.

3302.3.1 Violations.
Failure to properly conduct, document and maintain documentation required by this section shall constitute an unlawful act in accordance with Section 114.1 and shall result in the issuance of a notice of violation to the site safety director in accordance with Section 114.2. Upon the third offense, the Building Official is authorized to issue a stop work order in accordance with Section 115, and work shall not resume until satisfactory assurances of future compliance have been presented to and approved by the Building Official.

2021 International Existing Building Code

SECTION 1501

GENERAL

Revise as follows:

[BG] 1501.1 Scope. The provisions of this chapter shall govern safety during construction and the protection of adjacent public and private properties. Fire safety during construction shall also comply with the applicable provisions of Chapter 33 of the International Fire Code

[BG] 1501.2 Storage and placement of construction equipment and materials. Construction equipment and materials shall be stored and placed so as not to endanger the public, the workers or adjoining property for the duration of the construction project.

[BS] ~~1501.2.1~~ 1501.3 ~~Structural and construction~~ Roof loads. Structural roof components shall be capable of supporting the roof-covering system and the material and equipment loads that will be encountered during installation of the system.

[BG] ~~1501.3~~ 1501.4 ~~Alterations, repairs and additions~~ Maintenance of exit s, existing structural elements, fire protection devices and sanitary safeguards. Required exits, existing structural elements, fire protection devices and sanitary safeguards shall be maintained at all times during*alterations*, *repairs* or *additions* to any building or structure.

Exceptions:

1. Where such required elements or devices are being altered or repaired, adequate substitute provisions shall be made.
2. Maintenance of such elements and devices is not required where the *existing building* is not occupied.

[BG] ~~1501.4~~ 1501.5 Removal of waste materials ~~Manner of removal~~. Waste materials shall be removed in a manner that prevents injury or damage to persons, adjoining properties and public rights-of-way.

Delete without substitution:

~~**[BG] 1501.5 Fire safety during construction.** Fire safety during construction shall comply with the applicable requirements of the *International Building Code* and the applicable provisions of Chapter 33 of the International Fire Code.~~

Add new text as follows:

SECTION 1502
OWNER'S RESPONSIBILITY FOR FIRE PROTECTION

1502.1 Site Saf et y Plan.
The owner or owner's authorized agent shall be responsible for the development, implementation and maintenance of an approved, written site safety plan establishing a fire prevention program at the project site applicable throughout all phases of the construction, repair, alteration or demolition work. The plan shall be submitted and approved before a building permit is issued, Any changes to the plan shall address the requirements of this chapter and other applicable portions of the International Fire Code, the duties of staff, and staff training requirements. The plan shall be submitted for approval in accordance with the International Fire Code.

1502.1.1 Components of site safety plans.
Site safety plans shall include the following as applicable:

1. Name and contact information of site safety director.
2. Documentation of the training of the site safety director and fire watch personnel.
3. Procedures for reporting emergencies.
4. Fire department vehicle access routes.
5. Location of fire protection equipment, including portable fire extinguishers, standpipes, fire department connections and fire hydrants.
6. Smoking and cooking policies, designated areas to be used where approved, and signage locations in accordance with the International Fire Code.
7. Location and safety considerations for temporary heating equipment.
8. Hot work permit plan.
9. Plans for control of combustible waste material.
10. Locations and methods for storage and use of flammable and combustible liquids and other hazardous materials.
11. Provisions for site security and, where required, for a fire watch.
12. Changes that affect this plan.
13. Other site-specific information required by the International Fire Code.

1502.2 Site safety director.
The owner shall designate a person to be the site safety director. The site safety director shall be responsible for ensuring compliance with the site safety plan. The site safety director shall have the authority to enforce the provisions of this chapter and other provisions as necessary to secure the intent of this chapter. Where guard service is provided in accordance with the International Fire Code, the site safety director shall be responsible for the guard service.

1502.3 Daily fire safety inspect ion.
The site safety director shall be responsible for completion of a daily fire safety inspection at the project site. Each day, all building and outdoor areas shall be inspected to ensure compliance with the inspection list in this section. The results of each inspection shall be documented and maintained on-site until a certificate of occupancy has been issued. Documentation shall be immediately available on-site inspection and review.

1. Any contractors entering the site to perform hot work each day have been instructed in the hot work safety requirements in the International Fire Code, and hot work is performed only in areas approved by the site safety director.
2. Temporary heating equipment is maintained away from combustible materials in accordance with the equipment manufacturer's instructions.
3. Combustible debris, rubbish and waste material is removed from the building in areas where work is not being performed.
4. Temporary wiring does not have exposed conductors.
5. Flammable liquids and other hazardous materials are stored in locations that have been approved by the site safety director when not involved in work that is being performed.
6. Fire apparatus access roads required by the International Fire Code are maintained clear of obstructions that reduce the width of the usable roadway to less than 20 feet (6096 mm).
7. Fire hydrants are clearly visible from access roads and are not obstructed.
8. The location of fire department connections to standpipe and in-service sprinkler systems are clearly identifiable from the access road and such connections are not obstructed.
9. Standpipe systems are in service and continuous to the highest work floor, as specified in Section 1506.
10. Portable fire extinguishers are available in locations required by Sections 1504 and for roofing operations in accordance with the International Fire Code.
11. Where a fire watch is required, fire watch records complying with the International Fire Code are up-to-date.

1502.3.1 Violations.
Failure to properly conduct, document and maintain documentation required by this section shall constitute an unlawful act in accordance with Section 114.1 and shall result in the issuance of a notice of violation to the site safety director in accordance with Section 114.2. Upon the third offense, the Building Official is authorized to issue a stop work order in accordance with Section 115, and work shall not resume until satisfactory assurances of future compliance have been presented to and approved by the Building Official.

SECTION 1503 SANITARY

Revise as follows:

[BG] ~~1501.7~~ 1503.1 Facilities required. Sanitary facilities shall be provided during construction or demolition activities in accordance with the *International Plumbing Code* .

Add new text as follows:

SECTION 1504 PROTECTION OF PEDESTRIANS.
(Renumber 1501.6 through 1501.6.7 as 1504 subsections)

Reason: Correlation with IFC for provisions for construction site safety that a building inspector can reasonably verify and enforce while onsite doing other scheduled inspections. Clearly, building inspectors are plenty busy with scheduled inspections, and we are not looking to bog them down with additional work touring the site for safety violations. But, having them verify that required owner/manager site safety inspections are being documented is a minimal step to improving construction site safety. Also, IFC reference is moved to the scope for improved visibility and provisions have been added to clarify that a fire watch, where required, and associated records should be part of the safety play and records inspection.
It is recommended that the new section be scoped to the Fire Code for maintenance.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
Provisions being modified in the IBC are already in the IFC. Changes are for clarity and coordination between the codes.

G199-21 Part I

Public Hearing Results

Committee Action: **As Submitted**

Committee Reason: The proposal was approved as submitted as the proposal is a good coordinated change and providing a link to the Chapter 33 of the International Fire Code in the scoping statement of Section 3301.1. (Vote: 12-2)

G199-21 Part I

Individual Consideration Agenda

Public Comment 1:

IEBC: 1502.3.1; IBC: 3302.3.1

Proponents: Greg Johnson, representing Codes & Standards International (gjohnsonconsulting@gmail.com) requests As Modified by Public Comment

Modify as follows:

2021 International Existing Building Code

~~**1502.3.1 Violations .** Failure to properly conduct, document and maintain documentation required by this section shall constitute an unlawful act in accordance with Section 114.1 and shall result in the issuance of a notice of violation to the site safety director in accordance with Section 114.2. Upon the third offense, the Building Official is authorized to issue a stop work order in accordance with Section 115, and work shall not resume until satisfactory assurances of future compliance have been presented to and approved by the Building Official.~~

2021 International Building Code

~~**3302.3.1 Violations .** Failure to properly conduct, document and maintain documentation required by this section shall constitute an unlawful act in accordance with Section 114.1 and shall result in the issuance of a notice of violation to the site safety director in accordance with Section 114.2. Upon the third offense, the Building Official is authorized to issue a stop work order in accordance with Section 115, and work shall not resume until satisfactory assurances of future compliance have been presented to and approved by the Building Official.~~

Commenter's Reason: It is exceedingly bad practice to put administrative penalties in technical sections of the code. This would create a precedent where any section of the code could have requirements for fines, citations, castigations, public floggings, etc. within the technical content. Note that this requirement also prevents the building official from issuing a stop work order until the 3rd violation, which limits the authority the code official is already granted.

Cost Impact: The net effect of the public comment and code change proposal will not increase or decrease the cost of construction
This pc does not affect construction, but it could save some AHJ $.

Public Comment# 2489

NOTE: G199-21 PART II DID NOT RECEIVE A PUBLIC COMMENT AND IS REPRODUCED FOR INFORMATIONAL PURPOSES ONLY

G199-21 Part II

Proposed Change as Submitted

Proponents: Jeffrey Shapiro, representing Self (jeff.shapiro@intlcodeconsultants.com)

2021 International Fire Code

Revise as follows:

3303.1.1 Components of site safety plans. *Site safety plans* shall include the following as applicable:

1. Name and contact information of site safety director.
2. Documentation of the training of the site safety director and fire watch personnel.
3. Procedures for reporting emergencies.
4. Fire department vehicle access routes.
5. Location of fire protection equipment, including portable fire extinguishers, standpipes, fire department connections and fire hydrants.
6. Smoking and cooking policies, designated areas to be used where *approved*, and signage locations in accordance with Section 3305.8.
7. Location and safety considerations for temporary heating equipment.
8. Hot work permit plan.
9. Plans for control of combustible waste material.
10. Locations and methods for storage and use of *flammable* and *combustible liquids* and other hazardous materials.
11. Provisions for site security and, where required, for a fire watch.
12. Changes that affect this plan.
13. Other site-specific information required by the *fire code official*.

3303.3 Daily fire safety inspection. The site safety director shall be responsible for completion of a daily fire safety inspection at the project site. Each day, all building and outdoor areas shall be inspected to ensure compliance with the inspection list in this section. The results of each inspection shall be documented and maintained on-site until a certificate of occupancy has been issued. Documentation shall be immediately available on-site for presentation to the*fire code official* upon request.

1. Any contractors entering the site to perform hot work each day have been instructed in the hot work safety requirements in Chapter 35, and hot work is performed only in areas *approved* by the site safety director.
2. Temporary heating equipment is maintained away from combustible materials in accordance with the equipment manufacturer's instructions.
3. Combustible debris, rubbish and waste material is removed from the building in areas where work is not being performed.
4. Temporary wiring does not have exposed conductors.
5. *Flammable liquids* and other hazardous materials are stored in locations that have been *approved* by the site safety director when not involved in work that is being performed.
6. Fire apparatus access roads required by Section 3311 are maintained clear of obstructions that reduce the width of the usable roadway to less than 20 feet (6096 mm).
7. Fire hydrants are clearly visible from access roads and are not obstructed.
8. The location of fire department connections to standpipe and in-service sprinkler systems are clearly identifiable from the access road and such connections are not obstructed.
9. Standpipe systems are in service and continuous to the highest work floor, as specified in Section 3313.1.
10. Portable fire extinguishers are available in locations required by Sections 3316 and 3318.3.
11. Where a fire watch is required in accordance with Section 3305.5, fire watch records required by that section are up-to-date.

Reason: Correlation with IFC for provisions for construction site safety that a building inspector can reasonably verify and enforce while onsite

doing other scheduled inspections. Clearly, building inspectors are plenty busy with scheduled inspections, and we are not looking to bog them down with additional work touring the site for safety violations. But, having them verify that required owner/manager site safety inspections are being documented is a minimal step to improving construction site safety. Also, IFC reference is moved to the scope for improved visibility and provisions have been added to clarify that a fire watch, where required, and associated records should be part of the safety play and records inspection.
It is recommended that the new section be scoped to the Fire Code for maintenance.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
Provisions being modified in the IBC are already in the IFC. Changes are for clarity and coordination between the codes.

G199-21 Part II

Public Hearing Results

Committee Action: **As Submitted**

Committee Reason: This proposal was approved based upon the reason statement. It was suggested that perhaps the phrase "up-to-date" could be revised in Section 3303.3. (Vote: 13-0)

G199-21 Part II

G200-21

Proposed Change as Submitted

Proponents: Homer Maiel, PE, CBO, representing ICC Tri-Chapter (Peninsula, East Bay, Monterey Bay) (hmaiel@gmail.com)

THIS CODE CHANGE WILL BE HEARD BY THE MEANS OF EGRESS CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THAT COMMITTEE.

2021 International Building Code

Revise as follows:

3310.1 Stairway required. ~~Where building construction exceeds 40 feet (12 192 mm) in height above the lowest level of fire department vehicle access, a temporary or permanent *stairway* shall be provided~~. As construction progresses, ~~such *stairway* shall be extended to within one~~ all stairways approved per plan shall be extended to the floor of the highest point of construction having secured decking or flooring. A temporary stairway shall be provided and approved for each permitted stairway that is not completed in construction.

2021 International Fire Code

Revise as follows:

[BE] 3312.1 Stairways required. ~~Where building construction exceeds 40 feet (12 192 mm) in height above the lowest level of fire department vehicle access, a temporary or permanent *stairway* shall be provided.~~ As construction progresses, ~~such *stairway* shall be extended to within one~~ all stairways approved per plan shall be extended to the floor of the highest point of construction having secured decking or flooring. A temporary stairway shall be provided and approved for each permitted stairway that is not completed in construction.

2021 International Existing Building Code

Revise as follows:

[BE] 1505.1 Stairways required. ~~Where building construction exceeds 40 feet (12 192 mm) in height above the lowest level of fire department vehicle access, a temporary or permanent stairway shall be provided.~~ As construction progresses, ~~such stairway shall be extended to within one~~ all stairways approved per plan shall be extended to the floor of the highest point of construction having secured decking or flooring. A temporary stairway shall be provided and approved for each permitted stairway that is not completed in construction.

Reason: As many trade workers, building inspectors, superintendent's, engineers all navigate these floors while they are under construction, there are notably many stairways that are not roughed in for use. Many of them remain incomplete until much further into the advanced stages of the project. The Axis Appartment fire that happend in Houston Texas On March 25, 2014 (link is provided here) shows how a construction worker jumps from one balcony to balcony below to save his life. A stairway in this case would have made the rescue much easier.
https://www.khou.com/article/news/investigations/video-shows-new-perspective-of-dramatic-fire-rescue/285-215404218

Stairways are completed to the point where they are useable going up or down, and they are used as staging areas for fire extinguishers and other fire protection equipment. Unfortunately, with changing conditions and just a guardrail at some of these stair shafts, the fire extinguishing equipment is tossed aside with nowhere to be placed while construction is going on. The fire extinguishers need a home while construction is going on, and the landings at each level in the stairwells are their designation per IFC, IBC and OSHA. Per OSHA Safety and Health regulations for Construction, Subpart Fire Protection and Prevention, 1926.150(c)(1)(iv) One or more fire extinguishers, rated not less than 2A, shall be provided on each floor. In multistory buildings, at least one fire extinguisher shall be located adjacent to stairway.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The cost of construction should not be impacted since these stairways have to be built anyway.

G200-21

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The proposal was disapproved for several reasons. The phrase 'approved per plan' is not good code language - perhaps 'approved construction documents.' Are these temporary or permanent stairways. This will be difficult to sequence with having the stairway installers return at each floor. This will increase inspections for coming back for each stair flight. There is no justification for the same number of stairs for fire department and construction access as there is for a fully occupied building. Is this just to steps, or does this also include handrails and guards? What about damage during construction of finish materials? (Vote: 13-0)

Individual Consideration Agenda

Public Comment 1:

IBC: 3310.1; IFC: [BE] 3312.1; IEBC: [BE] 1505.1

Proponents: Homer Maiel, representing ICC Tri-Chapter (Peninsula, East Bay, Monterey Bay) (hmaiel@gmail.com) requests As Modified by Public Comment

Modify as follows:

2021 International Building Code

3310.1 Stairway required . ~~. As construction progresses , all~~ In Type III through Type V construction and buildings of 3 stories or more above grade plane, as construction progresses , all required stairways approved per construction documents, ~~plan~~ shall be extended to the floor of the highest point of construction having secured decking or flooring. ~~A temporary stairway shall be provided and approved for each permitted stairway that is not completed in construction.~~

> **Exception:** When approved by the Building Official, a temporary stairway may be provided for each required stairway which is not being extended during the course of the building floor construction

2021 International Fire Code

[BE] 3312.1 Stairways required. ~~As construction progresses , all~~ In Type III through Type V construction and buildings of 3 stories or more above grade plane, as construction progresses , all required stairways approved per construction documents ~~plan~~ shall be extended to the floor of the highest point of construction having secured decking or flooring~~. A temporary stairway shall be provided and approved for each permitted stairway that is not completed in construction.~~

> **Exception:** When approved by the Building Official, a temporary stairway may be provided for each required stairway which is not being extended during the course of the building floor construction

2021 International Existing Building Code

[BE] 1505.1 Stairways required. ~~As construction progresses , all~~ In Type III through Type V construction and buildings of 3 stories or more above grade plane, as construction progresses , all required stairways approved per construction documents, ~~plan~~ shall be extended to the floor of the highest point of construction having secured decking or flooring. ~~A temporary stairway shall be provided and approved for each permitted stairway that is not completed in construction.~~

> **Exception:** When approved by the Building Official, a temporary stairway may be provided for each required stairway which is not being extended during the course of the building floor construction

Commenter's Reason: In modifying this proposal, all committee concerns were taken into account. Also considering that this issue is more of a problem in combustible construction, Types I and II were excluded.
As many trade workers, building inspectors, superintendent's, engineers all navigate these floors while they are under construction, there are notably many stairways that are not roughed in for use. Many of them remain incomplete until much further into the advanced stages of the project. The Axis Appartment fire that happend in Houston Texas On March 25, 2014 (link is provided here) shows how a construction worker jumps from one balcony to balcony below to save his life. A stairway in this case would have made the rescue much easier.
https://www.khou.com/article/news/investigations/video-shows-new-perspective-of-dramatic-fire-rescue/285-215404218

Stairways are completed to the point where they are useable going up or down, and they are used as staging areas for fire extinguishers and other fire protection equipment. Unfortunately, with changing conditions and just a guardrail at some of these stair shafts, the fire extinguishing equipment is tossed aside with nowhere to be placed while construction is going on. The fire extinguishers need a home while construction is going on, and the landings at each level in the stairwells are their designation per IFC, IBC and OSHA. Per OSHA Safety and Health regulations for Construction, Subpart Fire Protection and Prevention, 1926.150(c)(1)(iv) One or more fire extinguishers, rated not less than 2A, shall be provided on each floor. In multistory buildings, at least one fire extinguisher shall be located adjacent to stairway.

Cost Impact: The net effect of the public comment and code change proposal will decrease the cost of construction
The increase cost maybe offset by reduced rental cost of temporary stairs.

G201-21

Proposed Change as Submitted

Proponents: Mike Nugent, Chair, representing ICC Building Code Action Committee (bcac@iccsafe.org)

2021 International Building Code

Add new text as follows:

APPENDIX Q
TEMPORARY STRUCTURES AND USES TO SERVE EMERGENCIES

Q101
GENERAL

Q101.1 Scope.
The provisions of this appendix shall apply to the use, construction, installation, alteration, relocation and location of emergency need based temporary structures and any service utilities or systems that serve such temporary structures.

Q101.1.1 Objectives.
The objective of this Appendix is intended to provide flexibility to permit the use of innovative approaches and techniques to establish temporary structures and uses in a timely fashion while encountering unusual circumstances and maintain the level of safety intended by the code.

Q101.1.2 Temporary use.
Temporary use during emergencies may exceed 180 days. Judgement shall be used by the code official to allow for temporary uses and conditions to continue for the duration of the emergency based on the needs of the emergency. The building official is authorized to grant extensions for demonstrated cause.

Q102
DEFINITIONS

Q102.1 Definitions.
The following words and terms shall, for the purposes of this appendix, have the meanings shown herein. Refer to Chapter 2 of this code for general definitions.

Add new definition as follows:

EMERGENCY. .
Any event declared by local, state, or federal entities that temporarily overwhelms response capabilities, and may require the suspension or modification of regulations, codes, or standards to facilitate response to such an event.

TEMPORARY STRUCTURES. .
That which is built, constructed or erected for a period of less than 180 days.

TEMPORARY USE.
An activity or practice that is established at designated location for a period of less than 180 days. Uses include, but are not limited to, those functional designations listed within the occupancy group descriptions in Section 302.1 of this code.

Add new text as follows:

Q103
SUBMITTAL DOCUMENTS

Q103.1 General.
Submittal documents shall be of sufficient clarity to indicate the location, nature and extent of the work or use proposed and show in detail that it will conform to the provisions of this code and relevant laws, ordinances, rules and regulations, as determined by the code official.

Q104
CONFORMANCE

Q104.1 Conformance.
Temporary structures and uses shall conform to the structural strength, fire safety, means of egress, accessibility, light, ventilation and sanitary requirements of this section as necessary to provide a reasonable level of safety, health and general welfare.

Q104.2 Changes over time.
As an emergency evolves, and more resources become available, plans should be made to bring structures and temporary uses in line with the main body of the code.

Q105
PERMITS

Q105.1 Required permits.
Temporary structures other than tents and other membrane structures that occupy an area greater than 120 square feet (11.16 m^2), shall not be erected, operated or maintained for any purpose without obtaining a permit from the code official. Tents and membrane structures should be permitted in accordance with the International Fire Code.

Q106
GENERAL STANDARDS FOR EMERGENCY STRUCTURES

Q106.1 Scope.
The provisions of Sections Q106.2 through Q106.7 shall apply to all structures constructed, erected or relocated during emergencies.

Q106.2 Intent.
The intent of this section is to provide a base level of safety in a structure built or repurposed for emergency use.

Q106.3 Change of occupancy.
Existing buildings used in a way that was not originally intended by occupancy class or use shall be allowed without formally changing the occupancy class. The previous occupancy class shall be restored upon the conclusion of the emergency.

Q106.4 Fire Safety Provisions.
Determine fire safety requirements in accordance with Section Q106.4.1 through Q106.4.5 in order to make determinations of safe conditions rather than strict adherence to the provisions of International Fire Code.

Q106.4.1 Fire safety and evacuation plans.
Fire Safety and evacuation plans shall be provided in accordance with Section 403 and 404 of the International Fire Code. Plans should be updated where there are any physical changes to the layout of the structure.

Q106.4.2 Training and practice drills.
Training of staff and practice drills shall comply with Section 405 and 406 of the International Fire Code. Structures in place for longer than 30 days shall conduct evacuation drill in accordance with Section 405.3 of the International Fire Code based on the temporary use.

Q106.4.3 Fire Protection.
An evaluation shall be performed to decide on fire protection needed utilizing NFPA 550.

Q106.4.4 Emergency Access.
Emergency vehicle access roads shall be approved by the fire code official.

Q106.4.5 Fire Watch.
A fire watch in accordance with Section 403.11.1 of the International Fire Code shall be permitted to be provided in lieu of other fire protection system.

Q106.5 Means of Egress.
Means of Egress shall comply with Sections 1004, 1005, 1006, 1007, 1008 and 1010 of the International Building Code in addition to Sections Q106.5.1 through Q106.5.3.

Q106.5.1 Exit Discharge.
Exits shall provide access to a public way, or to a safe dispersal area in accordance with 1028.5.

Q106.5.2 Means of Egress Lighting.
The means of egress shall be illuminated when the space is occupied.

Exception: Sleeping areas.

Q106.5.3 Exit Signs.
Exit signs shall be provided where the means of egress is not readily identifiable. Exit signs shall be permitted to be illuminated by the lighting provided in the structure.

Q106.6 Accessibility.
A facility that is constructed to be accessible shall be maintained accessible during occupancy.

Q106.7 Temporary connection.

The code official shall have the authority to authorize the temporary connection of the building or system to the utility, the source of energy, fuel, or power, or the water system or sewer system in accordance with Section 112. Water closets and lavatories shall be either permanent plumbing fixtures installed within the structure, or temporary water closets or lavatories, such as chemical toilets or other means approved by the code official.

Q106.7.1 Portable heating and cooling equipment.
Portable heating and cooling equipment shall be used in accordance with their listing, and manufacturer's instructions.

Q107
Use Specific Standards

Q107.1 Increased occupant load.
Temporary waivers for allowing for additional occupants in existing building shall comply with Section Q107.1.1 through Q107.1.3.

Q107.1.1 Authorization.
The code official is authorized to allow for an increase in the number of occupants or a change of use in a building or portion of a building during an emergency.

Q107.1.2 Maintenance of the means of egress.
The existing a means of egress shall be maintained.

Q107.1.3 Sleeping areas.
Where a space is used for sleeping purposes, the space shall be equipped with smoke alarms in accordance with Section 907.2.11 or be provided with a fire watch in accordance with Section 403.11.1 of the International Fire Code. Carbon monoxide detectors shall be installed in accordance with Section 915 where the structure uses any fossil fuel or wood burning appliances.

Q107.2 Temporary healthcare facilities. . Temporary health care facilities shall comply with Section Q107.2.1 and Q107.2.2.

Q107.2.1 General. Temporary health care facilities shall be erected, maintained and operated to minimize the possibility of a fire emergency requiring the evacuation of occupants.

Q107.2.2 Membrane structures under projections. . Membrane structures of less than 100 square fe et (9.3 m^2) may be placed under projections of a permanent building provided the permanent building is protected with an automatic sprinkler system installed in accordance with Section 903.3.1.1.

Q107.3 Use of tiny houses or manufactured housing. . Tiny houses or manufactured housing used for temporary housing shall comply with Section Q107.3.1 through Q107.3.5.

Q107.3.1 Fire separation distances. Tiny houses or manufactured housing shall be separated by not less than 5 feet (1524 mm) between structures.

Q107.3.2 Fire breaks. Tiny houses and manufactured housing shall not be located in groups of more than 20 units. Fire breaks of at least 20 feet (6096 mm) shall be provided between each group.

Q107.3.3 Smoke alarms. Tiny houses and manufactured housing used for sleeping purposes shall be equipped with a smoke alarm complying with Section 907.2.11. Smoke detectors are not required to be hard wired.

Q107.3.4 Carbon monoxide detectors. Carbon monoxide detectors shall be installed in accordance with Section 915, where the tiny house or manufactured housing uses any fossil fuel or wood burning appliances.

Q107.3.5 Structures located in a wildland urban interface zone. Tiny houses and manufactured housing that are located in a wildland urban interface area shall be provided with defensible space in accordance with the Section 603 of the International Wildland Urban Interface Code.

Q107.4 Tents and membrane structures used as sleeping accommodations. Tents or membrane structures used as sleeping accommodations shall comply with the same requirements as tiny homes in Section Q107.3.1 through Q107.3.5 and Chapter 31 of the International Fire Code.

Q107.5 Temporary emergency shelters during/after a natural disaster – wildfire, tornado, flood. . Where emergency shelters are planned, the process of organizing, planning, implementing, and evaluating a program for mass evacuation, sheltering, and re-entry shall comply withNFPA 1660.

SECTIONQ108
REFERENCED STANDARDS

Q108.1 General. SeeTable Q108.1for standards that are referenced in various sections of this appendix.Standards are listed by the standard identification with the effective date, standard title, and the section or sections of this appendix referenced in the standard.

Add new text as follows:

TABLE Q108.1 REFERENCED STANDARDS

STANDARD ACRONYM	STANDARD NAME	SECTIONS HEREIN REFERENCED
NFPA 550-2017	Guide to the Fire Safety Concepts Tree	Q106.5.3
NFPA 1660 - 2022	Standard on Community Risk Assessment, Pre-Incident Planning, Mass Evacuation, Sheltering, and Re-entry Programs.	Q107.5

Reason: The purpose of the proposed Appendix is to provide regulatory options to users based on trends that don't fit squarely in the IBC. Code users are facing diverse challenges never encountered before. Examples include setting up medical facilities in gymnasiums, or in tents in a park or parking lot. With the wildfires in the Western United States, emergency temporary housing is needed for displaced residents, as well as First Responders from other areas who are providing assistance. The Appendix format allows for Jurisdictional adoption with or without amendments, creating solutions for these types of uses, providing the AHJ with wide flexibility while ensuring public health, safety and general welfare for the end users
There will be related proposals submitted in group B.

This proposal is submitted by the ICC Building Code Action Committee (BCAC). BCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2020 the BCAC has held several virtual meetings open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the BCAC website at BCAC.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
These options mirror established ICC codes sections and standards.

Staff Analysis: A review of the standard proposed for inclusion in the code, NFPA 550-2017 and NFPA 1660-2022, with regard to the ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before March 20, 2021.

G201-21

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The proposal was disapproved as the proposal has a lack of enforceable language. The proposal does not provide full guidance in an emergency. With extensive work, the topic has potential. (Vote: 9-5)

G201-21

Individual Consideration Agenda

Public Comment 1:

IBC: (New), APPENDIX Q, Q101, Q101.1, Q101.1.1, Q101.1.2, Q102 , Q102.1, , Q103, Q103.1, Q104, Q104.1, Q104.2, Q105 , Q105.1, Q106, Q106.1, Q106.2, Q106.3, Q106.4, Q106.4.1, Q106.4.2, Q106.4.3, Q106.4.4, Q106.4.5, Q106.5 , Q106.5.1 , Q106.5.2, Q106.5.3 , Q106.6, Q106.7, Q106.7.1, Q107 , Q107.1, Q107.1.1, Q107.1.2, Q107.1.3, Q107.2, Q107.2.1, Q107.2.2, Q107.3, Q107.3.1, Q107.3.2, Q107.3.3, Q107.3.4, Q107.3.5, Q107.4, Q107.5, SECTIONQ108, Q108.1, TABLE Q108.1

Proponents: Mike Nugent, representing ICC Building Code Action Committee (bcac@iccsafe.org) requests As Modified by Public Comment

Modify as follows:

2021 International Building Code

User notes: . · **About this appendix:** The primary purpose for Appendix Q is to provide guidance for designers, engineers, architects, fire and building code officials, plans reviewers and inspectors to establish temporary emergency uses of existing building or temporary structures with respect to contemporary code minimums. The intent of this appendix is to not become code language. Rather, it should serve as that template or checklist for use during a time of urgency. A template to assure a path forward that references the relevant code concerns.

APPENDIX Q
TEMPORARY EMERGENCY STRUCTURES AND EMERGENCY USES ~~TO SERVE EMERGENCIES~~

Q101
GENERAL

Q101.1 Scope . The provisions of this appendix shall apply to the use, construction, installation, alteration, relocation and location of emergency need based temporary structures and any service utilities or systems that serve such temporary structures.

Q101.1.1 Objectives . The objective of this Appendix is intended to provide flexibility to permit the use of innovative approaches and techniques to establish temporary structures and uses in a timely fashion while encountering unusual circumstances and maintain the level of safety intended by the code.

Q101.1.2 Temporary use . Where temporary ~~Temporary~~ use during emergencies ~~may~~ exceed 180 days , judgement ~~Judgement~~ shall be used by the code official to allow for temporary uses and conditions to continue for the duration of the emergency based on the needs of the emergency. The building official is authorized to grant extensions for demonstrated cause.

Q102
DEFINITIONS

Q102.1 Definitions . The following words and terms shall, for the purposes of this appendix, have the meanings shown herein. Refer to Chapter 2 of this code for general definitions.

EMERGENCY . Any event declared by local, state, or federal entities that temporarily overwhelms response capabilities, and ~~may~~ that require the suspension or modification of regulations, codes, or standards to facilitate response to such an event.

TEMPORARY STRUCTURES . That which is built, constructed or erected for a period of less than 180 days.

TEMPORARY USE . An activity or practice that is established at designated location for a period of less than 180 days. Uses include, but are not limited to, those functional designations listed within the occupancy group descriptions in Section 302.1 of this code.

Q103
SUBMITTAL DOCUMENTS

Q103.1 General . Submittal documents shall be of sufficient clarity to indicate the location, nature and extent of the work or use proposed and show in detail that it will conform to the provisions of this code and relevant laws, ordinances, rules and regulations, as determined by the code official.

Q104
CONFORMANCE

Q104.1 Conformance . Temporary use of existing buildings and temporary structures ~~and uses~~ shall conform to the structural strength, fire safety, means of egress, accessibility, light, ventilation and sanitary requirements of this ~~section~~ code as necessary to provide a reasonable level of safety, health and general welfare. Tents and other membrane structures shall comply with Section 3102 and 3103.

Q104.2 Changes over time . As an emergency evolves, ~~and more resources become available,~~ plans should be made to bring ~~structures and~~ temporary uses in ~~line~~ compliance with the ~~main body~~ requirements of the code.

Q105
PERMITS

Q105.1 Required permits . Temporary structures other than tents and other membrane structures that occupy an area greater than 120 square feet (11.16 m^2), shall not be erected, operated or maintained for any purpose without obtaining a permit from the code official. Tents and membrane structures should be permitted in accordance with the International Fire Code.

Q106
GENERAL STANDARDS FOR EMERGENCY STRUCTURES

Q106.1 Scope . The provisions of Sections Q106.2 through Q106.7 shall apply to all existing structure being repurposed or temporary structures constructed, erected or relocated ~~during~~ to support needs for a response to emergencies.

Q106.2 Intent . The intent of this section is to provide a base level of safety in a structure built or repurposed for emergency use.

Q106.3 Change of occupancy . Existing buildings used in a way that was not originally intended by occupancy class or use shall be allowed without formally changing the occupancy class. The previous occupancy class shall be restored upon the conclusion of the emergency. Where the temporary live load of the floor is more than that required by Section 1607 for the original use, the area designated for the temporary live load shall be posted with placards for the approved live load.

Q106.4 Fire Safety Provisions . Determine fire safety requirements in accordance with Section Q106.4.1 through Q106.4.5 in order to make determinations of safe conditions rather than strict adherence to the provisions of International Fire Code.

Q106.4.1 Fire safety and evacuation plans . Fire Safety and evacuation plans shall be provided in accordance with Section 403 and 404 of the International Fire Code. Plans should be updated where there are any physical changes to the layout of the structure.

Q106.4.2 Training and practice drills . Training of staff and practice drills shall comply with Section 405 and 406 of the International Fire Code. Structures in place for longer than 30 days shall conduct evacuation drill in accordance with Section 405.3 of the International Fire Code based on the temporary use.

Q106.4.3 Fire Protection . An evaluation shall be performed to decide on fire protection needed utilizing NFPA 550.

Q106.4.4 Emergency Access . Emergency vehicle access roads shall be approved by the fire code official.

Q106.4.5 Fire Watch . A fire watch in accordance with Section 403.11.1 of the International Fire Code shall be permitted to be provided in lieu of other fire protection system.

Q106.5 Means of Egress . Means of Egress shall comply with Sections 1004, 1005, 1006, 1007, 1008 and 1010 of the International Building Code in addition to Sections Q106.5.1 through Q106.5.3.

Q106.5.1 Exit Discharge . Exits shall provide access to a public way, or to a safe dispersal area in accordance with 1028.5.

Q106.5.2 Means of Egress Lighting . The means of egress shall be illuminated when the space is occupied.

Exception: Sleeping areas.

Q106.5.3 Exit Signs . Exit signs shall be provided where the means of egress is not readily identifiable. Exit signs shall be permitted to be illuminated by the lighting provided in the structure.

Q106.6 Accessibility . A facility that is constructed to be accessible shall be maintained accessible during occupancy.

Q106.7 Temporary connection . The code official shall have the authority to authorize the temporary connection of the building or system to the utility, the source of energy, fuel, or power, or the water system or sewer system in accordance with Section 112. Water closets and lavatories shall be either permanent plumbing fixtures installed within the structure, or temporary water closets or lavatories, such as chemical toilets or other means approved by the code official.

Q106.7.1 Portable heating and cooling equipment . Portable heating and cooling equipment shall be used in accordance with their listing, and manufacturer's instructions.

Q107
Use Specific Standards

Q107.1 Increased occupant load . ~~Temporary waivers for allowing~~ Allowing for additional occupants in existing building shall comply with Section Q107.1.1 through Q107.1.3.

Q107.1.1 Authorization . The code official is authorized to allow for an increase in the number of occupants or a change of use in a building or portion of a building during an emergency.

Q107.1.2 Maintenance of the means of egress . The existing a means of egress shall be maintained.

Q107.1.3 Sleeping areas . Where a space is used for sleeping purposes, the space shall be equipped with smoke alarms in accordance with Section 907.2.11 or be provided with a fire watch in accordance with Section 403.11.1 of the International Fire Code. Carbon monoxide detectors shall be installed in accordance with Section 915 where the structure uses any fossil fuel or wood burning appliances.

Q107.2 Temporary healthcare facilities . Temporary health care facilities shall comply with Section Q107.2.1 and Q107.2.2.

Q107.2.1 General . Temporary health care facilities shall be erected, maintained and operated to minimize the possibility of a fire emergency requiring the evacuation of occupants.

Q107.2.2 Membrane structures under projections . Membrane structures of less than 100 square feet (9.3 m^2)~~may~~ shall be permitted to be placed under projections of a permanent building provided the permanent building is protected with an automatic sprinkler system installed in accordance with Section 903.3.1.1.

Q107.3 Use of tiny houses or manufactured ~~housing~~ homes . Tiny houses or manufactured ~~housing~~ homes used for temporary housing shall comply with Section Q107.3.1 through Q107.3.5.

Q107.3.1 Fire separation distances . Tiny houses or manufactured ~~housing~~ homes shall be separated by not less than 5 feet (1524 mm) betweenstructures.

Q107.3.2 Fire breaks . Tiny houses and manufactured ~~housing~~ homes shall not be located in groups of more than 20 units. Fire breaks of at least 20 feet (6096 mm) shall be provided between each group.

Q107.3.3 Smoke alarms . Tiny houses and manufactured ~~housing~~ homes used for sleeping purposes shall be equipped with a smoke alarm complying with Section 907.2.11. Smoke detectors are not required to be hard wired.

Q107.3.4 Carbon monoxide detectors . Carbon monoxide detectors shall be installed in accordance with Section 915, where the tiny house or manufactured ~~housing~~ homes uses any fossil fuel or wood burning appliances.

Q107.3.5 Structures located in a wildland urban interface zone . Tiny houses and manufactured ~~housing~~ homes that arelocated in a wildland urban interface area shall be provided with defensible space in accordance with the Section 603 of the International Wildland Urban Interface Code.

Q107.4 Tents and membrane structures used as sleeping accommodations . Tents or membrane structures used as sleeping accommodations shall comply with the same requirements as tiny ~~homes~~ houses in Section Q107.3.1 through Q107.3.5 and Chapter 31 of the International Fire Code.

~~**Q107.5 Temporary emergency shelters during/after a natural disaster – wildfire, tornado, flood.**~~ **.** ~~Where emergency shelters are planned, the process of organizing, planning, implementing, and evaluating a program for mass evacuation, sheltering, and re-entry shall comply withNFPA 1660.~~

SECTIONQ108
REFERENCED STANDARDS

Q108.1 General . SeeTable Q108.1for standards that are referenced in various sections of this appendix.Standards are listed by the standard identification with the effective date, standard title, and the section or sections of this appendix referenced in the standard.

TABLE Q108.1 REFERENCED STANDARDS

STANDARD ACRONYM	STANDARD NAME	SECTIONS HEREIN REFERENCED
NFPA 550-2017	Guide to the Fire Safety Concepts Tree	Q106.5.3
~~NFPA 1660 - 2022~~	~~Standard on Community Risk Assessment, Pre-Incident Planning, Mass Evacuation, Sheltering, and Re-entry Programs.~~	~~Q107.5~~

Commenter's Reason: The intent of this appendix is to provide guidance when there are emergencies that exceed the emergencies that the community has planned for. Response must be immediate, so there is not time for the typical plan review and inspection. Existing buildings will be used for occupancies other than they were intended, and temporary structures may need to be erected or brought in to address immediate needs. Recent examples were the housing needs due to mass evacuations during the west coast fires and how hard Covid hit many community health care systems.
The user note for this Appendix emphasizes that this is a guidance document for emergencies that exceed pre-planned emergency responses. The code officials are the people with the experience and knowledge base to identify what can be done and still maintain public health and safety. This idea is emphasized in Section Q101.1.2 and the definition of emergency for this appendix, as well as the modification to the title.

The following revisions were incorporated based on the input received during the hearing:

· The user note states this is a guidance appendix. The idea is used in IFC appendix E and G.

· The title was modified for clarity.

· Q101.1.2 – better code language

· Definition for emergency – better code language

· Q104.1 was modified to mirror Section 3103.1. This is already permitted by the code. Q104.1 has an added sentence clarify that tents and other membrane structures are required to comply with Section 3102 and 3103. These sections also incorporate Chapter 16.

· Q104.2 – re-evaluation is not always dependent on additional resources – it could be people being able to return or moving to family.

· Q106.1 – This change clarifies that this appendix is applicable to what is happening due to the emergency – not other construction that happens to be occurring at the same time that is not related.

· Q106.3 – this modification allows for temporary uses with heavier loading – such as storage of emergency supplies in an office building – where the safe limits are addressed. The change to Q104.1 and Q106.3 are to address concerns raised by structural engineers about loads.

· Q107.1 – the modification removed 'temporary waives for'. The criteria was not related to waivers.

· Q107.2.2 – better code language

· Q107.3 – use defined term for manufactured homes.

· Q107.4 – change 'tiny homes' to 'tiny houses' for consistent terminology

· Q107.5 and NFPA 1660 have been removed as they apply to previously anticipated emergencies. This appendix will only address where these plans are exceeded.

Cost Impact: The net effect of the public comment and code change proposal will not increase or decrease the cost of construction
These options mirror established ICC codes sections and standards.

Public Comment# 2657

G202-21

Proposed Change as Submitted

Proponents: Jonathan Roberts, representing UL LLC (jonathan.roberts@ul.com)

2021 International Building Code

Add new text as follows:

APPENDIX P
3D PRINTED BUILDING CONSTRUCTION

SECTION P101
GENERAL

P101.1 Scope.
Buildings, structures and building elements fabricated in whole or in part using 3D printed construction techniques shall be designed, constructed and inspected in accordance with the provisions contained in this Appendix and other applicable requirements in this code.

Exception: Where approved, 3D printed buildings, structures and building elements are permitted to be evaluated in accordance with engineering practices judged equivalent to the design, construction, inspection and integrity of construction requirements in this Appendix in accordance with Section 104.11.

SECTION P102
DEFINITIONS

P102.1 Definitions.
The following words and terms shall, for the purposes of this Appendix, have the meanings shown herein. Refer to Chapter 2 of this code for general definitions.

Add new definition as follows:

3D PRINTED BUILDING CONSTRUCTION.
A process for fabricating buildings, structures and building elements from 3D model data using automated equipment that deposits construction material in a layer upon layer fashion.

ADDITIVE MANUFACTURING MATERIALS.
Materials used by the 3D printer to produce the building structure or system components of the building.

FABRICATION PROCESS.
Preparation of the job site and construction material, and the deposition, curing, finishing, insertion of components and other methods used to construct building elements such as walls, partitions, roof assemblies and structural components, and the means used to connect assemblies together.

PRODUCTION EQUIPMENT.
The equipment, including 3D printer, its settings, nozzles and other accessories used in the fabrication process.

REPORT OF FINDINGS.
A report issued by an approved agency that provides a technical basis for accepting prefabricated or 3D printed building assemblies. It describes the building assembly construction covered, and provides a summary of the test results, ratings, material properties, and/or material performance characteristics established by evaluation or test.

Add new text as follows:

SECTION P103
BUILDING DESIGN

P103.1 Design.
3D printed buildings, structures and building elements shall be designed by an organization certified in accordance with UL 3401 by an approved agency and approved by the *building official*

P103.2 Design approval.
The structural design, construction documents, and UL 3401 *report of findings* shall be submitted for review and approval in accordance with

Section 104.11.

SECTION P104
BUILDING CONSTRUCTION

P104.1 Construction.
3D printed buildings, structures, and building elements shall be constructed in accordance with Sections P104.2 through P104.4.

P104.2 Construction method.
The building construction method, consisting of the manufacturer's *production equipment* and fabrication process shall be in accordance with the UL 3401 *report of findings* . The unique identifier of the construction method used shall match the identifier in the UL 3401 *report of findings* .

P104.3 Additive manufacturing materials.
Only the listed *additive manufacturing materials* identified in the UL 3401 *report of findings* shall be used to fabricate the building structure. Containers of the *additive manufacturing materials* shall be labeled.

P104.4 Depositing of manufacturing materials.
Manufacturing materials shall only be deposited where ambient temperature and environmental conditions at the job site are within limits specified in the UL 3401 *report of findings* . The maximum number of layers permitted, specified curing time and any surface preparation of finishing shall be performed as specified in the UL 3401 *report of findings* .

SECTION P105
SPECIAL INSPECTIONS

P105.1 Initial inspection. .
An initial inspection of the *production equipment* , including the 3D printer, and the fabrication process shall be performed after the *production equipment* is located onsite and before building fabrication has begun. The inspection shall be conducted by the representatives of the approved agency that evaluated the fabrication process for compliance with UL 3401. The inspection shall verify that the fabrications process, including *production equipment* , 3D printing parameters and *additive manufacturing materials* are in accordance with the UL 3401 *report of findings*, and the proprietary information in the UL 3401 detailed *report of findings* .

> **Exception:**
> Where approved by the building official, inspection of the *production equipment* , including 3D printer, and the fabrication process used in replicable buildings shall be permitted to be conducted on the first building to be constructed, and on a selected number of subsequent buildings, where the same equipment, equipment operators and fabrication process are used on all buildings. The number of inspections to be performed shall be determined by the building official.

SECTION P106
REFRENCED STANDARDS

P106.1 General.
See Table P106.1 for standards that are referenced in various sections of this appendix. Standards are listed by the standard identification with the effective date, the standard title and the section or sections of this appendix that reference the standard.

P106.1 REFERENCED STANDARDS

STANDARD ACRONYM	STANDARD NAME	SECTIONS HEREIN REFERENCED
UL 3401-19	Outline of Investigation for 3D Printed Building Construction	P103.2, P104.2, P104.3, P104.4, P105.1

Reason: 3D building construction has moved from a conceptual stage to reality, and projects are being proposed in an increasing number of jurisdictions. Unfortunately the prescriptive design and construction requirements in the IBC are not applicable to 3D printed fabrication techniques, so code officials have to approve this construction based on limited equivalency evaluations that may not take into account variations in material properties introduced by the 3D printing process, or variances in the physical characteristics of the construction materials used.
This proposal introduces an Appendix P, which is not mandatory unless specifically referenced in an adopting ordinance. The Appendix includes definitions, and requirements for 3D printed building design, construction and special inspections, which rely on the design being evaluated in advance by an approved agency for compliance with UL 3401. The resulting report of findings includes the information needed by the contractor and code official to verify compliance with applicable code requirements, and to verify that the 3D printing process and materials used on site are the same as those used during the UL 3401 evaluation and testing. The special inspection requirements are necessary because the portions of the fabrication process such as 3D printer settings, deposition rates and thickness, and curing processes, require special expertise to evaluate, especially when they include proprietary formulations, equipment and settings.

The exception to Section P101 recognizes there may be other published standards that evaluate 3D printed building construction, although we are not aware of any such standard for 3D printed building construction that is as comprehensive as UL 3401.

A similar Appendix was added to the 2021 International Residential Code. At present one company has received coverage for UL 3401 certification, and several others are in process.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The proposal covers a construction technique that is not currently addressed in the code.

Staff Analysis: A review of the standard proposed for inclusion in the code, UL 3401-19, with regard to the ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before April 2, 2021.

G202-21

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The proposal was disapproved as the proposed Appendix, on 3D printed building construction, is incomplete and lacking clarity on materials. (Vote: 13-0)

G202-21

Individual Consideration Agenda

Public Comment 1:

IBC: P101.1, P101.2 (New), P103.1,

Proponents: Jonathan Roberts, representing UL LLC (jonathan.roberts@ul.com) requests As Modified by Public Comment

Modify as follows:

2021 International Building Code

P101.1 Scope . Buildings, structures and building elements fabricated in whole or in part using 3D printed construction techniques shall be designed, constructed and inspected in accordance with the provisions contained in this Appendix and other applicable requirements in this code.

> ~~**Exception:** Where approved, 3D printed buildings, structures and building elements are permitted to be evaluated in accordance with engineering practices judged equivalent to the design, construction, inspection and integrity of construction requirements in this Appendix in accordance with Section 104.11.~~

P101.2 Alternative materials, design and methods of construction . The provisions of this Appendix are not intended to prevent the installation of any additive manufacturing material or to prohibit any design or method of 3D construction not covered in this Appendix, provided that any such alternative has been *approved* in accordance with Section 104.11 of this code.

P103.1 Design . 3D printed buildings, structures and building elements shall be designed by a registered design professional and constructed by an organization certified in accordance with UL 3401 by an approved agency and approved by the *building official*

REPORT OF FINDINGS . A report issued by an approved agency that provides a technical basis for accepting ~~prefabricated or~~ 3D printed building assemblies. It describes the building assembly construction covered, and provides a summary of the test results, ratings, material properties, and/or material performance characteristics established by evaluation or test.

Commenter's Reason: This public comments addresses concerns raised at the committee action hearings including the following:

1. A new Section P101.2 has been added that recognizes there may be alternative designs and other published standards that evaluate 3D printed building construction, although we are not aware of any such standard for 3D printed building construction that is as comprehensive as UL 3401. If someone chooses to use an acceptance criteria or a future standard for 3D printed building construction, this can certainly be accepted.
2. Concern was raised about the reference to prefabricated construction, which was removed.
3. Additionally, a revision was made to Section P103.1 regarding the need for the structural design of 3D printed building construction to be performed by a registered design professional.
4. Concern was expressed about how UL 3401 can be used to evaluate cementitious based 3D printed construction. It was pointed out that considerable time and effort is needed to develop these requirements. Comments on this concern are as follows:
    1. UL 3401 includes references to a number of material property tests that are referenced in ACI 318, including tests for compressive strength, slump, flexural bond strength freeze/thaw and others. These requirements are very similar to those included in AC 509.
    2. In addition to the material property tests, UL 3401 includes an evaluation of the 3D printing process, equipment, and environmental conditions to verify that the overall fabrication process produces building elements with consistent properties. Variation in printing parameters can have a significant impact on material performance and durability.
    3. Testimony was provided that it is going to take considerable time to develop an effective way to test and evaluate 3D printed concrete construction. We assume this referred to an ACI committee that is exploring 3-D Printing with Cementitious Materials. We applaud this effort, and feel that that their findings will correlate well with the overall UL 3401 evaluation process when it is finalized.

Make no mistake, 3D printed building construction is here now and is growing at a rapid rate. Buildings are being 3D printed around the country, including a housing development that is being produced by a UL 3401 certified company. Guidance on how this innovative construction can be designed and approved is needed now, not in the 2027 IBC. Since the proposal is for an Appendix, jurisdictions may or may not choose to adopt this criteria. However. Waiting until the 2027 codes are published to have any criteria that can be referenced in the Code leaves a huge void.

A similar Appendix was added to the 2021 International Residential Code. At present one company has received coverage for UL 3401 certification, and several others are in process.

Cost Impact: The net effect of the public comment and code change proposal will increase the cost of construction
The proposal covers a construction technique that is not currently addressed in the code.

Public Comment# 2555

G203-21

Proposed Change as Submitted

Proponents: Jane Malone, American Association of Radon Scientists and Technologists, representing American Association of Radon Scientists and Technologists; Thomas Bowles, representing EPA (bowles.thomas@epa.gov); Ruth Mcburney, representing CRCPD (rmcburney@crcpd.org); Jonathan Wilson, National Center for Healthy Housing, representing National Center for Healthy Housing (jwilson@nchh.org); Kevin Stewart, American Lung Association, representing American Lung Association (Kevin.Stewart@Lung.org); Tobie Bernstein, representing Environmental Law Institute (bernstein@eli.org); David Kapturowski, representing Spruce Environmental Technologies, Inc. (dave@spruce.com)

2021 International Building Code

Add new text as follows:

APPENDIX S
SOIL GAS CONTROL

SECTION S101
GENERAL

S101.1 Venting requirements.
Soil gas control systems shall comply with ANSI-AARST CC-1000.

Exception:
Radon control systems in one- and two-family dwellings and townhouse shall comply with Appendix F of the International Residential Code or ANSI-AARST RRNC.

SECTION S102
REFERENCED STANDARDS

S102.1 General.
See Table S102.1 for standards that are referenced in various sections of this appendix. Standards listed by the standard identification with the effective date, standard title, and the section or sections of this appendix that reference the standard.

TABLE S102.1 REFERENCED STANDARDS

STANDARD ACRONYM	STANDARD NAME	SECTIONS HEREIN REFERENCED
ANSI-AARST CC-1000-2018 [a]	Soil Gas Control Systems in New Construction of Buildings	S101.1
ANSI-AARST RRNC-2020 [a]	Rough-In of Radon Control Components In New Construction Of 1 & 2 Family Dwellings And Townhouses	S101.1

a. AARST - American Association of Radon Scientists and Technologists

Add new standard(s) as follows:

AARST

American Association of Radon Scientists and Technologists
527 N Justice Street
Hendersonville, NC 28739
USA

AARST ANSI-AARST CC-1000-2018: Soil Gas Control Systems in New Construction of Buildings

AARST ANSI-AARST RRNC-2020: Rough-In of Radon Control Components In New Construction Of 1 & 2 Family Dwellings And Townhouses

Reason: Several states (Illinois, Maine, Minnesota, Nebraska, New Jersey, Oregon, Rhode Island, Washington) require soil gas control in new buildings that cannot possibly be addressed through Appendix F of the International Residential Codes, such as schools, child day care facilities, and multifamily housing. Even where there are no requirements, builders are including some form of soil gas control in buildings. The IBC lacks any meaningful provision to oversee soil gas control systems in larger buildings.

The proposed new Appendix to the IBC will position the current standard for soil gas control in large buildings available as an enforcement tool for code officials and provide consistency among builders, architects, and developers and across jurisdictions.

Radon is present in indoor air everywhere, regardless of building type or radon zone. Radon-induced lung cancer takes 21,000 lives in the US each year. Chemical vapor is an increasingly documented hazard that also enters buildings from the soil.

It is more efficient and cost-effective to establish soil gas control from the ground up during construction than to retrofit a structure later to seal up the interface between structure and soil and position suction points, ventilation piping and other components.

The exception allows the use of Appendix F of the IRC, or the applicable current consensus standard ANSI-AARST RRNC, to be used for one- and two-family homes.

The standards included in this proposal have been vetted and approved by EPA, multiple regulatory states, and HUD. They are posted for public access at **https://standards.aarst.org/CC-1000-2018/index.html** and **https://standards.aarst.org/RRNC-2020/index.html**
In 2020, an addendum to ASHRAE 189.1 - 2017 was approved to incorporate a requirement for ANSI-AARST CC-1000 to replace the standard's existing soil gas requirement.

Cost Impact: The code change proposal will increase the cost of construction
This proposal does not add a requirement to install a radon control system. The proposal will add incremental cost to construction where radon control systems are installed if the builder is not already following the standard practice.
According to the Home Innovation Research Labs' Radon-Resistant Construction Practices in New U.S. Homes, the average reported per-unit installation cost of an active radon system in a multifamily dwelling in 2018 was $845, lower than $865 in 2017 but higher than $757 in 2016. The same paper indicates that in 2018 the average multifamily dwelling had an average selling price of $229,260. The cost of a system for a nonresidential commercial building will range from $2500 to higher depending on the footprint, volume and type of HVAC system.

Staff Analysis: A review of the standard proposed for inclusion in the code, AARST RRNC-2020 and AARST CC1000-2018, with regard to the ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before March 20, 2021.

G203-21

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The proposal was disapproved. The AARST standard has suggestive language, not enforceable language. There is no specific directions for testing and is not clear for how to comply. The language in the proposed appendix appears to conflict with the International Residential Code. (Vote 14-0)

G203-21

Individual Consideration Agenda

Public Comment 1:

IBC: APPENDIX S, SECTION S101, S101.1 (New), S101.2 (New)

Proponents: Jane Malone, representing American Assocation of Radon Scientists and Technologists; Jonathan Wilson, representing National Center for Healthy Housing (jwilson@nchh.org); Kevin Stewart, representing American Lung Association (kevin.stewart@lung.org); David Kapturowski, representing Spruce Environmental Technologies, Inc. (dave@spruce.com); Thomas Bowles, representing Indoor Environments Division (bowles.thomas@epa.gov); Warren Friedman, representing Office of Lead Hazard Control and Healthy Homes (warren.friedman@hud.gov); Ruth McBurney, representing CRCPD (rmcburney@crcpd.org) requests As Modified by Public Comment

Replace as follows:

2021 International Building Code

APPENDIX S
SOIL GAS CONTROL

SECTION S101
GENERAL

S101.1 Radon level . Occupiable spaces shall have indoor radon level below 4 picocuries per liter (pCi/L).

S101.2 Testing . Radon levels shall be determined by an approved testing method. Radon levels 4 pCi/L or more shall be reduced by an approved mitigation method. A radon test report indicating satisfactory test results shall be provided to the code official.

Commenter's Reason: This comment responds to the Committee's reasons by omitting the applicable ANSI standard and adding general direction to use approved methods for testing and mitigation.
The requirement to deliver a compliant test report to the code official is consistent with IRC Appendix F.

Cost Impact: The net effect of the public comment and code change proposal will increase the cost of construction
This proposal does not add a requirement to install a radon control system. The proposal will add incremental cost to construction where radon control systems are installed if the builder is not already following approved methods.
According to the Home Innovation Research Labs' Radon-Resistant Construction Practices in New U.S. Homes, the average reported per-unit installation cost of an active radon system in a multifamily dwelling in 2018 was $845, lower than $865 in 2017 but higher than $757 in 2016. The same paper indicates that in 2018 the average multifamily dwelling had an average selling price of $229,260. The cost of a system for a nonresidential commercial building will range from $2500 to higher depending on the footprint, volume and type of HVAC system.

Public Comment# 2829

G204-21

Proposed Change as Submitted

Proponents: Thomas Wysocki, Fire Suppression Systems Association, representing Fire Suppression Systems Association, Technical Director (twysocki@gsifire.com)

THIS CODE CHANGE WILL BE HEARD BY THE FIRE CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THAT COMMITTEE.

2021 International Building Code

Add new text as follows:

[F] 403.4.8.1.1 Generator rooms.
Emergency and standby equipment rooms that have a generator set within high-rise buildings as required by Section 2702.2.11, shall be protected with an alternative automatic fire-extinguishing systems in accordance with Section 904.

2021 International Fire Code

Add new text as follows:

914.3.8 Generator rooms.
Emergency and standby equipment rooms that have a generator set within high-rise buildings as required by Section 2702.2.11 of the *International Building Code*, shall be protected with an alternative automatic fire-extinguishing systems in accordance with Section 904.

Reason: History of fires
The February 2013 NFPA research study written by John R. Hall, Jr., titled - Non-Home Structure Fires By Equipment Involved In Ignition, states on page 7 line 224, that there were 333 fires on average per year started in Generators. The direct property damage cost, on average, $58,000,000.00 annually. This data was reported to U.S. Fire Department between 2007-2011 and was sourced from the National Fire Incident Reporting System.

Further information on fires originating in areas related to generators is found in the November 2016 NFPA document written by Marty Ahrens, titled - High-Rise Building Fires. The report states, on page 18, that 2% of all fires in high-rise buildings started in switchgear area or transformer vaults often associated with generators. Additionally, on page 18 machinery room or area or elevator machinery room which, by definition, includes generator rooms were responsible for 9% of all fires. There are other ignition sources mentioned in the report which potentially could also be associated with generators; for example, on page 23 in office high-rise buildings, 15% of fires were ignited via electrical distribution and lighting equipment.

Importance of generators

At almost a fire a day (333 fires on average per year), the damage caused by a generator fire has significant impact considering the critical nature of these generators to provide continued function of elevators, emergency lighting, life support systems, fire pumps, fire alarms, smoke control systems, and other services essential to life safety. Generators are required in many facilities and this proposal is only applicable to those facilities where generators are required.

Costs associated with a fire

Generator fires have a significant cost impact due to the presence of ignitable fuel being pumped under pressure. While the generator itself can cost upwards of several million dollars, loss of generator capability due to fire can result in loss of hundreds of millions of dollars if the facility is not able to function properly or to protect the life safety of occupants.

Solutions

Having an Alternative Automatic Fire-Extinguishing System (AAFES) in place using current technology provides for detection of a fire event at the early stages and rapid discharge of an extinguishing media to extinguish the fire prior to it causing significant damage to the generator itself or the building.

AAFES are shown to be the most effective solution for these unique fire hazards. Examples of AAFES specifically tested and listed for this type of hazard with the applicable listing/testing protocols include:

- Water Mist Systems per Factory Mutual Standard FM 5560
- Hybrid Systems per Factory Mutual Standard FM 5580
- Clean Agent Systems per Underwriters Laboratories Standard UL 2166 or UL 2167.

Additional effective alternatives include dry chemical, carbon dioxide, and foam.

Rapid detection and extinguishment of fire in a generator room by AAFES will allow the generator to get back into fully functional order quickly, minimize down time, business interruption, and protect building occupants.

Generator fires often involve ignition of ignitable liquids such as fuel oil or lubricating oil. Fires in such fuels can produce thick black smoke, severely limiting firefighter visibility. The use of AAFES to extinguish such fires by automatic means eliminates the need to expose firefighters to an extraordinarily high risk environment.

Bibliography: "High Rise Building Fires" Marty Ahrens, November, 2016, NFPA No. USS30 Copyright © 2016, National Fire Protection Association, Quincy, MA
"Non Home Structure Fires by Equipment by Equipment Involved in Ignition" John R. Hall, Jr., February, 2013, NFPA No. USS88 Copyright© 2013, National Fire Protection Association, Quincy, MA

Cost Impact: The code change proposal will increase the cost of construction
Cost estimates for material and labor to install four types of AAFES in a 9,240 cubic foot (40' X 15' X 15.4') generator room were generated. Average labor costs for the Greater New York City area based on prices effective in December 2020 were used in the estimates. The range of the cost estimates is $13,287 to $22,200 with the average estimated cost being $18,906.

Details of the cost estimates for the four systems are available at: https://spaces.hightail.com/space/F0QOHsHdwa

G204-21

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The committee stated that the reason for the disapproval was that there was some confusion and disagreement about the relationship between the current and the proposed requirement to provide protection in these rooms. (Vote: 14-0)

G204-21

Individual Consideration Agenda

Public Comment 1:

IFC: 914.3.8; IBC: [F] 403.4.8.1.1

Proponents: Thomas Wysocki, representing Fire Suppression Systems Association, Technical Director (twysocki@gsifire.com) requests As Modified by Public Comment

Modify as follows:

2021 International Fire Code

914.3.8 Generator rooms . ~~Emergency and standby equipment rooms that have~~ Where a generator set within ~~high-rise buildings as~~ a high-rise building provides the emergency and standby power required by Section 2702.2.11 of the International Building Code, the generator set shall be protected with an ~~alternative automatic fire-extinguishing systems in accordance with Section 904.~~ automatic sprinkler system or an alternative automatic fire extinguishing system.

2021 International Building Code

[F] 403.4.8.1.1 Generator rooms . ~~Emergency and standby equipment rooms that have~~ Where a generator set within ~~high-rise buildings as~~ a high-rise building provides the emergency and standby power required by Section 2702.2.11 of the International Building Code, the generator set shall be protected with an ~~alternative automatic fire-extinguishing systems in accordance with Section 904.~~ automatic sprinkler system or an alternative automatic fire extinguishing system.

Commenter's Reason: During the committee discussion, members of the IFC did not object to the concept of providing automatic fire extinguishing systems for generator sets installed to meet 2702.2.11 in high-rise buildings. *Rather members of the IFC suggested that the proposal needed clarification before it should be permitted to go forward. This Public Comment seeks to provide the desired clarification.*
Clean Copy of Public Comment Text: *Where a generator set within a high-rise building provides the emergency and standby power required by Section 2702.2.11 of the International Building Code, the generator set shall be protected with an automatic sprinkler system or an alternative automatic fire extinguishing system.*

When provisions of the code (IBC and IFC) require a building to be equipped throughout with an automatic sprinkler system, Section 903.3.1.1 gives the installation requirements and *gives an exception permitting* omission of sprinklers in certain rooms, including generator rooms. Thus, a generator set is permitted to be installed with no automatic fire suppression system in a building which is otherwise required to be fully sprinklered. This exception may be applied to all types of generator rooms including those supplying emergency power for life safety functions in high-rise buildings.

This comment seeks to require automatic fire suppression systems specifically to protect emergency generator sets providing the emergency power required by IBC 2702.2.11 for high-rise buildings.

Considering

- the fire history averaging nearly one fire per day in generator rooms as detailed in the substantiation for proposal G-204
- generators frequently provide the emergency power required in high-rise buildings by IBC Section 2702.2.11 for numerous life safety features
- generators may be located on various floors of the high-rise
- the most common fires associated with emergency generator sets are flammable liquid fires (typically diesel oil fires) which expose fire fighters to thick, oily, black smoke and extreme temperatures
- an uncontrolled flammable liquid fire within a high rise building can lead to structural damage and eventual collapse of the building
- fires can cause severe damage to a generator set while awaiting extinguishment by manual means
- loss of generator functionality can leave an entire high-rise building without emergency and standby power for life safety features including emergency lighting, emergency voice/alarm communications, elevators, automatic fire detection systems, fire alarm systems, electrically powered fire pumps, fire command center, emergency ventilation
- automatic sprinklers and alternative automatic fire extinguishing systems are recognized by NFPA Standard 37 for protection of stationary combustion engines and turbines such as those driving generators
- alternative automatic fire extinguishing systems are available at nominal cost (see Cost Impact Statement),

automatic fire protection in the form of either an automatic sprinkler system or an alternative automatic fire extinguishing system should be required for generator sets installed to comply with IBC Section 2702.2.11 in high-rise buildings.

There are alternative automatic fire extinguishing systems listed specifically for protection of generators. Since NFPA 37 recognizes both automatic sprinkler systems and alternative automatic fire extinguishing systems for generator protection, this public comment permits either automatic sprinklers or an alternative automatic fire extinguishing system to be installed to meet this new code requirement. For additional information on the protection of generators, please feel free to contact the Fire Suppression Systems Association (FSSA) at admin@fssa.net.

Bibliography: *High Rise Building Fires*, Marty Aherns, 2016, National Fire Protection Association, Quincy, Massachusetts 02169
Non-Home Structure Fires By Equipment Involved In Ignition, John R. Hall, Jr., February 2013, National Fire Protection Association, Quincy, Massachusetts 02169

Understanding the Hazard: Emergency and Standby Generator Fuel Fires in High-Rise Buildings, FM Global, 2014

NFPA 37 Standard for the Installation and Use of Stationary Combustion Engines and Gas Turbines, 2018 Edition, National Fire Protection

Association, Quincy, Massachusetts 02169

Cost Impact: The net effect of the public comment and code change proposal will increase the cost of construction
Cost estimates for material and labor to install four types of AAFES in a 9,240 cubic foot (40' X 15' X 15.4') generator room were generated. Average labor costs for the Greater New York City area based on prices effective in December 2020 were used in the estimates. The range of the cost estimates for equipment and installation labor is $13,287 to $22,200 with the average estimated cost being $18,906. Details of the cost estimates for the four systems are given at: https://spaces.hightail.com/space/F0QOHsHdwa.

Public Comment# 2357

PC5-21

Proposed Change as Submitted

Proponents: Robert Pekelnicky, Degenkolb Engineers, representing Federal Emergency Management Agency/Applied Technology Council - Seismic Code Support Committee (rpekelnicky@degenkolb.com); Kelly Cobeen, Wiss Janney Elstner Associates, Inc., representing Federal Emergency Management Agency/Applied Technology Council - Seismic Code Support Committee (kcobeen@wje.com); Michael Mahoney, Federal Emergency Management Agency, representing Federal Emergency Management Agency (mike.mahoney@fema.dhs.gov)

THIS PROPOSAL WILL BE HEARD BY THE BUILDING CODE GENERAL COMMITTEE. SEE THE TENTATIVE HEARING ORDER THE IBC-GENERAL COMMITTEE.

2021 International Code Council Performance Code

SECTION 304
MAXIMUM LEVEL OF DAMAGE TO BE TOLERATED

[BG] 304.2.2 Moderate impact. The tolerable impacts of the design loads are assumed as follows:

Revise as follows:

[BG] 304.2.2.3 Occupant hazards. Injuries to building or facility occupants from hazard-related applied loads~~may be locally significant, but generally moderate~~ are minimal in numbers and minor in nature. There is a~~ low likelihood of single life loss with a~~ very low likelihood of single or multiple life loss. The nature of the applied load, such as fire hazards, may result in higher levels of expected injuries and damage in localized areas, whereas the balance of the areas may sustain fewer injuries and less damage.

[BG] 304.2.3 High impact. The tolerable impacts of the design loads are assumed as follows:

Revise as follows:

[BG] 304.2.3.3 Occupant hazards. Injuries to building or facility occupants from hazard-related applied loads~~may be locally significant with a high risk to life, but~~ are ~~generally moderate~~ are minimal in numbers and minor in nature. There is a ~~moderate~~ low likelihood of single life loss, with a very low probability of multiple life loss. The nature of the applied load, such as fire hazards, may result in higher levels of expected injuries and damage in localized areas, whereas the balance of the areas may sustain fewer injuries and less damage.

Reason: The definitions of occupant hazard for the moderate and high damage states do not align with the intended performance of buildings designed to the IBC. The ICCPC should not have explicitly lower performance goals than the IBC; the difference should be in the scope of design considerations and in the acceptable methods of verification, not in the expected performance. The most significant misalignment is in the high impact state currently permitting “moderate” likelihood of a single loss of life. This is in direct conflict with the intention of ASCE 7, the structural design standard referenced in the IBC, for the design earthquake seismic hazard, where the goal is to avoid loss of life even at the large hazard level. The intended performance for other environmental hazards in ASCE 7 is life safety or better in the design event, where the design event is generally the large hazard contemplated by the ICCPC.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This change will not increase the cost of construction because it is simply aligning the provisions of the ICC-PC with the provisions in the standards referenced in Chapter 16 of the IBC.

PC5-21

Public Hearing Results

Committee Action: Disapproved

Committee Reason: This proposal was disapproved for several reasons. The proposal was a significant change to Section 304.2.3.3 for the occupant hazards in high impact. The occupant hazards are more than structural, so this should not be aligned only with ASCE 7. Proximity to the event could make a significant difference in the hazard. The current text aligns with Table 303.3 - high risk is not permitted for many building types. (Vote: 13-1)

PC5-21

Individual Consideration Agenda

Public Comment 1:

ICCPC: [BG] 304.2.2, [BG] 304.2.2.3, [BG] 304.2.3, [BG] 304.2.3.3

Proponents: Robert Pekelnicky, representing Federal Emergency Management Agency/Applied Technology Council - Seismic Code Support Committee (rpekelnicky@degenkolb.com); Michael Mahoney, representing Federal Emergency Management Agency (mike.mahoney@fema.dhs.gov); David Collins, representing The American Institute of Architects (dcollins@preview-group.com) requests As Modified by Public Comment

Replace as follows:

2021 International Code Council Performance Code

[BG] 304.2.2 Moderate impact . The tolerable impacts of the design loads are assumed as follows:

[BG] 304.2.2.3 Occupant hazards . Injuries to building or facility occupants from hazard-related applied loads may be locally significant, but generally moderate in numbers and in nature. There is a low likelihood of single life loss with a very low likelihood of multiple life loss. The nature of the applied load, such as fire hazards, may result in higher levels of expected injuries and damage in localized areas, whereas the balance of the areas may sustain fewer injuries and less damage. <u>When subject to structural loads and combinations of loads listed in Section 501.3.4, there is a very low likelihood of serious injury or loss of life.</u>

[BG] 304.2.3 High impact . The tolerable impacts of the design loads are assumed as follows:

[BG] 304.2.3.3 Occupant hazards . Injuries to building or facility occupants from hazard-related applied loads may be locally significant with a high risk to life, but are generally moderate in numbers and in nature. There is a moderate likelihood of single life loss, with a low probability of multiple life loss. The nature of the applied load, such as fire hazards, may result in higher levels of expected injuries and damage in localized areas, whereas the balance of the areas may sustain fewer injuries and less damage. <u>When subject to structural loads and combinations of loads listed in Section 501.3.4, there is a very low likelihood of serious injury or loss of life.</u>

Commenter's Reason: The proposed revised change clarifies that the changes originally proposed were intended for the structural design loads. The reason for disapproval was because the original proposed change would also have changed the occupant hazard for fire hazards. The revised proposal leaves in place the general discussion of occupant hazard and it's intent for fire hazards and add a specific statement that for structural loads and combinations of structural loads, the occupant hazard should be very low for Moderate and High impact. This aligns with the structural standards definition of life safety in the large hazard, which typical buildings must meet High impact, and thus also providing life safety in the medium hazard, as discussed in the reason statement to PC-5. An important feature of design for earthquake and other environmental hazards is ASCE 7 is protecting individuals from local falling hazards.

Cost Impact: The net effect of the public comment and code change proposal will not increase or decrease the cost of construction
This will not change the cost of construction because it is aligning the ICCPC with one of the performance objective for structural design loads based on the standard referenced in the IBC.

Public Comment# 2722

PC6-21

Proposed Change as Submitted

Proponents: Robert Pekelnicky, Degenkolb Engineers, representing Federal Emergency Management Agency/Applied Technology Council - Seismic Code Support Committee (rpekelnicky@degenkolb.com); Kelly Cobeen, Wiss Janney Elstner Associates, Inc., representing Federal Emergency Management Agency/Applied Technology Council - Seismic Code Support Committee (kcobeen@wje.com); Michael Mahoney, Federal Emergency Management Agency, representing Federal Emergency Management Agency (mike.mahoney@fema.dhs.gov)

THIS PROPOSAL WILL BE HEARD BY THE BUILDING CODE GENERAL COMMITTEE. SEE THE TENTATIVE HEARING ORDER THE IBC-GENERAL COMMITTEE.

2021 International Code Council Performance Code

[BG] 304.2.3 High impact. The tolerable impacts of the design loads are assumed as follows:

Revise as follows:

[BG] 304.2.3.2 Nonstructural systems. Nonstructural systems needed for normal building or facility use are significantly damaged and inoperable; egress routes may be impaired by light debris but means of egress are preserved; emergency systems may be significantly damaged, but remain operational.

Reason: In ICCPC Table 303.3, high impact is the performance level expected of Performance Group II buildings in large events. This objective corresponds to the design of normal occupancy buildings (Risk Category II) in design events using the IBC. Therefore, the performance description should align with the IBC's reference standards and resource documents. Section 1.1 of the 2020 NEHRP Provisions – the document that forms that basis for the seismic provisions in the IBC referenced structural loading standard, ASCE 7 – states that preservation of means of egress is a design intent of the Provisions. Throughout the commentary to Chapter 13 of ASCE 7 there are references to paying special consideration to components whose failure would block means of egress. Therefore, a change is proposed to clarify that while light debris may fall in an egress route, egress out of the building or facility should still be possible.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This change will not increase the cost of construction because it is simply aligning the provisions of the ICC-PC with the intent of the standards referenced Chapter 16 of the IBC.

PC6-21

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: This proposal was disapproved because the proposed language did not clarify the debris obstruction limits as intended. Generally the means of egress is already addressed in the general requirements and this proposal does not address the number of exits (e.g. one or all) or possible accessible means of egress concerns. (Vote: 8-6)

PC6-21

Individual Consideration Agenda

Public Comment 1:

ICCPC: [BG] 304.2.3, [BG] 304.2.3.2

Proponents: Robert Pekelnicky, representing Federal Emergency Management Agency/Applied Technology Council - Seismic Code Support Committee (rpekelnicky@degenkolb.com); Michael Mahoney, representing Federal Emergency Management Agency (mike.mahoney@fema.dhs.gov); David Collins, representing The American Institute of Architects (dcollins@preview-group.com) requests As Modified by Public Comment

Modify as follows:

2021 International Code Council Performance Code

[BG] 304.2.3 High impact . The tolerable impacts of the design loads are assumed as follows:

[BG] 304.2.3.2 Nonstructural systems . Nonstructural systems needed for normal building or facility use are significantly damaged and inoperable; egress routes may be impaired by light debris but ~~means of egress~~ are preserved; emergency systems may be significantly damaged, but remain operational.

Commenter's Reason: This proposal is modified to eliminate the phrase "means of egress" from the original PC-6 proposal, which led to the proposal being disapproved. This update makes clear that the light debris in the egress path is minimal enough that egress is still possible, thus preserving the egress. In ICCPC Table 303.3, high impact is the performance level expected of Performance Group II buildings in large events. This objective corresponds to the design of normal occupancy buildings (Risk Category II) in design events using the IBC. Therefore, the performance description should align with the IBC's reference standards and resource documents. Section 1.1 of the 2020 NEHRP Provisions – the document that forms that basis for the seismic provisions in the IBC referenced structural loading standard, ASCE 7 – states that preservation of means of egress is a design intent of the Provisions. Throughout the commentary to Chapter 13 of ASCE 7 there are references to paying special consideration to components whose failure would block means of egress. Therefore, a change is proposed to clarify that while light debris may fall in an egress route, egress out of the building or facility should still be possible.

Cost Impact: The net effect of the public comment and code change proposal will not increase or decrease the cost of construction
Because this proposal is aligning the performance of a building designed to the ICCPC with the intended performance of a building designed under the IBC, there should not be a change in construction cost.

Public Comment# 2729

E8-21

Proposed Change as Submitted

Proponents: Stephen Thomas, Colorado Code Consulting, a Shums Coda Assoc Company, representing Colorado Chapter ICC (sthomas@coloradocode.net); Timothy Pate, representing Colorado Chapter Code Change Committee (tpate@broomfield.org)

2021 International Building Code

Revise as follows:

TABLE 1004.5 MAXIMUM FLOOR AREA ALLOWANCES PER OCCUPANT

Portions of table not shown remain unchanged.

FUNCTION OF SPACE	OCCUPANT LOAD FACTOR[a]
Business areas	150 gross
<u>Conference Rooms</u>	<u>30 gross</u>
Concentrated business use areas	See Section 1004.8

For SI: 1 foot = 304.8 mm, 1 square foot = 0.0929 m^2.

a. Floor area in square feet per occupant.

Reason: Calculating the occupant load has always been an issue for design professionals and code officials. There is a theory about non-simultaneous use of the space where if employees are in the conference room, they are not in their office. However, the discussion centers around the fact that people from outside the business may be coming into the facility. This proposal addresses this issue by increasing the occupant load factor to the same value as the concentrated business factor. It is very common for conference rooms to have large tables in the middle of the room that takes up floor area that cannot be occupied. By changing the occupant load factor, we can address this issue as well. This proposal will also assist in determining the number of exits or exit access doors from a tenant space and provide a more reasonable approach to tenant space design.

Cost Impact: The code change proposal will decrease the cost of construction
The reduction in the occupant load in conference rooms will potentially reduce the number of exits provided in a tenant space.

E8-21

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: This proposal was disapproved because the committee felt that there should be a maximum size threshold for these conference rooms for when the 15 sq.ft. per person should be applied versus the 30 sq.ft. per person proposed. The collaboration areas in E7-21 and the conference rooms in E8-21 should be addressed together. (Vote: 14-0)

E8-21

Individual Consideration Agenda

Public Comment 1:

IBC: TABLE 1004.5 (IFC:[BE] TABLE 1004.5)

Proponents: Stephen Thomas, representing Colorado Chapter ICC (sthomas@coloradocode.net) requests As Modified by Public Comment

Modify as follows:

2021 International Building Code

TABLE 1004.5 MAXIMUM FLOOR AREA ALLOWANCES PER OCCUPANT

FUNCTION OF SPACE	OCCUPANT LOAD FACTOR[a]
Business areas	150 gross
Conference rooms <u>with an area of 750 square feet or less</u>	30 ~~gross~~ <u>net</u>
<u>Conference rooms with an area of greater than 750 square feet</u>	<u>See Assembly</u>
Concentrated business use areas	See Section 1004.8

For SI: 1 foot = 304.8 mm, 1 square foot = 0.0929 m^2.

a. Floor area in square feet per occupant.

Commenter's Reason: The committee felt that the proposal was to broad to include any conference room. They felt that a limitation in area should be included in the requirement. We have selected 750 square feet because that is the area in which a conference room would have the same occupancy as the rest of the business area. Many jurisdictions allow this reduced occupant load now. This would just codify the language and provide a more reasonable number of occupants in the space. Once the area exceeded 750 square feet, the 15 square feet occupant load factor for an assembly function would be used as currently required and the space classified as a Group A-3 Occupancy. We believe that this is a reasonable approach to determine the occupant load in small conference rooms within office spaces.

Cost Impact: The net effect of the public comment and code change proposal will decrease the cost of construction
The cost of construction could potential be reduced due to the lower occupant load that will affect the number of exits and plumbing fixtures.

Public Comment# 2410

E9-21

Proposed Change as Submitted

Proponents: Daniel Nichols, representing Metropolitan Transportation Authority, Construction and Development (dnichols@mnr.org)

2021 International Building Code

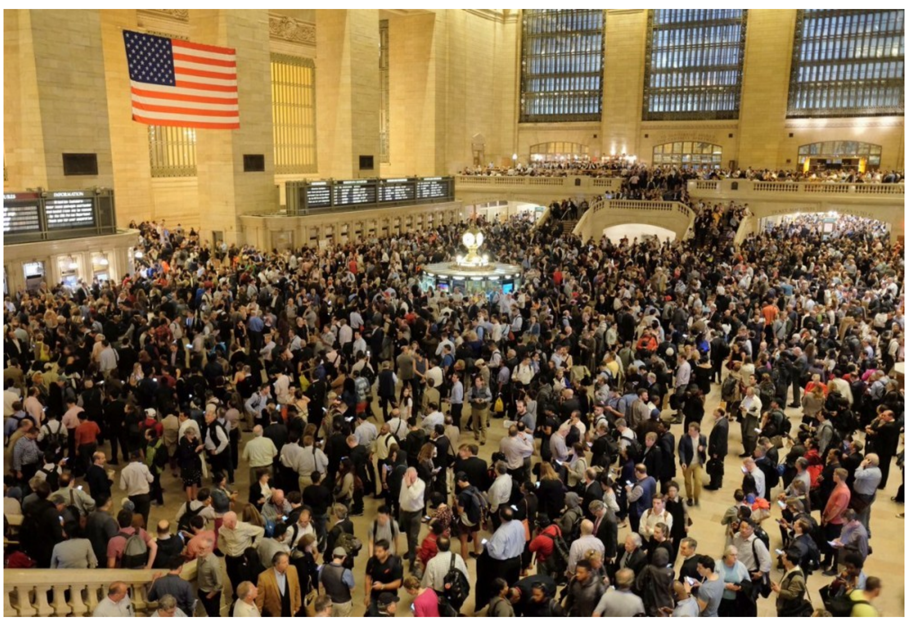
Revise as follows:

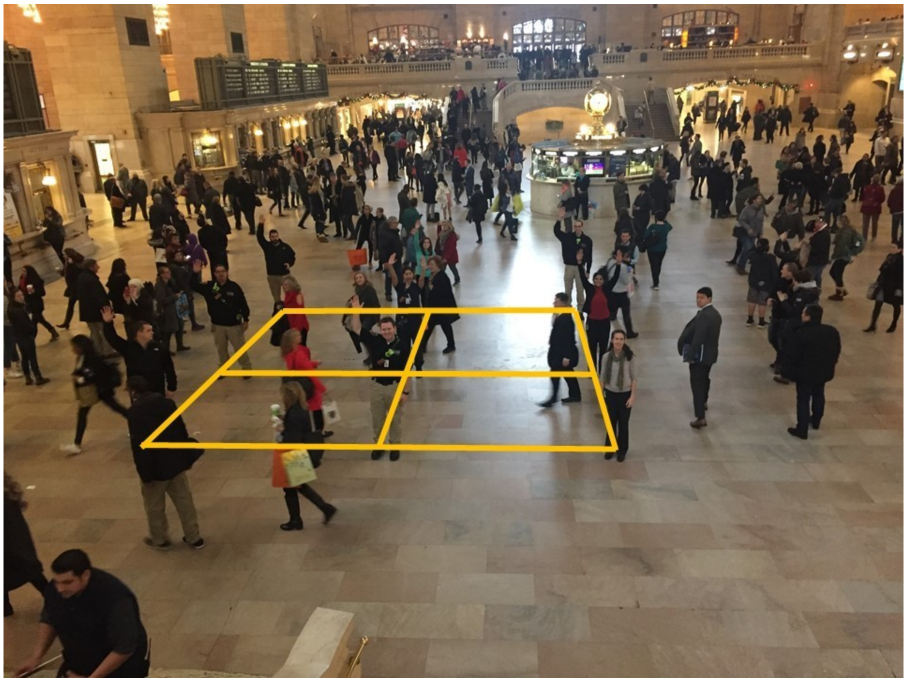
1004.5.1 Increased occupant load. The *occupant load* permitted in any building, or portion thereof, is permitted to be increased from that number established for the occupancies in Table 1004.5, provided that all other requirements of the code are met based on such modified number and the *occupant load* does not exceed one occupant per 5 ~~7~~ square feet (0.47 ~~0.65~~ m^2) of occupiable floor space. Where required by the *building official*, an *approved aisle*, seating or fixed equipment diagram substantiating any increase in *occupant load* shall be submitted. Where required by the *building official*, such diagram shall be posted.

Reason: 1004.5.1 permits the building official to accept an occupant load higher than Table 1004.5 permits, but not any higher that 7sf/person. This does create an issue for the building official that wants to utilize 5sf/person for concentrated standing spaces similar to a concentrated assembly standing area but is closely matches another category that the designer has designed to.
What this proposal is changing is to allow the building official the full range of occupant load values within the Table to be applied when information is presented to them. As an example, an airport concourse is 100 SF/person and is a direct application to designer for this specific use. However, the sole use of 100 SF/person is not appropriate in times of service delays.

Examples of service delay situations in rail stations is provided as a comparison to this concept. The picture with the grid shows 10' x 10' boxes, the requirement for an airport concourse. The other photo shows how 100SF/person is not indicative of a service delay in a similar arrangement by comparing the two photos. Please compare these findings with your experiences with delays at ATL, ORD, JFK, or any other main airport (LGA is only at 100 SF/person when it's closed).

What is important is that the proper determination of occupant loading is not only for the consideration of new buildings, but the capacity when the means of egress is being altered or rehabilitated. By allowing the code official to have the full range, egress can be sized for exiting in all situations.





Cost Impact: The code change proposal will not increase or decrease the cost of construction
This is a design criteria proposal.

E9-21

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: This proposal was disapproved because the committee felt that this increase allowance for the occupant load would allow for so many people to be in the space that there would not be enough room to move for smooth evacuation. This is too tight for all assembly spaces. It was suggested that a public comment could limit this to transportation terminals. (Vote: 11-3)

E9-21

Individual Consideration Agenda

Public Comment 1:

Proponents: Daniel Nichols, representing Metropolitan Transportation Authority, Construction and Development (dnichols@mnr.org) requests As Submitted

Commenter's Reason: We ask for the membership's support of our proposal E9. During the deliberation of the proposal, testifiers stated that code officials should not have the ability to "overcrowd" the building by permitting such a high occupant load. Our response continues to be that the purpose of this section is to adequately determine the occupant load that could be in the building AND ensure that the buildings features can handle it. Currently, a code official is permitted to lower the occupant load down to 7 square foot per person based on specifics of the use of the building. This would include lowering the ratio for casino floors with concert venues, establishing pre-function area occupant loading, and special event spaces on mechantile and business occupancies. In lowering the ratio- the IBC then requires the increase in occupant load calculation for not only exits, but plumbing fixtures, accessible features, and triggers for emergency evacuation and fire safety plans. If you look at the application of 7 square foot per person, that is for chairs only which doesn't address standing spaces. The prohibition for the fire code official not to be able to acknowledge known crowded standing spaces from 7 to 5 persons to square foot allows a building to be constructed or repurposed with 29% LESS exit capacity and potentially not triggering egress plans, exiting requirements for over 300 persons, and similar provisions.
The commentary supports this change by acknowledging that there can be standing spaces, but are usually small in nature and the ratio balances out throughout the space. We do not support the idea that occupant loading is balanced out or is usually limited to a specific area. This needs to be a tool that code officials can have to adequately provide exiting, services, and accessibility to actual number of persons within a building or space.

Cost Impact: The net effect of the public comment and code change proposal will increase the cost of construction
There will be no increase in construction since this adequately acknowledges the actual number of occupants.

Public Comment# 2883

E13-21

Proposed Change as Submitted

Proponents: Jeff Perras, representing Code Red Consultants, LLC (jeffp@crcfire.com)

2021 International Building Code

Revise as follows:

1006.2.1 Egress based on occupant load and common path of egress travel distance. Two *exits* or *exit access doorways* from any space shall be provided where the design *occupant load* or the *common path of egress* travel distance exceeds the values *listed* in Table 1006.2.1. The cumulative *occupant load* from adjacent rooms, areas or spaces shall be determined in accordance with Section 1004.2.

Exceptions:

1. The number of *exits* from foyers, lobbies, vestibules or similar spaces need not be based on cumulative *occupant loads* for areas discharging through such spaces, but the capacity of the *exits* from such spaces shall be based on applicable cumulative *occupant loads*. The maximum number of occupants served by a single exit shall be such that the sum of the ratios of the calculated number of occupants of the space divided by the allowable number of occupants indicated in Table 1006.2.1 for each occupancy or function does not exceed one.
2. *Care suites*in Group I-2 occupancies complying with Section 407.4.
3. Unoccupied mechanical rooms and *penthouses* are not required to comply with the common path of egress travel distance measurement.

1004.4 Multiple ~~occupancies~~ functions. Where a building contains two or more ~~occupancies~~ functions, the *means of egress* requirements shall apply to each portion of the building based on the ~~occupancy~~ function of that space. Where two or more ~~occupancies~~ functions utilize portions of the same *means of egress* system, those egress components shall meet the more stringent requirements of all ~~occupancies~~ functions that are served.

1004.5.1 Increased occupant load. The *occupant load* permitted in any building, or portion thereof, is permitted to be increased from that number established for the ~~occupancies~~ functions in Table 1004.5, provided that all other requirements of the code are met based on such modified number and the *occupant load* does not exceed one occupant per 7 square feet (0.65 m2) of occupiable floor space. Where required by the *building official*, an *approved aisle*, seating or fixed equipment diagram substantiating any increase in *occupant load* shall be submitted. Where required by the *building official*, such diagram shall be posted.

1004.8 Concentrated business use areas. The *occupant load* factor for concentrated business use shall be applied to telephone call centers, trading floors, electronic data processing centers and similar business use areas with a higher density of occupants than would normally be expected in a typical business ~~occupancy~~ environment. Where approved by the *building official*, the *occupant load* for concentrated business use areas shall be the actual *occupant load*, but not less than one occupant per 50 square feet (4.65 m^2) of gross occupiable floor space.

1004.9 Posting of occupant load. Every room or space that is an assembly ~~occupancy~~ function shall have the *occupant load* of the room or space posted in a conspicuous place, near the main *exit* or *exit access doorway* from the room or space, for the intended configurations. Posted signs shall be of an approved legible permanent design and shall be maintained by the owner or the owner's authorized agent.

TABLE 1006.2.1 SPACES WITH ONE EXIT OR EXIT ACCESS DOORWAY

~~OCCUPANCY~~ FUNCTION	MAXIMUM OCCUPANT LOAD OF SPACE	MAXIMUM COMMON PATH OF EGRESS TRAVEL DISTANCE (feet)		
		Without Sprinkler System (feet)		With Sprinkler System (feet)
		Occupant Load		
		OL ≤ 30	OL > 30	
A[c], E, M	49	75	75	75[a]
B	49	100	75	100[a]
F	49	75	75	100[a]
H-1, H-2, H-3	3	NP	NP	25[b]
H-4, H-5	10	NP	NP	75[b]
I-1, I-2[d], I-4	10	NP	NP	75[a]
I-3	10	NP	NP	100[a]
R-1	10	NP	NP	75[a]
R-2	20	NP	NP	125[a]
R-3[e]	20	NP	NP	125[a, g]
R-4[e]	20	NP	NP	125[a, g]
S[f]	29	100	75	100[a]
U	49	100	75	75[a]

For SI: 1 foot = 304.8 mm.

NP = Not Permitted.

a. Buildings equipped throughout with an *automatic sprinkler system* in accordance with Section 903.3.1.1 or 903.3.1.2. See Section 903 for occupancies where automatic sprinkler systems are permitted in accordance with Section 903.3.1.2.
b. Group H occupancies equipped throughout with an *automatic sprinkler system* in accordance with Section 903.2.5.
c. For a room or space used for assembly purposes having *fixed seating*, see Section 1030.8.
d. For the travel distance limitations in Group I-2, see Section 407.4.
e. The *common path of egress travel* distance shall only apply in a Group R-3 occupancy located in a mixed occupancy building.
f. The length of *common path of egress travel* distance in a Group S-2 *open parking garage* shall be not more than 100 feet.
g. For the travel distance limitations in Groups R-3 and R-4 equipped throughout with an *automatic sprinkler system* in accordance with Section 903.3.1.3, see Section 1006.2.2.6.

Reason: There are many times where areas of a building contain multiple occupancies or functions, and it is not clear in the code how to apply this section. A common example is a study/lounge smaller than 750 square feet located at the end of a corridor in a dormitory or apartment building. The study/lounge is required to be calculated using 15 net square feet per person for an assembly space with movable tables and chairs; however, it is classified as a Group R occupancy due to its size, limiting it to 300 square feet in areas with only one exit. If a sleeping or dwelling unit also opens into this area, it is likely the only option is to locate the stair at the end of the corridor.
This proposed code change incorporates the sum of the ratios criteria that is used by multiple sections of the code, including Section 1006.3.2.1 for determining stories with a single exit.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This code change impacts the potential location of the required exit and will not impact the cost of construction.

E13-21

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: This proposal was disapproved. The committee agreed that the occupant load is based the function of the space, however, Section 1004.9 should remain occupancy. The proposal to Section 1006.2.2 is a complex ratio calculation that is not needed for most spaces. If this is needed is should be in the main paragraph, not in an exception. (Vote: 14-0)

E13-21

Individual Consideration Agenda

Public Comment 1:

IBC: 1006.2.1 (IFC:[BE] 1006.2.1)

Proponents: Jeff Perras, representing Code Red Consultants, LLC (jeffp@crcfire.com) requests As Modified by Public Comment

Replace as follows:

2021 International Building Code

1006.2.1 Egress based on occupant load and common path of egress travel distance . Two *exits* or *exit access doorways* from any space shall be provided where the design *occupant load* or the *common path of egress* travel distance exceeds the values *listed* in Table 1006.2.1. The cumulative *occupant load* from adjacent rooms, areas or spaces shall be determined in accordance with Section 1004.2. <u>The maximum number of occupants served by a single exit shall be such that the sum of the ratios of the calculated number of occupants of the space divided by the allowable number of occupants indicated in Table 1006.2.1 for each occupancy or function does not exceed one.</u>

Exceptions:

1. The number of *exits* from foyers, lobbies, vestibules or similar spaces need not be based on cumulative *occupant loads* for areas discharging through such spaces, but the capacity of the *exits* from such spaces shall be based on applicable cumulative *occupant loads*.
2. *Care suites* in Group I-2 occupancies complying with Section 407.4.
3. Unoccupied mechanical rooms and *penthouses* are not required to comply with the common path of egress travel distance measurement.

Commenter's Reason: This modification relocates the proposed sum of the ratios calculation to the main section rather than the exception. This intent of the code change is to address situations where multiple occupancies or functions are served by a single means of egress, which is not currectly addressed in the code. The other changes that were incorporated complicated the intent of the proposed change and have been removed. One comment received during the hearing was that the proposed change is trying to solve an issue that doesn't exists. Not all spaces with one means of egress are limited to a single occupancy/function. Examples include office areas with storage rooms, lounges in residential buildings, storage areas or lounges in hospitals, etc. How to treat this condition is enforced differently by various jurisdictions and should really be addressed by the code.

Cost Impact: The net effect of the public comment and code change proposal will not increase or decrease the cost of construction
This code change impacts the potential location of the required exit and will not impact the cost of construction.

Public Comment# 2842

E14-21

<u>Proposed Change as Submitted</u>

Proponents: Timothy Stacy, representing Southern Oregon Fire Code Officials

2021 International Building Code

Revise as follows:

TABLE 1006.2.1 SPACES WITH ONE EXIT OR EXIT ACCESS DOORWAY

OCCUPANCY	MAXIMUM OCCUPANT LOAD OF SPACE	MAXIMUM COMMON PATH OF EGRESS TRAVEL DISTANCE (feet)		
		Without Sprinkler System (feet)		With Sprinkler System (feet)
		Occupant Load		
		OL ≤ 30	OL > 30	
A[c], E, M[h]	49	75	75	75[a]
B	49	100	75	100[a]
F	49	75	75	100[a]
H-1, H-2, H-3	3	NP	NP	25[b]
H-4, H-5	10	NP	NP	75[b]
I-1, I-2[d], I-4	10	NP	NP	75[a]
I-3	10	NP	NP	100[a]
R-1	10	NP	NP	75[a]
R-2	20	NP	NP	125[a]
R-3[e]	20	NP	NP	125[a, g]
R-4[e]	20	NP	NP	125[a, g]
S[f]	29	100	75	100[a]
U	49	100	75	75[a]

For SI: 1 foot = 304.8 mm.

NP = Not Permitted.

a. Buildings equipped throughout with an *automatic sprinkler system* in accordance with Section 903.3.1.1 or 903.3.1.2. See Section 903 for occupancies where automatic sprinkler systems are permitted in accordance with Section 903.3.1.2.

b. Group H occupancies equipped throughout with an *automatic sprinkler system* in accordance with Section 903.2.5.

c. For a room or space used for assembly purposes ~~having *fixed seating*~~, see Section 1030.8.

d. For the travel distance limitations in Group I-2, see Section 407.4.

e. The *common path of egress travel* distance shall only apply in a Group R-3 occupancy located in a mixed occupancy building.

f. The length of *common path of egress travel* distance in a Group S-2 *open parking garage* shall be not more than 100 feet.

g. For the travel distance limitations in Groups R-3 and R-4 equipped throughout with an *automatic sprinkler system* in accordance with Section 903.3.1.3, see Section 1006.2.2.6

h. The *common path of egress travel* in the *merchandise pad* shall comply with Section 1018.4.

Reason: This proposal is clarifying existing intent in an effort to make the table more useful. Footnote c: remove reference to fixed seating to clarify that section 1030.8 applies to more than fixed seating. This provides consistency with Section 1030.9 which specifically includes tables, displays, similar fixtures or equipment in addition to seats.
Footnote h: Add footnote to clarify that the common path limit in mercantile occupancies is reduced to 30 ft for merchandise pads per Section 1018.4. Similar references are provided such as for assembly uses, I-2, etc.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This is a clarifying code proposal.

Staff note: This proposal's revision to Table 1006.2.1 footnote c addresses requirements in a different or contradicting manner to those found in Code Change E108-21 to Section 1030.8. The committee is urged to make their intentions clear with their actions on these proposals.

E14-21

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: This proposal was disapproved because this issue need to be addressed in both Table 1006.2.1 note c and Section 1030.8. If 'fixed seating' was removed here was concern the common path of travel in Section 1030.8 would over ride the 75 foot common path of travel allowance in this table for assembly spaces. (Vote: 14-0)

Staff Analysis: This proposal's revision to Table 1006.2.1 footnote c addresses requirements in a different or contradicting manner to those found in Code Change E108-21 to Section 1030.8. The committee is urged to make their intentions clear with their actions on these proposals.

E14-21

Individual Consideration Agenda

Public Comment 1:

IBC: TABLE 1006.2.1 (IFC:[BE]TABLE 1006.2.1)

Proponents: Tanner Fairrington, representing Medford Fire-Rescue (tfairrington@yahoo.com) requests As Modified by Public Comment

Modify as follows:

2021 International Building Code

TABLE 1006.2.1 SPACES WITH ONE EXIT OR EXIT ACCESS DOORWAY

OCCUPANCY	MAXIMUM OCCUPANT LOAD OF SPACE	MAXIMUM COMMON PATH OF EGRESS TRAVEL DISTANCE (feet)		
		Without Sprinkler System (feet)		With Sprinkler System (feet)
		Occupant Load		
		OL ≤ 30	OL > 30	
A[c], E, M	49	75	75	75[a]
B	49	100	75	100[a]
F	49	75	75	100[a]
H-1, H-2, H-3	3	NP	NP	25[b]
H-4, H-5	10	NP	NP	75[b]
I-1, I-2[d], I-4	10	NP	NP	75[a]
I-3	10	NP	NP	100[a]
R-1	10	NP	NP	75[a]
R-2	20	NP	NP	125[a]
R-3[e]	20	NP	NP	125[a, g]
R-4[e]	20	NP	NP	125[a, g]
S[f]	29	100	75	100[a]
U	49	100	75	75[a]

For SI: 1 foot = 304.8 mm.

NP = Not Permitted.

a. Buildings equipped throughout with an *automatic sprinkler system* in accordance with Section 903.3.1.1 or 903.3.1.2. See Section 903 for occupancies where automatic sprinkler systems are permitted in accordance with Section 903.3.1.2.

b. Group H occupancies equipped throughout with an *automatic sprinkler system* in accordance with Section 903.2.5.

c. For a room or space used for assembly purposes having *fixed seating*, see Section 1030.8.

d. For the travel distance limitations in Group I-2, see Section 407.4.

e. The *common path of egress travel* distance shall only apply in a Group R-3 occupancy located in a mixed occupancy building.

f. The length of *common path of egress travel* distance in a Group S-2 *open parking garage* shall be not more than 100 feet.

g. For the travel distance limitations in Groups R-3 and R-4 equipped throughout with an *automatic sprinkler system* in accordance with Section 903.3.1.3, see Section 1006.2.2.6.

h. The *common path of egress travel* in the *merchandise pad* shall comply with Section 1018.4.

Commenter's Reason: This public comment addresses concerns raised in testimony and by the Committee related to the proposal. The public comment returns footnote "c" to model code language to include "having fixed seating" language as proposed in E14-21 and to be consistent with E108-21.
This public comment retains footnote "h" which provides a reference to a specific common path limit of 30 ft. for merchandise pads in mercantile occupancies. The intent of adding this footnote is to provide the user with a convenient reference, similar to the other references provided for assembly uses, I-2, etc.

Cost Impact: The net effect of the public comment and code change proposal will not increase or decrease the cost of construction
The proposal and public comment will likely not affect the cost of construction. However, adding this convenient reference could help avoid costs associated with changes are required during construction to meet this requirement.

Public Comment# 2644

E15-21

Proposed Change as Submitted

Proponents: Kevin Scott, representing KH Scott & Associates LLC (khscottassoc@gmail.com)

2021 International Building Code

Revise as follows:

1006.2.2.2 Refrigeration machinery rooms. Machinery rooms larger than 1,000 square feet (93 m^2) shall have not less than two *exits* or exit access doorways. Where two *exit access doorways* are required, one such doorway is permitted to be served by a fixed ladder or an *alternating tread device*. *Exit access doorways* shall be separated by a horizontal distance equal to one-half the maximum horizontal dimension of the room. All portions of machinery rooms shall be within 150 feet (45 720 mm) of an *exit* or *exit access doorway*. ~~An increase in *exit access* travel distance is permitted in accordance with Section 1017.1.~~

Exit and *exit access doorways* shall swing in the direction of egress travel and shall be equipped with *panic hardware*, regardless of the *occupant load* served. Exit and *exit access doorways* shall be tight fitting and *self-closing*.

1006.2.2.3 Refrigerated rooms or spaces.
Rooms or spaces having a floor area larger than 1,000 square feet (93 m^2), containing a refrigerant evaporator and maintained at a temperature below 68°F (20°C), shall have access to not less than two *exits* or *exit access doorways*.

Exit access travel distance shall be determined as specified in Section 1017.1. ~~1017.1 but all~~ All portions of a refrigerated room or space shall be within 150 feet (45 720 mm) of an *exit* or *exit access doorway* leading to a nonrefrigerated area where such rooms are not protected by an *approved automatic sprinkler system*. ~~Egress is allowed through adjoining refrigerated rooms or spaces.~~

Exception: Where using refrigerants in quantities limited to the amounts based on the volume set forth in the *International Mechanical Code*.

Egress is allowed through adjoining refrigerated rooms or spaces.

Reason: This proposal is designed to correlate and clarify the egress requirements for refrigerated rooms and associated machinery rooms.
In Section 1006.2.2.2, the second paragraph refers to a travel distance increase for refrigeration machinery rooms that is allowed in Section 1017.1. However, Section 1017.1 does not provide any increase in exit access travel distance for refrigeration machinery rooms; and in fact, Footnote a refers back to Section 1006.2.2.2 for distance limitations in refrigeration machinery rooms. This creates a circular reference and therefore this sentence is proposed to be deleted to eliminate the confusion.

In Section 1006.2.2.3, the second paragraph contains a requirement for nonsprinklered refrigerated rooms or spaces. This paragraph is revised to clarify that there are separate egress requirements.

- Exit access travel distance which is limited by Table 1017.1
- The travel distance within a nonsprinklered refrigerated room, which is limited to 150'

Additionally, language is added to clarify that the travel distance of 150' is to reach an area outside of the refrigerated portion of the building.

The last sentence is moved to after the exception so it is a separate paragraph since it does not affect the exit access travel distance. This clarifies that the egress path can pass through intervening refrigerated rooms.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This revision resolves correlation issues and clarifies the application of the requirements

E15-21

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The proposal was disapproved based on proponent's request. There is a problem with the wording in Section 1006.2.2.3. (Vote: 14-0)

E15-21

Individual Consideration Agenda

Public Comment 1:

IBC: 1006.2.2.2 (IFC:[BE] 1006.2.2.2)

Proponents: Jeffrey Shapiro, representing IIAR (jeff.shapiro@intlcodeconsultants.com) requests As Modified by Public Comment

Replace as follows:

2021 International Building Code

1006.2.2.2 Refrigeration machinery rooms . Machinery rooms larger than 1,000 square feet (93 m^2) shall have not less than two *exits* or exit access doorways. Where two *exit access doorways* are required, one such doorway is permitted to be served by a fixed ladder or an *alternating tread device*. *Exit access doorways* shall be separated by a horizontal distance equal to one-half the maximum horizontal dimension of the room. Exit access travel distance shall be determined as specified in Section 1017.1, but all portions of a refrigeration machinery room shall be within 150 feet (45 720 mm) of an exit or exit access doorway where such rooms are not protected by an approved automatic sprinkler system. Egress is allowed through adjoining refrigeration machinery rooms or adjoining refrigerated rooms or spaces.
~~All portions of machinery rooms shall be within 150 feet (45 720 mm) of an *exit* or *exit access doorway*. An increase in *exit access* travel distance is permitted in accordance with Section 1017.1.~~

Exit and *exit access doorways* shall swing in the direction of egress travel and shall be equipped with *panic hardware*, regardless of the *occupant load* served. Exit and *exit access doorways* shall be tight fitting and *self-closing*.

Commenter's Reason: The proponent of the original proposal correctly identified an issue with the circular reference in Section 1006.2.2.2, but a better fix is simply using identical text in Section 1006.2.2.2 and 1006.2.2.3, which does not have the same problem. The intent of both sections, which was clearly conveyed in the 2000 IBC and diminished in later editions as unrelated changes were made, is to restrict travel distance to 150 feet when sprinklers are not provided and to allow the occupancy classification associated travel distance when sprinklers are provided.
The unsprinklered condition is more restrictive than the general occupancy-related travel distance limit for unsprinklered occupancies in 1017.1. Hence the inclusion of special provisions in these sections, but only for unsprinklered conditions.

The suggested changes to 1006.2.2.3 were determined to be unnecessary. Any exit or exit access doorway will ultimately lead to a nonrefrigerated area, so adding that text accomplished nothing. And, moving the last sentence to after the exception wasn't necessary because egress is technically allowed through adjoining refrigerated rooms or spaces even if that text weren't present. There is nothing in the code that otherwise prohibits it.

Cost Impact: The net effect of the public comment and code change proposal will not increase or decrease the cost of construction
Editorial clarification of existing requirements.

Public Comment# 2978

E22-21

Proposed Change as Submitted

Proponents: Mike Nugent, Chair, representing ICC Building Code Action Committee (bcac@iccsafe.org)

2021 International Building Code

Revise as follows:

1006.3.4 Single exits. A single *exit* or access to a single *exit* shall be permitted from any *story* or occupied roof where one of the following conditions exists:

1. The *occupant load*, number of *dwelling units* and exit access travel distance do not exceed the values in Table 1006.3.4(1) or 1006.3.4(2).
2. Rooms, areas and spaces complying with Section 1006.2.1 with *exits* that discharge directly to the exterior at the *level of exit discharge*, are permitted to have one *exit* or access to a single *exit*.
3. Elevator lobbies shall be permitted to have one exit in accordance with Section 3006.4.

4.~~3.~~ Parking garages where vehicles are mechanically parked shall be permitted to have one *exit* or access to a single *exit*.

5.~~4.~~ Group R-3 and R-4 occupancies shall be permitted to have one *exit* or access to a single *exit*.

6.~~5.~~ Individual single-story or multistory *dwelling units* shall be permitted to have a single *exit* or access to a single *exit* from the *dwelling unit* provided that both of the following criteria are met:

6.1.~~5.1.~~ The *dwelling unit* complies with Section 1006.2.1 as a space with one *means of egress*.

6.2.~~5.2.~~ Either the exit from the *dwelling unit* discharges directly to the exterior at the *level of exit discharge*, or the *exit access* outside the *dwelling unit's* entrance door provides access to not less than two *approved* independent *exits*.

3006.4 Means of egress. Elevator lobbies shall ~~be provided with not less than one *means of egress* complying with Chapter 10 and other provisions in this code~~ have direct access from the elevator lobby to an enclosure for an interior exit stairway or ramp. Egress through an enclosed elevator lobby shall be permitted in accordance with Item 1 of Section 1016.2.

Exception: Access to an interior exit stairway or ramp shall be permitted to be through a protected path of travel enclosed with a smoke barrier having a fire-resistance rating of not less than 1 hour.

Reason: This proposal is intended to be a clarification of current exit requirements for secure elevator lobbies. The allowance for one exit from an elevator lobby is buried in Chapter 30 so it is often missed. The current language in Section 3006.4 can appear to be a conflict with Section 1006.3. The original intent of the allowance for one exit from an elevator lobby is to address secure lobby situations where the 2nd stairway is through a tenant space.The language in the exception is using the language for fire service access elevators in Section 3007 so that access to the stairway can be from the lobby to the exit stairway via a protected corridor.

This proposal is submitted by the ICC Building Code Action Committee (BCAC). BCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2020 the BCAC has held several virtual meetings open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the BCAC website at BCAC.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This is a clarification of requirements, not a change.

E22-21

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: This proposal was disapproved because the proposed language could be read to apply to all lobbies of any size - including general lobbies on the first floor. Some members felt the current language was requiring access to all the exits on the floor from all elevator lobbies, so this is not a clarification. The exception requires a rated corridor even in a sprinklered building - this is an unnecessary expenses (Vote: 13-1)

Individual Consideration Agenda

Public Comment 1:

IBC: 3006.4

Proponents: Mike Nugent, representing ICC Building Code Action Committee (bcac@iccsafe.org) requests As Modified by Public Comment

Further modify as follows:

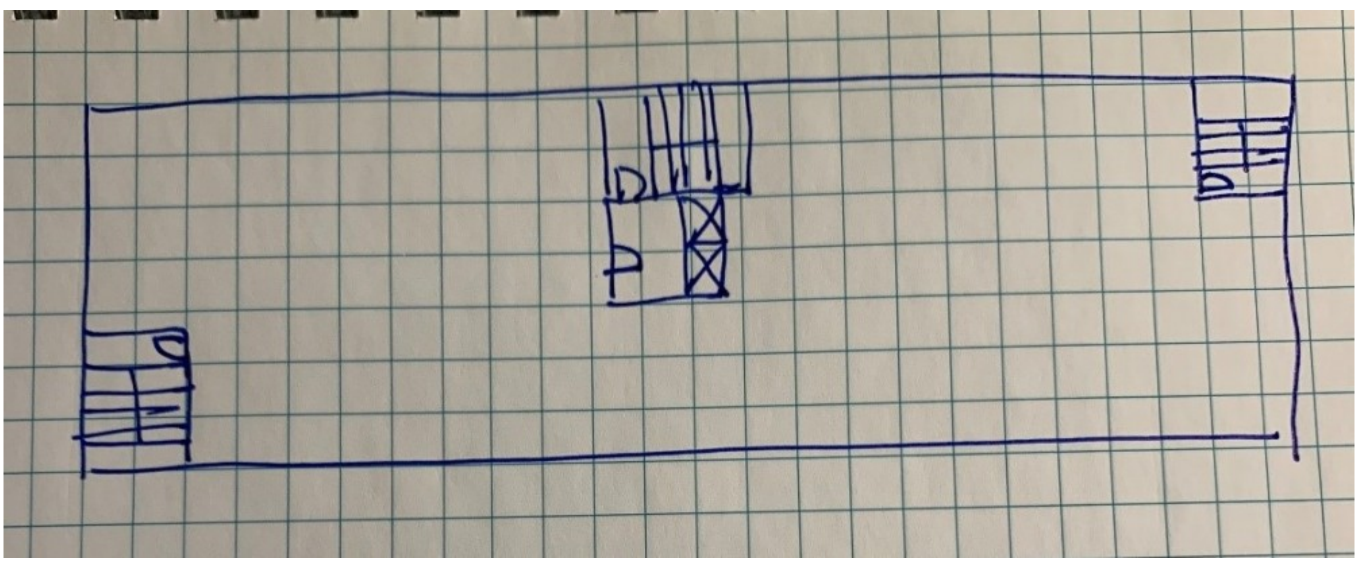
2021 International Building Code

3006.4 Means of egress . Elevator lobbies above and below a level of exit discharge shall have direct access from the elevator lobby to an enclosure for an interior exit stairway or ramp. Egress through an enclosed elevator lobby shall be permitted in accordance with Item 1 of Section 1016.2.

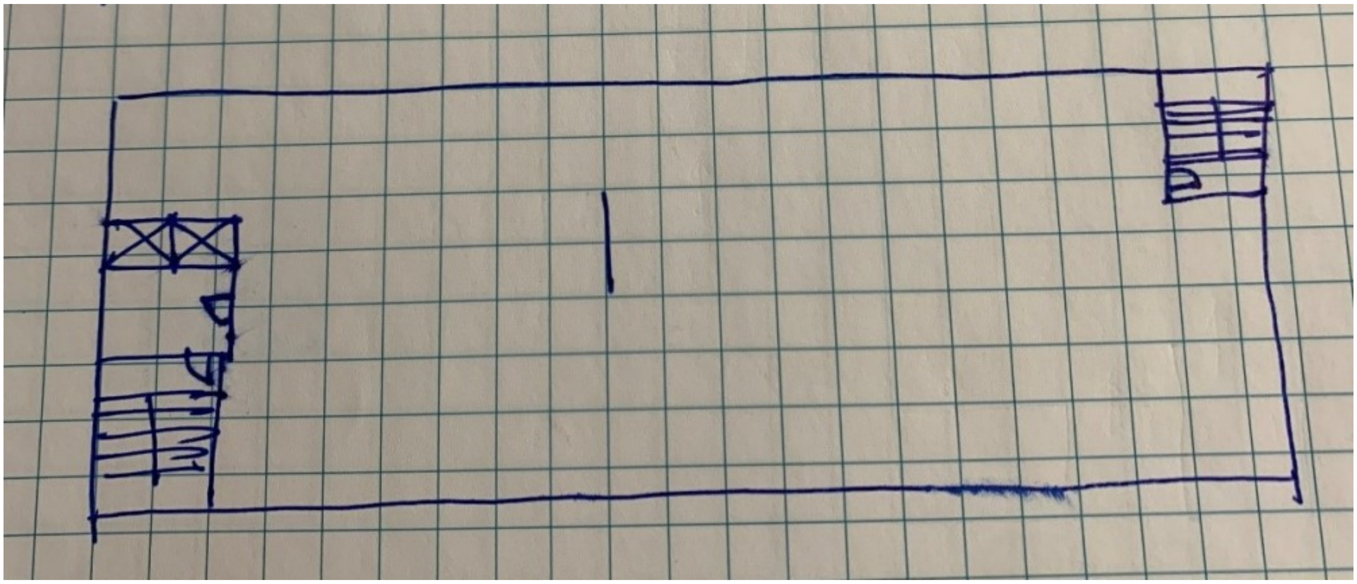
> **Exception:** Access to an interior exit stairway or ramp shall be permitted to be through a protected path of travel enclosed with a smoke barrier having a fire-resistance rating of not less than 1 hour.

Commenter's Reason: The intent of this proposal is to provide a balance between security for a tenant and exiting from the elevator lobby. Another option for elevator lobby egress was approved in E56-21.
There was some comments during the testimony about the limits of what could be in the elevator lobby. The modification is to address those concerns. This will eliminate someone thinking they can use this exception for the first floor lobbies that can include an elevator. Tenant spaces would still need access to all exits on the floor in accordance with Chapter 10.

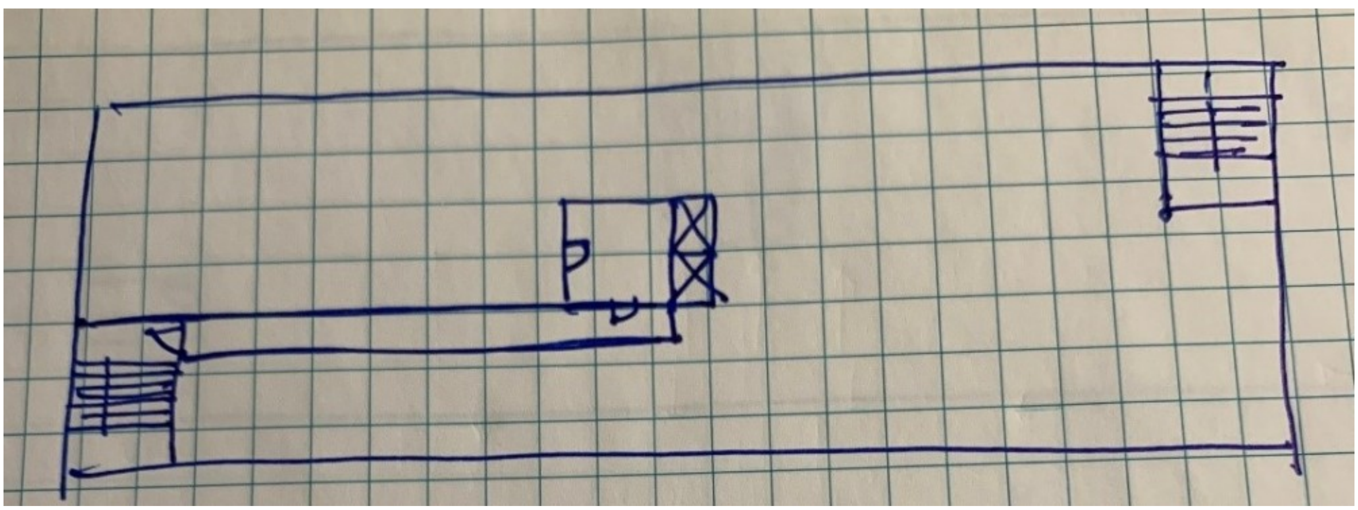
The current text only requires one exit from the elevator lobby, not access to all the exits on the floor. This is to address the very limited chance that someone could get into the elevator lobby after business hours or for a secure access tenant space and the elevators are not available to leave. The following are three examples of how Section 3006.4 could be applied for single tenant floors.



Example 1 is a three exit building with direct access from the elevator lobby to a stairway.



Example 2 is a two exit building with direct access from the elevator lobby to a stairway.



Example 3 is a two exit building with the option of providing a protected corridor, which is currently used for access to a stairway for the fire service access elevator.

Cost Impact: The net effect of the public comment and code change proposal will not increase or decrease the cost of construction
This is a clarification of requirements, not a change.

Public Comment# 2577

E23-21

Proposed Change as Submitted

Proponents: Mike Nugent, Chair, representing ICC Building Code Action Committee (bcac@iccsafe.org)

2021 International Building Code

1006.3.4 Single exits. A single *exit* or access to a single *exit* shall be permitted from any *story* or occupied roof where one of the following conditions exists:

1. The *occupant load*, number of *dwelling units* and exit access travel distance do not exceed the values in Table 1006.3.4(1) or 1006.3.4(2).
2. Rooms, areas and spaces complying with Section 1006.2.1 with *exits* that discharge directly to the exterior at the *level of exit discharge*, are permitted to have one *exit* or access to a single *exit*.
3. Parking garages where vehicles are mechanically parked shall be permitted to have one *exit* or access to a single *exit*.
4. Group R-3 and R-4 occupancies shall be permitted to have one *exit* or access to a single *exit*.
5. Individual single-story or multistory *dwelling units* shall be permitted to have a single *exit* or access to a single *exit* from the *dwelling unit* provided that both of the following criteria are met:

   5.1. The *dwelling unit* complies with Section 1006.2.1 as a space with one *means of egress*.

   5.2. Either the exit from the *dwelling unit* discharges directly to the exterior at the *level of exit discharge*, or the *exit access* outside the *dwelling unit's* entrance door provides access to not less than two *approved* independent *exits*.

Revise as follows:

TABLE 1006.3.4(1) STORIES WITH ONE EXIT OR ACCESS TO ONE EXIT FOR R-2 OCCUPANCIES[a]

STORY	OCCUPANCY	MAXIMUM NUMBER ~~OF DWELLING UNITS~~	MAXIMUM EXIT ACCESS TRAVEL DISTANCE
Basement, first, second or third story above grade plane	R-2~~[a, b]~~ consisting of dwelling units	4 dwelling units	125 feet
	R-2 consisting of sleeping units	20 occupants per story	125 feet
Fourth story above grade plane and higher	NP	NA	NA

For SI: 1 foot = 304.8 mm.

NP = Not Permitted.

NA = Not Applicable.

a. Buildings classified as Group R-2 equipped throughout with an *a*utomatic sprinkler system in accordance with Section 903.3.1.1 or 903.3.1.2 and provided with emergency escape and rescue openings in accordance with Section 1031.

~~b. This table is used for R-2 occupancies consisting of dwelling units. For R-2 occupancies consisting of sleeping units, use Table 1006.3.4(2).~~

TABLE 1006.3.4(2) STORIES WITH ONE EXIT OR ACCESS TO ONE EXIT FOR OTHER OCCUPANCIES

STORY	OCCUPANCY	MAXIMUM OCCUPANT LOAD PER STORY	MAXIMUM EXIT ACCESS TRAVEL DISTANCE (feet)
First story above or below grade plane	A, B[a~~b~~], E, F[a~~b~~], M, U	49	75
	H-2, H-3	3	25
	H-4, H-5, I, R-1~~, R-2[a, c]~~	10	75
	S[a,b~~,d~~]	29	75
Second story above grade plane	B, F, M, S[b~~d~~]	29	75
Third story above grade plane and higher	NP	NA	NA

For SI: 1 foot = 304.8 mm.

NP = Not Permitted.

NA = Not Applicable.

~~a. Buildings classified as Group R-2 equipped throughout with an *automatic sprinkler system* in accordance with Section 903.3.1.1 or 903.3.1.2 and provided with *emergency escape and rescue openings* in accordance with Section 1031.~~

~~b.~~ a. Group B, F and S occupancies in buildings equipped throughout with an *automatic sprinkler system* in accordance with Section 903.3.1.1 shall have a maximum *exit access* travel distance of 100 feet.

~~c. This table is used for R-2 occupancies consisting of *sleeping units*. For R-2 occupancies consisting of *dwelling units*, use Table 1006.3.4(1).~~

~~d.~~ b. The length of *exit access* travel distance in a Group S-2 *open parking garage* shall be not more than 100 feet.

1031.2 Where required. In addition to the *means of egress* required by this chapter, *emergency escape and rescue openings* shall be provided in the following occupancies:

1. Group R-2 occupancies located in stories with only one *exit* or *access* to only one *exit* as permitted by ~~Tables~~ Table 1006.3.4(1) ~~and 1006.3.4(2)~~.
2. Group R-3 and R-4 occupancies.

Basements and sleeping rooms below the fourth *story above grade plane* shall have not fewer than one *emergency escape and rescue opening* in accordance with this section. Where *basements* contain one or more sleeping rooms, an *emergency escape and rescue opening* shall be required in each sleeping room, but shall not be required in adjoining areas of the *basement*. Such openings shall open directly into a *public way* or to a *yard* or *court* that opens to a *public way*.

Exceptions:

1. *Basements* with a ceiling height of less than 80 inches (2032 mm) shall not be required to have *emergency escape and rescue openings*.
2. *Emergency escape and rescue openings* are not required from *basements* or sleeping rooms that have an *exit* door or *exit access* door that opens directly into a *public way* or to a *yard*, court or exterior egress balcony that opens to a *public way*.
3. *Basements* without *habitable spaces* and having not more than 200 square feet (18.6 m^2) in floor area shall not be required to have *emergency escape and rescue openings*.
4. Storm shelters are not required to comply with this section where the shelter is constructed in accordance with ICC 500.
5. Within individual *dwelling* and *sleeping units* in Groups R-2 and R-3, where the building is equipped throughout with an *automatic sprinkler system* installed in accordance with Section 903.3.1.1, 903.3.1.2 or 903.3.1.3, *sleeping rooms* in *basements* shall not be required to have *emergency escape and rescue openings* provided that the basement has one of the following:

   5.1. One *means of egress* and one *emergency escape and rescue opening*.

   5.2. Two *means of egress*.

Reason: The purpose of this code change is to coordinate and consolidate requirements for R-2 units in Tables 1006.2.1 (single exit space), 1006.3.4(1) and 1006.3.4(2) (singe exit buildings).

Proposal E17-15 increased the maximum occupant load for R-2 Occupancies from 10 to 20 occupants for single exit spaces stating that it's appropriate since Group R-2 occupancies require sprinkler protection per Section 903.3.1.1 or 903.3.1.2. and that the exit access travel distance is 125' in both Table 1006.2.1 and 1006.3.4(1).

There is no logic for a unit on the 1st floor of single exit building to have a lower occupant load or a shorter travel distance. In addition, if 4 single exit dwelling units are permitted on the 2nd and 3rd floor of a Group R-2 building, why is a single exit dwelling not permitted at the 2nd floor of a mixed-use building? Please note that emergency escape and rescue openings would be required in the single exit building.The change to 1031.2 is editorial to recognize that R-2 is only in one table.

This proposal is submitted by the ICC Building Code Action Committee (BCAC). BCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2020 the BCAC has held several virtual meetings open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the BCAC website at BCAC.

Cost Impact: The code change proposal will decrease the cost of construction
This will only affect dwelling units on the basement, 1st or 2nd floor of a mixed-use building. This will most likely be no change in units less than 2,000 sq.ft. This will allow for a single exit in some apartments between 2,000 and 4,000 sq.ft., provided they can meet the exit access travel distance.

E23-21

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The proposals was disapproved because the current tables are clear. Adding "per story" in the third column would limit this to each story in stead of allowing groups of 20 occupants in a row. (Vote: 13-1)

E23-21

Individual Consideration Agenda

Public Comment 1:

IBC: TABLE 1006.3.4(1) [IFC: [BE] TABLE 1006.3.4(1)]

Proponents: Mike Nugent, representing ICC Building Code Action Committee (bcac@iccsafe.org) requests As Modified by Public Comment

Modify as follows:

2021 International Building Code

TABLE 1006.3.4(1) STORIES WITH ONE EXIT OR ACCESS TO ONE EXIT FOR R-2 OCCUPANCIES[a]

STORY	OCCUPANCY	MAXIMUM NUMBER	MAXIMUM EXIT ACCESS TRAVEL DISTANCE
Basement, first, second or third story above grade plane	R-2consisting of dwelling units	4 dwelling units	125 feet
	R-2 consisting of sleeping units	20 occupants ~~per story~~	125 feet
Fourth story above grade plane and higher	NP	NA	NA

For SI: 1 foot = 304.8 mm.

NP = Not Permitted.

NA = Not Applicable.

a. Buildings classified as Group R-2 equipped throughout with an *a*utomatic sprinkler system in accordance with Section 903.3.1.1 or 903.3.1.2 and provided with emergency escape and rescue openings in accordance with Section 1031.

Commenter's Reason: The original intent of the proposed change during the Committee Action Hearings was to consolidate all of the Group R-2 occupancies into one table for stories with one exit or access to one exit. Because they were divided into two separate tables under Section 1006.3.4, it made practical sense to combine all references to Group R-2's into one table (Table 1006.3.4(1)), while dedicating the other occupancies into the second table (Table 1006.3.4(2)) to minimize any potential confusion.
The occupant load was revised to remove "per story". Although this was added for clarity, the Committee felt there was issue in that it would increase the access travel distance. This, too, has been revised to address that issue.
The revisions stated in this public comment are editorial in nature and still maintain the original intent of the proposed change, which is to consolidate all of the Group R-2 occupancies into one table.

Cost Impact: The net effect of the public comment and code change proposal will decrease the cost of construction
This will only affect dwelling units on the basement, 1st or 2nd floor of a mixed-use building. This will most likely be no change in units less than 2,000 sq.ft. This will allow for a single exit in some apartments between 2,000 and 4,000 sq.ft., provided they can meet the exit access travel distance.

Public Comment# 2584

E24-21

Proposed Change as Submitted

Proponents: Mike Nugent, Chair, representing ICC Building Code Action Committee (bcac@iccsafe.org)

2021 International Building Code

SECTION 1008
MEANS OF EGRESS ILLUMINATION

Revise as follows:

1008.1 Means of egress illumination. Illumination shall be provided in the *means of egress* in accordance with Section 1008.2. ~~Under emergency power~~ In the event of power supply failure, *means of egress* illumination shall comply with Section 1008.3.

1008.2 Illumination required. The *means of egress* serving a room or space shall be illuminated at all times that the room or space is occupied.

Exceptions:

1. Occupancies in Group U.
2. *Aisle accessways* in Group A.
3. *Dwelling units* and *sleeping units* in Groups R-1, R-2 and R-3.
4. *Sleeping units* of Group I occupancies.

1008.2.1 Illumination level under normal power. The *means of egress* illumination level shall be not less than 1 footcandle (11 lux) at the walking surface. Along *exit access stairways*, exit stairways and at their required landings, the illumination level shall not be less than 10 footcandles (108 lux) at the walking surface when the *stairway* is in use.

Exception: For auditoriums, theaters, concert or opera halls and similar assembly occupancies, the illumination at the walking surface is permitted to be reduced during performances by one of the following methods provided that the required illumination is automatically restored upon activation of a premises' *fire alarm system*:

1. Externally illuminated walking surfaces shall be permitted to be illuminated to not less than 0.2 footcandle (2.15 lux).
2. Steps, landings and the sides of *ramps* shall be permitted to be marked with *self-luminous* materials in accordance with Sections 1025.2.1, 1025.2.2 and 1025.2.4 by systems *listed* in accordance with UL 1994.

1008.2.2 Group I-2. In Group I-2 occupancies where two or more *exits* are required, on the exterior landings required by Section 1010.1.5, means of egress illumination levels for the exit discharge shall be provided such that failure of a single lamp in a luminaire shall not reduce the illumination level on that landing to less than 1 footcandle (11 lux).

1008.2.3 Exit discharge. Illumination shall be provided along the path of travel for the exit discharge from each exit to the *public way*.

Exception: Illumination shall not be required where the path of the exit discharge meets both of the following requirements:

1. The path of exit discharge is illuminated from the exit to a safe dispersal area complying with Section 1028.5.
2. A dispersal area shall be illuminated to a level not less than 1 footcandle (11 lux) at the walking surface.

Revise as follows:

~~**1008.3**~~ **1008.2.4** ~~**Emergency power**~~ **Power for illumination.** The power supply for *means of egress* illumination shall normally be provided by the premises' electrical supply.

~~**1008.3.1**~~ **1008.3** ~~**General**~~ **Illumination required with the emergency electrical system.** In the event of power supply failure in rooms and spaces that require two or more *exits* or access to exits, an emergency electrical system shall automatically illuminate all of the following areas:

1. *Aisles*.
2. *Corridors*.
3. *Exit access stairways* and *ramps*.

~~1008.3.2~~ 1008.3.1 **Buildings.** In the event of power supply failure in buildings that require two or more *exits* or access to exits, an emergency electrical system shall automatically illuminate all of the following areas:

1. *Interior exit access stairways* and *ramps*.
2. *Interior* and *exterior exit stairways* and *ramps*.
3. *Exit passageways*.
4. Vestibules and areas on the level of discharge used for *exit discharge* in accordance with Section 1028.2.
5. Exterior landings as required by Section 1010.1.5 for *exit doorways* that lead directly to the *exit discharge*.

~~1008.3.3~~ 1008.3.2 **Rooms and spaces.** In the event of power supply failure, an emergency electrical system shall automatically illuminate all of the following areas:

1. Electrical equipment rooms.
2. Fire command centers.
3. Fire pump rooms.
4. Generator rooms.
5. Public restrooms with an area greater than 300 square feet (27.87 m^2).

~~1008.3.4~~ 1008.3.3 **Duration.** The emergency power system shall provide power for a duration of not less than 90 minutes and shall consist of storage batteries, unit equipment or an on-site generator. The installation of the emergency power system shall be in accordance with Section 2702.

~~1008.3.5~~ 1008.3.4 **Illumination level under emergency power.** Emergency lighting facilities shall be arranged to provide initial illumination that is not less than an average of 1 footcandle (11 lux) and a minimum at any point of 0.1 footcandle (1 lux) measured along the path of egress at floor level. Illumination levels shall be permitted to decline to 0.6 footcandle (6 lux) average and a minimum at any point of 0.06 footcandle (0.6 lux) at the end of the emergency lighting time duration. A maximum-to-minimum illumination uniformity ratio of 40 to 1 shall not be exceeded. In Group I-2 occupancies, failure of a single lamp in a luminaire shall not reduce the illumination level to less than 0.2 footcandle (2.2 lux).

Reason: The intent of this proposal is to split this section into requirements for general means of egress illumination (1008.2) and emergency lighting (1008.3). To truly accomplish this, the sections should be re-arranged as indicated.
Section 1008.3 is currently titled '*Emergency power for illumination*.' However, that section really deals with general MOE lighting requirements, not emergency lighting requirements. Emergency lighting power requirements are addressed Sections 1008.3.3 and 1008.3.4. So we relocated it from 1008.3 to 1008.2.3 to group the lighting requirements appropriately.

The text change in Section 1008.1 will match the scoping phrase used in 1008.3, 1008.3.1 and 1008.3.2.Title changes in Section 1008.2.3 and 1008.3 will reinforce the idea of two different requirements – one for regular lighting and one for emergency lighting.

This proposal is submitted by the ICC Building Code Action Committee (BCAC). BCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2020 the BCAC has held several virtual meetings open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the BCAC website at BCAC.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This is a reorganization of existing text.

E24-21

Public Hearing Results

This proposal includes unpublished errata

~~1008.2.3~~ 1008.2.4 **Power for illumination.** The power supply for *means of egress* illumination shall normally be provided by the premises' electrical supply.

Committee Action: **As Submitted**

Committee Reason: The proposal was approved as an editorial grouping of means of egress and emergency lighting equipment. (Vote: 9-4)

Individual Consideration Agenda

Public Comment 1:

IBC: 1008.3 (New), 1008.3, 1008.3.1, 1008.3.2, 1008.3.3, 1008.3.4; (IFC [BE] 1008.3 (New), 1008.3, 1008.3.1, 1008.3.2, 1008.3.3, 1008.3.4)

Proponents: Jonathan Siu, representing Self requests As Modified by Public Comment

Modify as follows:

2021 International Building Code

SECTION 1008
MEANS OF EGRESS ILLUMINATION

1008.1 Means of egress illumination . Illumination shall be provided in the *means of egress* in accordance with Section 1008.2. In the event of power supply failure, *means of egress* illumination shall comply with Section 1008.3.

1008.2 Illumination required . The *means of egress* serving a room or space shall be illuminated at all times that the room or space is occupied.

Exceptions:

1. Occupancies in Group U.
2. *Aisle accessways* in Group A.
3. *Dwelling units* and *sleeping units* in Groups R-1, R-2 and R-3.
4. *Sleeping units* of Group I occupancies.

1008.2.1 Illumination level under normal power . The *means of egress* illumination level shall be not less than 1 footcandle (11 lux) at the walking surface. Along *exit access stairways*, exit stairways and at their required landings, the illumination level shall not be less than 10 footcandles (108 lux) at the walking surface when the *stairway* is in use.

Exception: For auditoriums, theaters, concert or opera halls and similar assembly occupancies, the illumination at the walking surface is permitted to be reduced during performances by one of the following methods provided that the required illumination is automatically restored upon activation of a premises' *fire alarm system*:

1. Externally illuminated walking surfaces shall be permitted to be illuminated to not less than 0.2 footcandle (2.15 lux).
2. Steps, landings and the sides of *ramps* shall be permitted to be marked with *self-luminous* materials in accordance with Sections 1025.2.1, 1025.2.2 and 1025.2.4 by systems *listed* in accordance with UL 1994.

1008.2.2 Group I-2 . In Group I-2 occupancies where two or more *exits* are required, on the exterior landings required by Section 1010.1.5, means of egress illumination levels for the exit discharge shall be provided such that failure of a single lamp in a luminaire shall not reduce the illumination level on that landing to less than 1 footcandle (11 lux).

1008.2.3 Exit discharge . Illumination shall be provided along the path of travel for the exit discharge from each exit to the *public way*.

Exception: Illumination shall not be required where the path of the exit discharge meets both of the following requirements:

1. The path of exit discharge is illuminated from the exit to a safe dispersal area complying with Section 1028.5.
2. A dispersal area shall be illuminated to a level not less than 1 footcandle (11 lux) at the walking surface.

1008.2.4 Power for illumination . The power supply for *means of egress* illumination shall normally be provided by the premises' electrical supply.

1008.3 Illumination required by an emergency electrical system . An emergency electrical system shall be provided to automatically illuminate the following areas in the event of a power supply failure:

1. In rooms or spaces that require two or more exits or access to exits:
   1.1. Aisles.
   1.2. Corridors.

1.3. Exit access stairways and ramps.

2. In buildings that require two or more exits or access to exits:
   2.1. Interior exit access stairways and ramps.
   2.2. Interior and exterior exit stairways and ramps.
   2.3. Exit passageways
   2.4. Vestibules and areas on the level of discharge used for exit discharge in accordance with Section 1028.2.
   2.5. Exterior landings as required by Section 1010.1.5 for exit doorways that lead directly to the exit discharge.

3. In other rooms and spaces:
   3.1. Electrical equipment rooms.
   3.2. Fire command centers.
   3.3. Fire pump rooms.
   3.4. Generator rooms.
   3.5. Public restrooms with an area greater than 300 square feet (27.87 m^2).

~~**1008.3 Illumination required with the emergency electrical system system**~~ **.** ~~In the event of power supply failure in rooms and spaces that require two or more *exits* or access to exits, an emergency electrical system shall automatically illuminate all of the following areas: an emergency an emergency~~

1. ~~*Aisles.*~~
2. ~~*Corridors.*~~
3. ~~*Exit access stairways* and *ramps.*~~

~~**1008.3.1**~~ **Buildings .** ~~In the event of power supply failure in buildings that require two or more *exits* or access to exits, an emergency electrical system shall automatically illuminate all of the following areas:~~

1. ~~*Interior exit access stairways* and *ramps.*~~
2. ~~*Interior* and *exterior exit stairways* and *ramps.*~~
3. ~~*Exit passageways.*~~
4. ~~Vestibules and areas on the level of discharge used for *exit discharge* in accordance with Section 1028.2.~~
5. ~~Exterior landings as required by Section 1010.1.5 for *exit doorways* that lead directly to the *exit discharge.*~~

~~**1008.3.2**~~ **Rooms and spaces .** ~~In the event of power supply failure, an emergency electrical system shall automatically illuminate all of the following areas:~~

1. ~~Electrical equipment rooms.~~
2. ~~Fire command centers.~~
3. ~~Fire pump rooms.~~
4. ~~Generator rooms.~~
5. ~~Public restrooms with an area greater than 300 square feet (27.87 m^2).~~

~~**1008.3.3**~~ **1008.3.1 Duration .** The emergency power system shall provide power for a duration of not less than 90 minutes and shall consist of storage batteries, unit equipment or an on-site generator. The installation of the emergency power system shall be in accordance with Section 2702.

~~**1008.3.4**~~ **1008.3.2 Illumination level under emergency power .** Emergency lighting facilities shall be arranged to provide initial illumination that is not less than an average of 1 footcandle (11 lux) and a minimum at any point of 0.1 footcandle (1 lux) measured along the path of egress at floor level. Illumination levels shall be permitted to decline to 0.6 footcandle (6 lux) average and a minimum at any point of 0.06 footcandle (0.6 lux) at the end of the emergency lighting time duration. A maximum-to-minimum illumination uniformity ratio of 40 to 1 shall not be exceeded. In Group I-2 occupancies, failure of a single lamp in a luminaire shall not reduce the illumination level to less than 0.2 footcandle (2.2 lux).

Commenter's Reason: This proposed reorganization of Section 1008.3 does not improve the code, and in fact, makes it more difficult to enforce. This public comment is intended to clarify the application of the code provisions, while preserving the intent of the original code change proposal. Under the current organization, each subsection in Section 1008.3 stands by itself--the requirements in the subsection are charged within that subsection. However, with the proposed code change, the old subsections 1008.3.2 and 1008.3.3 are now subsections to 1008.3. The problem is that the language in 1008.3 is not being changed to provide charging language for the new 1008.3.1 or 1008.3.2.

Referring to the section numbering in the proposal, 1008.3 says aisles, corridors, and exit access stairways and ramps need to have emergency illumination. However, 1008.3.1 and 1008.3.2 require illumination for buildings, rooms, and spaces that are not aisles, corridors, or exit access stairways/ramps. If they are subsections to 1008.3, how do you get to them? 1008.3 isn't providing any sort of charging language for 1008.3.1 or 1008.3.2, and subsection numbering is not a substitute for charging language.

This public comment charges all the provisions for where an emergency electrical system for means of egress illumination is required in the text of Section 1008.3 ("...shall be provided...in all of the following areas....") It also simplifies the code by removing repetitive code text and replacing the subsections with a single list.

Cost Impact: The net effect of the public comment and code change proposal will not increase or decrease the cost of construction
The cost impact statement for original proposal said it is a reorganization of the existing text. This public comment is merely a further reorganization of the proposed text.

Public Comment# 2866

E25-21

Proposed Change as Submitted

Proponents: Andrew Klein, representing Self Storage Association (andrew@asklein.com)

2021 International Building Code

Revise as follows:

1008.2 Illumination required. The *means of egress* serving a room or space shall be illuminated at all times that the room or space is occupied.

Exceptions:

1. Occupancies in Group U.
2. Self-service storage units accessed directly from the exterior.
3. ~~2.~~ *Aisle accessways* in Group A.
4. ~~3.~~ *Dwelling units* and *sleeping units* in Groups R-1, R-2 and R-3.
5. ~~4.~~ *Sleeping units* of Group I occupancies.

Reason: Although classified as Group S, exterior-access self storage facilities (those with rolling doors that open up for each unit) are similar in nature to Group U occupancies in the fact they are small, easily navigable, and have short dwell times. Many jurisdictions already do not require lighting inside of such units because they are not considered occupiable, and the safety concern of tenants unsing electricity for personal use and unregulated activities. This code change codifies for all jurisdictons that providing light inside of such units is unnecessary from a safety perspective and therefore not required.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
Most jurisdictions already interpret the code to not require illumination in self-service storage units that are accessible from the exterior. For jurisdictions that do require illumination, this code change will decrease the cost of construction.

E25-21

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The proposal was disapproved because the proposal did not limit the size of the self-storage facility that could use this exception. The proposal would be better if it also added "of the building" after "exterior." (Vote: 14-0)

E25-21

Individual Consideration Agenda

Public Comment 1:

IBC: 1008.2 (IFC:[BE]1008.2)

Proponents: Andrew Klein, representing Self Storage Association (andrew@asklein.com) requests As Modified by Public Comment

Further modify as follows:

2021 International Building Code

1008.2 Illumination required. The *means of egress* serving a room or space shall be illuminated at all times that the room or space is occupied.

Exceptions:

1. Occupancies in Group U.
2. Self-service storage units 400 ft^2 (37.16 m^2) or less in area and accessed directly from the exterior of the building .
3. *Aisle accessways* in Group A.
4. *Dwelling units* and *sleeping units* in Groups R-1, R-2 and R-3.
5. *Sleeping units* of Group I occupancies.

Commenter's Reason: This PC address the concerns of the committee. A maximum area of 400 SF was determined by the industry to be the maximum unit size to allow sufficient day light or exterior site lighting into all areas of the unit when the door is open.

Cost Impact: The net effect of the public comment and code change proposal will decrease the cost of construction
This PC will decrease the cost of construction where interior lighting would otherwise be required within self-storage units.

Public Comment# 2910

E26-21 Part I

Proposed Change as Submitted

Proponents: Bryan P. Holland, MCP, CStd., National Electrical Manufacturers Association, representing National Electrical Manufacturers Association (bryan.holland@nema.org)

THIS IS A 2 PART CODE CHANGE. PART I WILL BE HEARD BY THE MEANS OF EGRESS CODE COMMITTEE. PART II WILL BE HEARD BY THE FIRE CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THESE COMMITTEES.

2021 International Building Code

Add new definition as follows:

ENERGY STORAGE SYSTEM (ESS). One or more devices, assembled together, capable of storing energy in order to support electrical energy at a future time.

Revise as follows:

1008.3.4 Duration. The emergency power system shall provide power for a duration of not less than 90 minutes and shall consist of an energy storage system (ESS), storage batteries, unit equipment or an on-site generator. The installation of the emergency power system shall be in accordance with Section 2702.

1013.6.3 Power source. Exit signs shall be illuminated at all times. To ensure continued illumination for a duration of not less than 90 minutes in case of primary power loss, the sign illumination means shall be connected to an emergency power system provided from an energy storage system (ESS), storage batteries, unit equipment or an on-site generator. The installation of the emergency power system shall be in accordance with Chapter 27. Group I-2, Condition 2 exit sign illumination shall not be provided by unit equipment batteries only.

> **Exception:** *Approved* exit sign illumination types that provide continuous illumination independent of external power sources for a duration of not less than 90 minutes, in case of primary power loss, are not required to be connected to an emergency electrical system.

Add new standard(s) as follows:

NFPA

National Fire Protection Association
1 Batterymarch Park
Quincy, MA 02169-7471

NFPA 855-20	Standard for the Installation of Stationary Energy Storage Systems

Reason: The purpose of this proposal is too add energy storage systems (ESS) as a code recognized method to provide emergency or standby power for means of egress illumination and exit signs in Chapter 10 of the code. The proposal also includes product safety certification requirements in 1203.1.1/2702.1.1 and a pointer to the NFPA 855 in 1203.1.3/2702.1.3. Inclusion of ESS in the IFC/IBC aligns the codes with Article 706 of NFPA 70.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The inclusion of Energy Storage Systems (ESS) as an option to provide code required emergency or standby power will not increase nor decrease the cost of construction.

Staff Analysis: A review of the standard proposed for inclusion in the code, NFPA 855-20, with regard to the ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before March 20, 2021.

E26-21 Part I

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The proposal was disapproved because the new definition for energy storage system did not match the IFC or IECC definitions. This is addressed in the IFC, so it does not need to be added into IBC. The standard for these systems, NFPA855-20 should be referenced in the IBC if this is to be added. (Vote 14-0)

E26-21 Part I

Individual Consideration Agenda

Public Comment 1:

PART I - IBC: SECTION 202; (IFC:[BE]SECTION 202)

Proponents: Steven Rosenstock, representing Edison Electric Institute (srosenstock@eei.org) requests As Modified by Public Comment

Modify as follows:

2021 International Building Code

ENERGY STORAGE SYSTEM (ESS) . ~~One or more devices, assembled together, capable of storing energy in order to support electrical energy at a future time.~~ <u>One or more components assembled together capable of storing energy and providing electrical energy into the premises wiring system or an electric power production and distribution network.</u>

Commenter's Reason: This proposed language for the definition will match the approved language found in other standards and codes, such as the National Electrical Code.

Cost Impact: The net effect of the public comment and code change proposal will not increase or decrease the cost of construction
This public comment only revises the definition and will have no impact on the cost of construction.

Public Comment# 2514

NOTE: E26-21 PART II DID NOT RECEIVE A PUBLIC COMMENT AND IS REPRODUCED FOR INFORMATIONAL PURPOSES ONLY

E26-21 Part II

Proposed Change as Submitted

Proponents: Bryan Holland, National Electrical Manufacturers Association, representing National Electrical Manufacturers Association (bryan.holland@nema.org)

2021 International Fire Code

Revise as follows:

1203.1.1 Stationary generators <u>and energy storage systems (ESS)</u>. Stationary emergency and standby power generators required by this code shall be *listed* in accordance with UL 2200. <u>Energy storage systems (ESS) installed as an emergency or standby power system required by this code shall be listed in accordance with UL 9540.</u>

1203.1.3 Installation. Emergency power systems and standby power systems shall be installed in accordance with the *International Building Code*, NFPA 70, NFPA 110 and NFPA 111<u> and NFPA 855</u>.

Add new standard(s) as follows:

NFPA

National Fire Protection Association
1 Batterymarch Park
Quincy, MA 02169-7471

<u>NFPA 855-20</u> <u>Standard f or t he Installation of Stationary Energy Storage Systems</u>

Reason: See E26-21 Part 1

Cost Impact: The code change proposal will not increase or decrease the cost of construction
See E26-21 Part 1

Staff Analysis: A review of the standard proposed for inclusion in the code, NFPA 855-20, with regard to the ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before March 20, 2021.

E26-21 Part II

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: This proposal was disapproved based upon the action on F123-21. Section 1207 is a more appropriate compliance path. (Vote: 14-0)

E26-21 Part II

E27-21

Proposed Change as Submitted

Proponents: Mike Nugent, Chair, representing ICC Building Code Action Committee (bcac@iccsafe.org)

2021 International Building Code

Revise as follows:

1009.1 Accessible means of egress required. *Accessible* means of egress shall comply with this section. *Accessible* spaces shall be provided with not less than one accessible means of egress. Where more than one *means of egress* is required by Section 1006.2 or 1006.3 from any accessible space, each *accessible* portion of the space shall be served by not less than two accessible means of egress.

Exceptions:

1. One *accessible means of egress* is required from an *accessible mezzanine* level in accordance with Section 1009.3, 1009.4 or 1009.5.
2. In assembly areas with ramped *aisles* or stepped *aisles*, one *accessible means of egress* is permitted where the *common path of egress travel* is *accessible* and meets the requirements in Section 1030.8. <u>The common path of travel shall be measured from the wheelchair spaces along an accessible route to that point where the occupants have a choice of two accessible routes to accessible means of egress.</u>

1030.8 Common path of egress travel. The *common path of egress travel* shall not exceed 30 feet (9144 mm) from any seat to a point where an occupant has a choice of two paths of egress travel to two *exits*.

Exceptions:

1. For areas serving less than 50 occupants, the *common path of egress travel* shall not exceed 75 feet (22 860 mm).
2. For *smoke-protected* or *open-air assembly seating*, the *common path of egress travel* shall not exceed 50 feet (15 240 mm).

Reason: The intent of this proposal is to emphasize an existing requirement for accessible ways out of assembly spaces. Assemble seating is required to have at least one accessible route into a space. Wheelchair spaces have to be provided, integrated and dispersed. In space with 50 or more occupants, at least two accessible means of egress are required. Section 1009.1 allows for persons with mobility devices to return back the way out the along the same route they used to get to their seats up so the length of the common path of travel. This provides for an equivalent level of safety for everyone in the assembly seating.
This can apply to spaces such as theaters, stadiums, bleachers, grandstands and folding and telescopic seating. Where this is currently being missed the most in is raised bleacher seating. The designers provide one ramp to get in, but commonly only have one steps on the other ends of the bleachers. Very often, this common path of travel could be met by one ramp the ends at the center of the bleachers.

ICC 300 Standard for Bleachers, Folding and Telescopic Seating, and Grandstands had similar criteria for common path of egress travel –

407.4.1 Path of egress travel. For rows of seating served by only one path of egress travel, the common path of egress travel shall not exceed 30 feet (9144 mm) from any seat to a point where a person has a choice of two paths of egress travel to two exits.

Exceptions:

1. In smoke-protected or open-air assembly seating, the common path of egress travel shall not exceed 50 feet (15 240 mm) from any seat to a point where a person has a choice of two paths of egress travel to two exits.

2. For areas serving less than 50 occupants, the common path of egress travel shall not exceed 75 feet (22 860 mm) from any seat to a point where a person has a choice of two paths of egress travel to two exits.

3. Where bench-type seating without backrests is utilized and the top of the bench is no more than 7 inches (178 mm) above the footrest immediately behind, the common path of egress travel shall not exceed 75 feet (22 860 mm) from any seat to a point where a person has a choice of two paths of egress travel to two exits.

Example of ramp access to center of raised bleachers.

Example with ramp only at one end of bleachers.

This proposal is submitted by the ICC Building Code Action Committee (BCAC). BCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2020 the BCAC has held several virtual meetings open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the BCAC website at BCAC.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This is a clarification. It is not a change in the requirements for bleachers, grandstands or folding and telescopic seating.

E27-21

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The proposal was disapproved because exit access stairways can serve as part of an accessible means of egress, so raised bleachers already meet Section 1009 with two sets of stairways. The proposal is adding requirements - if you only need one accessible route to get onto the bleachers, why would you need two accessible routes off the bleachers? The proposal should add "egress" in the phrase "common path of travel" so they are using a defined term. This should be in the ICC 300, not the IBC. There were concerns raised that steps from a raised bleacher were not between stories or mezzanines, therefore they would not comply with Section 1009.3. (Vote: 9-5)

E27-21

Individual Consideration Agenda

Public Comment 1:

IBC: 1009.1 (IFC:[BE]1009.1)

Proponents: Mike Nugent, representing ICC Building Code Action Committee (bcac@iccsafe.org) requests As Modified by Public Comment

Modify as follows:

2021 International Building Code

1009.1 Accessible means of egress required . *Accessible* means of egress shall comply with this section. *Accessible* spaces shall be provided with not less than one accessible means of egress. Where more than one *means of egress* is required by Section 1006.2 or 1006.3 from any accessible space, each *accessible* portion of the space shall be served by not less than two accessible means of egress.

Exceptions:

1. One *accessible means of egress* is required from an *accessible mezzanine* level in accordance with Section 1009.3, 1009.4 or 1009.5.
2. In assembly areas with ramped *aisles* or stepped *aisles*, one *accessible means of egress* is permitted where the *common path of egress travel* is *accessible* and meets the requirements in Section 1030.8. The common path of *egress* travel shall be measured from the wheelchair spaces along an accessible route to that point where the occupants have a choice of two accessible routes to accessible means of egress.

Commenter's Reason: The modification is to use the defined term for common path of egress travel as suggested by the committee. The ICC 300 references back to the IBC for accessible means of egress (ICC 300 Section 404.1) and accessibility requirements (ICC 300 Section 310.1), therefore, this does not belong in ICC 300 as suggested by the committee. This requirement would also apply to raised tiered seating systems, not just the bleachers shown in the pictures. ICC 300 Table 404.1 requires two means of egress for bleachers with 251 or greater occupants, therefore, two accessible means of egress are already required for these large bleachers. The suggestion by some of the committee members that the stairways to raised bleachers can serve as part of an accessible means of egress is not correct because these are not stairways between stories (IBC Section 1009.3).

Cost Impact: The net effect of the public comment and code change proposal will not increase or decrease the cost of construction
This is a clarification. It is not a change in the requirements for bleachers, grandstands or folding and telescopic seating.

E28-21

Proposed Change as Submitted

Proponents: Mike Nugent, Chair, representing ICC Building Code Action Committee (bcac@iccsafe.org)

2021 International Building Code

Revise as follows:

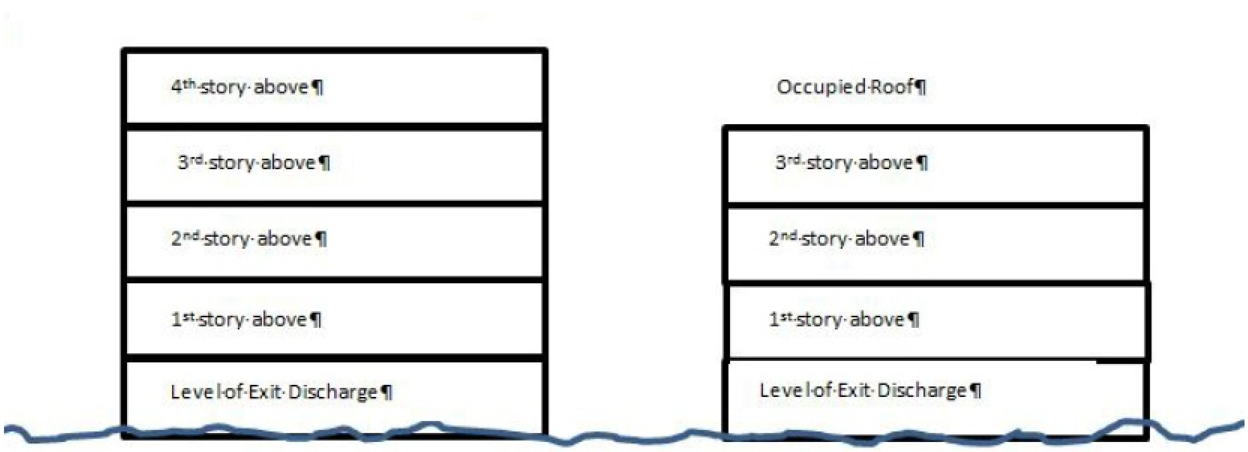
1009.2.1 Elevators required. In buildings where a required accessible floor ~~or occupied roof~~ is four or more stories above or below a *level of exit discharge* or where an accessible occupied roof is above a story that is three or more stories above the level of exit discharge, not less than one required *accessible means of egress* shall ~~be~~ include an elevator complying with Section 1009.4.

Exceptions:

1. In buildings equipped throughout with an *automatic sprinkler system* installed in accordance with Section 903.3.1.1 or 903.3.1.2, the elevator shall not be required as part of the accessible means of egress on floors provided with a *horizontal exit* and located at or above the *levels of exit discharge*.
2. In buildings equipped throughout with an *automatic sprinkler system* installed in accordance with Section 903.3.1.1 or 903.3.1.2, the elevator shall not be required on floors provided with a *ramp* conforming to the provisions of Section 1012.

Reason: The intent of this proposal is a clarification in terminology.
The new language added by E30-18 is confusing. An occupied roof is not a story. Therefore, to be clear, the requirement for an occupied roof should be dealt with separately from the number of stories in a building. It is not the intent of this proposal to change to result of what was voted approved by the MOE Code Development Committee.

It is important to point out that the original change said that there was no fiscal impact. Since the occupied roof is not considered a story for height and area limitations, with the 2018 text, it could have been interpreted that standby power was not required to an occupied roof on a 4 story building. Therefore, this does have a significant cost for a 4 story building that decides to have an occupied roof.



Height at which standby power would be required on the elevator for accessible MOE

The addition of “as part of the means of egress” added into the exceptions will clarify this limitation all the exception. The elevator is part of the accessible means of egress, not the only piece. When an elevator is required as part of an accessible means of egress, Section 1009.4 would require standby power.

This is one of a series of three independent proposals for this section. If all three are passed, the result will be this. The proposals each stand on their own.

1009.2.1 Elevators required.

In buildings where a required *accessible* floor ~~or occupied roof~~ is four or more *stories* above or below a *level of exit discharge* <u>or where an accessible occupied roof is above a story that is three or more stories above the level of exit discharge,</u> not less than one required *accessible means of egress* shall be an elevator complying with Section 1009.4.

Exceptions:

1. In buildings equipped throughout with an *automatic sprinkler system* installed in accordance with Section 903.3.1.1 or 903.3.1.2, the elevator shall not be required <u>as part of an accessible means of egress</u> on floors provided with a *horizontal exit* and located at or above the *levels of exit discharge*.

2. In buildings equipped throughout with an *automatic sprinkler system* installed in accordance with Section 903.3.1.1 or 903.3.1.2, the elevator shall not be required <u>as part of an accessible means of egress</u> on floors <u>or occupied roofs</u> provided with a *ramp* conforming to the provisions of Section 1012.

<u>3. In buildings equipped throughout with an automatic sprinkler system installed in accordance with Section 903.3.1.1 or 903.3.1.2, the elevator shall not be required as part of an accessible means of egress for an occupied roof where the floors located at or above the level of exit discharge are provided with a horizontal exit.</u>

This proposal is submitted by the ICC Building Code Action Committee (BCAC). BCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2020 the BCAC has held several virtual meetings open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the BCAC website at BCAC.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This is a clarification of the text and has no technical changes to construction requirements.

E28-21

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The proposal was disapproved because an occupied roof is not a story so this revision does not clarify the requirements. (Vote: 8-6)

E28-21

Individual Consideration Agenda

Public Comment 1:

Proponents: Mike Nugent, representing ICC Building Code Action Committee (bcac@iccsafe.org) requests As Submitted

Commenter's Reason: The committee statement for disapproval is the very reason that this proposal is needed. There was a tendency to overthink the issue here. But, clearly an occupied roof is not a story – therefore it needs to be clarified on what height of building (in stories) with an occupied roof needs to provide an elevator with standby power. Standby power is an expensive item, so it is important to be technically correct.

Cost Impact: The net effect of the public comment and code change proposal will not increase or decrease the cost of construction
This is a clarification of the text and has no technical changes to construction requirements.

Public Comment# 2587

E33-21

Proposed Change as Submitted

Proponents: Andrew Klein, representing Self Storage Association (andrew@asklein.com)

2021 International Building Code

Revise as follows:

1009.2.1 Elevators required. In buildings where a required accessible floor or occupied roof is four or more stories above or below a *level of exit discharge*, not less than one required *accessible means of egress* shall be an elevator complying with Section 1009.4.

Exceptions:

1. In buildings equipped throughout with an *automatic sprinkler system* installed in accordance with Section 903.3.1.1 or 903.3.1.2, the elevator shall not be required on floors provided with a *horizontal exit* and located at or above the *levels of exit discharge*.
2. In buildings equipped throughout with an *automatic sprinkler system* installed in accordance with Section 903.3.1.1 or 903.3.1.2, the elevator shall not be required on floors provided with a *ramp* conforming to the provisions of Section 1012.
3. In parking garages with no accessible parking space on levels other than the level of exit discharge, the elevator shall serve as an part of an accessible means of egress for stories or occupied roofs six or more stories above a level of exit discharge.
4. In self-service storage facilities with no accessible self-storage spaces on levels other than the level of exit discharge, the elevator shall serve as an part of an accessible means of egress for stories or occupied roofs six or more stories above a level of exit discharge.

Reason: Parking garages and self-service storage facilities have extremely low occupancy loads. Increasing the 4-story limit to 6-stories for when standby power for elevators is required takes this practical difference in uses into account.

Cost Impact: The code change proposal will decrease the cost of construction
The significant cost of a standby generator can be avioded in 5- and 6- story parking garages and self-service storage facilities if this code change passes.

E33-21

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: This proposal was disapproved because the language could be read to only require an accessible means of egress from the 6th floor and above. People with mobility impairments could be on the upper floors. (Vote: 14-0)

E33-21

Individual Consideration Agenda

Public Comment 1:

IBC: 1009.2.1 (IFC:[BE]1009.2.1)

Proponents: Andrew Klein, representing Self Storage Association (andrew@asklein.com) requests As Modified by Public Comment

Further modify as follows:

2021 International Building Code

1009.2.1 Elevators required . In buildings where a required accessible floor or occupied roof is four or more stories above or below a *level of exit discharge*, not less than one required *accessible means of egress* shall be an elevator complying with Section 1009.4.

Exceptions:

1. In buildings equipped throughout with an *automatic sprinkler system* installed in accordance with Section 903.3.1.1 or 903.3.1.2, the elevator shall not be required on floors provided with a *horizontal exit* and located at or above the *levels of exit discharge*.
2. In buildings equipped throughout with an *automatic sprinkler system* installed in accordance with Section 903.3.1.1 or 903.3.1.2, the elevator shall not be required on floors provided with a *ramp* conforming to the provisions of Section 1012.
3. ~~In parking garages with no accessible parking space on levels other than the level of exit discharge, the elevator shall serve as an part of an accessible means of egress for stories or occupied roofs six or more stories above a level of exit discharge.~~

3.~~4.~~ In *self-service storage facilities* ~~with no~~ where all accessible self-storage spaces required by Table 1109.3 are on ~~levels other than~~ the level of exit discharge, ~~the elevator shall serve as an part of an accessible means of egress for stories or occupied roofs six or more stories above a level of exit discharge.~~ *accessible means of egress* shall be an elevator complying with Section 1009.4 in buildings where a required accessible floor or occupied roof is six or more stories above or below a *level of exit discharge.*

Commenter's Reason: This PC cleans up the language to make it clear that an accessible means of egress is required only in buildings with a 6th floor or more in self-service storage facilities (defined in Chapter 2) that locate the required number of accessible spaces on the level of exit discharge.
At the CAH, there was opposiotion about the inclusion of parking garages, so that exception was not included as part of this PC.

Cost Impact: The net effect of the public comment and code change proposal will decrease the cost of construction
This PC will allow 4- and 5-story self service storage facilities to avoid the need of a backup generator to power an elevator.

Public Comment# 2914

E40-21

<u>Proposed Change as Submitted</u>

Proponents: Mike Nugent, Chair, representing ICC Building Code Action Committee (bcac@iccsafe.org)

2021 International Building Code

Revise as follows:

1010.1.1 Size of doors. The required capacity of each door opening shall be sufficient for the *occupant load* thereof and shall provide a minimum clear opening width of 32 inches (813 mm). The clear opening width of doorways with swinging doors shall be measured between the face of the door and the stop, with the door open 90 degrees (1.57 rad). Where this section requires a minimum clear opening width of 32 inches (813 mm) and a door opening includes two door leaves without a mullion, one leaf shall provide a minimum clear opening width of 32 inches (813 mm). In Group I-2, doors serving as means of egress doors where used for the movement of beds shall provide a minimum clear opening width of $41^{1}/_{2}$ inches (1054 mm). The minimum clear opening height of doors shall be not less than 80 inches (2032 mm).

Exceptions:

1. In Group R-2 and R-3 *dwelling and sleeping units* that are not required to be an *Accessible unit*, *Type A unit* or *Type B unit*, the minimum width shall not apply to door openings that are not part of the required *means of egress*.
2. In Group I-3, door openings to resident *sleeping units* that are not required to be an *Accessible unit* shall have a minimum clear opening width of 28 inches (711 mm).
3. Door openings to storage closets less than 10 square feet (0.93 m^2) in area shall not be limited by the minimum clear opening width.
4. The maximum width of door leaves in revolving doors that comply with Section 1010.3.1 shall not be limited.
5. The maximum width of door leaves in *power-operated doors* that comply with Section 1010.3.2 shall not be limited.
6. Door openings within a *dwelling unit* or *sleeping unit* shall have a minimum clear opening height of 78 inches (1981 mm).
7. In *dwelling and sleeping units* that are not required to be *Accessible*, Type A or *Type B units*, exterior door openings other than the required *exit* door shall have a minimum clear opening height of 76 inches (1930 mm).
8. In Groups I-1, R-2, R-3 and R-4, in *dwelling and sleeping units* that are not required to be Accessible, Type A or *Type B units*, the minimum clear opening widths shall not apply to interior egress doors.
9. Door openings required to be *accessible* within *Type B units* intended for user passage shall have a minimum clear opening width of 31.75 inches (806 mm).
10. Doors to walk-in freezers and coolers less than 1,000 square feet (93 m^2) in area shall have a maximum width of 60 inches (1524 mm) nominal.
11. Doors serving ~~nonaccessible single-user shower or~~ sauna compartments, toilet ~~stalls~~ <u>compartments</u> or dressing, fitting or changing ~~rooms~~ <u>compartments that are not required to be accessible</u> shall have a minimum clear opening width of 20 inches (508 mm).
12. <u>Door serving shower compartments in other than Accessible units or Type A units are not required to provide a minimum clear opening width.</u>

Reason: The intent of this proposal clarify which spaces the exception applies to, and remove a conflict for shower compartments with sliding shower compartment doors.

E40-18 was a proposal that added an exception for non-accessible dressing rooms or fitting rooms. This was Disapproved during the Committee Action Hearings because it could be applied to a large changing room that accommodates several individuals, such as a bridal fitting room where the 32” clear width door opening is necessary. The revision to Exception #11 would clarify that this applies to compartments, not rooms.The Proponent submitted a Public Comment revising and combining some of the exceptions into one exception for doors serving non-accessible single-user showers, toilet stalls, and dressing rooms, and allowed for a minimum clear opening width of 20”. The Reason Statement stated that the 20” width came from research to address doors serving these types of individual uses, and that it would address the needs of non-accessible dressing rooms, single-use toilet rooms, and shower compartments — all for single-person use rooms.
Exception #11 currently requires a 20” minimum clear opening for doors serving non-accessible single shower compartments. But that minimum clear opening width would conflict with the width of a sliding door on a standard 36”x36” shower compartments.

Revising exception #11 would remove shower compartments from the list of spaces where a 20” clear width opening requirement would apply to the door opening and move that to exception #12. Shower compartments in Accessible and Type A units would comply with 2017 ICC A117.1

requirements in Section 608.7. Type B units do not have a requirement for an opening width of the shower compartment door (2017 ICC A117.1 Section 1104.5.2 and 1004.11.3.1.3.3). This change to the exceptions in this section would protect remodelers who do work on Type B or non-accessible bathrooms with limited space and without having to make adjustments such as moving the walls of a shower unit to accommodate a 20" clear width door opening or to change to enclosure to a swinging instead of a sliding door. This would be an unnecessary additional cost. This width has never been identified as a safety hazard.

This proposal is submitted by the ICC Building Code Action Committee (BCAC). BCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2020 the BCAC has held several virtual meetings open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the BCAC website at BCAC.

Cost Impact: The code change proposal will decrease the cost of construction
This will allow for standard sliding shower doors instead of requiring swinging doors on shower compartments. Swinging doors typically also need a larger room size.

E40-21

Public Hearing Results

This proposal includes the following errata
The underline was missing from Section 1010.1.1 Item 11 for the phrase "compartments that are not required to be accessible."

Committee Action: **As Submitted**

Committee Reason: The proposal was approved because the added exception 12 allowed for sliding doors on standard 36 inch wide showers. These showers cannot make the 20" minimum width in exception 11. There was concern that this needs to be coordinated with IPC Section 421.4.2. (Vote: 10-4)

E40-21

Individual Consideration Agenda

Public Comment 1:

IBC: 1010.1.1

Proponents: Richard Williams, representing Washington Association of Building Officials Technical Code Development Committee (richard@cwaconsultants.net); Micah Chappell, representing Washington Association of Building Officials (micah.chappell@seattle.gov) requests As Modified by Public Comment

Modify as follows:

2021 International Building Code

1010.1.1 Size of doors . The required capacity of each door opening shall be sufficient for the *occupant load* thereof and shall provide a minimum clear opening width of 32 inches (813 mm). The clear opening width of doorways with swinging doors shall be measured between the face of the door and the stop, with the door open 90 degrees (1.57 rad). Where this section requires a minimum clear opening width of 32 inches (813 mm) and a door opening includes two door leaves without a mullion, one leaf shall provide a minimum clear opening width of 32 inches (813 mm). In Group I-2, doors serving as means of egress doors where used for the movement of beds shall provide a minimum clear opening width of $41^1/_2$ inches (1054 mm). The minimum clear opening height of doors shall be not less than 80 inches (2032 mm).

Exceptions:

1. In Group R-2 and R-3 *dwelling and sleeping units* that are not required to be an *Accessible unit*, *Type A unit* or *Type B unit*, the minimum width shall not apply to door openings that are not part of the required *means of egress*.
2. In Group I-3, door openings to resident *sleeping units* that are not required to be an *Accessible unit* shall have a minimum clear opening width of 28 inches (711 mm).

3. Door openings to storage closets less than 10 square feet (0.93 m^2) in area shall not be limited by the minimum clear opening width.
4. The maximum width of door leaves in revolving doors that comply with Section 1010.3.1 shall not be limited.
5. The maximum width of door leaves in *power-operated doors* that comply with Section 1010.3.2 shall not be limited.
6. Door openings within a *dwelling unit* or *sleeping unit* shall have a minimum clear opening height of 78 inches (1981 mm).
7. In *dwelling and sleeping units* that are not required to be *Accessible*, Type A or *Type B units*, exterior door openings other than the required *exit* door shall have a minimum clear opening height of 76 inches (1930 mm).
8. In Groups I-1, R-2, R-3 and R-4, in *dwelling and sleeping units* that are not required to be Accessible, Type A or *Type B units*, the minimum clear opening widths shall not apply to interior egress doors.
9. Door openings required to be *accessible* within *Type B units* intended for user passage shall have a minimum clear opening width of 31.75 inches (806 mm).
10. Doors to walk-in freezers and coolers less than 1,000 square feet (93 m^2) in area shall have a maximum width of 60 inches (1524 mm) nominal.
11. Doors serving sauna compartments, toilet compartments or dressing, fitting or changing compartments that are not required to be accessible shall have a minimum clear opening width of 20 inches (508 mm).
12. Door serving shower compartments ~~in other than Accessible units or Type A units are not required to provide a minimum clear opening widthwidth.~~ shall comply with Section 421.4.2 of the International Plumbing Code .

Commenter's Reason: This proposal attempts to clarify requirements for shower doors by removing them from Exception 11 and adding a new exception specific to shower compartments. In doing so, it creates confusion by including Accessible units and Type A units found in R occupancies to a section that previously only addressed accessible spaces in commercial buildings. In fact it now only addresses Accessible units and Type A units. Because of the the way it is worded, this proposal removes door opening width requirements for shower doors in some accessible shower areas. **This means that this section now indicates there is no minimum width requirement for shower doors in single user shower compartments - whether they are accessible or not – and this is clearly not correct.**

One reason cited for revising exception 11 is that because a 20” minimum clear opening is currently required for doors serving non-accessible single shower compartments, that minimum width requirement would conflict with a sliding door on a standard 36”x36” shower compartment. This is not necessarily a conflict, it merely means that it is not possible to install a sliding door where a 36” width is provided because it will not provide the minimum required width. In these situations, a hinged door would be required in order to provide the minimum width. This is no different than any other area of the building where a sliding door is allowed: if there is not enough physical space to install the sliding door to allow for the required clear width, then a hinged door would instead be required.

Exception 12 also does not include Type B units along with Accessible units and Type A units. This means a minimum width requirement would not apply to Type B units. The reason statement claims Type B units do not have a requirement for an opening width of the shower door compartment, per sections 1104.5.2 and 1004.11.3.1.3.3, but this is not entirely accurate. Section 1104.5.2 contains an exception that states doors that are part of a shower door assembly shall not be required to comply with minimum width requirements. Section 1104.11.3.1.3.3 sets a minimum opening width of 36” for shower compartments, but it allows for shower door assemblies to be installed in shower compartments as long as these assemblies can be removed without removal or replacement of the surrounding walls and floor to which it is affixed. This is an important distinction from other shower areas that would allow for any framed opening width less than 36" to accommodate a shower door and the author of this proposal does not seem to acknowledge this:

“…This change to the exceptions in this section would protect remodelers who do work on Type B or non-accessible bathrooms with limited space and without having to make adjustments such as moving the walls of a shower unit to accommodate a 20”clear width door opening or to change to enclosure to a swinging instead of a sliding door. This would be an unnecessary additional cost. This width has never been identified as a safety hazard.”

The reference will indicate the minimum width requirement for most shower doors in the IPC. Also, while we certainly do not think it was the intent of the author of this proposal, exception 12 eliminates the minimum width requirement for shower doors in ACCESSIBLE SHOWER COMPARTMENTS other than those in Accessible units and Type A units. This is clearly not permitted.

Cost Impact: The net effect of the public comment and code change proposal will not increase or decrease the cost of construction
No change to code.

E43-21

Proposed Change as Submitted

Proponents: John Woestman, Kellen Company, representing Builders Hardware Manufacturers Assoc. (BHMA) (jwoestman@kellencompany.com)

2021 International Building Code

Add new definition as follows:

AUTOMATIC FLUSH BOLT. Door locking hardware, installed on the inactive leaf of a pair of doors, which has a bolt that is extended automatically into the door frame or floor when the active leaf is closed after the inactive leaf, and which holds the inactive leaf in a closed position. When the active leaf is opened, the automatic flush bolt retracts the bolt or rod allowing the inactive leaf to be opened (see CONSTANT LATCHING BOLT, DEAD BOLT, MANUAL BOLT).

CONSTANT LATCHING BOLT. Door locking hardware installed on the inactive leaf of a pair of doors, which has a bolt that automatically latches into the door frame or the floor, and which holds the inactive leaf in a closed position. The latch bolt is retracted manually to allow the inactive leaf to be opened.

DEAD BOLT. Door locking hardware with a bolt which is extended and retracted by action of the lock mechanism (see AUTOMATIC FLUSH BOLT, CONSTANT LATCHING BOLT, MANUAL BOLT).

MANUAL BOLT. Door locking hardware operable from one side of the door, or from the edge of a door leaf, with a bolt or rod extended and retracted by manual movement of the bolt or rod, such as a manual flush bolt or manual surface bolt (see AUTOMATIC FLUSH BOLT, CONSTANT LATCHING BOLT, DEAD BOLT).

Revise as follows:

1010.2.1 Unlatching. The unlatching of any door or leaf for egress shall require not more than one motion in a single linear or rotational direction to release all latching and all locking devices. *Manual bolt* locks are not permitted.

Exceptions:

1. Places of detention or restraint.
2. Where ~~manually operated~~ *manual bolt* locks are permitted by Section ~~1010.2.5.~~ 1010.2.4 Item 4.
3. Doors with *automatic flush bolts* as permitted by Section 1010.2.4, Item 4.
4. Doors from individual *dwelling units* and *sleeping units* of Group R occupancies as permitted by Section 1010.2.4, Item 5.

1010.2.4 Locks and latches. Locks and latches shall be permitted to prevent operation of doors where any of the following exist:

1. Places of detention or restraint.
2. In Group I-1, Condition 2 and Group I-2 occupancies where the clinical needs of persons receiving care require containment or where persons receiving care pose a security threat, provided that all clinical staff can readily unlock doors at all times, and all such locks are keyed to keys carried by all clinical staff at all times or all clinical staff have the codes or other means necessary to operate the locks at all times.
3. In buildings in occupancy Group A having an *occupant load* of 300 or less, Groups B, F, M and S, and in *places of religious worship*, the main door or doors are permitted to be equipped with key-operated locking devices from the egress side provided:
   3.1. The locking device is readily distinguishable as locked.
   3.2. A readily visible durable sign is posted on the egress side on or adjacent to the door stating: THIS DOOR TO REMAIN UNLOCKED WHEN THIS SPACE IS OCCUPIED. The sign shall be in letters 1 inch (25 mm) high on a contrasting background.
   3.3. The use of the key-operated locking device is revocable by the *building official* for due cause.
4. ~~Where egress doors are used in pairs, *approved* automatic flush bolts shall be permitted to be used, provided that the door leaf having the automatic flush bolts does not have a doorknob or surface-mounted hardware.~~ *Manual bolt* locks, *automatic flush bolts*, and *constant latching bolts* on the inactive leaf of a pair of doors in accordance with Table 1010.2.4, provided the inactive leaf having a *manual bolt* lock, *automatic flush bolt*, or *constant latching bolt* does not have a doorknob, panic hardware, or similar operating hardware.
5. Doors from individual *dwelling* or *sleeping units* of Group R occupancies having an *occupant load* of 10 or less are permitted to be equipped with a night latch, *dead bolt*, *manual bolt*, or security chain, provided such devices are openable from the inside without the use of a key or tool.

6. *Fire doors* after the minimum elevated temperature has disabled the unlatching mechanism in accordance with *listed fire door* test procedures.

7. Doors serving roofs not intended to be occupied shall be permitted to be locked preventing entry to the building from the roof.

8. Other than egress *courts*, where occupants must egress from an exterior space through the building for *means of egress*, exit access doors shall be permitted to be equipped with an approved locking device where installed and operated in accordance with all of the following:

    8.1. The maximum *occupant load* shall be posted where required by Section 1004.9. Such signage shall be permanently affixed inside the building and shall be posted in a conspicuous space near all the exit access doorways.

    8.2. A weatherproof telephone or two-way communication system installed in accordance with Sections 1009.8.1 and 1009.8.2 shall be located adjacent to not less than one required exit access door on the exterior side.

    8.3. The egress door locking device is readily distinguishable as locked and shall be a key-operated locking device.

    8.4. A clear window or glazed door opening, not less than 5 square feet (0.46 m^2) in area, shall be provided at each exit access door to determine if there are occupants using the outdoor area.

    8.5. A readily visible, durable sign shall be posted on the interior side on or adjacent to each locked required exit access door serving the exterior area stating, "THIS DOOR TO REMAIN UNLOCKED WHEN THE OUTDOOR AREA IS OCCUPIED." The letters on the sign shall be not less than 1 inch (25.4 mm) high on a contrasting background.

    8.6. The *occupant load* of the occupied exterior area shll not exceed 300 occupants in accordance with Section 1004.

9. Locking devices are permitted on doors to balconies, decks or other exterior spaces serving individual dwelling or sleeping units.

10. Locking devices are permitted on doors to balconies, decks or other exterior spaces of 250 square feet (23.23 m^2) or less serving a private office space.

Add new text as follows:

TABLE 1010.2.4 MANUAL BOLTS, AUTOMATIC FLUSH BOLTS AND CONSTANT LATCHING BOLTS ON THE INACTIVE LEAF OF A PAIR OF DOORS

APPLICATION WHERE A PAIR OF DOORS WITH AN ACTIVE LEAF AND INACTIVE LEAF SERVE THE FOLLOWING:	**OCCUPANT LOAD OF SPACE SERVED BY THE PAIR OF DOORS**	**THE PAIR OF DOORS ARE REQUIRED TO COMPLY WITH SECTION 716**	**PERMITTED USES OF MANUAL BOLT LOCKS, AUTOMATIC FLUSH BOLTS AND CONSTANT LATCHING BOLTS ON THE INACTIVE LEAF OF A PAIR OF DOORS.**		
			Manual flush bolts or manual surface bolts with manual extension and retraction of bolt.	Automatic flush bolts with automatic extension and retraction of bolt by action of active leaf.	Constant latching bolts with automatic latching and manual retraction of bolt or latch.
Group B, F, or S occupancy	Less than 50	NO	P	P	P
		YES	NP	P[b]	P
Group B,F, or S occupancies where the building is equipped with an automatic sprinkler system in accordance with Section 903.3.1.1, and where the inactive leaf is not needed to meet egress capacity requirements.	Occupant load served by the active leaf.	NO	P	P	P
		YES	NP	P[b]	P
Patient care rooms in Group I-2 occupancies, and where the inactive leaf is not needed to meet egress capacity requirements.	Occupant load served by the active leaf.	NO	NP	P[b]	P
		YES	NP	P[b]	P
Ooccupancies where panic hardware is not required, the egress doors are used in pairs, and where both the active and inactive leafs are required to meet egress capacity requirements.	Occupant load served by both leafs.	NO	NP	P	NP
		YES	NP	P[b]	NP
Storage or equipment rooms.	Occupant load served by the active leaf.	NO	P[a]	P	P
		YES	P[a]	P	P

P - Permitted; NP - Not permitted.

a. Not permitted in Group I-2 where corridor doors are required to be positive latching, and the storage or equipment room door is in the corridor.

b. Permitted where both doors are self-closing or automatic-closing, and have a coordinator that causes the inactive leaf to be closed prior to the active leaf.

Delete without substitution:

~~**1010.2.5 Bolt locks**~~.
~~Manually operated flush bolts or surface bolts are not permitted.~~

~~**Exceptions:**~~

1. ~~On doors not required for egress in individual *dwelling units* or *sleeping units*.~~
2. ~~Where a pair of doors serves a storage or equipment room, manually operated edge- or surface-mounted bolts are permitted on the inactive leaf.~~
3. ~~Where a pair of doors serves an *occupant load* of less than 50 persons in a Group B, F or S occupancy, manually operated edge- or surface-mounted bolts are permitted on the inactive leaf. The inactive leaf shall not contain doorknobs, *panic* bars or similar operating hardware.~~
4. ~~Where a pair of doors serves a Group B, F or S occupancy, manually operated edge- or surface-mounted bolts are permitted on the inactive leaf provided that such inactive leaf is not needed to meet egress capacity requirements and the building is equipped throughout with an *automatic sprinkler system* in accordance with Section 903.3.1.1. The inactive leaf shall not contain doorknobs, *panic* bars or similar operating hardware.~~
5. ~~Where a pair of doors serves patient care rooms in Group I-2 occupancies, self-latching edge- or surface-mounted bolts are permitted on the inactive leaf provided that the inactive leaf is not needed to meet egress capacity requirements and the inactive leaf shall not contain doorknobs, *panic* bars or similar operating hardware.~~

Reason: The IBC is rather confusing regarding dead bolts, manual bolt locks, and automatic flush bolts leading to significant variability in interpretations and application of the code.
This proposal offers four definitions, and revises sections of the IBC where these hardware items are addressed with requirements.

The most significant revision is to incorporate all the requirements of Section 1010.2.5 into Sections 1010.2.1 and 1010.2.4.

Here's what happened with requirements and exceptions of 1010.2.5:

- The charging language that "manually operated flush bolts and surface bots are not permitted" is revised based on the proposed definition of "manual bolt" and included in the charging language of 1010.2.1. Exception 2 of 1010.2.1 was also revised based on the definition of "manual bolt".
- Exception 1 of 1010.2.5 is included in revised 1010.2.4 Item 5 with inserting "manual bolt" in that item.
- Exceptions 2 through 5 of 1010.2.5 are included in proposed Table 1010.2.4. Item 4 of 1010.2.4 is revised to reference Table 1010.2.4.

The applications in Exceptions 2 through 5 of 1010.2.5 are incorporated into proposed Table 1010.2.4. Also included in this table is Item 4 of 1010.2.4, which is an application where automatic flush bolt are acceptable: Spaces served by egress doors in pairs where the doors are not required to be equipped with panic hardware, and both door leafs are used for egress capacity.

Also, doors required to comply with IBC Section 716 (opening protectives) are also required to be self-latching or automatic latching. Proposed Table 1010.2.4 includes this determining factor as to what hardware may be used.

Several technical changes were incorporated in proposed Table 1010.2.4 that are not currently in these sections:·

- For Group I-2, the table clarifies manual bolt locks are not appropriate for use on patient care room doors where the door is required to be positive latching.
- The current requirements don't differentiate between doors required to be fire-rated or not. That is, required to comply with Section 716 or not.
- For I-2 patient care rooms, Exception 5 of 1010.2.5 permitted what are called constant latching bolts. But the code was silent on other applications where these door hardware items may be desired and appropriate (where the inactive leaf is not needed for egress).
- Didn't address using automatic flush bolts on the inactive leaf of patient care rooms, if the doors have closers and a coordinator which causes the inactive leaf to close prior to the active leaf.
- For storage and equipment rooms, manual bolts have been permitted, but automatic flush bolts and constant latching bolts would also be considered acceptable on the inactive leaf of storage and equipment rooms.

Manual bolt locks are typically located on the egress side of a door and have no operating parts on the other side of the door. Manual bolt are typically installed on the surface of the door panel, or installed flush with the edge or surface of the door

A dead bolt is manually extended from the egress side of the door by turning a thumb turn, or by manually pushing a button causing spring action to extend the lock bolt. Dead bolts are typically retracted (unlocked) from the egress side of the door by a thumb turn, or operation of the handle or lever. In very limited applications dead bolts may be extended and retracted by use of a key (see IBC Section 1010.2.4 Exception 3). On the ingress side of the door (the access side), dead bolts are typically extended (locked) and retracted (unlocked) by use of a key. Dead bolts are not considered to be manual bolt locks (see the definition for manual bolts).

The image below illustrates two manual bolts, an automatic flush bolt, and a constant latching (flush) bolt.

1 – Manual bolt mounted on the face of the door; the bolt is operated manually.

2 – Manual bolt mounted flush on the door edge; the bolt is projected and retracted manually using a small lever.
3 – Automatic flush bolt installed on the inactive leaf, and projected automatically when the active leaf closes, and retracted when the active leaf opens.

4 – Constant-latching (flush) bolt has a self-latching bolt which is retracted manually.

Dead bolt. Courtesy Allegion

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal provides updated guidance on "shall be permitted" locking hardware, and is an attempt to bring clarity to the requirements in the IBC.

E43-21

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: This proposal was disapproved, however the committee felt that cleanup of the language for bolts is needed. In Table 1010.2.4, it is recommended to take out "inactive leaf is not needed to meet egress capacity requirements." Would this be confused with Group I-2 constant latching? (Vote : 10-3)

E43-21

Individual Consideration Agenda

Public Comment 1:

IBC: 1010.2.1, 1010.2.4, Table 1010.2.4 (IFC:[BE] 1010.2.1, 1010.2.4, Table 1010.2.4)

Proponents: John Woestman, representing Builders Hardware Manufacturers Assoc. (BHMA) (jwoestman@kellencompany.com) requests As Modified by Public Comment

Modify as follows:

2021 International Building Code

1010.2.1 Unlatching . The unlatching of any door or ~~leaf for egress shall require not more than one motion in~~ leaf for egress shall require not more than one motion in a single linear or rotational direction to release all latching and all ~~locking devices.~~ locking devices. *Manual* ~~*bolt locks*~~ *bolts* are not permitted.

Exceptions:

1. Places of detention or restraint.

~~2. Where *manual bolt* locks are permitted by Section 1010.2.4 Item 4.~~

~~3. Doors with *automatic flush bolts* as permitted by Section 1010.2.4, Item 4.~~

2.~~4.~~ Doors with *manual bolts*, *automatic flush bolts* and *constant latching bolts* as permitted by Section 1010.2.4, Item 4.

3.~~4.~~ Doors from individual *dwelling units* and *sleeping units* of Group R occupancies as permitted by Section 1010.2.4, Item 5.

1010.2.4 Locks and latches . Locks and latches shall be permitted to prevent operation of doors where any of the following exist:

1. Places of detention or restraint.
2. In Group I-1, Condition 2 and Group I-2 occupancies where the clinical needs of persons receiving care require containment or where persons receiving care pose a security threat, provided that all clinical staff can readily unlock doors at all times, and all such locks are keyed to keys carried by all clinical staff at all times or all clinical staff have the codes or other means necessary to operate the locks at all times.
3. In buildings in occupancy Group A having an *occupant load* of 300 or less, Groups B, F, M and S, and in *places of religious worship*, the main door or doors are permitted to be equipped with key-operated locking devices from the egress side provided:

   3.1. The locking device is readily distinguishable as locked.

   3.2. A readily visible durable sign is posted on the egress side on or adjacent to the door stating: THIS DOOR TO REMAIN UNLOCKED WHEN THIS SPACE IS OCCUPIED. The sign shall be in letters 1 inch (25 mm) high on a contrasting background.

   3.3. The use of the key-operated locking device is revocable by the *building official* for due cause.

4. *Manual* ~~*bolt*~~ ~~locks~~ *bolts*, *automatic flush bolts,* and *constant latching bolts* on the inactive leaf of a pair of doors in accordance with Table 1010.2.4, provided the inactive leaf ~~having a *manual bolt* lock, *automatic flush bolt*, or *constant latching bolt*~~ does not have a doorknob, panic hardware, or similar operating hardware.
5. Doors from individual *dwelling* or *sleeping units* of Group R occupancies having an *occupant load* of 10 or less are permitted to be equipped with a night latch, *dead bolt*, *manual bolt*, or security chain, provided such devices are openable from the inside without the use of a key or tool.
6. *Fire doors* after the minimum elevated temperature has disabled the unlatching mechanism in accordance with *listed fire door* test procedures.
7. Doors serving roofs not intended to be occupied shall be permitted to be locked preventing entry to the building from the roof.
8. Other than egress *courts*, where occupants must egress from an exterior space through the building for *means of egress*, exit access doors shall be permitted to be equipped with an approved locking device where installed and operated in accordance with all of the following:

   8.1. The maximum *occupant load* shall be posted where required by Section 1004.9. Such signage shall be permanently affixed inside the building and shall be posted in a conspicuous space near all the exit access doorways.

   8.2. A weatherproof telephone or two-way communication system installed in accordance with Sections 1009.8.1 and 1009.8.2 shall be located adjacent to not less than one required exit access door on the exterior side.

   8.3. The egress door locking device is readily distinguishable as locked and shall be a key-operated locking device.

   8.4. A clear window or glazed door opening, not less than 5 square feet (0.46 m^2) in area, shall be provided at each exit access door to determine if there are occupants using the outdoor area.

8.5. A readily visible, durable sign shall be posted on the interior side on or adjacent to each locked required exit access door serving the exterior area stating, "THIS DOOR TO REMAIN UNLOCKED WHEN THE OUTDOOR AREA IS OCCUPIED." The letters on the sign shall be not less than 1 inch (25.4 mm) high on a contrasting background.

8.6. The *occupant load* of the occupied exterior area shll not exceed 300 occupants in accordance with Section 1004.

9. Locking devices are permitted on doors to balconies, decks or other exterior spaces serving individual dwelling or sleeping units.

10. Locking devices are permitted on doors to balconies, decks or other exterior spaces of 250 square feet (23.23 m^2) or less serving a private office space.

~~TABLE 1010.2.4 MANUAL BOLTS, AUTOMATIC FLUSH BOLTS AND CONSTANT LATCHING BOLTS ON THE INACTIVE LEAF OF A PAIR OF DOORS~~

~~APPLICATION WHERE A PAIR OF DOORS WITH AN ACTIVE LEAF AND INACTIVE LEAF SERVE THE FOLLOWING:~~	**~~OCCUPANT LOAD OF SPACE SERVED BY THE PAIR OF DOORS~~**	**~~THE PAIR OF DOORS ARE REQUIRED TO COMPLY WITH SECTION 716~~**	**~~PERMITTED USES OF MANUAL BOLT LOCKS, AUTOMATIC FLUSH BOLTS AND CONSTANT LATCHING BOLTS ON THE INACTIVE LEAF OF A PAIR OF DOORS.~~**		
			~~Manual flush bolts or manual surface bolts with manual extension and retraction of bolt.~~	~~Automatic flush bolts with automatic extension and retraction of bolt by action of active leaf.~~	~~Constant latching bolts with automatic latching and manual retraction of bolt or latch.~~
~~Group B, F, or S occupancy~~	~~Less than 50~~	~~NO~~	~~P~~	~~P~~	~~P~~
		~~YES~~	~~NP~~	~~P[b]~~	~~P~~
~~Group B,F, or S occupancies where the building is equipped with an automatic sprinkler system in accordance with Section 903.3.1.1, and where the inactive leaf is not needed to meet egress capacity requirements.~~	~~Occupant load served by the active leaf.~~	~~NO~~	~~P~~	~~P~~	~~P~~
		~~YES~~	~~NP~~	~~P[b]~~	~~P~~
~~Patient care rooms in Group I-2 occupancies, and where the inactive leaf is not needed to meet egress capacity requirements.~~	~~Occupant load served by the active leaf.~~	~~NO~~	~~NP~~	~~P[b]~~	~~P~~
		~~YES~~	~~NP~~	~~P[b]~~	~~P~~
~~Ooccupancies where panic hardware is not required, the egress doors are used in pairs, and where both the active and inactive leafs are required to meet egress capacity requirements.~~	~~Occupant load served by both leafs.~~	~~NO~~	~~NP~~	~~P~~	~~NP~~
		~~YES~~	~~NP~~	~~P[b]~~	~~NP~~
~~Storage or equipment rooms.~~	~~Occupant load served by the active leaf.~~	~~NO~~	~~P[a]~~	~~P~~	~~P~~
		~~YES~~	~~P[a]~~	~~P~~	~~P~~

~~P - Permitted; NP - Not permitted.~~

a. ~~Not permitted in Group I-2 where corridor doors are required to be positive latching, and the storage or equipment room door is in the corridor.~~

b. ~~Permitted where both doors are self-closing or automatic-closing, and have a coordinator that causes the inactive leaf to be closed prior to the active leaf.~~

TABLE 1010.2.4
MANUAL BOLTS, AUTOMATIC FLUSH BOLTS AND CONSTANT LATCHING BOLTS ON THE INACTIVE LEAF OF A PAIR OF DOORS

APPLICATION WITH A PAIR OF DOORS WITH AN ACTIVE LEAF AND INACTIVE LEAF	THE PAIR OF DOORS ARE REQUIRED TO COMPLY WITH SECTION 716	PERMITTED USES OF MANUAL BOLTS, AUTOMATIC FLUSH BOLTS, AND CONSTANT LATCHING BOLTS ON THE INACTIVE LEAF OF A PAIR OF DOORS.		
		Surface or flush mounted manual bolts	Automatic flush bolts	Constant latching bolts
Group B, F, or S occupancies with occupant load less than 50.	No	P	P	P
	Yes	NP	NP[b]	P
Group B,F, or S occupancies where the building is equipped with automatic sprinkler system in accordance with Section 903.3.1.1 and the inactive leaf is not needed to meet egress capacity requirements.	No	P	P	P
	Yes	NP	NP[b]	P
Group I-2 patient care and sleeping rooms where inactive leaf is not needed to meet egress capacity requirements.	No	NP	NP[b]	P
	Yes	NP	NP[b]	P
Any ooccupancy where panic hardware is not required, egress doors are used in pairs, and where both leafs are required to meet egress capacity requirements.	No	NP	P	NP
	Yes	NP	NP[b]	NP
Storage or equipment rooms where the inactive leaf is not needed to meet egress capacity requirements.	No	P[a]	P	P
	Yes	P[a]	P	P

P - Permitted; NP - Not permitted.

a. Not permitted on corridor doors in Group I-2 occupancies where corridor doors are required to be positive latching.

b. Permitted where both doors are self-closing or automatic-closing, and are provided with a coordinator that causes the inactive leaf to be closed prior to the active leaf.

Commenter's Reason: This public comment proposes in 1010.2.1, revisions to combine Exception 2 with Exception 3. And revisions in 1010.2.1 and 1010.2.4 for consistent use of the proposed defined term “manual bolt”.
This public comment also deletes and replaces proposed Table 1010.2.4 with a simpler table with minor revisions:

1. The left two columns of the originally proposed Table 1010.2.4 were combined into a single column to remove redundant text.

2. Also, where footnote “b” is used in the 2nd column from the right, the “P b” was revised to “NP b” for consistency with how footnote “a” is used in the table.

3. Editing of column and row headings for simplicity and better consistency with the proposed definitions and text.

During the committee action hearing, there was discussion that manual bolts (manual bolt locks) may not be permitted by the proposed revisions as they are currently permitted by the IBC (e.g. on a single door). An explanation of how the proposal permit manual bolts:

1. The proposal deletes, from 1010.2.5, the current prohibition of manually operated flush bolts and surface bolts, and inserts this prohibition with minor revisions in 1010.2.1 stating “*Manual bolt* locks are not permitted.

2. However, there are three (was four) exceptions to 1010.2.1.

a. Exception 2 (was Exception 3), for individual dwelling units and sleeping units of Group R occupancies, sends the reader to Section 1010.2.4 Item 5.

b. Item 5 of 1010.2.4 permits installation of a night latch, dead bolt, or security chains on doors from individual dwelling units or sleeping units of Group R occupancies having an occupant load of 10 or less. This proposal, E43-21, adds “manual bolt” to this list of hardware items (see the original E43-21 proposal as Item 5 is not proposed for revisions with this public comment).

c. The net effect is manual bolts would be permitted on doors from individual dwelling units or sleeping units of Group R occupancies with an occupant load of 10 or less in the same applications where a dead bolt or night latch have been permitted.

d. Note the 2021 IBC in 1010.2.5 permits manually operated flush bolts or surface bolts on doors not required for egress in individual dwelling units or sleeping units. The revisions in this proposal permit manual bolts on doors – not required, or required, for egress – in individual dwelling units.

3. Note: The proposed definition for manual bolts indicates manual bolts can be either flush or surface mounted.

Also during the CAH, there was discussion about permitting / not permitting manual bolts, automatic flush bolts, and constant latching bolts on doors in the means of egress per proposed Table 1010.2.4. Perhaps an explanation of where the provisions in proposed Table 1010.2.4 came from may be helpful.

1. Item 4 in 1010.2.4 (revised in E43-21) permits manual bolts, automatic flush bolts, and constant latching bolts on the inactive leaf of a pair of doors in accordance with (proposed) Table 1010.2.4 provided the inactive leaf does not have a doorknob, panic hardware, or similar operating hardware.

a. Do note Item 4 applies only to the inactive leaf of a pair of doors.

2. Proposed Table 1010.2.4, in the title of the table and in the heading of the right three columns, identifies the permitted uses of manual bolts, automatic flush bolts, and constant latching bolts on the inactive leaf of a pair of doors.

3. In proposed Table 1010.2.4,

a. Starting with the right-hand column of Table 1010.2.4, constant latching bolts, which have automatic latching and manual retraction of the bolt or latch, are proposed to be permitted:

i. On the inactive leaf where that inactive leaf is not required for egress capacity in B, F, and S occupancy groups (see deleted Exception 4 of Section 1010.2.5).

ii. On the inactive leaf of group I-2 patient care room doors (see deleted Exception 5 of Section 1010.2.5).

iii. On the inactive leaf of storage and equipment room doors where the occupant load is served by the active leaf (see deleted Exception 2 of Section 1010.2.5 – constant latching bolts release manually similar to manual bolts).

b. Automatic flush bolts, which are installed on the inactive leaf have automatic extension and have automatic retraction of the bolt by action of the active leaf, are proposed to be permitted

i. On the inactive leaf of a pair of doors in B, F, and S occupancy groups where the doors are not required to comply with IBC Section 716 for opening protectives (see deleted Exception 4 of Section 1010.2.5).

ii. For doors required to comply with 716 which are required elsewhere in the IBC to be positive latching, automatic flush bolts are not permitted on the inactive leaf unless the pair of doors meet the requirements of proposed footnote “b” requiring a coordinator to ensure the inactive leaf is closed prior to the active leaf.

iii. On doors to I-2 patient care rooms where the inactive leaf is not needed for egress capacity (see deleted Exception 4 of Section 1010.2.5).

iv. For storage or equipment rooms, wherever a manual bolt would be permitted on the inactive leaf, an automatic flush bolt should also be permitted (see deleted Exception 2 of Section 1010.2.5).

c. Surface or flush mounted manual bolts are permitted

i. On the inactive leaf in B, F, and S occupancy groups only where the inactive leaf is not needed for egress capacity (see deleted Exception 4 of Section 1010.2.5).

ii. On the inactive leaf of storage and equipment room doors where the occupant load is served by the active leaf (see deleted Exception 2 of Section 1010.2.5).

Cost Impact: The net effect of the public comment and code change proposal will not increase or decrease the cost of construction
This proposal provides updated guidance on “shall be permitted” locking hardware, and is an attempt to bring clarity to the requirements in the IBC.

Public Comment# 2814

E45-21

Proposed Change as Submitted

Proponents: John Woestman, Kellen Company, representing Builders Hardware Manufacturers Assoc. (BHMA) (jwoestman@kellencompany.com)

2021 International Building Code

Revise as follows:

1010.2.4 Locks and latches. Locks and latches shall be permitted to prevent operation of doors where any of the following exist:

1. Places of detention or restraint.
2. In Group I-1, Condition 2 and Group I-2 occupancies where the clinical needs of persons receiving care require containment or where persons receiving care pose a security threat, provided that all clinical staff can readily unlock doors at all times, and all such locks are keyed to keys carried by all clinical staff at all times or all clinical staff have the codes or other means necessary to operate the locks at all times.
3. In buildings in occupancy Group A having an *occupant load* of 300 or less, Groups B, F, M and S, and in *places of religious worship*, the main ~~door or~~ doors are permitted to be equipped with key-operated locking devices from the egress side provided:

    3.1. The doors are the main exterior doors to the building, or the doors are the main doors to the tenant space.

    3.2~~3.1~~. The locking device is readily distinguishable as locked.

    3.3~~3.2~~. A readily visible durable sign is posted on the egress side on or adjacent to the door stating: THIS DOOR TO REMAIN UNLOCKED WHEN THIS SPACE IS OCCUPIED. The sign shall be in letters 1 inch (25 mm) high on a contrasting background.

    3.4~~3.3~~. The use of the key-operated locking device is revocable by the *building official* for due cause.

4. Where egress doors are used in pairs, *approved* automatic flush bolts shall be permitted to be used, provided that the door leaf having the automatic flush bolts does not have a doorknob or surface-mounted hardware.
5. Doors from individual *dwelling* or *sleeping units* of Group R occupancies having an *occupant load* of 10 or less are permitted to be equipped with a night latch, dead bolt or security chain, provided such devices are openable from the inside without the use of a key or tool.
6. *Fire doors* after the minimum elevated temperature has disabled the unlatching mechanism in accordance with *listed fire door* test procedures.
7. Doors serving roofs not intended to be occupied shall be permitted to be locked preventing entry to the building from the roof.
8. Other than egress *courts*, where occupants must egress from an exterior space through the building for *means of egress*, exit access doors shall be permitted to be equipped with an approved locking device where installed and operated in accordance with all of the following:

    8.1. The maximum *occupant load* shall be posted where required by Section 1004.9. Such signage shall be permanently affixed inside the building and shall be posted in a conspicuous space near all the exit access doorways.

    8.2. A weatherproof telephone or two-way communication system installed in accordance with Sections 1009.8.1 and 1009.8.2 shall be located adjacent to not less than one required exit access door on the exterior side.

    8.3. The egress door locking device is readily distinguishable as locked and shall be a key-operated locking device.

    8.4. A clear window or glazed door opening, not less than 5 square feet (0.46 m^2) in area, shall be provided at each exit access door to determine if there are occupants using the outdoor area.

    8.5. A readily visible, durable sign shall be posted on the interior side on or adjacent to each locked required exit access door serving the exterior area stating, "THIS DOOR TO REMAIN UNLOCKED WHEN THE OUTDOOR AREA IS OCCUPIED." The letters on the sign shall be not less than 1 inch (25.4 mm) high on a contrasting background.

    8.6. The *occupant load* of the occupied exterior area shall not exceed 300 occupants in accordance with Section 1004.

9. Locking devices are permitted on doors to balconies, decks or other exterior spaces serving individual dwelling or sleeping units.
10. Locking devices are permitted on doors to balconies, decks or other exterior spaces of 250 square feet (23.23 m^2) or less serving a private office space.

Reason: What is now Item 3 in 2021 IBC Section 1010.2.4 permits doors to be locked not allowing ingress or egress from certain occupancies while the space is not occupied. Item 3 was revised per proposal E63-12 to recognize the main doors to a space may not be exterior doors – for example doors to a tenant space from an indoor shopping mall corridor. Unfortunately, removing the word “exterior” in what is now Item 3 has resulted in BHMA members seeing interpretations that the “main doors” can be just about any door to a space within a building. Our understanding is that this broad interpretation and application of the provisions in Item 3 are not as intended with the revisions approved in proposal. This proposal attempts to clarify Item 3 is limited to the main exterior doors a space, or the main doors to the tenant space

Cost Impact: The code change proposal will increase the cost of construction
The code proposal may increase the cost of construction if doors which were capable of being locked with a key-operated lock on the egress side would not be permitted to be locked, and a different, higher cost, lock was needed. On the other hand, this proposal may decrease the cost of construction as the locations where the key cylinder locks may be permitted may decrease slightly.

E45-21

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The proposal was disapproved. The proposed text as written appears to not be applicable to spaces with one means of egress. There was a question as to if there could be more than one door in the path of egress travel - from the tenant and then again from the building. (Vote: 9-4)

E45-21

Individual Consideration Agenda

Public Comment 1:

IBC: 1010.2.4 (IFC:[BE]1010.2.4)

Proponents: John Woestman, representing Builders Hardware Manufacturers Assoc. (BHMA) (jwoestman@kellencompany.com) requests As Modified by Public Comment

Modify as follows:

2021 International Building Code

1010.2.4 Locks and latches . Locks and latches shall be permitted to prevent operation of doors where any of the following exist:

1. Places of detention or restraint.
2. In Group I-1, Condition 2 and Group I-2 occupancies where the clinical needs of persons receiving care require containment or where persons receiving care pose a security threat, provided that all clinical staff can readily unlock doors at all times, and all such locks are keyed to keys carried by all clinical staff at all times or all clinical staff have the codes or other means necessary to operate the locks at all times.
3. In buildings in occupancy Group A having an *occupant load* of 300 or less, Groups B, F, M and S, and in *places of religious worship*, the main door or doors are permitted to be equipped with key-operated locking devices from the egress side provided:
   - 3.1. The doors are the main exterior doors to the building, or the doors are the main doors to the tenant space.
   - 3.2. The locking device is readily distinguishable as locked.
   - 3.3. A readily visible durable sign is posted on the egress side on or adjacent to the door stating: THIS DOOR TO REMAIN UNLOCKED WHEN THIS SPACE IS OCCUPIED. The sign shall be in letters 1 inch (25 mm) high on a contrasting background.
   - 3.4. The use of the key-operated locking device is revocable by the *building official* for due cause.
4. Where egress doors are used in pairs, *approved* automatic flush bolts shall be permitted to be used, provided that the door leaf having the automatic flush bolts does not have a doorknob or surface-mounted hardware.
5. Doors from individual *dwelling* or *sleeping units* of Group R occupancies having an *occupant load* of 10 or less are permitted to be equipped with a night latch, dead bolt or security chain, provided such devices are openable from the inside without the use of a key or tool.
6. *Fire doors* after the minimum elevated temperature has disabled the unlatching mechanism in accordance with *listed fire door* test procedures.
7. Doors serving roofs not intended to be occupied shall be permitted to be locked preventing entry to the building from the roof.

8. Other than egress *courts*, where occupants must egress from an exterior space through the building for *means of egress*, exit access doors shall be permitted to be equipped with an approved locking device where installed and operated in accordance with all of the following:

    8.1. The maximum *occupant load* shall be posted where required by Section 1004.9. Such signage shall be permanently affixed inside the building and shall be posted in a conspicuous space near all the exit access doorways.

    8.2. A weatherproof telephone or two-way communication system installed in accordance with Sections 1009.8.1 and 1009.8.2 shall be located adjacent to not less than one required exit access door on the exterior side.

    8.3. The egress door locking device is readily distinguishable as locked and shall be a key-operated locking device.

    8.4. A clear window or glazed door opening, not less than 5 square feet (0.46 m^2) in area, shall be provided at each exit access door to determine if there are occupants using the outdoor area.

    8.5. A readily visible, durable sign shall be posted on the interior side on or adjacent to each locked required exit access door serving the exterior area stating, "THIS DOOR TO REMAIN UNLOCKED WHEN THE OUTDOOR AREA IS OCCUPIED." The letters on the sign shall be not less than 1 inch (25.4 mm) high on a contrasting background.

    8.6. The *occupant load* of the occupied exterior area shall not exceed 300 occupants in accordance with Section 1004.

9. Locking devices are permitted on doors to balconies, decks or other exterior spaces serving individual dwelling or sleeping units.
10. Locking devices are permitted on doors to balconies, decks or other exterior spaces of 250 square feet (23.23 m^2) or less serving a private office space.

Commenter's Reason: Item 3 in 1010.2.4 permits the main doors of a space to be locked with a key operated lock preventing egress (and ingress) when locked. Traditionally, this provision was applied to the main exterior doors to a business or restaurant, and the main doors would be locked all times other than business hours. Employees of the business or restaurant would know to enter or leave by one of the other doors, or a few employees would have the key needed to unlock the doors for egress.
Prior to the 2015 IBC, the applicability of Item 3 was limited to the **main exterior doors** of a building for the listed occupancies. And, the sign required by this section stated: THIS DOOR TO REMAIN UNLOCKED WHEN **THIS BUILDING** IS OCCUPIED.

However, for the 2015 IBC, proposal E63-12, as modified by the committee, revised item 3 to be applicable to the **main doors** to a space for the same listed occupancies. And, the sign required by this section stated: THIS DOOR TO REMAIN UNLOCKED WHEN **THIS SPACE** IS OCCUPIED. The proponent's intent of E63-12 was to permit the provisions of Item 3 to be applicable to, for example, where the main doors to a restaurant open into a mall.

Unfortunately, over the last several years, we have been observing that Item 3 is being interpreted as broadly as written: any doors that could be described as the main doors, to any space in the listed occupancies, regardless of the size or use of the space and regardless of how far into the bowels of the building, could be locked with a key operated lock preventing ingress **and / or egress**.

This proposal is intended to bring the scope of the applicability of Item 3 to be more closely aligned to the proponents stated intent of E63-12. Item 3 would be applicable to the **main exterior doors to the building**, **or** the doors are the **main doors to the tenant space**.

Cost Impact: The net effect of the public comment and code change proposal will increase the cost of construction
This code proposal may increase the cost of construction if doors which were capable of being locked with a key-operated lock on the egress side would not be permitted to be locked, and a different, higher cost lock was needed. On the other hand, this proposal may decrease the cost of construction as the locations where the key cylinder locks may be permitted may decrease.

Public Comment# 2793

E49-21

Proposed Change as Submitted

Proponents: John Woestman, Kellen Company, representing Builders Hardware Manufacturers Assoc. (BHMA) (jwoestman@kellencompany.com)

2021 International Building Code

Add new text as follows:

1010.2.10 Access control door locking systems.
Where electrical door locking systems that prevent or control ingress to a space are incorporated in a locking system of a door in the means of egress, the locking system shall comply with Section 1010.2.12, 1010.2.13, 1010.2.14, 1010.2.15, or 1010.2.16, or shall be readily openable from the egress side without the use of a key or special knowledge or effort.

Reason: Modeled from and similar to current 2021 IBC Section 1010.2.10 Monitored or recorded egress, this proposed section describes how access control systems – ingress control systems – may be incorporated into the locking system of a door in the means of egress.
This proposed section of the IBC is technically not necessary in the IBC as the IBC is essentially silent regarding requirements for ingress control systems (access control systems). In other words, what is not prohibited by the code is, by default, permitted.

However, BHMA members are being drawn into conversations and debates with code officials as to what section(s) of the IBC with requirements for door locking arrangements are applicable to electrical locking systems which control or prevent **ingress** to a space (access control systems). This proposed new section is intended to prevent these debates by requiring doors in the means of egress which incorporate ingress control systems (access control systems) to require, on the egress side of the door, the door to be readily openable without the use of a key or special knowledge or effort, or comply with any one of the “shall be permitted” electrical locking systems.

FYI: with relatively few exceptions, the code does not regulate ingress control / access control into a building or room. For most doors, the building owner / occupant can do as desired regarding ingress control (access control) as long as all the requirements for egress are satisfied. The code does have requirements for stairway re-entry into the building (IBC Section 1010.2.7 Stairway doors), for authorized personnel access into locked occupied rooms (IBC Section 1010.2.8 Locking arrangements in educational occupancies), and for access to pools (IBC Section 1010.2.3, and ISPSC).

Cost Impact: The code change proposal will increase the cost of construction
This proposal would not increase the cost of construction as ingress control systems are not required by the IBC.

E49-21

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The proposal was disapproved because Chapter 10 is for means of egress and this proposal is about entering, not exiting. (Vote: 11-3)

E49-21

Individual Consideration Agenda

Public Comment 1:

IBC: 1010.2.10 (IFC:[BE]1010.2.10)

Proponents: John Woestman, representing Builders Hardware Manufacturers Assoc. (BHMA) (jwoestman@kellencompany.com) requests As Modified by Public Comment

Replace as follows:

2021 International Building Code

1010.2.10 Monitored or recorded egress, and access control systems . Where electrical systems that monitor or record egress activity are incorporated, or where the door has an access control system, the locking system on the egress side of the door shall comply with Section 1010.2.11, 1010.2.12, 1010.2.13, 1010.2.14 or 1010.2.15 or shall be readily openable from the egress side without the use of a key or special knowledge or effort.

Commenter's Reason: The proposed revisions to 2021 IBC Section 1010.2.10 adds access control systems to this section of the code, and how monitored egress systems and access control systems must "play nice" with door hardware and locking systems on the egress side of a door in the means of egress.
The proposed revisions address doors which incorporate access control systems to require, on the egress side, the door to be readily openable without the use of a key or special knowledge or effort, or comply with any one of the "shall be permitted" electrical locking systems of 1010.2.11, 1010.2.12, 1010.2.13, 1010.2.14 or 1010.2.15.

Cost Impact: The net effect of the public comment and code change proposal will not increase or decrease the cost of construction
Since access control systems are not required by the code, this proposal would not be expected to increase the cost of construction.

Public Comment# 2806

E55-21

Proposed Change as Submitted

Proponents: Mike Nugent, Chair, representing ICC Building Code Action Committee (bcac@iccsafe.org)

2021 International Building Code

Add new definition as follows:

CONTROL VESTIBULE. A space with doors in series such that when one door is open the other door is interlocked and cannot be opened.

Add new text as follows:

1010.2.15 Control vestibule.
Control vestibules shall be permitted for security, clinical needs or environmental control in Groups F, H-5, and S and in Groups B, I-1, I-2, and M where the occupant load of the room or space served by the control vestibule is less than 50. Where doors in the means of egress are configured as a control vestibule, the control vestibule door locking system shall provide for egress. The control vestibule shall comply with all of the following:

1. On the egress side of each door of the control vestibule, an approved override shall be provided which deactivates the interlock of the door when that door is interlocked. Signage shall be provided with instructions on the use of the override.
2. Where an automatic sprinkler system or automatic fire detection system is provided, upon activation of such system the interlock function of the door locking system of the control vestibule shall deactivate.
3. Upon loss of power to the interlock function of the doors, the interlock function of the door locking system of the control vestibule shall deactivate.
4. The egress path from any point shall not pass through more than one control vestibule.
5. The control vestibule door interlocking system units shall be listed in accordance with UL 294.

Reason: This proposal includes a definition for “control vestibule” and offers detailed requirements for control vestibules. This vestibule system controls egress temporarily. One door must be closed for the other to open.
Control vestibules – which have doors in series which are interlocked – are being incorporated in the means of egress in a variety of occupancies. The IBC is currently silent regarding requirements and guidance for control vestibules. This proposal offers requirements (guidance) for control vestibules in the means of egress.

The significant difference between typical doors in series in the means of egress (i.e. one after the other) and doors in the means of egress configured as a control vestibule is the doors of a control vestibule are interlocked such that when one door of a control vestibule is open, the other door in series in the control vestibule is temporarily locked; and conversely, in the means of egress when all doors of a control vestibule are closed, any door may be opened.

Control vestibules are most commonly configured as a space with two doors in series. But, some control vestibules are configured with more than one inner door and / or more than one outer door. For example, where a control vestibule is required to help keep clean rooms clean, there may be inner doors from three different clean rooms opening into the control vestibule, and one outer door for leaving the control vestibule in the direction of egress.

It should be noted that control vestibules on the access (ingress) side of doors controlling access into a building or into a space within a building are more common that control vestibules on the egress side of doors controlling egress from a space or from a building. Requirements for access-side control vestibules is outside the scope of the IBC. Thus access-side control vestibules are not regulated or prohibited by the IBC provided all requirements for egress are complied with. This proposal addresses control vestibules in the means of egress addressing egress-side requirements.

Also, it should be noted that control vestibules may be “stacked” or combined with any of the other “shall be permitted” electrical locking arrangements of the IBC (2021 IBC sections 1010.2.11 through 1010.2.14).For example, assume both doors in the (air lock) control vestibule from an electronics manufacturing clean room are equipped with sensor release of electrically locked egress doors (IBC Section 1010.2.12) to allow no-touch exiting from the clean room through the (air-lock) control vestibule. The electrical locks on the two doors of the (air lock) control vestibule would be interlocked such that only one door is able to be open at a time. In the event of fire in the clean room, Item 2 requires the interlock function of the control vestibule to be deactivated, facilitating egress through the control vestibule with both doors open at the same time.

The proposed requirements for control vestibules are for these reasons:

Control vestibules are recommended to be permitted in the listed occupancy groups: Group B for banks and laboratories. Group F for factories.

Group H for operations where contamination or atmospheric control is vital. Groups I-1 and I-2 to facilitate patient care and patient security. Group M for sales rooms for jewelry, gems, drugs, and similar highly valuable items. Group S for storage of valuables.

This proposal has no limits on occupant loads for a factory – access to factories is limited to employees, or visitors escorted by employees. Similar situation for H-5. And for storage, especially large storage areas, the calculated occupant load may be significant although the actual quantity of occupants is typically limited (i.e. employees). The other Groups – the proposed less than 50 occupant load is to be consistent with requirements for panic hardware on doors in the means of egress (occupant loads of 50 or more require panic hardware).

Control vestibules must provide for egress – which is a requirement in the charging language.

The last sentence in the charging language provides needed flexibility. For example, where casinos count money, accepted industry practices may not incorporate all of the requirements of Items 1 through 5 but may incorporate significant other security and safety provisions.

Item 1: A requirement to address the potential situation where one of the doors on the control vestibule is held open (example: a person holds the outer doorway open and other occupants need to be able to egress through the control vestibule in an emergency situation). This item requires, on the egress side of each door of the control vestibule, installation of an approved override which deactivates the interlock on that door. It is common the activation of an override would set off an alarm, and / or the activation of an override without a valid reason results in disciplinary action (i.e. employee gets fired). This item also requires signage with instruction on how to use the override.

Items 2 and 3: Requires the interlock function to be disabled in the event of fire, actuation of the fire detection system, or power loss to the interlock system renders the control vestibule equivalent to two doors in the means of egress allowing unobstructed egress.

Item 4: Requires that egressing through the control vestibule involves no more than two doors. While not common, there are situations where more than one control vestibule may be needed in the means of egress.

Item 5: Requires the units of the control vestibule locking system to be listed in accordance with UL 294, the same standard required for units for other electrical locking system units.

Together, the definition and proposed requirements provide for egress and emergency egress where control vestibules are installed.

Note: a control vestibule is different than a sallyport, which is defined in the IBC and permitted in Group I-3 occupancies. Group I-3 includes correction centers, detention centers, jails, prisons, and similar uses. A sallyport is a security vestibule which prevents unobstructed passage. A control vestibule is intended to allow unobstructed passage, but prevents more than one door of doors in series to be open at the same time.

This proposal is submitted by the ICC Building Code Action Committee (BCAC). BCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2020 the BCAC has held several virtual meetings open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the BCAC website at BCAC.

Cost Impact: The code change proposal will increase the cost of construction
Control vestibules are currently not addressed in the code. Where control vestibules are constructed, these requirements may include some locking requirements and interconnectedness currently not incorporated into some control vestibules.

E55-21

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: This proposal was disapproved. The intent is good and is needed but there were still several questions. What is the maximum size of the vestibule? Is self closing needed on the doors for the exiting? What is the duration of the over ride? Would this be a hazard if used for areas with large occupant loads? (Vote: 13-1)

Individual Consideration Agenda

Public Comment 1:

IBC: 1010.2.15 (IFC:[BE]1010.2.15)

Proponents: Mike Nugent, representing ICC Building Code Action Committee (bcac@iccsafe.org) requests As Modified by Public Comment

Modify as follows:

2021 International Building Code

1010.2.15 Control vestibule . Control vestibules shall be permitted for security, clinical needs or environmental control in Groups F, H-5, and S and in Groups ~~B,~~ I-1~~,~~ and I-2~~, and M~~ where the occupant load of the room or space served by the control vestibule is less than 50 , and in Group B and M where the occupant load of the room or space served by the control vestibule is 10 or less. Where doors in the means of egress are configured as a control vestibule, the control vestibule door ~~locking~~ interlocking system shall provide for egress. The control vestibule shall comply with all of the following:

1. On the egress side of each door of the control vestibule, an approved override shall be provided which deactivates the interlock of the door when that door is interlocked. Signage shall be provided with instructions on the use of the override.
2. Where an automatic sprinkler system or automatic fire detection system is provided, upon activation of such system the interlock function of the door locking system of the control vestibule shall deactivate.
3. Upon loss of power to the interlock function of the doors, the interlock function of the door locking system of the control vestibule shall deactivate.
4. The egress path from any point shall not pass through more than one control vestibule.
5. The control vestibule door interlocking system units shall be listed in accordance with UL 294.

Commenter's Reason: A wide variety of questions and suggestions were shared during the CAH and are addressed by this public comment. Concerns were raised regarding occupancy groups B and M with a maximum occupant load of 50 – the proposed revision to a maximum occupant load of 10 or less in B and M occupancies is based on IBC 1010.1.2 that permits doors other than side-hinged swinging doors for occupant loads of 10 or less.

Cost Impact: The net effect of the public comment and code change proposal will increase the cost of construction
Control vestibules are currently not addressed in the code. Where control vestibules are constructed, these requirements may include some locking requirements and interconnectedness currently not incorporated into some control vestibules.

Public Comment# 2803

Public Comment 2:

IBC: 1010.2.15 (IFC:[BE]1010.2.15)

Proponents: John Williams, representing Healthcare Committee (ahc@iccsafe.org); Mike Nugent, representing ICC Building Code Action Committee (bcac@iccsafe.org) requests As Modified by Public Comment

Modify as follows:

2021 International Building Code

1010.2.15 Control vestibule. Control vestibules shall be permitted for security, clinical needs or environmental control in Groups F, H-5, and S and in Groups B, I-1, I-2, and M where the occupant load of the room or space served by the control vestibule is less than 50. Where doors in the means of egress are configured as a control vestibule, the control vestibule door interlocking ~~locking~~ system shall provide for egress. The control vestibule shall comply with all of the following:

1. On the egress side of each door of the control vestibule, an approved override shall be provided which deactivates the interlock of the door when that door is interlocked. The override switch shall be within 48 inches (1219 mm) of the door and between 34 inches (864 mm) and 48 inches (1219 mm) above the floor. Signage shall be provided with instructions on the use of the override.

2. Where an automatic sprinkler system or automatic ~~fire~~ smoke detection system is provided, upon activation of such system the interlock function of the ~~door locking system~~ doors of the control vestibule shall deactivate.
3. Upon loss of power to the interlock function of the doors, the interlock function of the door locking system of the control vestibule shall deactivate.
4. The egress path from any point shall not pass through more than one control vestibule.
5. The doors of the control vestibule shall be self-closing.
6. The doors of the control vestibule shall swing in the direction of egress travel.

   Exception: Power-operated doors in accordance with Section 1010.3.2.

~~5~~ 7. The ~~control vestibule door interlocking system units~~ electro-mechanical or electromagnetic locking devices shall be listed in accordance with either UL 294 or UL 1034.

Commenter's Reason: A wide variety of questions and suggestions were shared during the CAH and are addressed by this public comment.
In Item 1, the committee questioned if the location of the override switch should be specified – the proposed revision is from the IBC requirement for emergency stop switches for revolving doors (1010.3.1 item 5).In Item 2, the revisions address concerns raised prior to the CAH regarding the detection system.

The added Items 5 and 6 address committee concerns and questions. The proposed exception to Item 6 is important for control vestibules where the doors need to operate without touching, which may be important in numerous applications including health care.

In Item 7 (was item 5), the proposed revisions are consistent with E52-21 approved as submitted during the CAH, which revised the UL standard reference.

The committee suggested it may be desirable to specify how long the override in Item 1 overrides the interlock function of the doors in the control vestibule. Considering an override switch is required on the egress side of each door of the control vestibule, it was felt it was not necessary to specify a minimum or maximum duration the interlock is disabled upon pushing an override button.

The committee wondered if the minimum or maximum size of the control vestibule should be specified. Considering a control vestibule would be required to comply with accessibility requirements if on an accessible route, it was felt a minimum size would not need to be specified. And, considering that larger rooms take up more space and cost more to construct, and that a control vestibule would be included in the determination of travel distance, it was felt the maximum size of a control vestibule would not need to be specified.

Examples of patient care facilities that utilize secured vestibules include Behavioral Health settings, where a patient is admitted against their will and whose treatment is the responsibility of the healthcare provider. Another is a post-partum unit, where control vestibules are utilized to combat infant abduction. This arrangement is typically used at the primary entry to the unit and not secondary exits, where other locking arrangements are utilized. The primary entry points represent the most occupant traffic, and therefore the higher risk of elopement.

This public comment is submitted by the ICC Building Code Action Committee (BCAC) and the Committee on Healthcare (CHC).

BCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2020 and 2021 the BCAC has held several virtual meetings open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the BCAC website at BCAC.

The CHC was established by the ICC Board to evaluate and assess contemporary code issues relating to healthcare facilities. This is a joint effort between ICC and the American Society for Healthcare Engineering (ASHE), a subsidiary of the American Hospital Association, to eliminate duplication and conflicts in healthcare regulation. In 2020 and 2021 the CHC held several virtual meeting, which included members of the committees as well as any interested parties, to discuss and debate the proposed changes. Information on the CHC, including: meeting agendas; minutes; reports; resource documents; presentations; and all other materials developed in conjunction with the CHC effort can be downloaded from the CHC website at CHC.

Cost Impact: The net effect of the public comment and code change proposal will increase the cost of construction
Control vestibules are currently not addressed in the code. Where control vestibules are constructed, these requirements may include some locking requirements and interconnectedness currently not incorporated into some control vestibules.

Public Comment# 2574

Public Comment 3:

IBC: 1010.2.15 (IFC:[BE]1010.2.15)

Proponents: John Williams, representing Healthcare Committee (ahc@iccsafe.org); Mike Nugent, representing ICC Building Code Action Committee (bcac@iccsafe.org) requests As Modified by Public Comment

Modify as follows:

2021 International Building Code

1010.2.15 Control vestibule . Control vestibules shall be permitted for security, clinical needs or environmental control in Groups F, H-5, and S and in Groups B, I-1, I-2, and M where the occupant load of the room or space served by the control vestibule is less than 50. Control vestibules shall be permitted only in buildings equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1. or an approved automatic smoke detection system installed in the room or space served by the control vestibule in accordance with Section 907. Where doors in the means of egress are configured as a control vestibule, the control vestibule door ~~locking~~ interlocking system shall provide for egress. The control vestibule shall comply with all of the following:

1. On the egress side of each door of the control vestibule, an approved override shall be provided which deactivates the interlock of the door when that door is interlocked. Signage shall be provided with instructions on the use of the override.
2. ~~Where~~ Upon activation of the ~~an~~ automatic sprinkler system or automatic ~~fire~~ smoke detection system ~~is provided, upon activation of such system~~ the interlock function of the ~~door locking system~~ doors of the control vestibule shall deactivate.
3. Upon loss of power to the interlock function of the doors, the interlock function of the door locking system of the control vestibule shall deactivate.
4. The egress path from any point shall not pass through more than one control vestibule.
5. The control vestibule door interlocking system units shall be listed in accordance with UL 294.

Commenter's Reason: Concerns were raised during the CAH, and subsequent to the CAH, regarding permitting control vestibules in buildings which did not have either a fire sprinkler system or smoke detection system. This public comment attempts to address those concerns by permitting control vestibules only in buildings with an automatic sprinkler system or an automatic smoke detection system.
This public comment may be a compromise between applications for control vestibules in quite small buildings with occupants familiar with the space where an automatic sprinkler system would not otherwise be required for the building and applications of control vestibules serving more occupants where requiring the building to have a fire sprinkler system throughout is prudent.

For hospital settings, full sprinklering is required in new construction, and smoke detection is often utilized in healthcare suites, where this arrangement is typically used.

This public comment is submitted by the ICC Building Code Action Committee (BCAC) and the Committee on Healthcare (CHC).

BCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2020 and 2021 the BCAC has held several virtual meetings open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the BCAC website at BCAC.

The CHC was established by the ICC Board to evaluate and assess contemporary code issues relating to healthcare facilities. This is a joint effort between ICC and the American Society for Healthcare Engineering (ASHE), a subsidiary of the American Hospital Association, to eliminate duplication and conflicts in healthcare regulation. In 2020 and 2021 the CHC held several virtual meeting, which included members of the committees as well as any interested parties, to discuss and debate the proposed changes. Information on the CHC, including: meeting agendas; minutes; reports; resource documents; presentations; and all other materials developed in conjunction with the CHC effort can be downloaded from the CHC website at CHC.

Cost Impact: The net effect of the public comment and code change proposal will increase the cost of construction
Control vestibules are currently not addressed in the code. Where control vestibules are constructed, these requirements may include some locking requirements and interconnectedness currently not incorporated into some control vestibules.

Public Comment# 2579

Public Comment 4:

IBC: 1010.2.15 (IFC:[BE]1010.2.15)

Proponents: John Williams, representing Healthcare Committee (ahc@iccsafe.org); Mike Nugent, representing ICC Building Code Action

Committee (bcac@iccsafe.org) requests As Modified by Public Comment

Modify as follows:

2021 International Building Code

1010.2.15 Control vestibule . Control vestibules shall be permitted for security, clinical needs or environmental control in Groups F, H-5, and S and in Groups B, I-1, I-2, and M where the occupant load of the room or space served by the control vestibule is less than 50. Where doors in the means of egress are configured as a control vestibule, the control vestibule door locking system shall provide for egress. The control vestibule shall comply with all of the following:

1. On the egress side of each door of the control vestibule, an approved override shall be provided which deactivates the interlock of the door when that door is interlocked. Signage shall be provided with instructions on the use of the override.

   Exception: Where approved by the building official, overrides are not required where the control vestibule is designed for security reasons to impede occupant egress.
2. Where an automatic sprinkler system or automatic fire detection system is provided, upon activation of such system the interlock function of the door locking system of the control vestibule shall deactivate.
3. Upon loss of power to the interlock function of the doors, the interlock function of the door locking system of the control vestibule shall deactivate.
4. The egress path from any point shall not pass through more than one control vestibule.
5. The control vestibule door interlocking system units shall be listed in accordance with UL 294.

Commenter's Reason: During the Committee Action Hearings there was discussion that the override switches required in Item 1 would not be appropriate where the control vestibule is needed and designed for security reasons. This public comment presents that option with a proposed exception. The code official could request the over ride to be located in a supervised location as part of that approval.
For hospital settings, and per the already established requirements to allow special locking arrangements in behavioral health and infant settings, all staff are equipped with keys and access to allow egress. The use of remote release of the locks represents a vulnerability that this locking arrangement is designed to eliminate for safe care of these particularly vulnerable patients.

This public comment is submitted by the ICC Building Code Action Committee (BCAC) and the Committee on Healthcare (CHC).

BCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2020 and 2021 the BCAC has held several virtual meetings open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the BCAC website at BCAC.

The CHC was established by the ICC Board to evaluate and assess contemporary code issues relating to healthcare facilities. This is a joint effort between ICC and the American Society for Healthcare Engineering (ASHE), a subsidiary of the American Hospital Association, to eliminate duplication and conflicts in healthcare regulation. In 2020 and 2021 the CHC held several virtual meeting, which included members of the committees as well as any interested parties, to discuss and debate the proposed changes. Information on the CHC, including: meeting agendas; minutes; reports; resource documents; presentations; and all other materials developed in conjunction with the CHC effort can be downloaded from the CHC website at CHC.

Cost Impact: The net effect of the public comment and code change proposal will increase the cost of construction
Control vestibules are currently not addressed in the code. Where control vestibules are constructed, these requirements may include some locking requirements and interconnectedness currently not incorporated into some control vestibules.

Public Comment# 2589

E60-21

Proposed Change as Submitted

Proponents: Marsha Mazz, representing United Spinal Association (mmazz@accessibility-services.com); Gene Boecker, representing Code Consultants, Inc. (geneb@codeconsultants.com)

2021 International Building Code

Revise as follows:

1011.5.2 Riser height and tread depth. *Stair* riser heights shall be 7 inches (178 mm) maximum and 4 inches (102 mm) minimum. The riser height shall be measured vertically between the *nosings* of adjacent treads or between the *stairway* landing and the adjacent tread. Rectangular tread depths shall be 11 inches (279 mm) minimum measured horizontally between the vertical planes of the foremost projection of adjacent treads and at a right angle to the tread's *nosing*. *Winder* treads shall have a minimum tread depth of 11 inches (279 mm) between the vertical planes of the foremost projection of adjacent treads at the intersections with the walkline and a minimum tread depth of 10 inches (254 mm) within the clear width of the stair.

Exceptions:

1. *Spiral stairways* in accordance with Section 1011.10.
2. *Stairways* connecting stepped *aisles* to cross *aisles* or concourses shall be permitted to use the riser/tread dimension in Section 1030.14.2.
3. In Group R-3 occupancies; within *dwelling units* in Group R-2 occupancies<u> not required by Chapter 11 to be Accessible or Type A dwelling or sleeping units</u>; and in Group U occupancies that are accessory to a Group R-3 occupancy or accessory to individual *dwelling units* in Group R-2 occupancies; the maximum riser height shall be $7^3/_4$ inches (197 mm); the minimum tread depth shall be 10 inches (254 mm); the minimum *winder* tread depth at the walkline shall be 10 inches (254 mm); and the minimum *winder* tread depth shall be 6 inches (152 mm). A *nosing* projection not less than $^3/_4$ inch (19.1 mm) but not more than $1^1/_4$ inches (32 mm) shall be provided on *stairways* with solid risers where the tread depth is less than 11 inches (279 mm).
4. See Section 503.1 of the International Existing Building Code for the replacement of existing *stairways*.
5. In Group I-3 facilities, *stairways* providing access to guard towers, observation stations and control rooms, not more than 250 square feet (23 m^2) in area, shall be permitted to have a maximum riser height of 8 inches (203 mm) and a minimum tread depth of 9 inches (229 mm).

Reason: The 2010 ADA Standards, he Uniform Federal Accessibility Standards, and the Architectural Barriers Act (ABA) Accessibility Standard all require all stairs that are a part of a means of egress in accessible buildings and facilities to comply with provisions for stair geometry that are the same as those in the main paragraph of Section 1011.5.2. There is no exception in these documents for stairs within dwelling units or sleeping units that must be accessible. .

Cost Impact: The code change proposal will increase the cost of construction
This code change will increase costs where Accessible or Type A dwelling or sleeping units are required by the code, but are not also required by Federal laws such as, the Americans with Disabilities Act, the Architectural Barriers Act, or Section 504 of the Rehabilitation Act of 1973, as amended.

E60-21

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The proposal was disapproved because stairways are never part of an accessible route, therefore, there should not be different requirements for stairways within Accessible or Type A units. (Vote: 14-0)

E60-21

Individual Consideration Agenda

Public Comment :

Proponents: Marsha Mazz, representing United Spinal Association (mmazz@accessibility-services.com) requests As Submitted

Commenter's Reason: The Committee disapproved this proposal because "stairways are never part of an accessible route" and "therefore, there should not be different requirements for stairways within Accessible or Type A units.".

- Federal Rules: The committee correctly recognized that stairs are not part of an accessible route. However, the Federal ADA requirements (see bibliography) regarding what the IBC calls "Accessible" and "Type A" units require all stairs that are part of a means of egress to comply with the 7/11 stair geometry.
- Stairs used for egress: While not all people with mobility disabilities can use stairs, some can, particularly in an emergency. There are many reasons why anyone, particularly a person with a mobility disability might be better off not using the dwelling unit elevator, even if it is working, during an evacuation.
- No opposition: During the hearing, the Stairway Manufacturers agreed with this interpretation and there was no opposition.
- Flats recognized as equivalent: Nothing in the IBC, the ICC A117.1, or the ADA requires Accessible and Type A dwelling units to be multistory units. In fact, the ADA clearly recognizes single-story units to be equivalent to multi-story units provided they have the same living spaces.

Bibliography: 2010 ADA Standards (https://www.access-board.gov/ada/#ada-210). Section 210.1 requires the following: "210.1 Stairways. Interior and exterior stairs that are part of a means of egress shall comply with 504".
2010 ADA Standards Section 504.2 (https://www.access-board.gov/ada/#ada-504). Section 504.2 requires the following: "All steps on a flight of stairs shall have uniform riser heights and uniform tread depths. Risers shall be 4 inches (100 mm) high minimum and 7 inches (180 mm) high maximum. Treads shall be 11 inches (280 mm) deep minimum."

Cost Impact: The net effect of the public comment and code change proposal will not increase or decrease the cost of construction
Because there is no requirement for multistory Accessible or Type A units, any cost impact related to making the stairs accessible can be attributed to a design choice - the choice to design a multi-story unit instead of a flat unit.

Public Comment# 2542

E61-21

Proposed Change as Submitted

Proponents: David Cooper, representing Stairbuilders and Manufacturers Association (Coderep@stairways.org)

2021 International Building Code

Revise as follows:

1011.5.2 Riser height and tread depth. *Stair* riser heights shall be 7 inches (178 mm) maximum and 4 inches (102 mm) minimum. The riser height shall be measured vertically between the *nosings* of adjacent treads or between the *stairway* landing and the adjacent tread. Rectangular tread depths shall be 11 inches (279 mm) minimum measured horizontally between the vertical planes of the foremost projection of adjacent treads and at a right angle to the tread's *nosing*. *Winder* treads shall have a minimum tread depth of 11 inches (279 mm) between the vertical planes of the foremost projection of adjacent treads at the intersections with the walkline and a minimum tread depth of 10 inches (254 mm) within the clear width of the stair.

Exceptions:

1. *Spiral stairways* in accordance with Section 1011.10.
2. *Stairways* connecting stepped *aisles* to cross *aisles* or concourses shall be permitted to use the riser/tread dimension in Section 1030.14.2.
3. In Group R-3 occupancies; within *dwelling units* in Group R-2 occupancies; and in Group U occupancies that are accessory to a Group R-3 occupancy or accessory to individual *dwelling units* in Group R-2 occupancies; the maximum riser height shall be $7^{3}/_{4}$ inches (197 mm); the minimum tread depth shall be 10 inches (254 mm); the minimum *winder* tread depth at the walkline shall be 10 inches (254 mm); and the minimum *winder* tread depth shall be 6 inches (152 mm). ~~A *nosing* projection not less than $^{3}/_{4}$ inch (19.1 mm) but not more than $1^{1}/_{4}$ inches (32 mm) shall be provided on *stairways* with solid risers where the tread depth is less than 11 inches (279 mm).~~
4. See Section 503.1 of the International Existing Building Code for the replacement of existing *stairways*.
5. In Group I-3 facilities, *stairways* providing access to guard towers, observation stations and control rooms, not more than 250 square feet (23 m^2) in area, shall be permitted to have a maximum riser height of 8 inches (203 mm) and a minimum tread depth of 9 inches (229 mm).

1011.5.5.1 Nosing projection size. The ~~leading edge (*nosings*)~~ nosing of treads shall project not more than $1^{1}/_{4}$ inches (32 mm) ~~beyond~~ over the tread below. The maximum nosing projection shall not be limited on stairways with open risers. A nosing projection not less than ¾ inch (19.1 mm) but not more than 1 ¼ inches (32 mm) shall be provided on stairways where the tread depth is less than 11 inches (279 mm).

Reason: Nosing projection regardless of size does not increase or decrease the unit run, or tread depth dimension. As stated in the code the required tread depth is measured horizontally between the nosings of adjacent treads. Currently the requirement for a nosing projection and its size is buried within an exception to tread depth for only residential stairs. This proposal appropriately moves the misplaced requirement to **1011.5.5.1 Nosing projection size**, and will now address the size of the nosing projection as well as the maximum nosing projection and shall apply to all stairs not just certain residential stairs. All steps with or without solid risers benefit from a nosing projection in descent. Nosing projections are essential in descent to allow the user to advance the forefoot further from the tread above as the leading foot points downward to find purchase on the tread below providing clearance for the heel as it lowers in an arc onto the walking surface. The IBC Commentary describes it like this:
"A nosing projection allows the descending foot to be placed farther forward on the tread and the heel to then clear the nosing of the tread above as it swings down in an arc, landing on a tread that is effectively deeper than if no nosing projection is used. **Nosing projections are so common in stair design that they are usually only noticed by users where they are absent since the lack of nose projection can affect one's gait."** (emphasis added)

Nosing projections are required in the IRC and should also be required for all stairways with tread depths less than 11 inches not just those in dwelling units that are allowed in the IBC. Currently the code does not require a nosing projection on open riser stairs. This change will require a nosing projection on open riser stairs but will not limit the maximum nosing projection at open risers. A maximum nosing projection limit where the riser is open does nothing to eliminate the potential of the forefoot extending under the tread above in ascent. A maximum nosing projection on an open riser stair would also frequently complicate enforcement at the lowest step of a flight where it overlaps a floor landing that is usually located independent of the stairway design.

Cost Impact: The code change proposal will increase the cost of construction
The code change proposal may increase the cost of construction for some stairs. Although the required nosing projection for residential has not changed, this may change the cost of stairs in I-3 facilities requiring a tread about an inch wider. However, tread materials are manufactured to accommodate the currently required nosing projection at treads on stairs with less than 11 inch tread depth and are readily available. The minimal material increase per tread would vary based upon the material used and the width of the stair/length of the tread. No increase in labor would be

required.

Staff note: Proposals E61-21, E63-21 and E64-21 addresses requirements for nosing in a different or contradicting manner. The committee is urged to make their intentions clear with their actions on these proposals.

E61-21

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The proposal was disapproved because the proposed language would conflict with winder treads. The committee preferred the language in E64-21. (Vote: 13-1)

Staff Analysis: Proposals E61-21, E63-21 and E64-21 addresses requirements for nosing in a different or contradicting manner. The committee is urged to make their intentions clear with their actions on these proposals.

E61-21

Individual Consideration Agenda

Public Comment :

IBC: 1011.5.5.1 (IFC:[BE] 1011.5.5.1)

Proponents: David Cooper, representing Stairbuilders and Manufacturers Association (coderep@stairways.org) requests As Modified by Public Comment

Modify as follows:

2021 International Building Code

1011.5.2 Riser height and tread depth . *Stair* riser heights shall be 7 inches (178 mm) maximum and 4 inches (102 mm) minimum. The riser height shall be measured vertically between the *nosings* of adjacent treads or between the *stairway* landing and the adjacent tread. Rectangular tread depths shall be 11 inches (279 mm) minimum measured horizontally between the vertical planes of the foremost projection of adjacent treads and at a right angle to the tread's *nosing*. *Winder* treads shall have a minimum tread depth of 11 inches (279 mm) between the vertical planes of the foremost projection of adjacent treads at the intersections with the walkline and a minimum tread depth of 10 inches (254 mm) within the clear width of the stair.

Exceptions:

1. *Spiral stairways* in accordance with Section 1011.10.
2. *Stairways* connecting stepped *aisles* to cross *aisles* or concourses shall be permitted to use the riser/tread dimension in Section 1030.14.2.
3. In Group R-3 occupancies; within *dwelling units* in Group R-2 occupancies; and in Group U occupancies that are accessory to a Group R-3 occupancy or accessory to individual *dwelling units* in Group R-2 occupancies; the maximum riser height shall be $7^3/_4$ inches (197 mm); the minimum tread depth shall be 10 inches (254 mm); the minimum *winder* tread depth at the walkline shall be 10 inches (254 mm); and the minimum *winder* tread depth shall be 6 inches (152 mm).
4. See Section 503.1 of the International Existing Building Code for the replacement of existing *stairways*.
5. In Group I-3 facilities, *stairways* providing access to guard towers, observation stations and control rooms, not more than 250 square feet (23 m^2) in area, shall be permitted to have a maximum riser height of 8 inches (203 mm) and a minimum tread depth of 9 inches (229 mm).

1011.5.5.1 Nosing projection size . The nosing of treads shall project not more than $1^1/_4$ inches (32 mm) over the tread below. The maximum nosing projection shall not be limited ~~on stairways with open~~ at open risers. A nosing projection not less than ¾ inch (19.1 mm) but not more than 1

¼ inches (32 mm) shall be provided on stairways where the tread depth is less than 11 inches (279 mm).

Exception: Where the nosing projection of the lowest tread of a flight is over an open riser at a floor or landing the nosing projection shall be considered compliant provided the tread depth complies with Section 1011.5.4

Commenter's Reason: Please note that no further modification of 1011.5.2 Riser height and tread depth is being made to the original proposal and that the substitution of the defined term*"nosing*" in the first sentence of the original proposal was also included in E59-21 which was approved by the committee as submitted.
The substitution of "over" in place of "beyond" also in the original proposal more accurately describes that the tread projection does not extend "beyond" the tread below, as this term would raise the question "Beyond what point?" The term "over" does the job without argument.

This proposal as modified seeks to do two things:

1. Move the requirement for nosing projection and size from the residential exception to the nosing projection size section such that it will apply to all stairs that have less than an 11" tread depth.
2. Allow the maximum nosing projection to be exceeded at open risers provided the projection is uniform.

The requirement for regulating the size of nosing projections is currently buried in an exception for residential stairs. Not only is this a prime example of poor code format but located there it fails to address stairs other than residential stairs such as those in I-3 facilities where only a 9 inch tread depth should require a nosing projection to provide a minimum tread surface and heel clearance for safe descent. See Fig 1. The code currently warrants a very unsafe design flaw by not requiring a nosing projection on all treads with less than 11 inch tread depth .

The text related to the nosing projection allowed at open risers has been modified to address the committee's concerns in discussion of this and related proposals. The modified language allows the maximum nosing projection to be exceeded only at open risers. It is important to note here that nosing projection uniformity is regulated in 1011.5.5.2.

This proposal moves the "requirement" for a nosing projection complete and without change from hiding in exception 3 limited to certain residential stairs into the existing section titled **1011.5.5.1 Nosing projection size**. Section 1011.5.5.1 now now as modified, clearly provides both minimum and maximum limits for all stairs. Testimony at the hearing lead the committee to believe that moving the requirement from the exception for residential stairs would adversely affect the minimum tread depth of IBC winders in curved and residential stairs by requiring more space. This is simply incorrect and is a widely misunderstood concept. Tread depth is defined in **"1015.5.2 Riser height and tread depth"** as the horizontal distance between the nosings of adjacent treads. Figure 2 clearly shows that regardless of the nosing projection size the tread depth remains the same. The required minimum tread depths of curved stair winders and of residential stair winders of 10 inches and 6 inches respectively is unchanged. The run of the stair and the space required to fit the stair and its treads through the turn is unchanged.

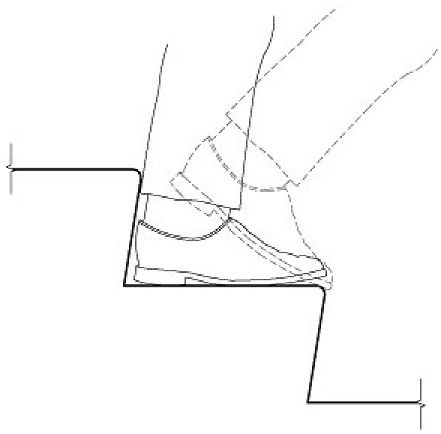
In any case the nosing projection is already required on residential winders where they have tread depths less than 11 inches. Where winders are allowed at curved stairs the minimum tread depth, at the narrow end, is 10 inches. These are very large monumental stairs with a minimum inside radius that is twice the width. Used only where ample space is available they are complex and typically designed and built by specialists without issues related to providing a nosing projection where required.

Most stairs have a nosing projection regardless of the tread depth. This is a common feature of well designed stairs that conform to the users expectations. No doubt you have felt the awkward difference when a nosing projection is absent. This change provides effective regulation of both the minimum and maximum size of the nosing projection on all stairs where used as well as where required.

The committee stated they preferred E64 however it is flawed. The use of "when" should be "where" but most significant is that it allows the maximum nosing projection to be exceeded on any stair when solid risers are not required whether the risers are open or not. I am sure this is not the intent of the proponent. The other flaw is that what could be a requirement, as formatted in this proposal, is a mistakenly approved exception we will have to live with if E64 is not overturned in this hearing.

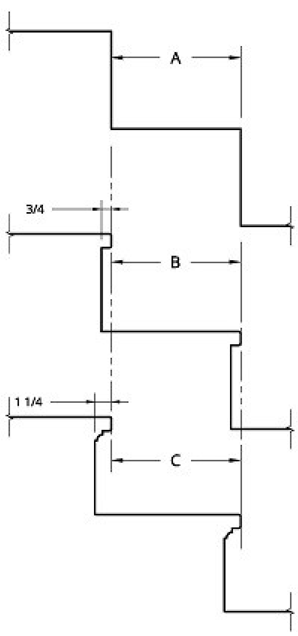
Finally the modification further clarifies regulation of the nosing projection at the lowest tread of a flight where nosing projection cannot be measured at stairs that terminate on to a floor or landing where there is no tread below.

Approval of this greatly improved proposal as modified by this public comment provides a comprehensive fix to the committee action and misunderstanding as a result of inaccurate testimony on E61. The modification provides specific conditions for exceeding the maximum nosing projection which was the intent of the committee in approval of E64. Most importantly this proposal moves the hidden requirement out in the open with clear language applicable to any stair that can be easily found, consistently interpreted, and fairly enforced.



A NOSING PROJECTION ALLOWS THE FOOT TO BE PLACED FURTHER FORWARD AND PROVIDES MORE HEEL CLEARANCE IN DESCENT.

FIG.1



TREAD DEPTH A= NO NOSING PROJECTION
TREAD DEPTH B= MIN NOSING PROJECTION
TREAD DEPTH C=MAX NOSING PROJECTION

TREAD DEPTHS A,B, AND C ARE EQUAL
NOSING PROJECTION SIZE DOES NOT CHANGE TREAD DEPTH

FIG.2

Cost Impact: The net effect of the public comment and code change proposal will increase the cost of construction
Residential stairs will not see an increase. This will add approximately one inch to the finished width of a stair tread in I-3 occupancies however treads are typically manufactured to widths that accomodate the nosing projection. If there is an increase it will be minimal but not possible to calculate as it is dependent upon the material chosen.

Public Comment# 2491

E64-21

Proposed Change as Submitted

Proponents: Thomas Zuzik Jr, of Railingcodes.com representing the National Ornamental & Miscellaneous Metals Association (NOMMA), representing the National Ornamental & Miscellaneous Metals Association (NOMMA) (coderep@railingcodes.com)

2021 International Building Code

Revise as follows:

1011.5.5.1 Nosing projection size. The leading edge (*nosings*) of treads shall project not more than $1^1/_4$ inches (32 mm) ~~beyond~~ over the required depth of the tread below.

Exception: When solid risers are not required, the nosing projection is permitted to exceed the maximum projection limit over the tread below.

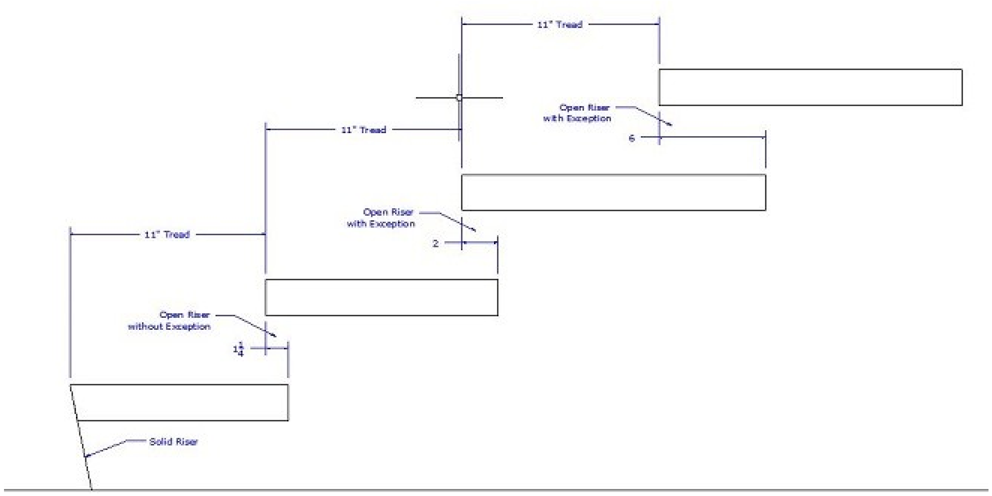
1011.5.5.2 Nosing projection uniformity. *Nosing* projections of the leading edges shall be of uniform size, including the projections of the *nosing's* leading edge of the floor at the top of a *flight*.

1011.5.5.3 Solid risers. Risers shall be solid.

Exceptions:

1. Solid risers are not required for *stairways* that are not required to comply with Section 1009.3, provided that the opening between treads does not permit the passage of a sphere with a diameter of 4 inches (102 mm).
2. Solid risers are not required for occupancies in Group I-3 or in Group F, H and S occupancies other than areas accessible to the public. The size of the opening in the riser is not restricted.
3. Solid risers are not required for *spiral stairways* constructed in accordance with Section 1011.10.

Reason: When open risers are allowed per exceptions 1, 2 or 3 of Section 1011.5.5.3 Solid risers; limiting the depth of the nosing projection over the tread below does not limit or prevent how far a foot or other object may project under the tread above. The new exception to Section 1011.5.5.1 removes the maximum limit on the nosing projection allowing for the option of a deeper tread under the tread above when open risers are allowed and present.
The sketch below is provided for reference.



Cost Impact: The code change proposal will not increase or decrease the cost of construction
This code change proposal only allows for the possibility for the treads to be larger, but does not require them to be larger nor allow for the treads to be smaller. Thus, it adds no cost to a project, unless the project designer elects to add cost.

Staff note: Proposals E61-21, E63-21 and E64-21 addresses requirements for nosing in a different or contradicting manner. The committee is urged to make their intentions clear with their actions on these proposals.

Public Hearing Results

Committee Action: **As Modified**

Committee Modification:

1011.5.5.1 Nosing projection size. The leading edge (*nosings*) of treads shall project not more than $1^{1}/_{4}$ inches (32 mm) beyond ~~over the required depth of~~ the tread below.

Exception: When solid risers are not required, the nosing projection is permitted to exceed the maximum projection ~~limit over the tread below~~.

Committee Reason: The modification removed a conflict with tread depth. The proposal was approved as it clarified that the controlling dimension is the location of the riser. The full tread depth is from nosing to nosing and does not change where the horizontal piece if larger than the tread. (Vote: 8-6)

Staff Analysis: Proposals E61-21, E63-21 and E64-21 addresses requirements for nosing in a different or contradicting manner. The committee is urged to make their intentions clear with their actions on these proposals.

E64-21

Individual Consideration Agenda

Public Comment :

Proponents: David Cooper, representing Stairbuilders and Manufacturers Association (coderep@stairways.org) requests Disapprove

Commenter's Reason: Although we agree with the intent of this proposal to allow exceeding the maximum nosing projection at open risers this proposal has serious flaws but was approved as modified as they were unnoticed by the committee.
For the following reasons the committee's decision must be disapproved.

1. The use of permissive language will cause misinterpretation. "When" should be replaced with "where".
2. The intent would be better understood if stated as requirement rather than as an exception.
3. As worded, if solid risers are not required the maximum nosing projection could be exceeded even if the the risers are not open.
4. The proposal approved as modified suggests the possibility of a varied nosing projection. Although I understand it not to be the intent of the proponent, this variation within a flight as illustrated in the proposal received significant objections from many on the committee. Regardless of the size of the nosing projection, dimensional uniformity is an issue just as it is with tread depth but must also must be controlled at floors and landings not just at treads or open risers even though nosing projection uniformity is covered in 1011.5.5.2.

For these reasons this must be disapproved. We will address these flaws in a modification to a similar proposal E61 that provides a comprehensive solution to this issue and other flaws in the current regulation of nosing projections that cause significant stair safety issues.

Your vote of disapproval is a necessity to correct the flawed committee action.

Cost Impact: The net effect of the public comment and code change proposal will not increase or decrease the cost of construction
No change to code.

Public Comment# 2493

E66-21

Proposed Change as Submitted

Proponents: Jeff Perras, representing Code Red Consultants, LLC (jeffp@crcfire.com)

2021 International Building Code

Revise as follows:

1011.7.3 Enclosures under ~~interior~~ exit access stairways. The walls and soffits within enclosed usable spaces under ~~enclosed and~~ unenclosed *stairways* shall be protected by 1-hour fire-resistance-rated construction~~. or the *fire-resistance rating* of the *stairway* enclosure, whichever is greater. Access to the enclosed space shall not be directly from within the *stairway* enclosure~~.

Exception: ~~Spaces under stairways serving and contained within a single residential dwelling unit in Group R-2 or R-3 shall be permitted to be protected on the enclosed side with 1/2-inch (12.7 mm) gypsum board.~~ In buildings equipped throughout with an automatic sprinkler system installed in accordance with Section 903.3.1.1 or 903.3.1.2.

Reason: The commentary for this section states that the section is intended to address the fire hazard of storage under a stairway. Enclosed stairways are required by Section 1023.2 to be separated from adjacent spaces with rated construction and direct access from normally unoccupied spaces is prohibited by Section 1023.4. Therefore, this section is not necessary for enclosed stairs and should only apply to exit access stairways. The intent of this section is for limit a fire in an enclosed, normally unoccupied space with moderate fuel loads from compromising the use of an exit access stairway. In lieu of needing a 1-hour separation, this code changes proposes to add an exception for fully sprinklered buildings. Providing sprinkler protection in the storage room should alleviate the concern with a fire going unnoticed in a storage room and is a concept recognized by multiple sections of the code. There is also no need for the existing exception with the proposed change since all new Group R buildings are sprinklered and dwelling unit separations are required by Section 420.2 & 420.3.

Cost Impact: The code change proposal will decrease the cost of construction
The proposed change eliminates the need for a rated storage room in a building with sprinkelrs throughout.

E66-21

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: This proposal was disapproved. Exit access stairways are open, so enclosure under a stairway would never be applicable. This protection for the exit stairways is needed. This would be in conflict with similar stairway requirements in the IRC. The exception is expanded too far. (Vote: 12-1)

E66-21

Individual Consideration Agenda

Public Comment :

IBC: 1011.7.3 (IFC:[BE]1011.7.3)

Proponents: Jeff Perras, representing Code Red Consultants, LLC (jeffp@crcfire.com) requests As Modified by Public Comment

Modify as follows:

2021 International Building Code

1011.7.3 Enclosures under exit access stairways . The walls and soffits within enclosed usable spaces under unenclosed *stairways* shall be protected by 1-hour fire-resistance-rated construction.

Exceptions:

1. Spaces under stairways serving and contained within a single residential dwelling unit in Group R-2 or R-3 shall be permitted to be

protected on the enclosed side with 1/2-inch (12.7 mm) gypsum board.

2. In buildings equipped throughout with an automatic sprinkler system installed in accordance with Section 903.3.1.1 or 903.3.1.2.

Commenter's Reason: During the committee action hearing concerns were raised about requiring buildings to be upgraded from an NFPA 13D system to an NFPA 13R system in order to avoid the rated separation. This revision to the proposal will keep the original exception for buildings equipped with an NFPA 13D system. The term unenclosed is changed to exit access stairways to make it clear which stairs this requirement applies to. Applying this requirement to stairs not used for egress purposes is unnecessary.
Concerns were raised during the hearing regarding stair enclosures being used for storage. The code is clear in Section 1023.1 that interior exit stairways are not permitted to be used for purposes other than egress and circulation. It is also clear in Section 1023.4 that normally unoccupied spaces are not permitted to open directly into interior stairs. There is not technical basis for prohibiting all spaces from opening directly into a stair just because they are located under a stair. Also, this requirement will/does not prevent occupants from storing items in a stair such as a copy machine as mentioned in the hearing. This will continue to happen regardless of this requirement and should be addressed during the local inspection process.

Another concern raised during the eharing was the reduction in rating for interior exit stairs. Since this section is revised to only apply to exit access stairs, this concern is not valid.

Lastly, the public hearing results states that this code change would be in conflict with the IRC. This code section is not in the IRC, so there is no conflict.

Cost Impact: The net effect of the public comment and code change proposal will decrease the cost of construction
The proposed change eliminates the need for a rated separation for spaces under exit access stairway in buildings protected with NFPA 13 or NFPA 13R systems.

Public Comment# 2839

E68-21

Proposed Change as Submitted

Proponents: Eirene Knott, BRR Architecture, representing BRR Architecture (eirene.knott@brrarch.com)

2021 International Building Code

Revise as follows:

1012.1 ~~Scope~~ General. ~~The provisions of this section shall apply to *ramps* used as a component of a *means of egress*.~~ *Ramps* serving occupied portions of a building shall comply with the requirements of Sections 1012.2 through 1012.10.

Exceptions:

1. Ramped *aisles* within assembly rooms or spaces shall comply with the provisions in Section 1030.
2. Curb ramps shall comply with ICC A117.1.
3. Vehicle ramps in parking garages for pedestrian *exit access* shall not be required to comply with Sections 1012.3 through 1012.10 where they are not an *accessible* route serving accessible parking spaces, other required accessible elements or part of an *accessible means of egress*.
4. Ramps associated with loading docks or piers are not required to comply with this section.

Reason: Where does the IBC provide the requirements for a ramp that does not serve a means of egress? There is no language in the IBC yet a ramp that serves other than a means of egress is required to comply with accessibility requirements. There are no provisions in Chapter 11 to address how ramps are to be constructed nor is there any reference to Section 1012 in Chapter 11. So how does one know how to design a ramp without using the provisions in Section 1012? Section 1011 for stairs applies to any stair serving an occupied portion of a building, why should ramps be any different?
What happens when there is a ramp provided for delivery of products to a building or within a building? Where does the code provide direction on how these ramps are to be constructed? They are not used for egress so one would never end up in this section of the code to determine guard and handrail requirements. Since the current language in 1012 says the provisions apply only to ramps used in a means of egress, then there is no direction on how to provide a ramp for any other purpose than egress.

What I've done is taken the language from 1011.1 for stairs and applied it to ramps for 1012. I've included an exception for loading docks as those are exempt from guard requirements per 1015.2.

Cost Impact: The code change proposal will increase the cost of construction
I do not foresee this language increasing the cost of construction. However, some will believe it will. In my opinion, this only clarifies that when a ramp is provided, it does have code requirements associated with it. I believe the code is silent on those ramps.

E68-21

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The proposal was disapproved because the committee felt that the proposed exception could conflict with exit discharge requirements. The exception should be limited to ramps for vehicle use only. (Vote: 13-0)

E68-21

Individual Consideration Agenda

Public Comment :

IBC: 1012.1 (IFC:[BE]1012.1)

Proponents: Eirene Knott, representing Metropolitan Kansas City Chapter of the ICC (eirene.knott@brrarch.com) requests As Modified by Public Comment

Modify as follows:

2021 International Building Code

1012.1 General . *Ramps* serving ~~occupied portions~~ *occupiable spaces* or *habitable spaces* of a building shall comply with the requirements of Sections 1012.2 through 1012.10.

Exceptions:

1. Ramped *aisles* within assembly rooms or spaces shall comply with the provisions in Section 1030.
2. Curb ramps shall comply with ICC A117.1.
3. Vehicle ramps in parking garages for pedestrian *exit access* shall not be required to comply with Sections 1012.3 through 1012.10 where they are not an *accessible* route serving accessible parking spaces, other required accessible elements or part of an *accessible means of egress*.
4. ~~Ramps associated with loading docks or piers are not required to comply with this section.~~

Commenter's Reason: The committee felt the proposed language need to apply to loading ramps only. So rather than provide another exception, by adding within the scoping language that ramps in habitable spaces and occupiable spaces must comply with this section, that should address that a loading ramp would not need to comply with this section. By using the terms "habitable space" and "occupiable space" we're now suggesting terms which are defined as to when the ramp requirements would apply.

Cost Impact: The net effect of the public comment and code change proposal will increase the cost of construction
I do not foresee this increasing the cost of construction, but some may believe it will so I have erred on the side of caution.

Public Comment# 2688

E70-21

Proposed Change as Submitted

Proponents: Timothy Stacy, representing Southern Oregon Fire Code Officials

2021 International Building Code

Add new text as follows:

1013.2 Mounting Location for signs near exits.
The center of exit signs shall be located a maximum vertical distance of 4 feet (1220 mm) above the egress opening and a maximum horizontal distance of 4 feet (1220 mm) from the edge of the egress opening.

Exception: The locations of exit signs shall be permitted to exceed these dimensions where approved by the building official.

Reason: Currently, exit signs can be installed at any height above an egress opening, potentially resulting in unreasonable viewing angles and increased difficulty with maintenance and testing. Both the vertical and horizontal 4 ft. dimensions would improve identification of the egress opening, access for maintenance and design flexibility. The 4 ft. vertical limit would allow most people to reach the exit signs with standard equipment, and the 4 ft. horizontal dimension is intended to provide consistency with the vertical distance. The exception is provided to accommodate situations where the code metrics cannot be achieved.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
It is assumed the sign will already be required.

E70-21

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The proposal was disapproved because the committee felt that the requirements for exit sign location should match NFPA 101. The proposed dimension of 4 feet is arbitrary. It is up to the fire code official to determine this on a case-by-case basis for unusual situations. The exception is not needed - this is the same as alternative means. The proposed text literally applies to all exit signs; it is suggested to add a limitation such as where associated with an exit opening. (Vote: 7-6)

E70-21

Individual Consideration Agenda

Public Comment 1:

IBC: 1013.2 (IFC:[BE]1013.2)

Proponents: Tanner Fairrington, representing Medford Fire-Rescue (tfairrington@yahoo.com) requests As Modified by Public Comment

Modify as follows:

2021 International Building Code

1013.2 Mounting ~~Location~~ location for signs ~~near exits~~ . ~~The center of of exit signs shall be located a maximum vertical distance of 4 feet (1220 mm) above the egress opening and a maximum horizontal distance of 4 feet (1220 mm) from the edge of the egress opening. opening.~~
In Group B and M occupancies, the exit signs shall be located above the exit or exit access opening associated with the exit signs in accordance with the following:

1. The bottom of the exit signs shall be 6 feet 8 inches (2033 mm) or less measured vertically above the clear opening height of the exit or exit access opening.
2. The closest side of the exit sign shall be less than the clear width of the exit or exit access opening measure horizontally from the edge of the clear opening of the exit or exit access opening.

Exception: ~~The locations of exit~~ Exit signs shall be permitted to be located at distances greater than ~~exceed~~ these requirements ~~dimensions~~ where approved by the building official.

Commenter's Reason: The proposal language is replaced with language that provides consistency with NFPA 101 as recommended by the committee. This public comment also addresses concerns raised during testimony by limiting the application to Group B and M occupancies since exit signs are commonly placed at the ceiling in open areas. The requirements only apply to exit signs near openings which should address the concerns expressed during testimony about the height of intermediate exit signs added to meet the 100 ft / viewing distance placement requirements of 503.1. Placing signs lower will allow for easier maintenance and inspection of these signs which will improve public safety. For example, car dealerships and large retail box stores often have open areas with ceiling heights at 20 ft. or more. Exit signs placed at the ceiling height are more difficult to reach and therefore are more difficult to inspect and maintain and would be blocked from view quickly by smoke in the event of a fire.

Cost Impact: The net effect of the public comment and code change proposal will increase the cost of construction
The proposal and public comment may result in a minimally increased construction costs in some cases. However, maintenance of these signs is required, and the reduced height may result in reduced maintenance costs.

Public Comment# 2967

E71-21

Proposed Change as Submitted

Proponents: Traci Harvey, Washington State Association of Fire Marshals, representing Washington State Association of Fire Marshals

2021 International Building Code

Revise as follows:

1013.5 Internally illuminated exit signs. Electrically powered, *self-luminous* and *photoluminescent* exit signs shall be *listed* and labeled in accordance with UL 924 and shall be installed in accordance with the manufacturer's instructions and Chapter 27. Exit signs shall be illuminated at all times. Exit signs shall be easily discernable and legible at all times.

Add new text as follows:

1013.5.1 Photoluminescent exit signs installation. .
Photoluminescent exit signs shall be installed in locations where normal operating lighting conditions is sufficient to adequately charge the sign.

Reason: This section addresses a pervasive problem the working group has tried to address in photoluminescent exit signs. Photoluminescence is a process whereby luminescence is induced by the absorption of visible light. The use of photoluminescent exit signage in a low light areas [ie: movie theatres] has presented a problem where minimal or no ambient light is available to recharge the sign. The code lacks adequate means to address photoluminescent exit signs.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal would not directly increase construction costs as it clarifies that exit signs need to be seen to perform the intended function.

E71-21

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The proposal was disapproved. The additional language to Section 1030.5 is already addressed in exit sign requirements in Section 1030.1. UL924 already addressed requirements for charging photoluminescent exit signs. The suggested language in Section 1030.5.1 is vague – how could a code official determine 'adequate'? The reason statement talks about movie theaters but lights turn on and off in these venues, so the proposed language does not work for those locations. (Vote: 13-0)

E71-21

Individual Consideration Agenda

Public Comment 1:

IBC: 1013.5.1 (IFC:[BE]1013.5.1)

Proponents: Traci Harvey, representing Washington State Association of Fire Marshals (harveyt@spokanevalleyfire.com) requests As Modified by Public Comment

Replace as follows:

2021 International Building Code

1013.5.1 Photoluminescent exit signs . Photoluminescent exit signs shall be provided with an illumination source to charge the exit sign in accordance with the manufacturers instructions.

Commenter's Reason: The intent of this PC is clarify the original intent of the proposal that photoluminescent exiting signs are installed only in locations where they receive enough light to be able to function appropriately. This new language replacing the original proposal refers to the manufacturers instructions as that will better define what operating lighting is considered sufficient to charge the sign.
The revision initially submitted to Section 1013.5 was removed as such language is already addressed in Section 1013.1.

Cost Impact: The net effect of the public comment and code change proposal will not increase or decrease the cost of construction
This is a clarification that is ensuring these signs work appropriately as intended.

Public Comment# 2240

E72-21

Proposed Change as Submitted

Proponents: Lee Kranz, representing Myself (lkranz@bellevuewa.gov)

2021 International Building Code

Add new text as follows:

1014.2 Location.
Handrails serving flights of stairways, ramps, stepped aisles and ramped aisles shall comply with the provisions of Sections 1014.2.1 and 1014.2.2.

Revise as follows:

1014.2.1 ~~**1014.2**~~
Height. *Handrail* height, measured above *stair* tread *nosings*, or finish surface of *ramp* slope, shall be uniform, not less than 34 inches (864 mm) and not more than 38 inches (965 mm). *Handrail* height of *alternating tread devices* and ships ladders, measured above tread *nosings*, shall be uniform, not less than 30 inches (762 mm) and not more than 34 inches (864 mm).

Exceptions:

1. Where *handrail* fittings or bendings are used to provide continuous transition between flights, the fittings or bendings shall be permitted to exceed the maximum height.
2. In Group R-3 occupancies; within *dwelling units* in Group R-2 occupancies; and in Group U occupancies that are associated with a Group R-3 occupancy or associated with individual *dwelling units* in Group R-2 occupancies; where *handrail* fittings or bendings are used to provide continuous transition between flights, transition at *winder* treads, transition from *handrail* to guard, or where used at the start of a *flight*, the *handrail* height at the fittings or bendings shall be permitted to exceed the maximum height.
3. *Handrails* on top of a *guard* where permitted along stepped *aisles* and ramped *aisles* in accordance with Section 1030.16.

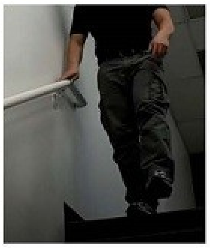
Add new text as follows:

1014.2.2 Lateral location.
Handrails located outward from the edge of the walking surface of flights of stairways, ramps, stepped aisles and ramped aisles shall be located within 6 inches (152.4 mm) measured horizontally from the edge of the walking surface. Handrails projecting into the width of the walking surface shall comply with Section 1014.8.

Revise as follows:

1014.8 Projections. On *ramps* and on ramped *aisles* that are part of an *accessible* route, the clear width between *handrails* shall be 36 inches (914 mm) minimum. Projections into the required width of stepped and ramped *aisles*, flights of *stairways* and *ramps* at each side shall not exceed $4^1/_2$ inches (114 mm) at or below the *handrail* height. Projections into the required width shall not be limited above the minimum headroom height required in Section 1011.3. Projections due to intermediate *handrails* shall not constitute a reduction in the egress width. Where a pair of intermediate *handrails* are provided within the *stairway* width without a walking surface between the pair of intermediate *handrails* and the distance between the pair of intermediate *handrails* is greater than 6 inches (152 mm), the available egress width shall be reduced by the distance between the closest edges of each such intermediate pair of *handrails* that is greater than 6 inches (152 mm).

Reason: Surprisingly, the code does not currently regulate the lateral distance that a handrail can be located away from the edge of the walking surface of a stair, ramp or aisle. If an architect wanted to locate a handrail 24 or even 36 inches away from the walking surface, there is currently no code provision to prevent that from happening. Most building officials would not permit that design but there is no code backing to support them. The substantive data provided as part of this code change provides the justification for limiting the lateral distance of the handrail to be not more than 6" from the edge of the walking surface. This code change is needed to insure that handrails will be located close enough to the edge of the walking surface to provide adequate support for pedestrians with limited reach capabilities.
Handrails that protrude into the required width of the stairway, ramp or aisle are currently regulated in Section 1014.8.



Note relative distance from the extent of the walking surface to edge of foot in photos 1-5 and in videos from SMA funded pilot study of handrails as used by persons with disabilities at the following links:

> *Https://stairways.wildapricot.org/resources/code-research-videos/nodevice01hr1.wmv*
> *Https://stairways.wildapricot.org/resources/code-research-videos/nodevice02hr1.wmv*
> *Https://stairways.wildapricot.org/resources/code-research-videos/nodevice04hr1.wmv*
> *Https://stairways.wildapricot.org/resources/code-research-videos/nodevice05hr1.wmv*

The persons in these videos have difficulty walking across a room but use no device such as a cane or walker.

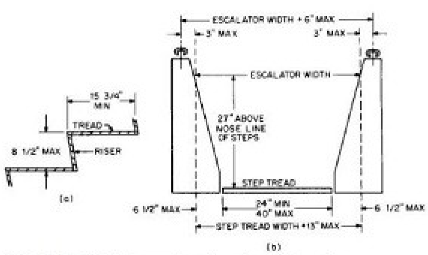
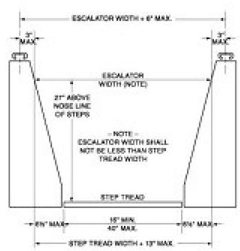


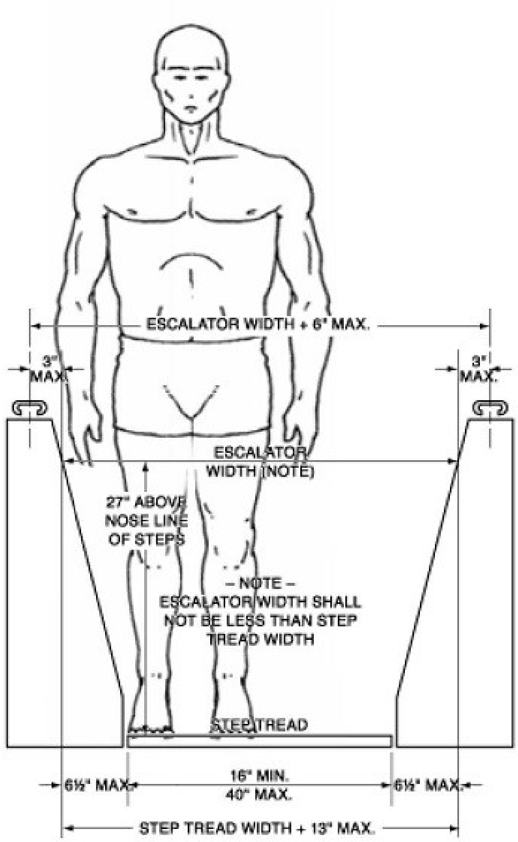
FIGURE 16.8 Limitations on dimensions of a straight escalator.



RELATIONSHIP OF ESCALATOR PARTS
FIGURE 3089B

From Oregon Escalator Regulation   From California Escalator Regulation

Typical Escalator regulations allow up to 9 ½ inches from end of walking surface to center of handrail

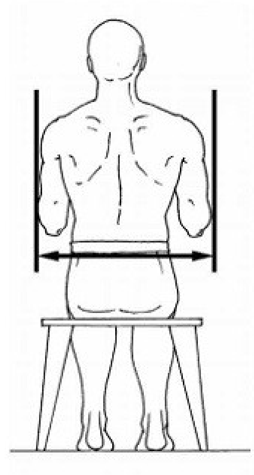


RELATIONSHIP OF ESCALATOR PARTS
FIGURE 3089B

Scaled Composite of 5'9" Male Anthropometric Sketch on escalator illustrates relative position of Hand to rail with the side of the foot at the end of the walking surface.

Forearm-Forearm Breadth

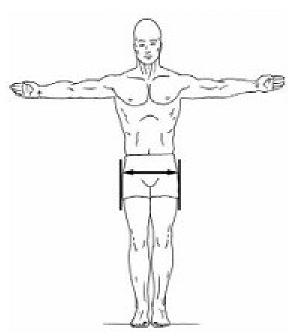
Centimeters	FEMALE N = 2208	Inches	Centimeters	MALE N = 1774	Inches
46.85	**Mean**	18.44	54.61	**Mean**	21.50
3.47	**Std Dev**	1.36	4.36	**Std Dev**	1.72
60.90	**Maximum**	23.98	72.52	**Maximum**	28.54
37.30	**Minimum**	14.69	39.90	**Minimum**	15.71
	Percentiles			**Percentiles**	
39.42	1st	15.52	45.12	1st	17.76
40.24	2nd	15.84	46.17	2nd	18.18
40.76	3rd	16.05	46.84	3rd	18.44
41.47	5th	16.33	47.74	5th	18.80
42.58	10th	16.76	49.16	10th	19.35
43.33	15th	17.06	50.13	15th	19.74
43.94	20th	17.30	50.91	20th	20.04
44.47	25th	17.51	51.59	25th	20.31
44.94	30th	17.69	52.21	30th	20.56
45.39	35th	17.87	52.79	35th	20.79
45.82	40th	18.04	53.35	40th	21.00
46.24	45th	18.20	53.90	45th	21.22
46.66	50th	18.37	54.45	50th	21.44
47.08	55th	18.54	55.00	55th	21.65
47.52	60th	18.71	55.56	60th	21.88
47.98	65th	18.89	56.16	65th	22.11
48.47	70th	19.08	56.79	70th	22.36
49.01	75th	19.30	57.47	75th	22.63
49.63	80th	19.54	58.25	80th	22.93
50.37	85th	19.83	59.16	85th	23.29
51.33	90th	20.21	60.32	90th	23.75
52.84	95th	20.80	62.06	95th	24.43
53.87	97th	21.21	63.18	97th	24.87
54.66	98th	21.52	64.00	98th	25.20
55.95	99th	22.03	65.27	99th	25.70



11

Hip Breadth

Centimeters	FEMALE N = 2208	Inches	Centimeters	MALE N = 1774	Inches
34.27	**Mean**	13.49	34.18	**Mean**	13.46
2.24	**Std Dev**	.88	2.03	**Std Dev**	.80
42.00	**Maximum**	16.54	41.60	**Maximum**	16.38
27.00	**Minimum**	10.63	28.20	**Minimum**	11.10
	Percentiles			**Percentiles**	
29.58	1st	11.65	29.64	1st	11.67
30.05	2nd	11.83	30.18	2nd	11.88
30.35	3rd	11.95	30.51	3rd	12.01
30.78	5th	12.12	30.97	5th	12.19
31.47	10th	12.39	31.66	10th	12.46
31.96	15th	12.58	32.12	15th	12.65
32.35	20th	12.74	32.49	20th	12.79
32.70	25th	12.87	32.81	25th	12.92
33.01	30th	13.00	33.10	30th	13.03
33.31	35th	13.11	33.36	35th	13.14
33.59	40th	13.23	33.62	40th	13.24
33.87	45th	13.34	33.87	45th	13.33
34.15	50th	13.45	34.12	50th	13.43
34.44	55th	13.56	34.37	55th	13.53
34.73	60th	13.67	34.62	60th	13.63
35.03	65th	13.79	34.89	65th	13.74
35.36	70th	13.92	35.18	70th	13.85
35.71	75th	14.06	35.49	75th	13.97
36.12	80th	14.22	35.85	80th	14.11
36.59	85th	14.41	36.27	85th	14.28
37.21	90th	14.65	36.82	90th	14.50
38.15	95th	15.02	37.65	95th	14.82
38.77	97th	15.27	38.22	97th	15.05
39.24	98th	15.45	38.64	98th	15.21
40.00	99th	15.75	39.32	99th	15.48



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Anthropometric Data

Apr 21, 2006 — **TABLE** OF CONTENTS. **Anthropometric Data** Point. Page #11 & 19 Gordon, Claire C. et. al 1988 Anthropometric Survey of U.S. Personnel:
https://multisite.eos.ncsu.edu/www-ergocenter-ncsu-edu/wp-content/uploads/sites/18/2016/06/Anthropometric-Detailed-Data-Tables.pdf

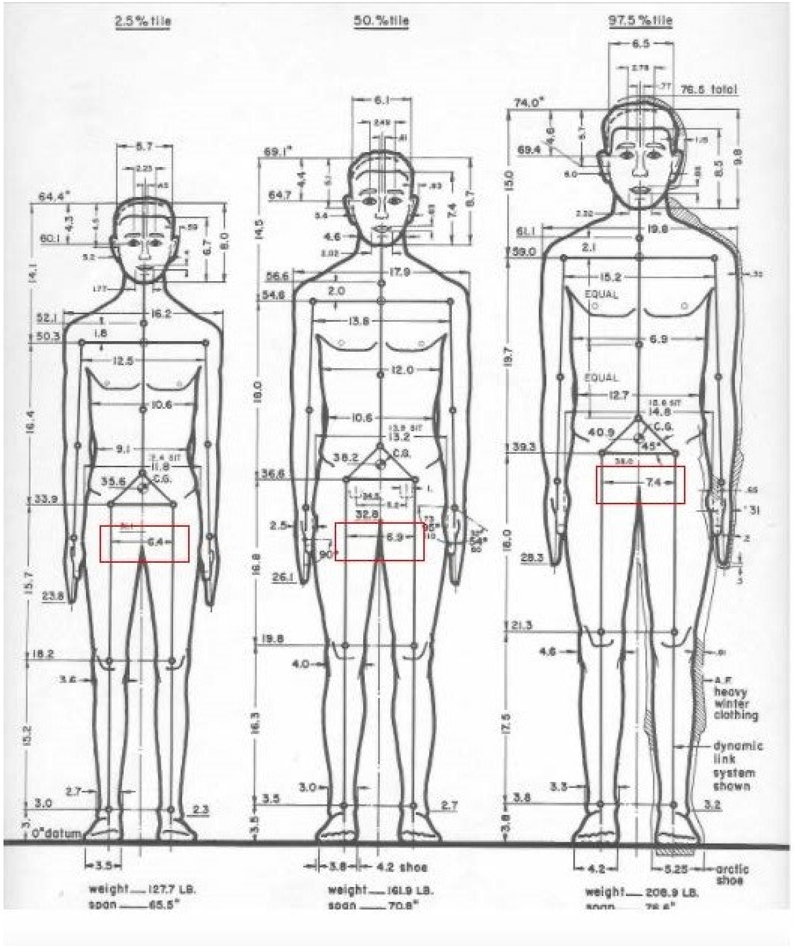
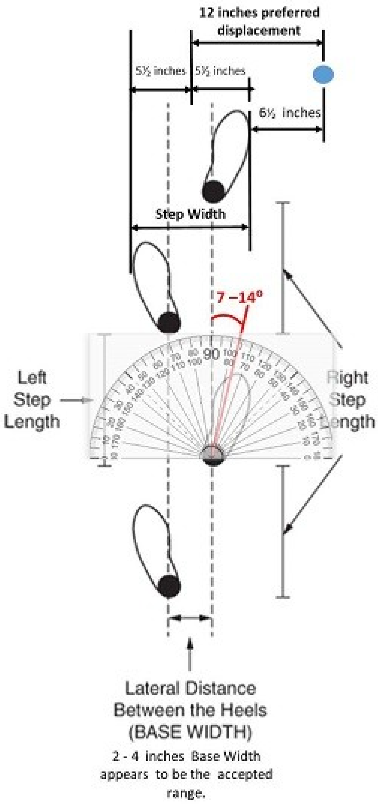
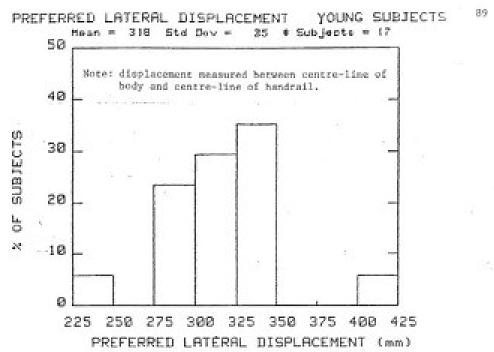


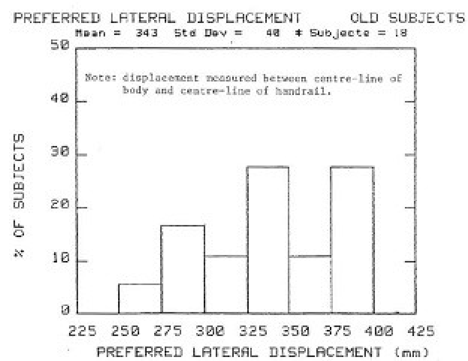
Illustration of only 1 inch range in stance dimension from 6.4 inches for 2.5 percentile to 7.4 inches for 97.5 percentile



An offset of 6 inches from the limit of the walking surface to the center of the handrail is conservatively justified considering:

1. Data from B. Maki's static measurement of preferred lateral displacement.
2. Step widths shown in the tables below for older persons who widen their gait in an effort to stabilize as determined by Herrero-Larrea, A.





Above Tables from:

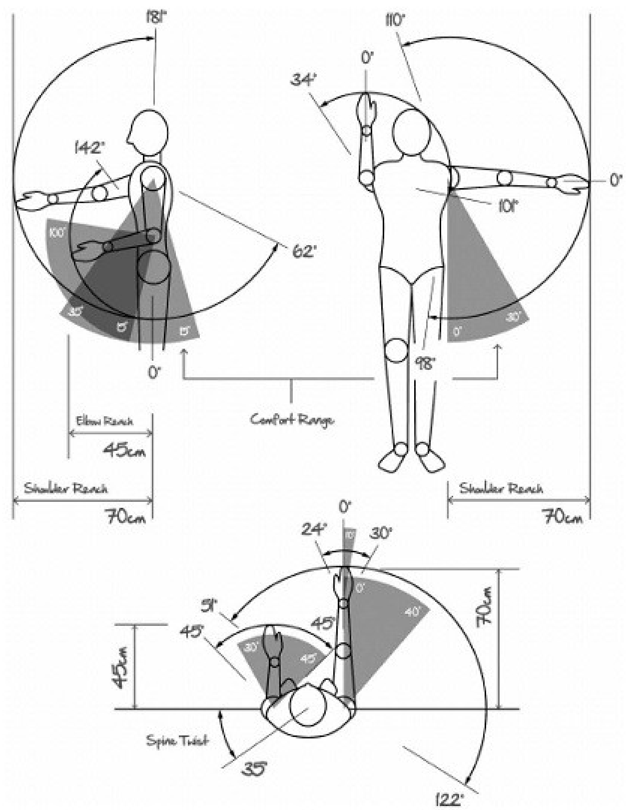
Biomechanical Assessment of Handrail Parameters with Special Consideration to the Needs of Elderly Users; B.E. Maki, G.R. Fernie, West Park Research, May 5, 1983. Prepared for the National Research Council of Canada.

2.

	Step width	Mean	SD	Normal limits (95%)		Normal limits (99%)		n
65–79	Men 65–79	10	4.5	1.1	19	−1.6	21.6	71
	Women 65–79	9.4	3.8	1.9	17	−0.4	19.2	98
>79	Men >79	12.5	4.9	2.6	22.3	−0.3	25.2	98
	Women >79	11.4	4.5	2.4	20.5	−0.3	23.2	164
TOTAL	(weighted)	10.3	4.37	1.6	19.8	−1	21.7	431

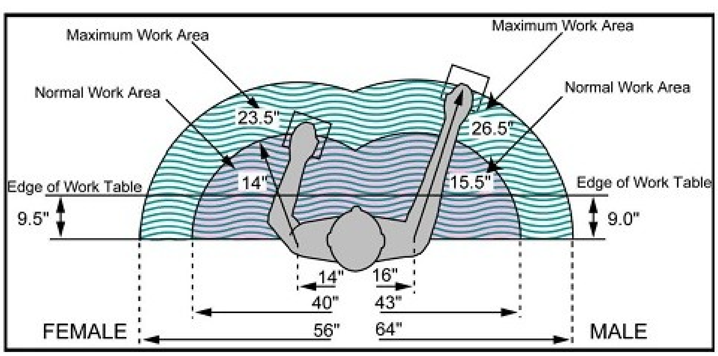
Above Table from:

Herrero-Larrea, A., Miñarro, A., Narvaiza, L. *et al.* Normal limits of home measured spatial gait parameters of the elderly population and their association with health variables. *Sci Rep* **8,** 13193 (2018). https://doi.org/10.1038/s41598-018-31507-1



Reach and rotation comfort zones of the average human based on charts developed by Dreyfuss & Tilley (2002).

Looker, Jed. (2015). Reaching for Holograms: Assessing the Ergonomics of the Microsoft™ Hololens™ 3D Gesture Known as the "Air Tap".
https://www.researchgate.net/publication/284283876_Reaching_for_Holograms_Assessing_the_Ergonomics_of_the_Microsoft_Hololens_3D_Gesture_Known_as_the_Air_Tap/citation/download



Reach range illustrations above clearly show that proposed 6 inch offset of the handrail beyond the extent of the walking surface is well within reason.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The proposal simply limits the distance that a handrail can be from the edge of the walking surface. It will not change the cost of construction.

Staff Note: E72-21, E73-21 and E79-21 addresses requirements in a different or contradicting manner. The committee is urged to make their intentions clear with their actions on these proposals.

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The proposal was disapproved because some of the committee felt that moving the handrail outboard from the stair treads would allow a gap next to the stairway at the walking surface. There was concern that someone could get their foot trapped at the edge and this would be a tripping hazard. It might be better for the code to be silent and address this on a case-by-case basis. (Vote: 8-5)

Staff Analysis: E72-21, E73-21 and E79-21 addresses requirements in a different or contradicting manner. The committee is urged to make their intentions clear with their actions on these proposals.

Individual Consideration Agenda

Public Comment 1:

Proponents: Lee Kranz, representing Myself (lkranz@bellevuewa.gov) requests As Submitted

Commenter's Reason: Many building officials are surprised when they learn that the building code does not limit how far away a handrail can be from the edge of a stair or ramp walking surface. E72 would limit how far a handrail can be located away from the edge of the walking surface of a stairway tread or a ramp. The anthropometric data submitted with this proposal shows that a handrail located within 6” of the edge of the walking surface of a stair or ramp is reasonable and is a vast improvement over what we have now.

The Means of Egress Committee raised the following issues. Our response to them follows each point.

1. **Issue:** The proposal would create the option to have a 6" opening between the edge of the walking surface and the guard.

Response: You are still required to comply with the guard requirements in Section 1015.4, which only allows a 4” space. See Figure 1 below.

2. **Issue:** Related to #1 above, someone could place their foot in the gap between the edge of the walking surface and the guard.

Response: The current code does not prohibit creation of a 4” gap between the edge of the walking surface and the guard. This proposal does not change anything regarding how much space is allowed at the edge of a stair tread or ramp in relation to the bottom of a guard. Again, see Figure 1 below.

3. **Issue:** The anthropometric data did not include individuals with physical disabilities or sight impairments.

Response: The data was collected from the Stair Builders and Manufacturer’s Association (SMA) and includes data on how an older person, a young child, a woman carrying a baby and a healthy person would use a handrail. There are also links to videos showing persons with difficulty walking and how they rely on the use of the handrail for stabilization and support. After studying the data, limiting the handrail to be within 6” of the edge of the walking surface of a stair or ramp was determined to be the most reasonable distance for the handrail location.

Photographic Examples. Photos 1, 2 and 3 below show the difficulty using a handrail that is 15 ½” away from the edge of the walking surface. In all the photos, the person’s arm is already fully- or over-extended, which is not comfortable for the user, nor is it safe if the person were to trip. You can see that this is an extreme example of what the code currently allows (i.e. not regulated). It’s not a safe design but without language in the code that limits the handrail reach range, it’s legal for the design professional to design it this way.

Photo 4 shows how the same child in Photo 3 can easily reach a handrail located 6" from the edge of the walking surface (note the bent elbow). The wood handrail in this photo is at approximately the same height as the handrail that is in the background, which is 15-1/2 inches from the edge of the stair. This shows 6” is a reasonable and safer limitation for the handrail placement, even for a small child.

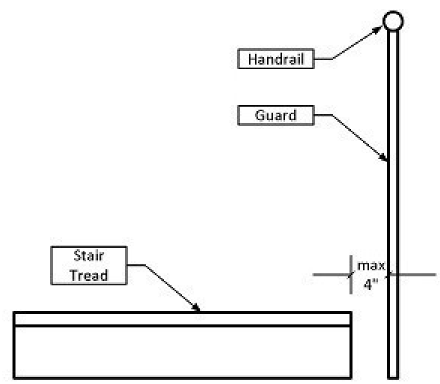


Figure 1 - Gap at Guards
(Not Prohibited in IBC 1015.4; Not Changed by E72/E73)

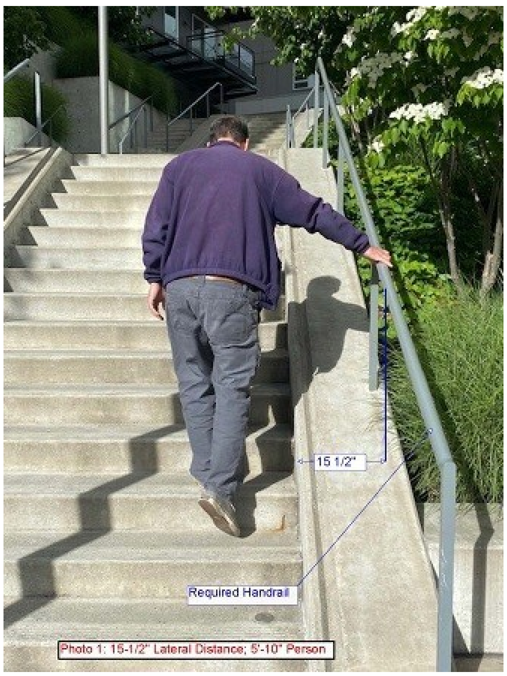


Photo 2: 15-1/2" Lateral Distance; 5'-1" Person

Photo 3: 15-1/2" Lateral Distance; 3'-1" Child

Photo 4: 6" Lateral Distance; 3'-1" Child

During testimony at the CAH, a question was raised as to the applicability of the figure in the reason statement showing the escalator. Our response is that this was included only to demonstrate the viability of the 6” lateral distance, since escalators are allowed to have up to 9-1/2” from the edge of the tread to the handrail.

E73 also proposes a 6” lateral distance. The only difference between E72 and E73 is how they are formatted in the code; there are no substantive differences. We would note that one of the people who spoke in opposition to this proposal at the CAH submitted a public comment to an ultimately unsuccessful proposal last cycle on the same topic (E76-18), in an attempt to set the lateral distance to zero (no offset allowed). This public comment did not get onto the ballot for the online vote. It is also worth noting that the Egress Committee final vote on E72-21 was very close.

Cost Impact: The net effect of the public comment and code change proposal will not increase or decrease the cost of construction
This code change simply limits the distance that a handrail can be located away from the edge of the walking surface of a stair or ramp. There will be no impact to the cost of construction.

Public Comments to Code Change Proposals E72-21 and E73-21 address requirements in a different or contradicting manner. The eligible ICC voting members are urged to make their intentions clear with their actions on these proposals.

Public Comment# 2320

E73-21

Proposed Change as Submitted

Proponents: Lee Kranz, representing Washington Association of Building Officials Technical Code Development Committee (lkranz@bellevuewa.gov); Micah Chappell, representing Washington Association of Building Officials (micah.chappell@seattle.gov)

2021 International Building Code

Add new text as follows:

1014.3 Lateral location.
Handrails located outward from the edge of the walking surface of flights of stairways, ramps, stepped aisles and ramped aisles shall be located within 6 inches (152.4 mm) measured horizontally from the edge of the walking surface. Handrails projecting into the width of the walking surface shall comply with Section 1014.8.

Reason: Surprisingly, the code does not currently regulate the lateral distance that a handrail can be located away from the edge of the walking surface of a stair, ramp or aisle. If an architect wanted to locate a handrail 24 or even 36 inches away from the walking surface, there is currently no code provision to prevent that from happening. Most building officials would not permit that design but there is no code backing to support them. The substantive data provided as part of this code change provides the justification for limiting the lateral distance of the handrail to be not more than 6" from the edge of the walking surface. This code change is needed to insure that handrails will be located close enough to the edge of the walking surface to provide adequate support for pedestrians with limited reach capabilities. Handrails that protrude into the required width of the stairway, ramp or aisle are currently regulated in Section 1014.8
See the reason statement for E72-21 for additional anthropometric data.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This code change will not increase the cost of construction. The intent is to improve the safety for those needing to use a handrail while traversing on stairways, ramps and aisles.

Staff Note: E72-21, E73-21 and E79-21 addresses requirements in a different or contradicting manner. The committee is urged to make their intentions clear with their actions on these proposals.

E73-21

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The committee disapproved this proposal based on their action on E72 and for the same reasons. (Vote 7-6)

Staff Analysis: E72-21, E73-21 and E79-21 addresses requirements in a different or contradicting manner. The committee is urged to make their intentions clear with their actions on these proposals.

E73-21

Individual Consideration Agenda

Public Comment 1:

IBC: 1014.3 (IFC:[BE]1014.3)

Proponents: Gene Boecker, representing Code Consultants, Inc. (geneb@codeconsultants.com) requests As Modified by Public Comment

Modify as follows:

2021 International Building Code

1014.3 Lateral location. Handrails located outward from the edge of the walking surface of flights of stairways, ramps, stepped aisles and ramped aisles shall be located within ~~6 inches (152.4 mm)~~ 3 inches (76 mm) measured horizontally from the edge of the walking surface to the edge of the handrail. Handrails projecting into the width of the walking surface shall comply with Section 1014.8.

Commenter's Reason: During the committee deliberation, a statement was brought up about a concern that placing the handrail outside the tread could result in a gap. This public comment moves the handrail closer to the edge of the tread. Given the ergonomics noted in the original E72-21 proposal, it is unlikely that any footfall would occur within this area.

Cost Impact: The net effect of the public comment and code change proposal will not increase or decrease the cost of construction
The proposal intent is to clarify a design option.

Public Comments to Code Change Proposals E72-21 and E73-21 address requirements in a different or contradicting manner. The eligible ICC voting members are urged to make their intentions clear with their actions on these proposals.

Public Comment# 2871

Public Comment 2:

IBC: 1014.3 (IFC:[BE]1014.3)

Proponents: Richard Williams, representing Washington Association of Building Officials Technical Code Development Committee (richard@cwaconsultants.net); Micah Chappell, representing Washington Association of Building Officials (micah.chappell@seattle.gov) requests As Submitted

Commenter's Reason: Many building officials are surprised when they learn that the building code does not limit how far away a handrail can be from the edge of a stair or ramp walking surface. E73 would limit how far a handrail can be located away from the edge of the walking surface of a stairway tread or a ramp. The anthropometric data submitted with E72-21 (E72 and E73 were submitted together) shows that a handrail located within 6” of the edge of the walking surface of a stair or ramp is reasonable and is a vast improvement over what we have now.
The Means of Egress Committee raised the following issues. Our response to them follows each point.

1. **Issue:** The proposal would create the option to have a 6" opening between the edge of the walking surface and the guard.

Response: You are still required to comply with the guard requirements in Section 1015.4, which only allows a 4” space. See Figure 1 below.

2. **Issue:** Related to #1 above, someone could place their foot in the gap between the edge of the walking surface and the guard.

Response: While current edge protection requirements for ramps would prohibit this, the current code does not prohibit creation of a 4” gap between the edge of the walking surface and the guard for stairs. This proposal does not change anything regarding how much space is allowed at the edge of a stair tread or ramp in relation to the bottom of a guard. Again, see Figure 1 below.

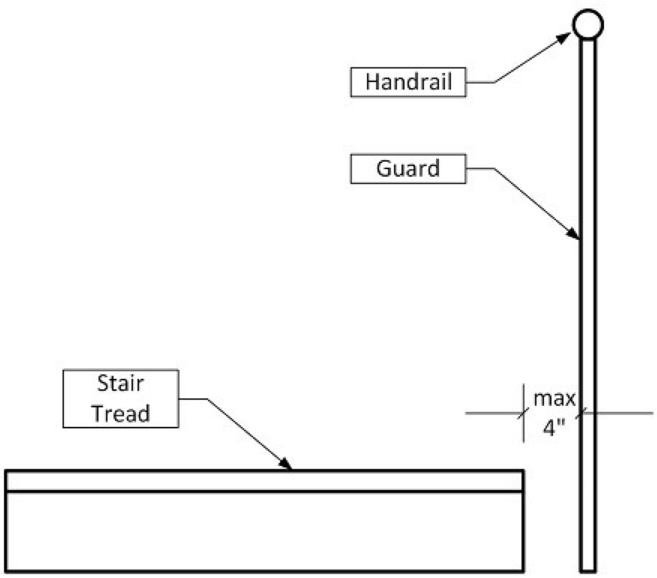


Figure 1 - Gap at Guards
(Not Prohibited in IBC 1015.4; Not Changed by E72/E73)

3. **Issue:** The anthropometric data did not include individuals with physical disabilities or sight impairments.

Response: The data was collected from the Stair Builders and Manufacturer's Association (SMA) and includes data on how an older person, a young child, a woman carrying a baby and a healthy person would use a handrail. There are also links to videos showing persons with difficulty walking and how they rely on the use of the handrail for stabilization and support. After studying the data, limiting the handrail to be within 6" of the edge of the walking surface of a stair or ramp was determined to be the most reasonable distance for the handrail location.

Photographic Examples. Photos 1, 2 and 3 below show the difficulty using a handrail that is 15 ½" away from the edge of the walking surface. In all the photos, the person's arm is already fully- or over-extended, which is not comfortable for the user, nor is it safe if the person were to trip. You can see that this is an extreme example of what the code currently allows (i.e. not regulated). It's not a safe design but without language in the code that limits the handrail reach range, it's legal for the design professional to design it this way.

Photo 4 shows how the same child in Photo 3 can easily reach a handrail located 6" from the edge of the walking surface (note the bent elbow). The wood handrail in this photo is at approximately the same height as the handrail that is in the background, which is 15-1/2 inches from the edge of the stair. This shows 6" is a reasonable and safer limitation for the handrail placement, even for a small child.


15 1/2"
Required Handrail
Photo 1: 15-1/2" Lateral Distance; 5'-10" Person


15 1/2"
Required Handrail
Photo 2: 15-1/2" Lateral Distance; 5'-1" Person

Photo 3: 15-1/2" Lateral Distance; 3'-1" Child

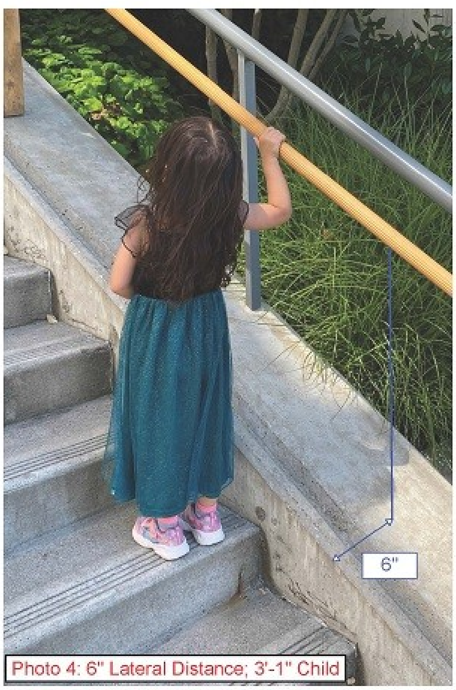


Photo 4: 6" Lateral Distance; 3'-1" Child

During testimony at the CAH, a question was raised as to the applicability of the figure in the reason statement showing the escalator. Our response is that this was included only to demonstrate the viability of the 6” lateral distance, since escalators are allowed to have up to 9-1/2” from the edge of the tread to the handrail.

E72 also proposes a 6” lateral distance. The only difference between E72 and E73 is how they are formatted in the code; there are no substantive differences. We would note that one of the people who spoke in opposition to this proposal at the CAH submitted a public comment to an ultimately unsuccessful proposal last cycle on the same topic (E76-18), in an attempt to set the lateral distance to zero (no offset allowed). This public comment did not get onto the ballot for the online vote. It is also worth noting that the egress committee final vote on E73 (and E72) was very close.

Cost Impact: The net effect of the public comment and code change proposal will not increase or decrease the cost of construction
This code change simply limits the distance that a handrail can be located away from the edge of the walking surface of a stair or ramp. There will be no impact to the cost of construction.

Public Comments to Code Change Proposals E72-21 and E73-21 address requirements in a different or contradicting manner. The eligible ICC voting members are urged to make their intentions clear with their actions on these proposals.

Public Comment# 2527

E76-21

Proposed Change as Submitted

Proponents: Thomas Zuzik Jr, of Railingcodes.com representing the National Ornamental & Miscellaneous Metals Association (NOMMA), representing the National Ornamental & Miscellaneous Metals Association (NOMMA) (coderep@railingcodes.com)

2021 International Building Code

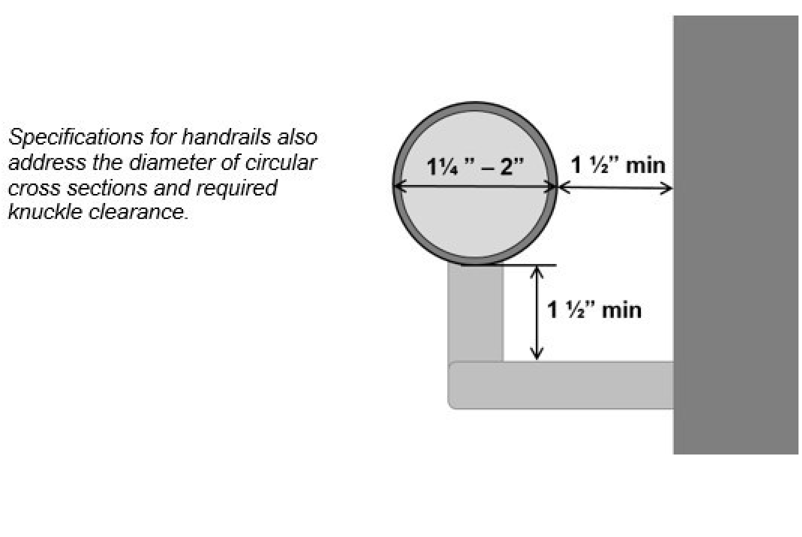
Revise as follows:

1014.6 Handrail extensions. *Handrails* shall return to a wall, *guard* or the walking surface or shall be continuous to the *handrail* of an adjacent *flight of stairs* or *ramp* run. Where *handrails* are not continuous between flights, the *handrails* shall extend horizontally not less than 12 inches (305 mm) beyond the top riser and continue to slope for the depth of one tread beyond the bottom riser. At *ramps* where *handrails* are not continuous between runs, the *handrails* shall extend horizontally above the landing 12 inches (305 mm) minimum beyond the top and bottom of *ramp* runs. The extensions of *handrails* shall be in the same direction of the flights of *stairs* at *stairways* and the *ramp* runs at *ramps* and shall extend the required minimum length before any change in direction. The length of the extension shall be measured in accordance with Section 1014.4 or 1014.7, whichever is less.

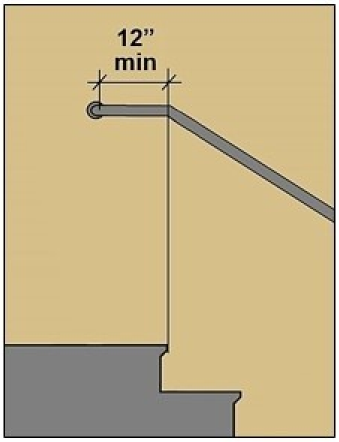
Exceptions:

1. *Handrails* within a *dwelling unit* that is not required to be *accessible* need extend only from the top riser to the bottom riser.
2. *Handrails* serving *aisles* in rooms or spaces used for assembly purposes are permitted to comply with the *handrail* extensions in accordance with Section 1030.16.
3. *Handrails* for *alternating tread devices* and ships ladders are permitted to terminate at a location vertically above the top and bottom risers. *Handrails* for *alternating tread devices* are not required to be continuous between flights or to extend beyond the top or bottom risers.

Reason: One of the most common handrail conflicts fabricators undergo with design professionals, contractors and inspectors is the proper termination of handrail extensions. Architectural drawings and plans continue to be widely drawn and distributed with incorrect minimum termination lengths and premature changes in direction. The family of ICC codes, A117.1, ADA and ABA covertly state where to measure the minimum extension length to and understate that handrail extensions “shall be in the same direction” before any change in direction; this leads to the codes and standards largely being misinterpreted by designers, contractors, fabricators, and inspectors that the minimum extension length is required to be met before any change in direction over landings is permitted. The diagram figures of A117.1, 2010 ADA, ABA and posted information on the US Access Boards website clearly explain that handrail extensions are to be measured to the furthest usable portion of the handrail before a return or termination, and specifically not to use a handrails overall length.
This code change specifically addresses both the issues outlined above by clearly defining the parameters a handrail termination is to be measured to, and the minimum length a handrail extension shall meet before any change in direction is allowed. The diagram figures shown below provide visual reference of the intended points to measure extensions to in A117.1, 2010 ADA & ABA, the figures however are not part of the IBC. Thus this code change provides a written description within the IBC that designers, contractors, manufactures and inspectors can clearly follow that will produce a result that meets the intent of the code for the extensions to be fully usable for the entire minimum length before any change in direction or termination occurs.

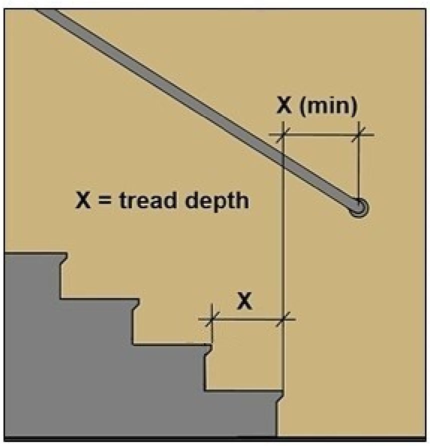


Top Handrail Extension

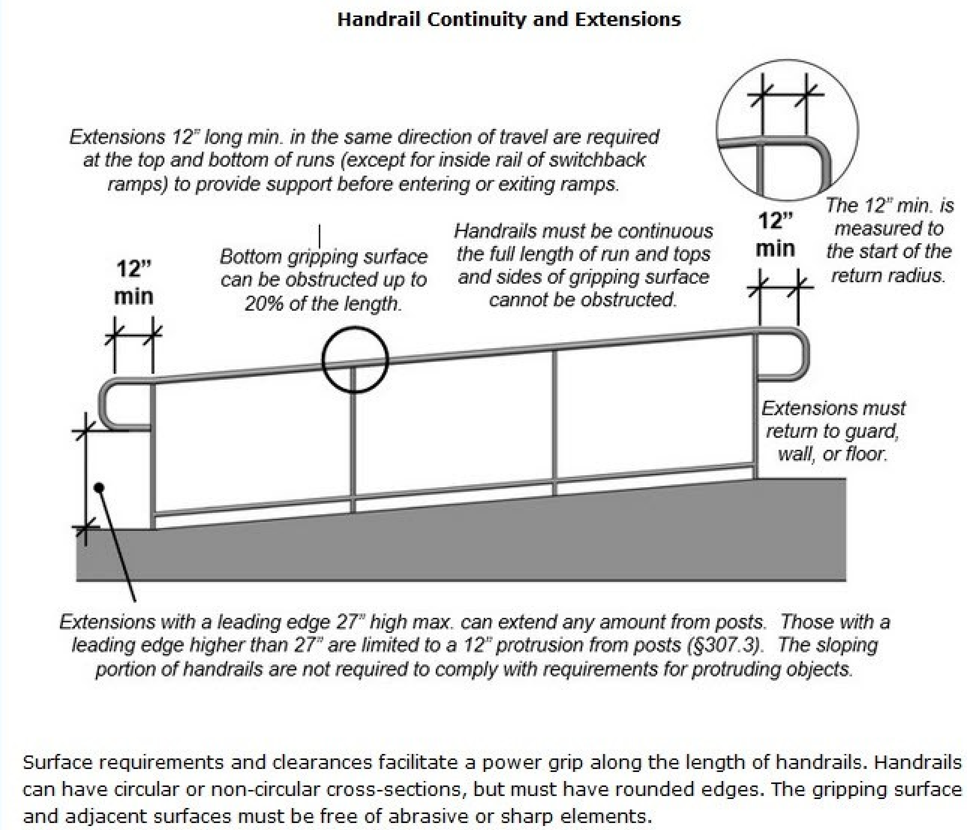


Handrails at the top of stairways must extend 12" minimum horizontally above the landing beginning directly above the first riser nosing or be continuous to the handrail of an adjacent stair flight (§505.10.2).

Bottom Handrail Extension



Handrails at the bottom must extend beyond the last riser nosing at the slope of the stair flight for a distance at least equal to one tread depth or be continuous to the handrail of an adjacent stair flight protruding objects.



Bibliography: The figures shown were downloaded from the U.S. Access Board - Home (access-board.gov)

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal is providing clarification of already required parameters within the code.

Staff Note: E75-21 and E76-21 addresses requirements in a different or contradicting manner. The committee is urged to make their intentions clear with their actions on these proposals.

E76-21

Public Hearing Results

Committee Action: **As Submitted**

Committee Reason: This proposal was approved because the committee felt the handrail extension should be measured from the stairway nosing. The proposed text matches the interpretation issued by the U.S. Access Board. (Vote: 12-2)

Staff Analysis: E75-21 and E76-21 addresses requirements in a different or contradicting manner. The committee is urged to make their intentions clear with their actions on these proposals.

E76-21

Individual Consideration Agenda

Public Comment 1:

IBC: 1014.6 (IFC:[BE]1014.6)

Proponents: David Cooper, representing Stairbuilders and Manufacturers Association (coderep@stairways.org) requests As Modified by Public

Comment

Modify as follows:

2021 International Building Code

1014.6 Handrail extensions . *Handrails* shall return to a wall, *guard* or the walking surface or shall be continuous to the *handrail* of an adjacent *flight of stairs* or *ramp* run. Where *handrails* are not continuous between flights, the *handrails* shall extend horizontally not less than 12 inches (305 mm) beyond the top ~~riser~~ landing nosing and continue to slope for the depth of one tread beyond the bottom ~~riser~~ tread nosing . At *ramps* where *handrails* are not continuous between runs, the *handrails* shall extend horizontally above the landing 12 inches (305 mm) minimum beyond the top and bottom of *ramp* runs. The extensions of *handrails* shall be in the same direction of the flights of *stairs* at *stairways* and the *ramp* runs at *ramps* and shall extend the required minimum length before any change in direction or decrease in the clearance required by Section 1014.4 or 1014.7. ~~The length of the extension shall be measured in accordance with Section 1014.4 or 1014.7, whichever is less.~~

Exceptions:

1. *Handrails* within a *dwelling unit* that is not required to be *accessible* need extend only from the top riser to the bottom riser.
2. *Handrails* serving *aisles* in rooms or spaces used for assembly purposes are permitted to comply with the *handrail* extensions in accordance with Section 1030.16.
3. *Handrails* for *alternating tread devices* and ships ladders are permitted to terminate at a location vertically above the top and bottom risers. *Handrails* for *alternating tread devices* are not required to be continuous between flights or to extend beyond the top or bottom risers.

Commenter's Reason: The substitution of "Nosing" for "Riser" provides a place to measure from that will ensure consistent measurement when stairs have sloped risers or none at all. This modification complies with the interpretive illustrations of handrail extension standards provided in the proposal from the access board and will ensure consistent enforcement. In the committees discussion of both E75 and E76 this modification was a portion of E75 that was highly recommended by the committee to be added to E76 by public comment.
The last sentence has been deleted to be more clear. It has been replaced with "or decrease in the clearance as required by Section 1014.4 or 1014.7". Section 1014.4 Continuity cites clearance at handrail brackets and Section 1014.7 cites clearance at walls and other surfaces. Clearance is relevant as the clearance decreases at the beginning of the bend of the return, the change of direction, and identifies the end of the required length of the extension and that it has the required clearance for the full length.

Cost Impact: The net effect of the public comment and code change proposal will not increase or decrease the cost of construction
This modified proposal merely clarifies the current requirement.

Public Comment# 2494

Public Comment 2:

IBC: 1014.6 (IFC:[BE]1014.6)

Proponents: Shane Nilles, representing Self (snilles@cityofcheney.org) requests As Modified by Public Comment

Modify as follows:

2021 International Building Code

1014.6 Handrail extensions . *Handrails* shall return to a wall, *guard* or the walking surface or shall be continuous to the *handrail* of an adjacent *flight of stairs* or *ramp* run. Where *handrails* are not continuous between flights, the *handrails* shall extend horizontally not less than 12 inches (305 mm) beyond the top riser and continue to slope for the depth of one tread beyond the bottom riser. At *ramps* where *handrails* are not continuous between runs, the *handrails* shall extend horizontally above the landing 12 inches (305 mm) minimum beyond the top and bottom of *ramp* runs. The extensions of *handrails* shall be in the same direction of the flights of *stairs* at *stairways* and the *ramp* runs at *ramps* and shall extend the required minimum length before any change in direction. ~~The length of the extension shall be measured in accordance with Section 1014.4 or 1014.7, whichever is less.~~

Exceptions:

1. *Handrails* within a *dwelling unit* that is not required to be *accessible* need extend only from the top riser to the bottom riser.
2. *Handrails* serving *aisles* in rooms or spaces used for assembly purposes are permitted to comply with the *handrail* extensions in accordance with Section 1030.16.

3. *Handrails* for *alternating tread devices* and ships ladders are permitted to terminate at a location vertically above the top and bottom risers. *Handrails* for *alternating tread devices* are not required to be continuous between flights or to extend beyond the top or bottom risers.

Commenter's Reason: Sections 1014.4 and 1014.7 do not contain any language regarding performing measurement of extensions. If that sentence is not deleted it will create great confusion for the code user.

Cost Impact: The net effect of the public comment and code change proposal will not increase or decrease the cost of construction
There is no cost impact by the revision. The revisions is editorial.

Public Comment# 2550

E80-21

Proposed Change as Submitted

Proponents: David Cooper, representing Stairbuilders and Manufacturers Association (Coderep@stairways.org)

2021 International Building Code

Revise as follows:

1015.2 Where required. *Guards* shall be provided for those portions of ~~located along~~ open-sided walking surfaces, including floors, *mezzanines*, equipment platforms, *aisles*, *stairs*, *ramps* and landings that are located more than 30 inches (762 mm) measured vertically to the floor or grade below at any point within 36 inches (914 mm) horizontally to the edge of the open side. Gaps at the top of guards shall be less than 4 inches (102 mm) in length.*Guards* shall be adequate in strength and attachment in accordance with Section 1607.9.

Exceptions: *Guards* are not required for the following locations:

1. On the loading side of loading docks or piers.
2. On the audience side of *stages* and raised *platforms*, including *stairs* leading up to the *stage* and raised *platforms*.
3. On raised *stage* and *platform* floor areas, such as runways, *ramps* and side *stages* used for entertainment or presentations.
4. At vertical openings in the performance area of *stages* and *platforms*.
5. At elevated walking surfaces appurtenant to *stages* and *platforms* for access to and utilization of special lighting or equipment.
6. Along vehicle service pits not accessible to the public.
7. In assembly seating areas at cross *aisles* in accordance with Section 1030.17.2.
8. On the loading side of station platforms on fixed guideway transit or passenger rail systems.

Reason: The change to the first sentence correlates with a similar change implemented in the 2021 IRC as shown below.

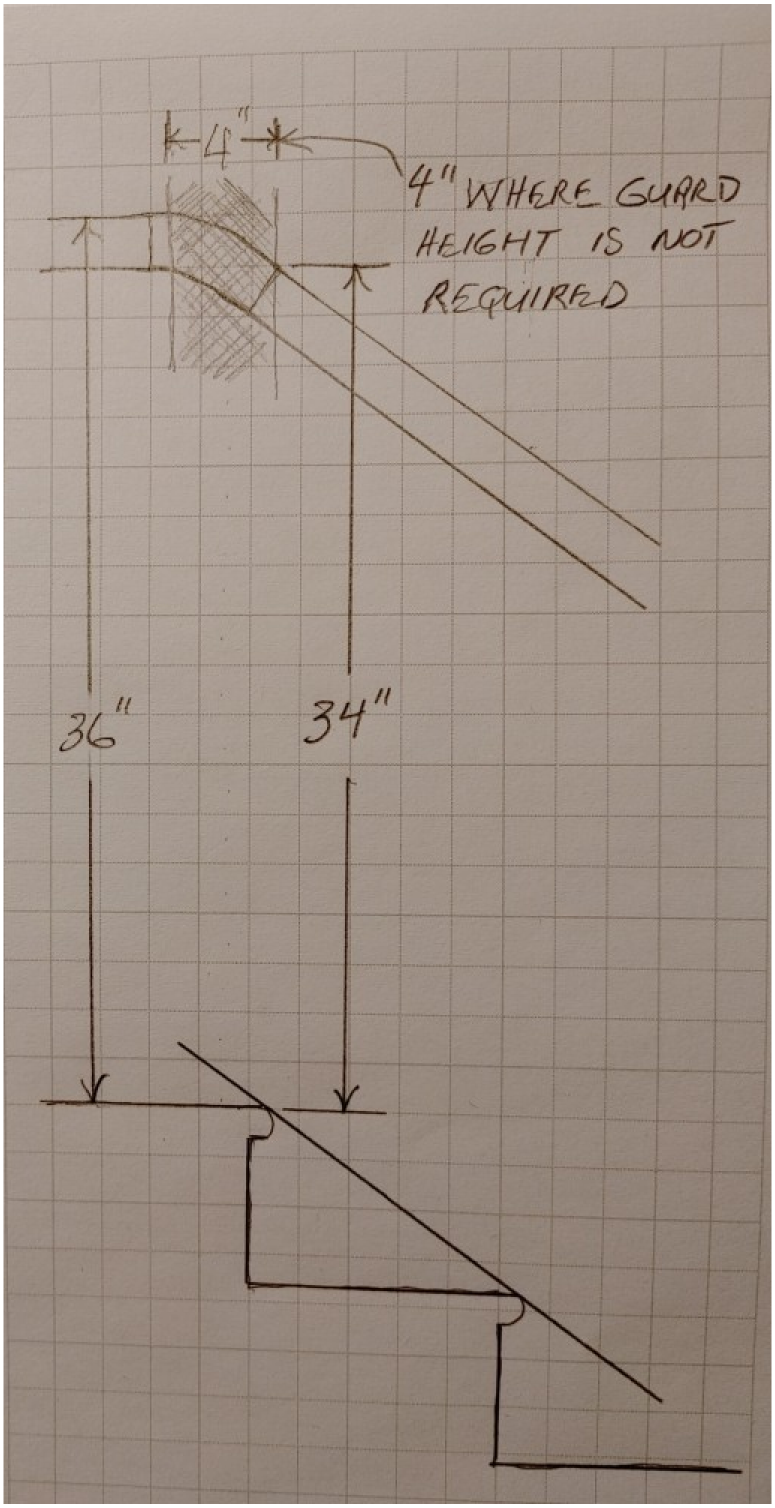
R312.1.1 Where required.

Guards shall be ***provided for those portions*** of open-sided walking surfaces, including ***floors***, stairs, ramps and landings that are located more than 30 inches (762 mm) measured vertically to the floor or grade below at any point within 36 inches (914 mm) horizontally to the edge of the open side. Insect screening shall not be considered as a guard. (***emphasis added***)

Many guards are provided in areas where the elevation is not constant. As in the IRC this change to the IBC clarifies the intent of the code to provide a guard only on that portion of an elevated surface exceeding the specified height above the floor or grade below.

The additional sentence inserted recognizes that the code does not specify that guards must have a continuous top, or how guards terminate as it does with handrails. Consequently, the code does not limit the use of simple pilons, or bollards spaced as far apart as 21 inches to suffice as the required guard in applications where a 21-inch opening limitation is allowed. Guards need not be continuous to serve their defined purpose to limit the possibility of a fall to a lower elevation nor does the top of the guard need to terminate in a wall or other portion of the structure when the guard is supported by connections at points below the top of the guard. The limit provided in this proposal of four inches is like the smallest guard opening. Four inches is a reasonable limit for a horizontal gap at the top of the guard that can be easily complied with in any occupancy and will not further restrict the opening limitations allowed below the top of the guard.

It is also the intent of this proposal to provide a four-inch “gap zone” to allow a smooth transition from stair guard height to level guard height at the top of flights. The “gap zone” limit will clarify that a guard of any height or none would be permitted. Currently in certain residential applications the code allows the handrail to serve as the top of the stair guard and requires the handrail to be continuous to the top riser. Where the nosing projects over the top riser a level guard is required at a higher height than allowed for the handrail creating a overlapping conflict. Figure 1 illustrates a very typical residential stair. The handrail serves as the top of the stair guard at the lowest possible height to allow the grasp of children. The handrail does not reach guard height until it is well past the top nosing where a taller level guard height is required. The over easing shown is simply a much safer condition that is currently not allowed by the most common interpretations. This change resolves the conflict in the requirements.



Cost Impact: The code change proposal will increase the cost of construction
Due to the many varied guard designs and materials no exact cost can be determined. Although most guards would not increase in cost those that are currently designed as simple vertical pilons or bollards will be most affected as well as those designed to terminate 21 inches away from a wall or other object will need to be extended. The 21-inch sphere rule guard systems as most commonly installed of pipe would not increase in cost. Other guard systems would not be increased in cost.

E80-21

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: This proposal was disapproved. The committee felt that this gap in the handrails was already addressed in Section 1015.4. (Vote: 14-0)

E80-21

Individual Consideration Agenda

Public Comment 1:

IBC: 1015.2 (IFC:[BE]1015.2)

Proponents: David Cooper, representing Stairbuilders and Manufacturers Association (coderep@stairways.org) requests As Modified by Public Comment

Modify as follows:

2021 International Building Code

1015.2 Where required . *Guards* shall be provided for those portions of open-sided walking surfaces, including floors, *mezzanines*, equipment platforms, *aisles*, *stairs*, *ramps* and landings that are located more than 30 inches (762 mm) measured vertically to the floor or grade below at any point within 36 inches (914 mm) horizontally to the edge of the open side. ~~Gaps at the top of guards shall be less than 4 inches (102 mm) in length.~~ *Guards* shall be adequate in strength and attachment in accordance with Section 1607.9. <u>Guards shall have a top rail or top surface without interruptions that allow the passage of a sphere $4^3/_8$ inches (111 mm) in diameter.</u>

Exceptions: *Guards* are not required for the following locations:

1. On the loading side of loading docks or piers.
2. On the audience side of *stages* and raised *platforms*, including *stairs* leading up to the *stage* and raised *platforms*.
3. On raised *stage* and *platform* floor areas, such as runways, *ramps* and side *stages* used for entertainment or presentations.
4. At vertical openings in the performance area of *stages* and *platforms*.
5. At elevated walking surfaces appurtenant to *stages* and *platforms* for access to and utilization of special lighting or equipment.
6. Along vehicle service pits not accessible to the public.
7. In assembly seating areas at cross *aisles* in accordance with Section 1030.17.2.
8. On the loading side of station platforms on fixed guideway transit or passenger rail systems.

Commenter's Reason: This modification more succinctly prescribes a guard system that cannot be simply pylons and provides specific limitation for allowed interruptions of the top surface or top rail of the guard system. I have increased the "gap" to $4^3/_8$ inches as this is the same as the sphere rule in the upper portion of the guards from the 36 height to the 42 height.
It is important to note that OSHA requires a guard with a top rail however ICC codes do not recognize that guards must be anything other than a system of vertical pylons, Especially where 21inch sphere rules are allowed it is impossible to understand that a system of only vertical pylons or simple bars spaced almost 21 inches apart could be understood to be a guard as defined in the ICC codes: *"**A building component** or system of building components located near the open sides of elevated walking surfaces **that minimizes the possibilility of a fall from the walking surface to a lower level.***

This is a clear of example that the committee got this wrong. The section on opening limitation they cite in their reason for disapproval allows a 21inch sphere rule that simply is not sufficient to minimize a fall. How can this situation be any different than the requirement for a top rail at structural glass baluster panels in the event one should break. In this case there is nothing at all to limit the possibility of a fall through a 21 inch wide swath between pylons. Good common sense should prevail.

Please overturn the committee and vote to approve this proposal as modified by public comment.

Cost Impact: The net effect of the public comment and code change proposal will increase the cost of construction
Due to the many varied designs of guard systems no exact cost can be determined. However this will only require the addition of a top rail or top surface to those guards that are currently designed as a simple array of pylons or only vertical elements.

E81-21

Proposed Change as Submitted

Proponents: Stephen Thomas, Colorado Code Consulting, a Shums Coda Assoc Company, representing Colorado Chapter ICC (sthomas@coloradocode.net); Timothy Pate, representing Colorado Chapter Code Change Committee (tpate@broomfield.org)

2021 International Building Code

Revise as follows:

1015.3 Height. Required *guards* shall be not less than 42 inches (1067 mm) high, measured vertically as follows:

1. From the adjacent walking surfaces.
2. On *stairways* and stepped *aisles*, from the line connecting the leading edges of the tread *nosings*.
3. On *ramps* and ramped *aisles*, from the *ramp* surface at the guard.

Exceptions:

1. For occupancies in Group R-3 ~~not more than three stories above grade in height~~ and within individual *dwelling units* in occupancies in Group R-2 ~~not more than three stories above grade in height with separate *means of egress*~~, required *guards* shall be not less than 36 inches (914 mm) in height measured vertically above the adjacent walking surfaces. Guards serving exterior spaces accessed from a dwelling unit and located not more than 3 stories above grade plane shall be not less than 36 inches (914 mm) in height measured vertically above the adjacent walking surfaces.
2. For occupancies in Group R-3, and within individual *dwelling units* in occupancies in Group R-2, *guards* on the open sides of *stairs* shall have a height not less than 34 inches (864 mm) measured vertically from a line connecting the leading edges of the treads.
3. For occupancies in Group R-3, and within individual *dwelling units* in occupancies in Group R-2, where the top of the *guard* serves as a *handrail* on the open sides of *stairs*, the top of the *guard* shall be not less than 34 inches (864 mm) and not more than 38 inches (965 mm) measured vertically from a line connecting the leading edges of the treads.
4. The *guard* height in assembly seating areas shall comply with Section 1030.17 as applicable.
5. Along *alternating tread devices* and ships ladders, *guards* where the top rail serves as a *handrail* shall have height not less than 30 inches (762 mm) and not more than 34 inches (864 mm), measured vertically from the leading edge of the device tread *nosing*.
6. In Group F occupancies where *exit access stairways* serve fewer than three stories and such *stairways* are not open to the public, and where the top of the *guard* also serves as a *handrail*, the top of the *guard* shall be not less than 34 inches (864 mm) and not more than 38 inches (965 mm) measured vertically from a line connecting the leading edges of the treads.

Reason: The purpose of this proposal is to make the language easier to understand and more reasonable. The height of a guard located within a dwelling unit should be consistent. Whether it is in a Group R-3 dwelling unit or an individual dwelling unit in a Group R-2 occupancy, the requirements should be the same. The level of hazard is the same in both. The existing language that limited the exception to Group R-2 occupancies 3 stories or less does not make any sense. What makes a fall any more dangerous within a dwelling unit on the second floor than a dwelling unit on the sixth floor. It also does not make sense to limit this to buildings with separate occupancies. The presences of one or two exits has no bearing on the fall protection within a dwelling unit.
We have added language to clarify that guards outside of the dwelling unit such as decks and balconies will need to have guards with a minimum height of 42 inches if the unit is more than three stories above grade plane. This seems reasonable since we believe that is what the original language was intended to do.

Cost Impact: The code change proposal will decrease the cost of construction
The costs will decrease slightly since taller guards will not be required within the dwelling units.

E81-21

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: This proposal was disapproved because the committee felt that the height of the exterior guard should be based on the height above grade, not the grade plane. This could also be an issue for Group R-3 units taller than 3 stories. (Vote: 9-5)

Individual Consideration Agenda

Public Comment 1:

IBC: 1015.3

Proponents: David Cooper, representing Stairbuilders and Manufacturers Association (coderep@stairways.org) requests As Modified by Public Comment

Modify as follows:

2021 International Building Code

1015.3 Height . Required *guards* shall be not less than 42 inches (1067 mm) high, measured vertically as follows:

1. From the adjacent walking surfaces.
2. On *stairways* and stepped *aisles*, from the line connecting the leading edges of the tread *nosings*.
3. On *ramps* and ramped *aisles*, from the *ramp* surface at the guard.

Exceptions:

1. For occupancies in Group R-3 and within individual *dwelling units* in occupancies in Group R-2,required *guards* serving walking surfaces not more than 2 stories above the floor or grade below shall be not less than 36 inches (914 mm) in height measured vertically above the adjacent walking surfaces. *Guards* serving exterior ~~spaces~~ walking surfaces accessed only from a single, individual R-3 or R-2 dwelling unit and located not more than ~~3~~ 2 stories above the grade ~~plane~~ below shall be not less than 36 inches (914 mm) in height measured vertically above the adjacent walking surfaces.
2. For occupancies in Group R-3, and within individual *dwelling units* in occupancies in Group R-2, *guards* on the open sides of *stairs* shall have a height not less than 34 inches (864 mm) measured vertically from a line connecting the leading edges of the treads.
3. For occupancies in Group R-3, and within individual *dwelling units* in occupancies in Group R-2, where the top of the *guard* serves as a *handrail* on the open sides of *stairs*, the top of the *guard* shall be not less than 34 inches (864 mm) and not more than 38 inches (965 mm) measured vertically from a line connecting the leading edges of the treads.
4. The *guard* height in assembly seating areas shall comply with Section 1030.17 as applicable.
5. Along *alternating tread devices* and ships ladders, *guards* where the top rail serves as a *handrail* shall have height not less than 30 inches (762 mm) and not more than 34 inches (864 mm), measured vertically from the leading edge of the device tread *nosing*.
6. In Group F occupancies where *exit access stairways* serve fewer than three stories and such *stairways* are not open to the public, and where the top of the *guard* also serves as a *handrail*, the top of the *guard* shall be not less than 34 inches (864 mm) and not more than 38 inches (965 mm) measured vertically from a line connecting the leading edges of the treads.

Commenter's Reason: The code currently recognizes that in certain residential occupancies minimizing a possible fall from a walking surface only requires a guard height of 36 inches, however it is does not clearly address guards at the exterior walking surfaces of these units. Nor does it address possible exposures of more than a three story drop within certain interior occupancies described in E82.
This modification of E81 clearly addresses the issues at the root of E81, floor modification E81-Niles-1 and E82 by simply referring to the level of the walking surface that requires a guard that is 36 inches in height regardless of whether it is an interior or exterior walking surface. Within the specified occupancies, if the height from the walking surface to the floor or grade below is not greater than 2 stories the required guard height is 36 inches.

Please overturn the committee action and support this modification.

Cost Impact: The net effect of the public comment and code change proposal will decrease the cost of construction
This will clarify that 36 inch high guards may be used in certain locations where 42 inch guards are now required lower the quantity and cost of related materials. Due to the varied designs of guard systems it is impossible to calculate the savings.

Public Comments to Code Change Proposals E81-21 and E82-21 address requirements in a different or contradicting manner. The eligible ICC voting members are urged to make their intentions clear with their actions on these proposals.

Public Comment# 2508

E82-21

Proposed Change as Submitted

Proponents: Thomas Zuzik Jr, of Railingcodes.com representing the National Ornamental & Miscellaneous Metals Association (NOMMA), representing the National Ornamental & Miscellaneous Metals Association (NOMMA) (coderep@railingcodes.com)

2021 International Building Code

Revise as follows:

1015.3 Height. Required *guards* shall be not less than 42 inches (1067 mm) high, measured vertically as follows:

1. From the adjacent walking surfaces.
2. On *stairways* and stepped *aisles*, from the line connecting the leading edges of the tread *nosings*.
3. On *ramps* and ramped *aisles*, from the *ramp* surface at the guard.

Exceptions:

1. For occupancies in Group R-3 not more than three stories above grade in height and within individual *dwelling units* in occupancies in Group R-2 not more than three stories above grade in height with separate *means of egress*, required *guards* shall be not less than 36 inches (914 mm) in height measured vertically above the adjacent walking surfaces.

2. For occupancies in Group R-2 and R-3, within the interior space in individual dwelling units, where the open-sided walking surface or landing are located not more than 25 feet (7.62 meters) measured vertically to the floor or grade below, required guards shall not be less than 36 inches (914 mm) in height measured vertically above the adjacent walking surface or landing.

~~2.~~ 3. For occupancies in Group R-3, and within individual *dwelling units* in occupancies in Group R-2, *guards* on the open sides of *stairs* shall have a height not less than 34 inches (864 mm) measured vertically from a line connecting the leading edges of the treads.

~~3.~~ 4. For occupancies in Group R-3, and within individual *dwelling units* in occupancies in Group R-2, where the top of the *guard* serves as a *handrail* on the open sides of *stairs*, the top of the *guard* shall be not less than 34 inches (864 mm) and not more than 38 inches (965 mm) measured vertically from a line connecting the leading edges of the treads.

~~4.~~ 5. The *guard* height in assembly seating areas shall comply with Section 1030.17 as applicable.

~~5.~~ 6. Along *alternating tread devices* and ships ladders, *guards* where the top rail serves as a *handrail* shall have height not less than 30 inches (762 mm) and not more than 34 inches (864 mm), measured vertically from the leading edge of the device tread *nosing*.

~~6.~~ 7. In Group F occupancies where *exit access stairways* serve fewer than three stories and such *stairways* are not open to the public, and where the top of the *guard* also serves as a *handrail*, the top of the *guard* shall be not less than 34 inches (864 mm) and not more than 38 inches (965 mm) measured vertically from a line connecting the leading edges of the treads.

Reason: Both the IBC & IRC have accepted the reduction in guard height from 42 inches to 36 inches for private dwelling units since the first model ICC code publications. The current height exceptions within the ICC's family of model codes are focused on a predetermined building height of 3 stories and centered around that the occupants are extremely familiar with their living environment. This code change proposal builds on the established history of the 36-inch height exception currently within the 2021 IBC under exception (1), in Section 1015.3 Height and published in prior model code years also.
This proposal specifically limits the new exception to openside walking surfaces and landings within the interior space of individual dwelling units, within occupancy Groups R-3 & R-2.

The proposal is centered on allowing an owner of a 2 or 3 floor unit within a Group R-2 building who's unit is located on upper floor levels within a building more than 3 stories in height or owns a single-family R-3 dwelling more than 3 stories, by allowing the same guard height exception as a home 3 stories or less; but specifically limits the exception to only the interior area of the dwelling, and only when the interior openside fall in question is less than 25 feet in total rise.

There are many dwelling units that have an interior single floor level rise to a second level located along a stair flight, were the stair flight guard is allowed to be reduced in height from 42-inches to 34-38 inches for the handrail height, however once reaching a mid-landing or the 2nd level are now required to increase the height changing the design of the pattern or ornamental look of the guard. Wanting to keep a consistent height for both the stairs and the landings is highly important when designers are working with ornamental infill in guards.

This new exception is different than exception 1 though similar in wording, however, both exceptions are required to hold the line with the widely established exception allowing the 36-inch guard height for very specific dwelling unit. The history of why previous model code proposals have not had this specific exception is of the concern for making sure that the exception is not used for public areas and private dwelling fall heights above 3 stories. By limiting the exception specifically to interior conditioned space of an individual dwelling and attaching a maximum fall height limit to 25 feet, keeps the exception well within the parameters of the existing exception 1. As to the 25-foot vertical rise limit, this is based on the approximate maximum rise a dwelling unit might have when 2 stair flights are stacked above each other without any mid-landings in either of the stair flights. The horizontal measuring parameters for the 36-inch is based on long established code language for required guards under Section 1015.1.

Cost Impact: The code change proposal will decrease the cost of construction
Having to select a cost impact when submitting a proposal, there will be a savings on projects, but this savings will be very minimal for the most common project if any. The major savings will be seen on much higher cost projects with highly ornamental and detailed guards.

E82-21

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The proposal was disapproved for consistency with the committee action on E81. (Vote: 13-1)

E82-21

Individual Consideration Agenda

Public Comment 1:

IBC: 1015.3 (IFC:[BE] 1015.3)

Proponents: Thomas Zuzik Jr, representing the National Ornamental & Miscellaneous Metals Association (NOMMA) (coderep@railingcodes.com) requests As Modified by Public Comment

Modify as follows:

2021 International Building Code

1015.3 Height . Required *guards* shall be not less than 42 inches (1067 mm) high, measured vertically as follows:

1. From the adjacent walking surfaces.
2. On *stairways* and stepped *aisles*, from the line connecting the leading edges of the tread *nosings*.
3. On *ramps* and ramped *aisles*, from the *ramp* surface at the guard.

Exceptions:

1. For occupancies in Group R-3 not more than three stories above grade in height and within individual *dwelling units* in occupancies in Group R-2 not more than three stories above grade in height with separate *means of egress*, required *guards* shall be not less than 36 inches (914 mm) in height measured vertically above the adjacent walking surfaces.
2. For occupancies in Group R-2 and R-3, within the interior conditioned space ~~in~~ of individual dwelling units, where the open-sided walking surface is ~~or landing are~~ located not more than 25 feet (7.62 meters) measured vertically to the floor or ~~grade~~ walking surface below, required guards shall not be less than 36 inches (914 mm) in height measured vertically above the adjacent walking surface ~~or landing~~.
3. For occupancies in Group R-3, and within individual *dwelling units* in occupancies in Group R-2, *guards* on the open sides of *stairs* shall have a height not less than 34 inches (864 mm) measured vertically from a line connecting the leading edges of the treads.
4. For occupancies in Group R-3, and within individual *dwelling units* in occupancies in Group R-2, where the top of the *guard* serves as a *handrail* on the open sides of *stairs*, the top of the *guard* shall be not less than 34 inches (864 mm) and not more than 38 inches (965 mm) measured vertically from a line connecting the leading edges of the treads.
5. The *guard* height in assembly seating areas shall comply with Section 1030.17 as applicable.
6. Along *alternating tread devices* and ships ladders, *guards* where the top rail serves as a *handrail* shall have height not less than 30 inches (762 mm) and not more than 34 inches (864 mm), measured vertically from the leading edge of the device tread *nosing*.

7. In Group F occupancies where *exit access stairways* serve fewer than three stories and such *stairways* are not open to the public, and where the top of the *guard* also serves as a *handrail*, the top of the *guard* shall be not less than 34 inches (864 mm) and not more than 38 inches (965 mm) measured vertically from a line connecting the leading edges of the treads.

Commenter's Reason: Reason:

- Both the IBC & IRC have accepted the reduction in guard height from 42 inches to 36 inches for private dwelling units since the first model ICC code publications. The current height exceptions within the ICC's family of model codes are focused on a predetermined building height of 3 stories and centered around that the occupants are extremely familiar with their living environment. The original code change proposal builds on the established history of the 36-inch height exception currently within the 2021 IBC under exception (1), in Section 1015.3 Height and published in prior model code years also.
- This proposal specifically limits the new exception to openside walking surfaces and landings within the **interior conditioned space** of individual dwelling units, within occupancy Groups R-3 & R-2.
- The proposal is centered on allowing an owner of a 2 or 3 floor unit within a Group R-2 building who's unit is located on upper floor levels within a building more than 3 stories in height or owns a single-family R-3 dwelling more than 3 stories, by allowing the same guard height exception as a home 3 stories or less; but specifically limits the exception to only the interior area of the dwelling, and only when the fall for the interior open side in question is less than 25 feet in total rise.
- There are many dwelling units that have an interior single floor level rise to a second level located along a stair flight, were the stair flight guard is allowed to be reduced in height from 42-inches to 34-38 inches for the handrail height, however once reaching a mid-landing or the 2nd level are now required to increase the height changing the design of the pattern or ornamental look of the guard. Wanting to keep a consistent height for both the stairs and the landings is highly important when designers are working with ornamental infill in guards.
- This new exception is **completely different** than exception 1, though similar in wording in that both exceptions hold the line with the widely established precedent of allowing the 36-inch guard height for very specific dwelling units. However, exception 1 allows both exterior and interior locations. By limiting the exception specifically to the interior conditioned space of an individual dwelling unit and attaching a maximum fall height limit to 25 feet, stays within the parameters of the existing exceptions for lower buildings.
    - As to the 25-foot vertical rise limit, this is based on the approximate maximum rise a dwelling unit might have when 2 stair flights are stacked above each other without any mid-landings in either of the stair flights.
    - Exception 1, conditions the exception to the height of the building structure above grade plane, where as the new exception (2) does not look at how tall the building is above grade plane, the exception only focuses on the height above the walking surface below, within the individual dwelling unit, not outside.
- A review of the video from the committee action hearing's, https://cpdaccess.com/videos/4378/ shows that the committee felt the wording needed to be slightly adjusted and with that adjustment should pass during the final action hearings through public comment.

We ask that you approve this code change proposal as presented with public comment

Cost Impact: The net effect of the public comment and code change proposal will decrease the cost of construction
The cost impact for this proposal will show a savings on projects, but this savings will be very minimal for the most common project if any. The major savings will be seen on much higher cost projects with highly ornamental and detailed guards

Public Comments to Code Change Proposals E81-21 and E82-21 address requirements in a different or contradicting manner. The eligible ICC voting members are urged to make their intentions clear with their actions on these proposals.

Public Comment# 2801

E86-21

Proposed Change as Submitted

Proponents: William Koffel, representing Semiconductor Industry Association (wkoffel@koffel.com)

2021 International Building Code

Revise as follows:

TABLE 1017.2 EXIT ACCESS TRAVEL DISTANCE[a]

OCCUPANCY	WITHOUT SPRINKLER SYSTEM (feet)	WITH SPRINKLER SYSTEM (feet)
A, E, F-1, M, R, S-1	200[e]	250[b]
I-1	Not Permitted	250[b]
B	200	300[c]
F-2, S-2, U	300	400[c]
H-1	Not Permitted	75[d]
H-2	Not Permitted	100[d]
H-3	Not Permitted	150[d]
H-4	Not Permitted	175[d]
H-5	Not Permitted	200[c]
I-2, I-3	Not Permitted	200[c]
I-4	150	200[c]

For SI: 1 foot = 304.8 mm.

a. See the following sections for modifications to exit access travel distance requirements:

- Section 402.8 : For the distance limitation in malls
- Section 407.4: For the distance limitation in Group I-2.
- Sections 408.6.1 and 408.8.1: For the distance limitations in Group I-3.
- Section 411.2: For the distance limitation in special amusement areas.
- Section 412.6: For the distance limitations in aircraft manufacturing facilities.
- Section 1006.2.2.2: For the distance limitation in refrigeration machinery rooms.
- Section 1006.2.2.3: For the distance limitation in refrigerated rooms and spaces.
- Section 1006.3.4: For buildings with one exit.
- Section 1017.2.2: For increased distance limitation in Groups F-1 and S-1.
- <u>Section 1017.2.3: For increased distance limitation in Group H-5</u>
- Section 1030.7: For increased limitation in assembly seating.
- Section 3103.4: For temporary structures.
- Section 3104.9: For pedestrian walkways.

b. Buildings equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1 or 903.3.1.2. See Section 903 for occupancies where automatic sprinkler systems are permitted in accordance with Section 903.3.1.2.

c. Buildings equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1.

d. Group H occupancies equipped throughout with an automatic sprinkler system in accordance with Section 903.2.5.1.

e. Group R-3 and R-4 buildings equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.3. See Section 903.2.8 for occupancies where automatic sprinkler systems are permitted in accordance with Section 903.3.1.3.

1017.2.1 Exterior egress balcony increase. *Exit access* travel distances specified in Table 1017.2 shall be increased up to an additional 100 feet (30 480 mm) provided that the last portion of the *exit access* leading to the exit occurs on an exterior egress balcony constructed in accordance with Section 1021. The length of such balcony shall be not less than the amount of the increase taken.

1017.2.2 Groups F-1 and S-1 increase. The maximum *exit access* travel distance shall be 400 feet (122 m) in Group F-1 or S-1 occupancies where all of the following conditions are met:

1. The portion of the building classified as Group F-1 or S-1 is limited to one *story* in height.
2. The minimum height from the finished floor to the bottom of the ceiling or roof slab or deck is 24 feet (7315 mm).
3. The building is equipped throughout with an *automatic sprinkler system* in accordance with Section 903.3.1.1.

Add new text as follows:

<u>1017.2.3</u> <u>Group H-5 Increase</u>.
<u>The maximum *exit access* travel distance shall be 300 feet (91 m) in the fabrication areas of Group H-5 occupancies where all of the following conditions are met:</u>

1. The width of the fabrication area is 300 feet (91 m) or greater.
2. The area of the fabrication area is 220,000 sq. ft. (18,600 m^2) or greater.
3. The height of the fabrication area, measured between the raised metal floor and the clean filter ceiling, is 16 feet (48768 mm) or greater.
4. The supply ventilation rate is 20 cfm/sq. ft. or greater and shall remain operational.

Reason: The Semiconductor Industry Association commissioned a study by Jensen Hughes to evaluate the feasibility of increasing the exit access travel distance in the fabrication areas of a Group H-5 occupancy. A decision was made to see determine if the travel distance could be increased to 300 feet, as permitted for Group B occupancies. When the Group H-5 requirements were introduced into the Legacy Codes, it was stated that the control requirements would be such that the fire risk associated with a Group H-5 occupancy would be similar to that associated with a Group B occupancy. This concept is reflected in the building area limits in Table 506.2 for other than the recently introduced Type IV building area limits. The Pathfinder people movement model was utilized to calculate required safe egress times (RSET) and the Fire Dynamics Simulator (FDS) was utilized to evaluate tenability conditions that would result from the design fire.

Bounding facility design parameters were selected based on input from the semiconductor industry to develop minimum requirements for a generic fabrication facility (Fab). These parameters were used as inputs for the computer modeling that was performed and include:

+ Minimum fab width of 300 ft.

+ Minimum fab area of 220,000 SF

+ Minimum distance between raised metal floor (RMF) and clean filter ceiling (CFC) system of 16 ft

+ Minimum (supply) ventilation rate of 20 cfm/SF (at least 25% fan filter unit (FFU) coverage). (must remain running at full capacity during egress)

Performance Criteria

Performance objectives were selected for the generic study to ensure that occupants would not encounter untenable conditions during the period of egress. Visibility, thermal exposure, and smoke toxicity are the commonly used tenability parameters for egress studies. Table 1 summarizes the threshold criteria that were used in the study.

Table 1 – Summary of Performance Criteria for Egress Study

Table 1 – Summary of Performance Criteria for Egress Study

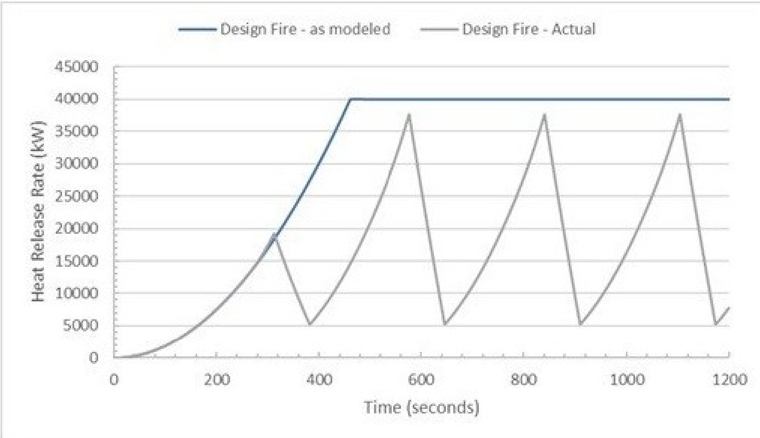
Parameter	Performance Criteria[1]
Visibility distance	At least 33 ft (10 m) to backlit object while en route to exit; At least 10 ft (3.3 m) to backlit object while in queue
Temperature	Less than 76 °C (169 °F)[2]
Toxic Gas (measured as Carbon Monoxide concentration)	Less than 600 ppm[3]

[1] All values measured at 6 ft (1.8 m) above floor
[2] Based on 20 minute exposure before incapacitation [ref]
[3] Concentration levels of approximately 600 ppm can affect cardiac function for some individuals [ref]

Design Fire Scenario

The design fire scenario was based on a flammable liquid spill that ignites and spreads to a process tool. The resulting heat release rate profile was developed based on a generic tool size, the spacing between tools, and a fuel load limit of 1 lb/ft^2 of non-FM 4910 plastic. This information was used to model the fire development for a worst-case tool, and the ability for fire to spread to adjacent tools either in the same row or across the bay or chase.

A maximum heat release rate of 20 MW was calculated for each tool with potential spread to 2 adjacent tools in the time period of evacuation. At any given time, no more than 2 tools would be burning at this steady-state heat release rate of 20 MW each, for a total of 40 MW. Rather than crediting the decay and growth periods that would occur during the time period of tool fire spread, an ultra-fast growing fire that reaches a steady-state value of 40 MW was used to provide a conservative bound for the tool fire scenario (see Figure 1)



Three fire locations (center, southwest corner and west wall locations) were evaluated to examine the effect of location on smoke spread dynamics and the RSET values resulting when a reduced number of exits are available.
Figure 1 – Heat release rate profile for tool design fire scenario

Summary of Egress Times

RSET values were determined by summing the detection, warning, premovement and travel times required to travel to an exit stair and enter the vestibule. The detection time was identified using FDS model data for smoke detection and sprinkler activation, while allowing for the 90 second delay specified in NFPA 72. The warning time was based on IBC requirements for smoke control systems and the premovement time was conservatively selected based on literature data. Travel times were determined by Pathfinder assuming that 96.6% of building occupants travel unimpeded and 3.4% of building occupants require the use of crutches or a cane. These times are summarized in Table 2.

A safety factor of 1.5 was applied to the evacuation times as specified in IBC Section 909.4.6. As shown in Table 2, RSET values ranged between 10.9 and 15 minutes, with longer values corresponding to the southwest corner and west wall fire scenarios where an exit is closed for at least part of the egress time period. The largest RSET value resulted for the west wall fire location where all of the exits are initially available for use. At 380 seconds, the exit is blocked due to diminished visibility conditions, requiring that occupants in the queue travel to another exit.

Table 2 – Summary of Required Safe Egress Time Model Results

Table 2 – Summary of Required Safe Egress Time Model Results

Event	*Center Fire No Exits Closed (seconds / minutes)*	*Southwest Corner Fire One Exit Closed (seconds / minutes)*	*West Wall Fire One Exit Closed at 380 seconds (seconds / minutes)*
Detection	215 / 3.6	215 / 3.6	215 / 3.6
Warning	10 / 0.2	10 / 0.2	10 / 0.2
Pre-movement delay	30 / 0.5	30 / 0.5	30 / 0.5
Travel time	256 / 4.3	385 / 6.4	250 / 4.2
Evacuation time	**511 / 8.5**	**640 / 10.7**	**678 / 11.3**
RSET	**655 / 10.9**	**847 / 14.1**	**904 / 15.0**

Summary of Fire Modeling

FDS models were constructed for the three fire locations, incorporating sprinkler activation to examine mixing effects but not suppression effects. Model results showed that visibility is the limiting tenability parameter where smoke spreads radially from the fire location but never fills the entire Fab. Rather, a steady-state condition is reached for each scenario where the smoke generation rate is balanced with the ventilation rate. For each fire location, the visibility at 6 ft above the floor will exceed 98 ft in approximately 30-50% of the Fab when the steady-state condition is reached.

A sensitivity study was performed to determine if the model results are dependent on FFU coverage, ventilation rate/SF, FFU capacity, FFU dimensions, tool size, and tool height. With the exception of FFU coverage, it was determined that these parameters do not have a significant impact on the spread of smoke, heat and toxic gases in the Fab. Percentages greater than 25% of the FFUs will result in a smaller region of smoke spread.

Conclusions

Based on these results, Jensen Hughes finds that an egress distance of 300 ft. in a generic H5 fabrication design will meet the intent of the IBC where safe egress conditions exist, provided that the minimum design parameters for building width, square footage, ceiling height, and ventilation rate are met.. Therefore, the increased travel distance of 300 ft. (91.5 m) is acceptable and will not impact the safety of occupants in the event that emergency evacuation during a fire is necessary.

Bibliography: H5 Timed Egress Analysis, Performance-Based Design Study for Increasing the Maximum Exiting Distance for a Generic Semiconductor Fabrication Facility, Jensen Hughes, 2021.

Cost Impact: The code change proposal will decrease the cost of construction
Increasing the maximum exit access travel distance permits more efficient use of the area of the building.

E86-21

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The proposal was disapproved because the committee felt that they did not have the expertise to make the decision on hazards associated with H-5. This should have a third party review. (Vote: 13-0)

E86-21

Individual Consideration Agenda

Public Comment 1:

Proponents: William Koffel, representing Semiconductor Industry Association (wkoffel@koffel.com) requests As Submitted

Commenter's Reason: The Committee voted for Disapproval of E86-21 because they "felt that they did not have the expertise to make the decision on hazards associated with H-5. This should have a third party review."
Based upon the Committee reason for Disapproval, SIA retained Arup to review the report prepared by Jensen Hughes. One of the specific questions raised by the Committee was whether the modeling that was document in the Jensen Hughes report were the appropriate analytical tools to be used. In response to that question, Arup commented "that the simulation tools used to estimate RSET vs ASET as part of the study to support the code change are appropriate."

During the Committee Hearings it was noted that the modeling included several conservative assumptions. Arup reviewed the significant assumptions and offered the following comments:

- "We have found that the simplifications made in the construction of the geometric model are based on industry standard and reasonable engineering judgement. The models are simplified but are understood to capture the physics of fire effects and evacuation movement within the simulated space sufficiently."
- With respect to the occupant load, Arup stated that the approached used "likely overestimates the actual occupant loads on all levels of a typical fab facility and leads to conservative estimations of the RSET and is conservative and appropriate."
- With respect to the three fire scenarios that were evaluated, Arup stated that "Based on typical materials used in construction of the fabrication tools and the fact that raw material feeds were assumed to be interlocked to pause upon detection of an abnormal condition, we believe that the design fire was sized to represent a conservative fire scenario. The multiple locations of the design fire also allow an analysis of fire effects through the fab floor.
- With respect to the criteria used for the tenability analysis, Arup stated that "We agree with the chosen tenability criteria and their tenability limits to be in accordance with reasonable engineering judgement based upon literature data."

Overall, Arup summarized that they agree "with Jensen Hughes' approach using computational fire effects and evacuation modeling to model the RSET vs ASET at a generic Group H-5 semiconductor fabrication facility. We found the analysis to have been completed in accordance with industry standard practice and is based upon sound engineering judgement. The assessment provides appropriate justification to support the proposed Group H-5 code proposal and the corresponding conditions in order to increase the maximum allowable exit access travel distance from 200 feet to 300 feet."

A copy of the complete Hughes report and Arup review will be made available to any interested parties.

In summary the technical justification for E86-21 is based upon:

- A project initiated and sponsored by the Semiconductor Industry Association Code Committee with technical support from their consultant, Koffel Associates.
- An independent quantitative analysis by a second fire protection engineering firm, Jensen Hughes.
- As requested by the Committee, a third party review by a third firm that offers fire protection engineering services, Arup.

The proponent, the SIA, has done what the Committee requested and therefore we request that the ICC membership approve E86-21 as submitted.

Bibliography: SIA Egress Study Third Party Peer Review Report, Arup, dated June 29, 2021

Cost Impact: The net effect of the public comment and code change proposal will decrease the cost of construction
The proposal and public comment result in an optional increase in travel distance and as such, the cost of construction will decrease.

Public Comment# 2772

E90-21

Proposed Change as Submitted

Proponents: Stephen Thomas, Colorado Code Consulting, a Shums Coda Assoc Company, representing Colorado Chapter ICC (sthomas@coloradocode.net); Timothy Pate, representing Colorado Chapter Code Change Committee (tpate@broomfield.org)

2021 International Building Code

Revise as follows:

1020.2 Construction. Corridors shall be fire-resistance rated in accordance with Table 1020.2. The *corridor* walls required to be fire-resistance rated shall comply with Section 708 for *fire partitions*.

Exceptions:

1. A *fire-resistance rating* is not required for *corridors* in an occupancy in Group E where each room that is used for instruction has not less than one door opening directly to the exterior and rooms for assembly purposes have not less than one-half of the required means of egress doors opening directly to the exterior. Exterior doors specified in this exception are required to be at ground level.
2. A *fire-resistance rating* is not required for *corridors* contained within a *dwelling unit* or *sleeping unit* in an occupancy in Groups I-1 and R.
3. A *fire-resistance rating* is not required for *corridors* in *open parking garages*.
4. ~~A *fire-resistance rating* is not required for *corridors* in an occupancy in Group B that is a space requiring only a single *means of egress* complying with Section 1006.2.~~ A fire-resistance rating is not required for corridors located within an individual tenant space.
5. *Corridors* adjacent to the *exterior walls* of buildings shall be permitted to have unprotected openings on unrated *exterior walls* where unrated walls are permitted by Table 705.5 and unprotected openings are permitted by Table 705.8.

Reason: Providing a fire-rated corridor within a single tenant space is very difficult and very seldom required. However, the existing language would require a rated corridor if the occupant load exceeds those outlined in Table 1020.2 and the building is not provided with a fire sprinkler system. Most jurisdictions do not enforce this requirement on the individual tenant space. It is also a maintenance and inspection issue for fire departments. if the internal corridor within a space is required to be fire-resistant rated, all of the doors are required to be 20-minute doors and they must be self-closing. No one wants their private office door closed all of the time, so they are typically propped open eliminating any protection. This proposal provides language that allows what is currently common practice in the design of tenant spaces.

Cost Impact: The code change proposal will decrease the cost of construction
For those areas where jurisdictions are requiring the rated corridors, the cost of constructing non-rated corridor will be less than the rated corridors.

E90-21

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: This proposal was disapproved because this would allow for unrated corridors in tenant spaces of any size, including large one tenant buildings without sprinklers. This would conflict with Table 1020.2. (Vote: 8-6)

E90-21

Individual Consideration Agenda

Public Comment 1:

IBC: 1020.2 (IFC:[BE]1020.2)

Proponents: Stephen Thomas, representing Colorado Chapter ICC (sthomas@coloradocode.net) requests As Modified by Public Comment

Modify as follows:

2021 International Building Code

1020.2 Construction . Corridors shall be fire-resistance rated in accordance with Table 1020.2. The *corridor* walls required to be fire-resistance rated shall comply with Section 708 for *fire partitions*.

Exceptions:

1. A *fire-resistance rating* is not required for *corridors* in an occupancy in Group E where each room that is used for instruction has not less than one door opening directly to the exterior and rooms for assembly purposes have not less than one-half of the required means of egress doors opening directly to the exterior. Exterior doors specified in this exception are required to be at ground level.
2. A *fire-resistance rating* is not required for *corridors* contained within a *dwelling unit* or *sleeping unit* in an occupancy in Groups I-1 and R.
3. A *fire-resistance rating* is not required for *corridors* in *open parking garages*.
4. A fire-resistance rating is not required for corridors located within ~~an individual tenant space.~~ a single-tenant office space having an occupant load of 100 or less.
5. *Corridors* adjacent to the *exterior walls* of buildings shall be permitted to have unprotected openings on unrated *exterior walls* where unrated walls are permitted by Table 705.5 and unprotected openings are permitted by Table 705.8.

Commenter's Reason: The committee agreed with the concept but felt that our proposal was to broad. They suggested limiting the use of the exception to just office spaces and to limit the occupant load where it could be used. Therefore, we have revised the proposal to address their concerns. We have added the term single-tenant office to the language and limited the occupant load to 100 or less. We believe that this is a reasonable limitation for this exception. Occupants of these spaces are familiar with their surroundings and alert. It is the intent of this provision that a single tenant be limited to an area occupied under a single management and work the same hours. The concept is that people under the same employ working the same hours would likely be familiar with their entire tenant space. They are typically well within the required travel distance. The fire record for office uses is very good already. This will not lessen the life-safety aspects of an office tenant space. This will also eliminate an enforcement issue for these types of uses.
The current language would require a rated corridor within a single-tenant office space when the occupant load exceeds 30. This would require 1-hour fire partitions to be constructed. It would also require rated doors on each individual office or room opening into that corridor. Those doors are required to be self-closing and self-latching with smoke and draft control. The problem is that people don't want their private office doors closed all of the time. So, they prop them open which violates the code. The fire official then conducts an inspection and requires the tenant to close all of the doors. As soon as they leave, the doors are propped open again. It is a viscous cycle and wastes the fire officials time.

NFPA 101 Life Safety Code has a similar exception for a space occupied by a single tenant without an occupant load limitation. We are not aware of any issue with this exception where that code is enforced.

Cost Impact: The net effect of the public comment and code change proposal will decrease the cost of construction
If a corridor is no longer required within a single office tenant space the fire protection requirements will not need to be met and those additional costs will not be applicable.

Public Comment# 2411

E96-21

Proposed Change as Submitted

Proponents: David Renn, PE, SE, City and County of Denver, representing Code Change Committee of ICC Colorado Chapter (david.renn@denvergov.org)

2021 International Building Code

Revise as follows:

1023.5 Penetrations. Penetrations into or through *interior exit stairways* and *ramps* are prohibited except for the following:

1. Equipment and ductwork necessary for independent ventilation or pressurization.
2. *Fire protection systems*.
3. Security systems.
4. Two-way communication systems.
5. Electrical raceway for fire department communication systems.
6. Electrical raceway serving the *interior exit stairway* and *ramp* and terminating at a steel box not exceeding 16 square inches (0.010 m^2).
7. Structural elements ~~supporting the *interior exit stairway* or *ramp* or enclosure,~~ such as beams or joists.

Such penetrations shall be protected in accordance with Section 714. There shall not be penetrations or communication openings, whether protected or not, between adjacent interior exit *stairways* and *ramps*.

> **Exception:** *Membrane penetrations* shall be permitted on the outside of the *interior exit stairway* and *ramp*. Such penetrations shall be protected in accordance with Section 714.4.2.

1024.6 Penetrations. Penetrations into or through an *exit passageway* are prohibited except for the following:

1. Equipment and ductwork necessary for independent ventilation or pressurization.
2. *Fire protection systems.*
3. Security systems.
4. Two-way communication systems.
5. Electrical raceway for fire department communication.
6. Electrical raceway serving the *exit passageway* and terminating at a steel box not exceeding 16 square inches (0.010 m^2).
7. <u>Structural elements such as beams and joists.</u>

Such penetrations shall be protected in accordance with Section 714. There shall not be penetrations or communicating openings, whether protected or not, between adjacent exit passageways.

> **Exception:** *Membrane penetrations* shall be permitted on the outside of the *exit passageway*. Such penetrations shall be protected in accordance with Section 714.4.2.

Reason: Item 7 for structural element penetrations in interior exit stairways and ramps was added in the last code cycle with the intent of matching the allowance for structural element penetrations in shaft enclosures. The reason statement for this change (E98-18) stated that the proposed language is verbatim to that found in Section 713.8 for shaft enclosures. However, the wording was actually changed from "Structural elements, such as beams or joists" to "Structural elements supporting the *interior exit stairway* or *ramp* or enclosure, such as beams or joists". The effect of requiring the structural element to support the stairway, ramp or enclosure is that floor or landing beams and joists are allowed to penetrate stairway enclosures, but roof beams and joists are not. Since fire barriers that form the enclosure are required to continue to the underside of the roof deck or sheathing, it is necessary to include roof beams and joists as allowed penetrations since these are no more hazardous than the floor or landing penetrations. This proposal does this by simply removing the language that is different from the language in Section 713.8 for shaft enclosures. This proposal also adds this same Item 7 to the list of allowed penetrations in exist passageways. The intent of the code is that allowed penetrations are the same for interior exit stairways and ramps and exit passageways, since these are all protected exit elements.

Cost Impact: The code change proposal will decrease the cost of construction
This proposal will allow structural penetrations that currently not allowed, which will simplify framing at exit enclosures, thus reducing cost of construction.

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: This proposal was disapproved because the result would be a mishmash between rating of stairway enclosure and construction ratings. The current text is only for supporting the stair, not all construction. The proposal did not limit this to roof members which is what the proponent said his concern was. (Vote: 14-0)

Individual Consideration Agenda

Public Comment 1:

IBC: 1023.5, 1024.6 (IFC:[BE]1023.5, 1024.6)

Proponents: David Renn, City and County of Denver, representing Code Change Committee of ICC Colorado Chapter (david.renn@denvergov.org) requests As Modified by Public Comment

Modify as follows:

2021 International Building Code

1023.5 Penetrations . Penetrations into or through *interior exit stairways* and *ramps* are prohibited except for the following:

1. Equipment and ductwork necessary for independent ventilation or pressurization.
2. *Fire protection systems.*
3. Security systems.
4. Two-way communication systems.
5. Electrical raceway for fire department communication systems.
6. Electrical raceway serving the *interior exit stairway* and *ramp* and terminating at a steel box not exceeding 16 square inches (0.010 m^2).
7. Structural elements <u>supporting the *interior exit stairway* or *ramp* or enclosure,</u> such as beams or joists.
8. <u>Structural elements supporting a roof at the top of the *interior exit stairway* or *ramp*,such as beams or joists.</u>

Such penetrations shall be protected in accordance with Section 714. There shall not be penetrations or communication openings, whether protected or not, between adjacent interior exit *stairways* and *ramps*.

> **Exception:** *Membrane penetrations* shall be permitted on the outside of the *interior exit stairway* and *ramp*. Such penetrations shall be protected in accordance with Section 714.4.2.

1024.6 Penetrations . Penetrations into or through an *exit passageway* are prohibited except for the following:

1. Equipment and ductwork necessary for independent ventilation or pressurization.
2. *Fire protection systems.*
3. Security systems.
4. Two-way communication systems.
5. Electrical raceway for fire department communication.
6. Electrical raceway serving the *exit passageway* and terminating at a steel box not exceeding 16 square inches (0.010 m^2).
7. Structural elements <u>supporting a floor or roof at the top of the *exit passageway*,</u> such as beams and joists.

Such penetrations shall be protected in accordance with Section 714. There shall not be penetrations or communicating openings, whether protected or not, between adjacent exit passageways.

Exception: *Membrane penetrations* shall be permitted on the outside of the *exit passageway*. Such penetrations shall be protected in accordance with Section 714.4.2.

Commenter's Reason: The main opposition to the original proposal was that the language was wide open as to what structural elements would be allowed to penetrate an enclosure. However, the actual intent of the proposal was to allow structural elements that support the roof or floor at the top of an enclosure to penetrate the enclosure. This public comment modification limits the newly allowed penetrations to the intended elements as follows:

- In 1023.5 for interior exit stairways and ramps, the current requirement in Item 7 that the structural elements must support the interior exit stairway or ramp or enclosure is added back in.
- A new Item 8 is then added for structural elements supporting a roof at the top of the interior exit stairway or ramp. Note that this item does not include floors at the top of an interior exit stairway or ramp (where an enclosure stops at a floor instead of a roof) since the floor would be part of the enclosure and structural elements supporting this floor are already allowed by Item 7.
- In 1024.6 for exit passageways, Item 7 is modified by adding a requirement that the structural elements must support a floor or roof at the top of the exit passageway. Floors and roofs are included here since exit passageways don't have an item that covers structural elements that support the enclosure like the interior exit stairways and ramps section does (1023.5 Item 7).

The above changes are consistent with the intent of the code that penetrations are permitted for items that serve the enclosure or are needed for construction of the enclosure.

Another concern raised is that this proposal would allow penetrations by structural elements that may have a fire-resistance rating that is less than required for the enclosure. This concern is not valid as this proposal does not change supporting construction requirements for enclosure walls (Section 707.5.1 for fire barriers), so any member that supports the walls, or supports floors that then support the walls, are required to have a rating that is equal to or great than the rating of the enclosure. Furthermore, where a floor forms the top of the enclosure it is required to have a rating equal to or greater than the enclosure, and the supporting construction requirements for horizontal assemblies (Section 711.2.3) requires the beams or joists that support this assembly to have a rating equal to or greater than the horizontal assembly.

Another item discussed is that Item 7 in 1023.5 was originally added in the 2021 IBC to address platform framing. While Item 7 does address platform framing at floor levels, it does not address platform framing at the roof of an enclosure since these roof beams and joists do not support the enclosure. This proposal would allow platform framing of the roof, which is the logical method of framing the roof if the floors are constructed in this manner. To require the roof to be framed in a different manner than the floors is not reasonable and may be difficult and costly to accomplish. Furthermore, the newly allowed penetrations at the roof level are less hazardous than the floor level penetrations since a premature failure of these penetrations would not immediately affect egress since the smoke and/or fire at the failed penetrations are above the egress path, while the floor penetrations are within the egress path.

Please consider approval of this proposal as modified by this public comment.

Cost Impact: The net effect of the public comment and code change proposal will decrease the cost of construction
This proposal and public comment modification will allow structural penetrations that are currently not allowed, which will simplify framing at exit enclosures, thus reducing the cost of the construction.

Public Comment# 2497

E97-21

Proposed Change as Submitted

Proponents: Lee Kranz, representing Washington Association of Building Officials Technical Code Development Committee (lkranz@bellevuewa.gov); Micah Chappell, representing Washington Association of Building Officials (micah.chappell@seattle.gov)

2021 International Building Code

Revise as follows:

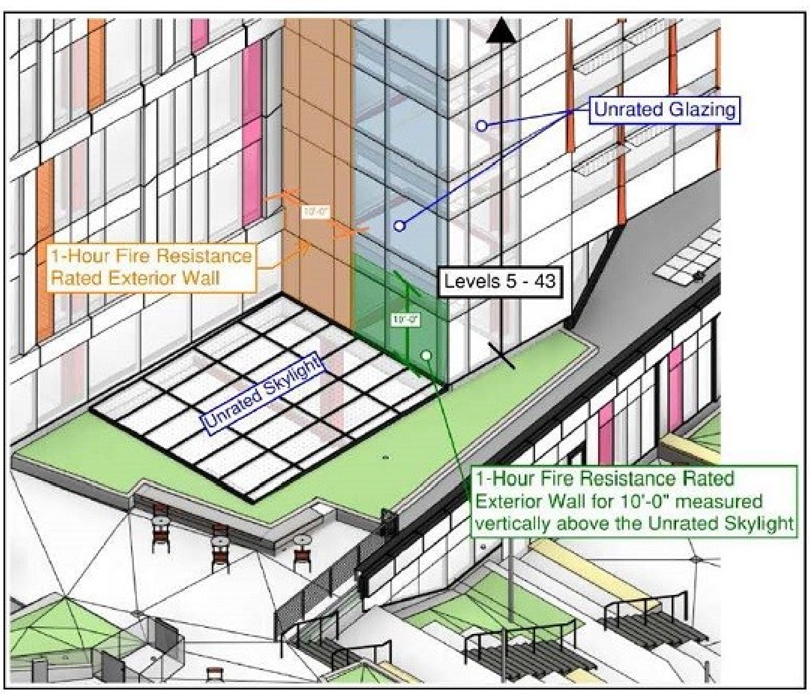
1023.7 Interior exit stairway and ramp exterior walls. *Exterior walls* of the *interior exit stairway* or *ramp* shall comply with the requirements of Section 705 for *exterior walls*. Where nonrated walls or unprotected openings enclose the exterior of the *stairway* or *ramps* and the walls or openings are exposed by other parts of the building at an angle of less than 180 degrees (3.14 rad), building construction within 10 feet of the exterior walls of the interior exit stairway or ramp shall comply with Section 1023.7.1 and 1023.7.2. ~~the building *exterior walls* within 10 feet (3048 mm) horizontally of a nonrated wall or unprotected opening shall have a *fire-resistance rating* of not less than 1 hour. Openings within such *exterior walls* shall be protected by opening protectives having a *fire protection rating* of not less than $^{3}/_{4}$ hour. This construction shall extend vertically from the ground to a point 10 feet (3048 mm) above the topmost landing of the *stairway* or *ramp*, or to the roof line, whichever is lower.~~

Add new text as follows:

1023.7.1 Building exterior walls.
Building exterior walls within 10 feet (3048 mm) horizontally of a nonrated wall or unprotected opening in an exterior exit stairway or ramp shall have a fire-resistance rating of not less than 1 hour. Openings within such exterior walls shall be protected by opening protectives having a fire protection rating of not less than 3/4 hour. This construction shall extend vertically from the ground to a point 10 feet (3048 mm) above the topmost landing of the stairway or ramp, or to the roof line, whichever is lower.

1023.7.2 Roof assemblies.
Where the interior exit stairway or ramp extends above a roof, the lower roof assembly shall have a fire resistance rating of not less than 1 hour and openings shall be protected by opening protectives having a fire protection rating of not less than ¾ hour. The fire resistance rating and opening protection shall extend horizontally a minimum of 10 feet (3048 mm) from the exterior wall of the stairway or ramp, or to the perimeter of the lower roof, whichever is less.

Reason: This code change is needed to address designs where nonrated exterior walls of an interior exit stairway or ramp are adjacent to nonrated roof assemblies which may also have unprotected openings within 10 feet of the exterior walls of the stairway or ramp. As you can see in the attached illustration, the unrated glazed exterior wall of the interior exit stairway is directly adjacent to an unprotected skylight in the roof of a lobby below. The designer agreed to protect the exterior wall of the stairway for 10 feet above the skylight but currently there is no language in the code to require it. This proposal provides more comprehensive protection for one of the most important egress elements in Chapter 10, interior exit stairways and ramps.



Cost Impact: The code change proposal will increase the cost of construction

The cost of construction will increase due to more roof assemblies and related openings needing to be of rated construction.

E97-21

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The proposal was disapproved because there are issues with the language. This proposal missed the option to rate the exterior walls 10 feet up or the roof 10 feet out from the opening. The language in Section 1023.7.2 does not limit the roof to that near the area of concern. (Vote: 10-4)

E97-21

Individual Consideration Agenda

Public Comment 1:

IBC:1023.7.1, 1023.7.2 (IFC:[BE]1023.7.1, 1023.7.2)

Proponents: Lee Kranz, representing Washington Association of Building Officials Technical Code Development Committee (lkranz@bellevuewa.gov); Micah Chappell, representing Washington Association of Building Officials (micah.chappell@seattle.gov) requests As Modified by Public Comment

Modify as follows:

2021 International Building Code

1023.7 Interior exit stairway and ramp exterior walls . *Exterior walls* of the *interior exit stairway* or *ramp* shall comply with the requirements of Section 705 for *exterior walls*. Where nonrated walls or unprotected openings enclose the exterior of the *stairway* or *ramps* and the walls or openings are exposed by other parts of the building at an angle of less than 180 degrees (3.14 rad), building construction within 10 feet of the exterior walls of the interior exit stairway or ramp shall comply with Section 1023.7.1 and 1023.7.2.

1023.7.1 Building exterior walls . Building exterior walls within 10 feet (3048 mm) horizontally of a nonrated wall or unprotected opening in an ~~exterior~~ interior exit stairway or ramp shall have a fire-resistance rating of not less than 1 hour. Openings within such exterior walls shall be protected by opening protectives having a fire protection rating of not less than 3/4 hour. This construction shall extend vertically from the ground to a point 10 feet (3048 mm) above the topmost landing of the stairway or ramp, or to the roof line, whichever is lower.

1023.7.2 Roof assemblies . Where the interior exit stairway or ramp extends above ~~a~~ an adjacent roof of the same building, the ~~lower~~ adjacent roof assembly shall have a fire resistance rating of not less than 1 hour and openings shall be protected by opening protectives having a fire protection rating of not less than ¾ hour. The fire resistance rating and opening protection shall extend horizontally a minimum of 10 feet (3048 mm) from the exterior wall of the stairway or ramp, or to the perimeter of the ~~lower~~ adjacent roof, whichever is less.

Exceptions:

1. The roof assembly need not be rated and openings in the roof need not be protected where they are adjacent to the *penthouse* of the stairway or ramp, unless otherwise required by this code.
2. The adjacent roof assembly need not be rated and adjacent openings in the roof need not be protected where the exterior wall of the stairway or ramp has a fire-resistance rating of 1 hour and openings are protected by opening protectives having a fire protection rating of not less than 3/4 hours, extending a minimum of 10 feet (3048 mm) above the roof.

Commenter's Reason: Where an interior exit stairway or ramp is located at the perimeter of a building, it is subject to risk from fire or smoke from other parts of the building. Section 1023.7 requires protection of the vertical walls and openings adjacent to the enclosure wall(s) less than angles of 180 degrees to the enclosure walls but does not address designs where the enclosure could be exposed to fire or smoke from adjacent roof assemblies.

E97-21 is intended to provide clear direction on measures to keep fire and smoke away from enclosed stairways or ramps in order to maintain tenability of the enclosures. Most, if not all, building and fire officials would agree that the risk of fire or smoke from a roof assembly that is part of, and adjacent to, a stair or ramp enclosure is greater than that from an adjacent wall assembly so it makes sense to include these provisions in the

code.
There were constructive suggestions provided by members of the Egress Committee, proponents and opponents during and after the Committee Action Hearings and this public comment has been revised to include those valuable suggestions. The changes contained in this public comment include:

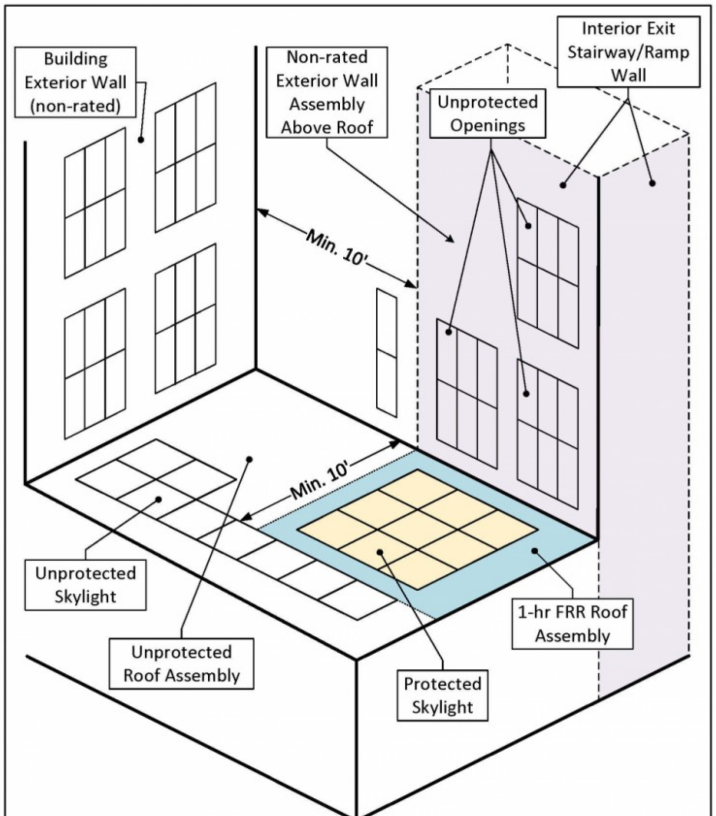
1) clear language that either the exterior wall and openings of the enclosure must be protected <u>or</u> protect the adjacent building wall and/or roof assembly (see Section 1023.7.2, Exception 2, and Figures 1 and 2 below);

2) clarify in the charging language of Section 1023.7.2 that the protection of roof assemblies only applies when it is part of the same building in which the enclosure is located; and

3) exempt roof assemblies adjacent to penthouse structures covering stair or ramp enclosures (see Section 1023.7.2, Exception 1).

We also addressed an error we discovered in 1023.7.1 that mistakenly referred to exterior exit stairways and ramps. It has been corrected to refer to interior exit stairways and ramps.

Figure 1 below illustrates the base requirement in Section 1023.7.2, that the roof assembly and openings in the roof must be protected within 10 feet of the wall of the stairway or ramp enclosure. Figure 2 illustrates the option provided in Section 1023.7.2, Exception 2, allowing protection of the stairway/ramp enclosure wall to a height of 10 feet above the adjacent roof in lieu of protecting the roof assembly. These figures, or something similar, could be included in the IBC Commentary to help code users understand and apply these important passive life safety provisions.



<u>**FIGURE 1 – Protect Roof for 10' => Unprotected Stair Wall (§1023.7.2)**</u>

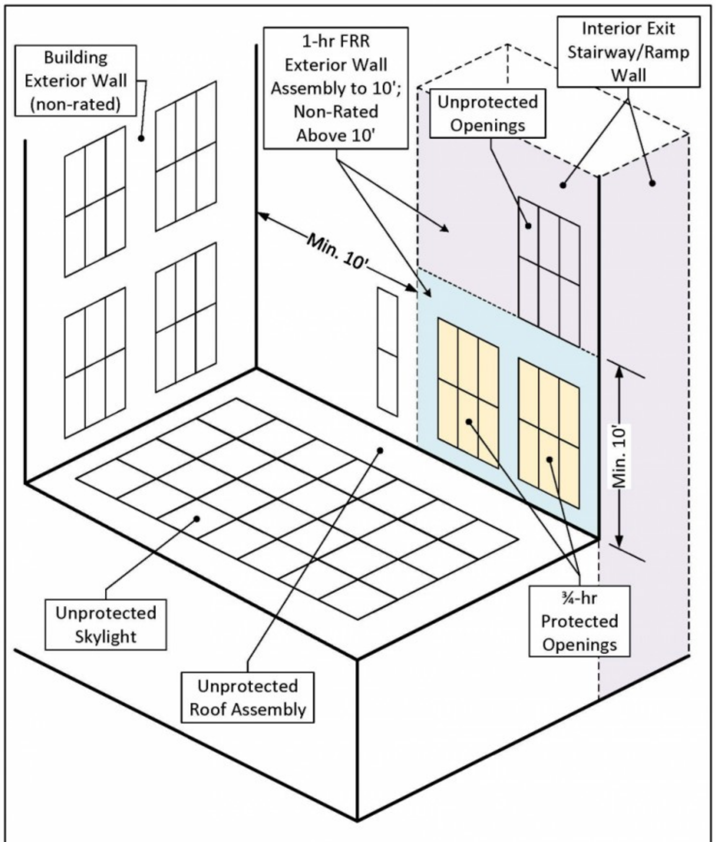


FIGURE 2 – Protect Stair Wall for 10' => Unprotected Building Wall/Roof (§1023.7.2 exc. 2)

In response to a comment we received after the Committee Action Hearings, the requirement for 10 feet of protection above the roof for the stair enclosure wall in 1023.7.2, Exception 2 is consistent with the extent of vertical protection requirements for other components of the means of egress in the current code:

- Protection of the stair enclosure near building exterior walls (IBC 1023.7)
- Protection for exterior areas for assisted rescue (IBC 1009.7.2)
- Protection for exit passageways (IBC 1024.8)
- Protection for exit courts (IBC 1029.3).

Cost Impact: The net effect of the public comment and code change proposal will increase the cost of construction
In some cases, roof assemblies adjacent to interior exit stairways or ramps, or the exterior wall of interior exit stairways or ramps will be required to be 1 hour rated with 3/4 hour rated openings. This will increase the cost of construction when these rated assemblies are provided.

Public Comment# 2362

E98-21

Proposed Change as Submitted

Proponents: Jeffrey S. Grove, P.E. FSFPE, Jensen Hughes, representing Jensen Hughes (jgrove@jensenhughes.com)

2021 International Building Code

Revise as follows:

1024.3 Construction. *Exit passageway*
enclosures shall have walls, floors and ceilings of not less than a 1-hour *fire-resistance rating*.~~,~~ The fire-resistance rating of the exit passageway, where extending an exit enclosure from or between interior exit stairways or ramps, shall not be less than that required for the ~~and not less than that required for any connecting~~ *interior exit stairway* or *ramp*. Exit passageways shall be constructed as *fire barriers* in accordance with Section 707 or *horizontal assemblies* constructed in accordance with Section 711, or both.

Reason: It is clearly the intent of the Code that an exit passageway may be of minimum one-hour fire-resistance rating, regardless of the type of construction or number of stories in a building. The Code Commentary already states that "Where extending an enclosure for an exit stairway, the rating must not be less than the enclosure for the exit stairway so that the degree of protection is kept at the same level." This proposal is intended to clarify these code provisions. For example, a one-hour fire-resistance rated exit passageway could be utilized on the fifth story of a building. This passageway would then connect to a two-hour fire-resistance rated interior exit stairway or ramp. If a horizontal offset would be required for that interior exit stairway or ramp, the required exit passageway would be required to be two-hour fire-resistance rated.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This code change is a clarification that has no impact to the cost of construction.

E98-21

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The proposal was disapproved because the exit passageway need to be connected to the exit stairway, not just anywhere in the building. (Vote: 12-2)

E98-21

Individual Consideration Agenda

Public Comment 1:

Proponents: Jeffrey Grove, representing Jensen Hughes (jgrove@jensenhughes.com) requests As Submitted

Commenter's Reason: The purpose of this code change proposal was simply to indicate that an exit passageway, when required for travel distance or some other reason, is only required to be one-hour fire-resistive rated, regardless of which story the exit passageway is located, or the type of construction. There are many times that this is misinterpreted that if you are located in a Type I building, or several stories up in a structure, that the exit passageway must be two-hour rated.
The second part of the proposal clarifies that if the exit passageway is required to extend an interior exit stairway or ramp, that exit passageway must be at least same rating as that stairway or ramp. The proposal does not change these current requirements in any way.

The committee seemed to misunderstand that the purpose of this proposal was trying to change the current requirements of the required rating of an exit passageway when extending an interior exit stairway or ramp. The committee chair used a specific example that reinforced the purpose of this proposal and not the extension of the exit enclosure. One of the committee members also had an issue with removing the word "connecting". However, as noted in the proposal, the word "extending" was utilized to achieve the same purpose.

Cost Impact: The net effect of the public comment and code change proposal will not increase or decrease the cost of construction
This code change is a clarification that has no impact to the cost of construction.

E100-21

Proposed Change as Submitted

Proponents: Lee Kranz, City of Bellevue, WA, representing Myself (lkranz@bellevuewa.gov)

2021 International Building Code

Revise as follows:

1027.2 Use in a means of egress. *Exterior exit stairways* shall not be used as an element of a required *means of egress* for Group I-2 occupancies. For occupancies in other than Group I-2, *exterior exit stairways* and *ramps* shall be permitted as an element of a required *means of egress* for buildings not exceeding six stories above grade plane ~~or that are not *high-rise buildings*~~.

Reason: The current language in Section 1027.2 is confusing because the two test cases overlap. The first test to determine if an e*xterior exit stairway* can be used as an element of a required means of egress applies to buildings not exceeding 6-stories above grade plane. The second test is that the building cannot be a high-rise. There is no clear direction if it is permissible to use an e*xterior exit stairway* for a 7 or 8-story building that does not meet the definition of a high-rise building. Deleting the high-rise test, which is more liberal than the 6-story test, appears to be the best course of action.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This is a clarification only. It shouldn't impact the cost of construction.

E100-21

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The proposal was disapproved because the committee felt that both thresholds - 6 stories above grade plane and highrise- were needed to address sloped sites. (Vote: 14-0)

E100-21

Individual Consideration Agenda

Public Comment 1:

IBC: 1027.2 (IFC:[BE]1027.2)

Proponents: Julius Carreon, representing Washington Association of Building Officials Technical Code Development Committee (jcarreon@bellevuewa.gov); Micah Chappell, representing Washington Association of Building Officials (micah.chappell@seattle.gov) requests As Modified by Public Comment

Modify as follows:

2021 International Building Code

1027.2 Use in a means of egress . *Exterior exit stairways* shall not be used as an element of a required *means of egress* for Group I-2 occupancies. For occupancies in other than Group I-2, *exterior exit stairways* and *ramps* shall ~~be permitted~~ <u>not be used</u> as an element of a required *means of egress* for buildings ~~not~~ exceeding six stories above grade plane <u>or that are high-rise buildings</u>.

Commenter's Reason: The original code change proposal of deleting the high-rise test case was disapproved because the committee felt that both thresholds - six stories above grade plane and high rise were needed. This public comment addresses both the committee's concerns and the confusion created by the current language in Section 1027.2. The current language could be interpreted such that only one of the two test cases is needed to permit the exterior exit stairways and ramps as an element of a required means egress for the building.

Cost Impact: The net effect of the public comment and code change proposal will not increase or decrease the cost of construction
This is a clarification only. It shouldn't impact the cost of construction.

E102-21

Proposed Change as Submitted

Proponents: Homer Maiel, PE, CBO, representing ICC Tri-Chapter (Peninsula, East Bay, Monterey Bay) (hmaiel@gmail.com)

2021 International Building Code

Revise as follows:

1027.5 Location. *Exterior exit stairways* and *ramps* shall have a minimum *fire separation distance* of 10 feet (3048 mm) measured at right angles from the exterior edge of the *stairway* or *ramps*, including landings, to:

1. Adjacent *lot lines*.
2. Other portions of the building.
3. Other buildings on the same lot unless the adjacent building *exterior walls* and openings are protected in accordance with Section 705 based on *fire separation distance*.
4. The centerline of a street, an alley or public way

For the purposes of this section, other portions of the building shall be treated as separate buildings.

Exception: *Exterior exit stairways* and *ramps* serving individual *dwelling units* of Group R-3 shall have a minimum *fire separation distance* of 5 feet (1525 mm).

Reason: An exterior exit stairway maybe less than 10 feet from the public sidewalk or street. Without New Exception 4, that will not be allowed.

Cost Impact: The code change proposal will decrease the cost of construction
This will allow the exterior stairs to be allowed next to public right of way with no restrictions.

E102-21

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The current language requires measurement to all of the items, so you would never get to the center of the public way in new item 4 because this would always be past the adjacent lot line in existing item 1. The proponent needs to fix this in the base paragraph. The definition of 'fire separation distance' includes the center line of a public way, so that phrase is not needed. (Vote: 11-3)

E102-21

Individual Consideration Agenda

Public Comment 1:

IBC: 1027.5 (IFC:[BE] 1027.5)

Proponents: Homer Maiel, representing ICC Tri-Chapter (Peninsula, East Bay, Monterey Bay) (hmaiel@gmail.com) requests As Modified by Public Comment

Modify as follows:

2021 International Building Code

1027.5 Location . *Exterior exit stairways* and *ramps* shall have a minimum *fire separation distance* of 10 feet (3048 mm) measured at right angles from the exterior edge of the *stairway* or *ramps*, including landings, to one of the following:

1. Adjacent *lot lines*.

2. Other portions of the building.

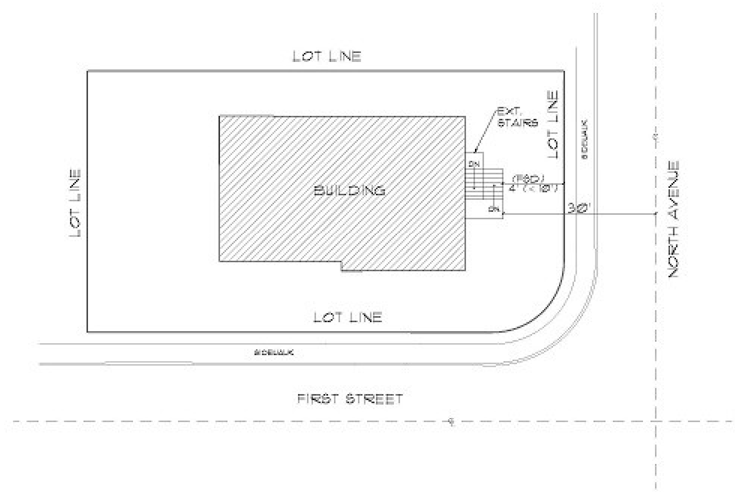
3. Other buildings on the same lot unless the adjacent building *exterior walls* and openings are protected in accordance with Section 705 based on *fire separation distance*.

4. The centerline of a street, an alley or public way

For the purposes of this section, other portions of the building shall be treated as separate buildings.

Exception: *Exterior exit stairways* and *ramps* serving individual *dwelling units* of Group R-3 shall have a minimum *fire separation distance* of 5 feet (1525 mm).

Commenter's Reason: A comment from committee was that newly introduced condition #4 is already covered in #3 under the definition of fire separation distance. That is not true. #3 only covers buildings on the same lot not the condition in #4. Figure below is provided for more clarification. As you see the FSD from the stairs is only 4'. Without #4, I either can not have the stairs or have to creat an enclosure. With inclusion of #4, I can measureto center of the street or alley which is 30 feet away



Cost Impact: The net effect of the public comment and code change proposal will decrease the cost of construction
This will allow exterior stairs to be built next to public-right-away with no additiona restriction

Public Comment# 2558

E104-21

Proposed Change as Submitted

Proponents: Jeffrey S. Grove, P.E. FSFPE, Jensen Hughes, representing Jensen Hughes (jgrove@jensenhughes.com)

2021 International Building Code

Revise as follows:

1028.2 Exit discharge. *Exits* shall discharge directly to the exterior of the building. The *exit discharge* shall be at grade or shall provide a direct path of egress travel to grade. The *exit discharge* shall not reenter a building. The combined use of Exceptions 1 and 2 shall not exceed 50 percent of the number and minimum width or required capacity of the required *exits*.

Exceptions:

1. Not more than 50 percent of the number and minimum width or required capacity of *interior exit stairways* and *ramps* is permitted to egress through areas, including *atriums*, on the level of discharge provided that all of the following conditions are met:

   1.1. Discharge of *interior exit stairways* and *ramps* shall be provided with a free and unobstructed path of travel to an exterior *exit* door and such *exit* is readily visible and identifiable from the point of termination of the enclosure.

   1.2. The entire area of the *level of exit discharge* is separated from areas below by construction conforming to the *fire-resistance rating* for the enclosure.

   1.3. The egress path from the *interior exit stairway* and *ramp* on the *level of exit discharge* is protected throughout by an *approved automatic sprinkler system*. Portions of the *level of exit discharge* with access to the egress path shall be either equipped throughout with an *automatic sprinkler system* installed in accordance with Section 903.3.1.1 or 903.3.1.2, or separated from the egress path in accordance with the requirements for the enclosure of *interior exit stairways* or *ramps*.

   1.4. Where a required *interior exit stairway* or *ramp* and an *exit access stairway* or *ramp* serve the same floor level and terminate at the same *level of exit discharge*, the termination of the *exit access stairway* or *ramp* and the *exit discharge* door of the *interior exit stairway* or *ramp* shall be separated by a distance of not less than 30 feet (9144 mm) or not less than one-fourth the length of the maximum overall diagonal dimension of the building, whichever is less. The distance shall be measured in a straight line between the *exit discharge* door from the *interior exit stairway* or *ramp* and the last tread of the *exit access stairway* or termination of slope of the *exit access ramp*.

2. Not more than 50 percent of the number and minimum width or required capacity of the *interior exit stairways* and *ramps* is permitted to egress through a vestibule provided that all of the following conditions are met:

   2.1. The entire area of the vestibule is separated from areas below by construction conforming to the *fire-resistance rating* of the *interior exit stairway* or *ramp enclosure*.

   2.2. The depth from the exterior of the building is not greater than 10 feet (3048 mm) and the length is not greater than 30 feet (9144 mm).

   2.3. The area is separated from the remainder of the *level of exit discharge* by a *fire partition* constructed in accordance with Section 708.

      Exception: The maximum transmitted temperature rise is not required.

   2.4. The area is used only for *means of egress* and *exits* directly to the outside.

3. *Horizontal exits* complying with Section 1026 shall not be required to discharge directly to the exterior of the building.

4. <u>Exit discharge onto the roof of the same building or an adjoining building is permitted when all of the following criteria are met:</u>

   <u>4.1. The roof assembly has the same fire resistance rating required for the exit enclosure.</u>

   <u>4.2. A continuous path of egress travel is provided to a public way.</u>

Reason: The code addresses exit discharge that is adjacent to building areas, in which case one hour rated separation of the exit discharge may be required (see 1028.4). This code change proposal extends that concept to exit discharge that is above other building areas.
It is not unusual for buildings in urban areas to have below-grade parking garages that have a larger footprint than the above-grade portions of the building. Having an exit discharge onto the below-grade "roof" would be prohibited by 1028.1 because the roof of the parking garage is not "grade".

This exception would permit exit discharge onto the roof of the below-grade parking garage provided that the roof has the same fire resistance rating as the exit.

The NFPA Life Safety Code has a similar provision in section 7.7.6.

Cost Impact: The code change proposal will decrease the cost of construction
This code change proposal would reduce the cost of construction because it would allow greater flexibility in building design. Thus, land could be used more efficiently.

E104-21

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: This proposal was disapproved. The committee felt this was a good idea, but had several issues that need to be addressed. The use of 'adjoining' roof could be a building that was not the same owner - so the exit off the roof could be locked or blocked. The proponent said this was for podium buildings, but the language would allow this for all buildings. If this is a two story building over a parking garage, there could be unrated exit access stairways in the building, so the roof people were exiting over would have no rating. What happens if the discharge can be to ground level but not to a public way? This could be a problem with landscaped roofs because the occupants could assume they were at grade when they were still on the roof. (Vote: 12-2)

E104-21

Individual Consideration Agenda

Public Comment 1:

IBC: 1028.2 (IFC:[BE]1028.2)

Proponents: Jeffrey Grove, representing Jensen Hughes (jgrove@jensenhughes.com) requests As Modified by Public Comment

Further modify as follows:

2021 International Building Code

1028.2 Exit discharge . *Exits* shall discharge directly to the exterior of the building. The *exit discharge* shall be at grade or shall provide a direct path of egress travel to grade. The *exit discharge* shall not reenter a building. The combined use of Exceptions 1 and 2 shall not exceed 50 percent of the number and minimum width or required capacity of the required *exits*.

Exceptions:

1. Not more than 50 percent of the number and minimum width or required capacity of *interior exit stairways* and *ramps* is permitted to egress through areas, including *atriums*, on the level of discharge provided that all of the following conditions are met:
    1.1. Discharge of *interior exit stairways* and *ramps* shall be provided with a free and unobstructed path of travel to an exterior *exit* door and such *exit* is readily visible and identifiable from the point of termination of the enclosure.

    1.2. The entire area of the *level of exit discharge* is separated from areas below by construction conforming to the *fire-resistance rating* for the enclosure.

    1.3. The egress path from the *interior exit stairway* and *ramp* on the *level of exit discharge* is protected throughout by an *approved automatic sprinkler system*. Portions of the *level of exit discharge* with access to the egress path shall be either equipped throughout with an *automatic sprinkler system* installed in accordance with Section 903.3.1.1 or 903.3.1.2, or separated from the egress path in accordance with the requirements for the enclosure of *interior exit stairways* or *ramps*.

    1.4. Where a required *interior exit stairway* or *ramp* and an *exit access stairway* or *ramp* serve the same floor level and terminate at the same *level of exit discharge*, the termination of the *exit access stairway* or *ramp* and the *exit discharge* door of the *interior exit stairway* or *ramp* shall be separated by a distance of not less than 30 feet (9144 mm) or not less than one-fourth the length of the maximum overall diagonal dimension of the building, whichever is less. The distance shall be measured in a straight line between the *exit discharge* door from the *interior exit stairway* or *ramp* and the last tread of the *exit access stairway* or termination of slope of the *exit access ramp*.

2. Not more than 50 percent of the number and minimum width or required capacity of the *interior exit stairways* and *ramps* is permitted to egress through a vestibule provided that all of the following conditions are met:

   2.1. The entire area of the vestibule is separated from areas below by construction conforming to the *fire-resistance rating* of the *interior exit stairway* or *ramp enclosure*.

   2.2. The depth from the exterior of the building is not greater than 10 feet (3048 mm) and the length is not greater than 30 feet (9144 mm).

   2.3. The area is separated from the remainder of the *level of exit discharge* by a *fire partition* constructed in accordance with Section 708.

   Exception: The maximum transmitted temperature rise is not required.

   2.4. The area is used only for *means of egress* and *exits* directly to the outside.

3. *Horizontal exits* complying with Section 1026 shall not be required to discharge directly to the exterior of the building.

4. Exit discharge onto the roof of the same building ~~or an adjoining building~~ is permitted ~~when~~ where all of the following criteria are met:

   4.1. ~~The roof assembly has the same fire resistance rating required for the exit enclosure.~~ The roof assembly shall have not less than a one hour fire resistance rating, and not less than the fire resistance rating required for the exit enclosure that discharges onto the roof.

   4.2. ~~A continuous path of egress travel is provided to a public way.~~ There is a free and unobstructed path of travel to the public way.

Commenter's Reason: The code addresses exit discharge that is adjacent to building areas, in which case one hour rated separation of the exit discharge may be required (see 1028.4). This code change proposal extends that concept to exit discharge that is above other building areas. It is not unusual for buildings in urban areas to have below-grade parking garages that have a larger footprint than the above-grade portions of the building. Having an exit discharge onto the below-grade “roof” would be prohibited by 1028.1 because the roof of the parking garage is not “grade”. This exception would permit exit discharge onto the “roof” of a below-grade parking garage provided that the roof has at least the same fire resistance rating as is required for the exit.
This change addresses the committee’s comments by (1) removing the text that would have permitted exit discharge to be on the roof of an adjoining building and (2) providing a minimum required fire resistance rating for the roof.

Cost Impact: The net effect of the public comment and code change proposal will decrease the cost of construction
This code change proposal would reduce the cost of construction because it would allow greater flexibility in building design. Thus, land could be used more efficiently

Public Comment# 2770

E105-21

Proposed Change as Submitted

Proponents: Ali Fattah, City of San Diego Development Services Department, representing City of San Diego Development Services Department (afattah@sandiego.gov)

2021 International Building Code

Revise as follows:

1029.3 Construction and openings. Where an *egress court* serving a building or portion thereof is less than 10 feet (3048 mm) in width, the *egress court* walls shall have not less than 1-hour *fire-resistance-rated* construction for a distance of 10 feet (3048 mm) above the floor of the *egress court*. Openings within such walls shall be protected by opening protectives having a *fire protection rating* of not less than $^{3}/_{4}$ hour.

Exceptions:

1. *Egress courts* serving an *occupant load* of less than 10.
2. *Egress courts* serving Group R-3.
3. <u>Egress courts, located at *grade*, which provide direct and unobstructed access to a *public way* through two or more independent paths. The required width or capacity shall be maintained along each path.</u>

Reason: The proposed code change adds an exception to allow omission of opening protection from openings in walls adjacent to egress courts where occupants have access to the public way through two different paths, in other words from a yard designed to comply as an exit court that has two outlets. This will reduce the cost of construction and will allow design flexibility.

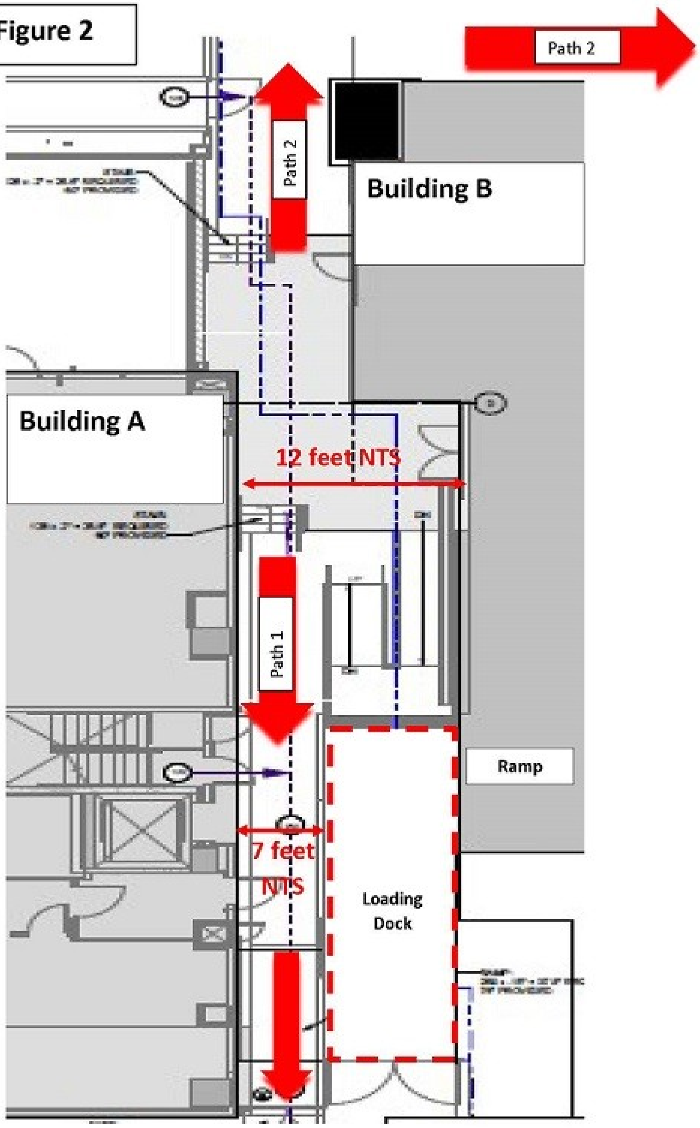
- Protection will not be diminished since the exterior walls for almost all buildings located at an FSD less than 10 feet will have a fire resistance of at least 1-hour and exterior wall openings will be restricted to 25% of the area of the wall (10% if not fire sprinklers).
- Additionally most buildings are protected with fire sprinkler systems and the IBC does account this additional level of protection.

This Code change recognizes the benefit of the egress path within an exit court being located far enough away from the building requiring the egress court. So by providing multiple paths occupants do not have to select the path that may have been compromised by fire in the building from which they accessed the egress court.

- The 2018 IBC commentary explains that an egress court, which is a portion of the exit discharge, is "A portion of the exit discharge that is partially confined by exterior walls or other elements that confine the discharge path to a single narrow route ..." This code change recognizes the benefits of multiple paths.
- The 2018 IBC Commentary on page 10-186 also includes a clarification that "The purpose of this section is to protect the occupants served by the egress court from the building that they are exiting. If occupants must walk closely by the exterior walls of the court, the walls are required to have the specified fire-resistance rating and the openings are required to be protected as specified." The proposed exception recognizes the benefits of two outlets from an exit court that does not require occupants to walk along a particular path.
- The 2018 IBC Commentary also explains that "An exit discharge component could be a large exterior open space where occupants could discharge in a number of different directions or it could be limited to a narrower path by landscaping or walls (i.e., egress court). In all cases, the space must be open enough to the outside that smoke and fumes will vent upward and away from occupants evacuating the building." The proposed exception allows the egress court with multiple outlets to be have like a a surface parking lot in front of the building

In closing, if occupants have choices of paths it is reasonable to assume that one of the alternative paths will be available and provide safe access to the public way and therefore protection of the exit court is not required. See figure 2 attached for an illustration of this concept. We request that the Means of Egress Committee approve this sensible code change.

Figure 2



Cost Impact: The code change proposal will decrease the cost of construction
The proposed code change will reduce the need to add opening protectives at doors and windows along egress courts.

E105-21

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: This proposal was disapproved because this proposal does not indicate the larger of width versus capacity for the size. This could be read to be exempting rated walls and openings. The proposal seems to be assuming the buildings are sprinklered. (Vote: 12-1)

E105-21

Individual Consideration Agenda

Public Comment 1:

IBC: 1029.3 (IFC:[BE]1029.3)

Proponents: Ali Fattah, representing City of San Diego Development Services Department (afattah@sandiego.gov) requests As Modified by Public Comment

Modify as follows:

2021 International Building Code

1029.3 Construction and openings . Where an *egress court* serving a building or portion thereof is less than 10 feet (3048 mm) in width, the *egress court* walls shall have not less than 1-hour *fire-resistance-rated* construction for a distance of 10 feet (3048 mm) above the floor of the *egress court*. Openings within such walls shall be protected by opening protectives having a *fire protection rating* of not less than $^3/_4$ hour.

Exceptions:

1. *Egress courts* serving an *occupant load* of less than 10.
2. *Egress courts* serving Group R-3.
3. Egress courts, located at *grade,* which provide direct and unobstructed access to a *public way* through two or more independent paths. The minimum width provided along each path shall be based on the required width or the required capacity , whichever is greater, and shall be maintained along each path.

Commenter's Reason: We request that the ICC Governmental Voting members overturn the committee decision for disapproval so that we can over come the 2/3 vote hurdle necessary to consider approval as submitted with further modification per public comment. The Public Comment is submitted in response to feedback provided by the Means of Egress Committee which supported the code change in concept. While the reason statement intended to point out that most buildings will be protected with fire sprinklers and that the exterior walls located at a fire separation distance less than 10 ft will in the vast majority of cases be 1-hour fire resistant with a significant reduction in the permitted area of exterior wall openings. The proposed code change does not require the presence of fire sprinklers and recognizes the benefits of alternative paths regardless of the type of construction, occupancy and protection for the building. The example provided is intended to be illustrative of a condition that occurred in a local jurisdiction where the IBC was silent regarding the benefits of equivalent alternative paths to the public way. The net effect of the updates in the public comment ensure that the larger of the width or calculated capacity be provided along the alternative paths to the public way.

Cost Impact: The net effect of the public comment and code change proposal will decrease the cost of construction
The proposed code change will not require opening protection when alternative paths are provided.

Public Comment# 2244

E107-21 Part I

Proposed Change as Submitted

Proponents: Marcelo Hirschler, GBH International, representing self (mmh@gbhint.com)

THIS IS A 3 PART CODE CHANGE. PART I WILL BE HEARD BY THE MEANS OF EGRESS CODE COMMITTEE. PART II WILL BE HEARD BY THE GENERAL CODE COMMITTEE. PART III WILL BE HEARD BY THE FIRE CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THESE COMMITTEES.

2021 International Building Code

Revise as follows:

1030.1.1 Bleachers. *Bleachers*, *grandstands* and *folding and telescopic seating*, that are not building elements, shall comply with ICC 300 , and shall be constructed of materials complying with Section 1030.1.1.1.

Add new text as follows:

1030.1.1.1 Materials of construction of bleachers, grandstands and folding and telescopic seating.
Bleachers, grandstands and folding and telescopic seating shall be constructed of materials that comply with either one of the following requirements:

1. Materials shall be noncombustible materials in accordance with Section 703.3.1.
2. Materials shall exhibit a Class C flame spread index and smoke developed index when tested in accordance with ASTM E84 or UL 723, with the test specimen remaining in place during the test, or shall comply with the requirements of Section 803.1.1.

Revise as follows:

~~**1030.1.1.1**~~ **1030.1.1.2 Spaces under grandstands and bleachers.** Spaces under *grandstands* or *bleachers* shall be separated by *fire barriers* complying with Section 707 and *horizontal assemblies* complying with Section 711 with not less than 1-hour *fire-resistance-rated* construction.

Exceptions:

1. Ticket booths less than 100 square feet (9.29 m^2) in area.
2. Toilet rooms.
3. Other accessory use areas 1,000 square feet (92.9 m^2) or less in area and equipped with an *automatic sprinkler system* in accordance with Section 903.3.1.1.

Reason: This proposal is in three parts. All parts require that bleachers meet all the requirements from ICC 300, a standard already referenced in the IBC, in Chapter 10 and in Chapter 16.
ICC 300 is the Standard for Bleachers, Folding and Telescopic Seating, and Grandstands. However, the section on materials in ICC 300 is not very useful, as it states:*302.1 Combustibility and flame spread. Bleachers, folding and telescopic seating, and grandstands shall be permitted to be constructed of combustible or noncombustible materials. Such installations within a building shall not be considered interior finish relative to the application of the building code.*

The requirement that bleachers be constructed of "combustible or noncombustible materials" does not exclude anything, since there is no other option for a material. There is a need to ensure the bleachers are not made of a material that is highly combustible.

This proposal contains a requirement that is pretty straightforward to meet, since traditional bleacher materials (including wood) would meet the requirements. This proposal says that they can be made of noncombustible materials (and sends to 703.3.1 of the IBC) or of materials that meet a Class C in accordance with ASTM E84.

This requirement ensures that they cannot simply be made of a highly combustible plastic or plastic composite material (note that wood materials meet a Class C without any treatment), which would introduce a high fuel load into these temporary structures.

The added requirement that “the test specimen remain in place during the test” is the same as is required for plastic composites in both the IBC (section 2612) and the IRC (section R507).

Part 1 addresses the requirements in chapter 10 of the IBC, part 2 addresses the same requirements in Chapter 31 of the IBC and part 3 addresses the same requirements in the IFC.

Cost Impact: The code change proposal will increase the cost of construction
This proposal adds a material fire performance requirement for bleachers and, therefore, it is necessary to state that it "will" increase the cost of construction. However, most bleachers in use are likely to meet the "new" requirements.

E107-21 Part I

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: This proposal was disapproved because the materials of which a bleacher is constructed should be addressed in the bleacher standard, ICC 300. The language is confusing and could be read to prohibit any part of a bleacher made out of wood. This would apply to all size bleachers, even just two rows. (Vote: 13-0)

E107-21 Part I

Individual Consideration Agenda

Public Comment 1:

IBC: 1030.1.1.1; (IFC[BE] 1030.1.1.1)

Proponents: Marcelo Hirschler, representing self (mmh@gbhint.com) requests As Modified by Public Comment

Modify as follows:

2021 International Building Code

1030.1.1 Bleachers . *Bleachers*, *grandstands* and *folding and telescopic seating*, that are not building elements, shall comply with ICC 300, and shall be constructed of materials complying with Section 1030.1.1.1.

1030.1.1.1 Materials of construction of bleachers, grandstands and folding and telescopic seating . Bleachers, grandstands and folding and telescopic seating shall be constructed of materials that comply with any ~~either~~ one of the following requirements:

1. Wood.
~~1.~~ 2. Materials shall be noncombustible materials in accordance with Section 703.3.1.
~~2.~~ 3. Materials shall exhibit a Class C flame spread index and smoke developed index when tested in accordance with ASTM E84 or UL 723, with the test specimen remaining in place during the test, or shall comply with the requirements of Section 803.1.1.

Commenter's Reason: ICC 300 is not included in the complete collection of ICC codes. Therefore the code official attempting to look at compliance would need an added document to know whether any specific material is or is not allowed for use in bleachers and grandstands. There has been at least one very severe and tragic fire involving burning of grandstands, in England, on May 11, 1985, killing 56 spectators and injuring at least 265.
It was pointed out during testimony that the proposal as originally written would have required wood materials to be tested to ASTM E84. That is an unnecessary requirement since wood typically complies with the requirements proposed for other materials. The public comment clarifies that wood materials need to be permitted for construction of bleachers and grandstands.

The new language simply is intended to prevent the use of highly combustible materials.

Cost Impact: The net effect of the public comment and code change proposal will increase the cost of construction
The public comment still attempts to prevent the use of highly flammable materials.

Public Comment# 2278

E107-21 Part II

Proposed Change as Submitted

Proponents: Marcelo Hirschler, GBH International, representing self (mmh@gbhint.com)

2021 International Building Code

Revise as follows:

3103.1 General. The provisions of Sections 3103.1 through 3103.5 ~~3103.4~~ shall apply to structures erected for a period of less than 180 days. *Special event structures*, tents, umbrella structures and other membrane structures erected for a period of less than 180 days shall also comply with the *International Fire Code*. Those erected for a longer period of time shall comply with applicable sections of this code.

Add new text as follows:

3103.5 Bleachers,grandstandsandfolding and telescopic seating.
Bleachers,grandstandsandfolding and telescopic seating, that are not building elements, shall comply withICC 300, and shall be constructed of materials complying with Section 3103.5.1.

3103.5.1 Materials of construction of bleachers,grandstandsandfolding and telescopic seating.
Bleachers,grandstandsandfolding and telescopic seating shall be constructed of materials that comply with either one of the following requirements:

1. Materials shall be noncombustible materials in accordance with Section 703.3.1.
2. Materials shall exhibit a Class C flame spread index and smoke developed index when tested in accordance with ASTM E84 or UL 723, with the test specimen remaining in place during the test, or shall comply with the requirements of Section 803.1.1.

Reason: This proposal is in three parts. All parts require that bleachers meet all the requirements from ICC 300, a standard already referenced in the IBC, in Chapter 10 and in Chapter 16.
ICC 300 is the Standard for Bleachers, Folding and Telescopic Seating, and Grandstands. However, the section on materials in ICC 300 is not very useful, as it states:*302.1 Combustibility and flame spread. Bleachers, folding and telescopic seating, and grandstands shall be permitted to be constructed of combustible or noncombustible materials. Such installations within a building shall not be considered interior finish relative to the application of the building code.*

The requirement that bleachers be constructed of "combustible or noncombustible materials" does not exclude anything, since there is no other option for a material. There is a need to ensure the bleachers are not made of a material that is highly combustible.

This proposal contains a requirement that is pretty straightforward to meet, since traditional bleacher materials (including wood) would meet the requirements. This proposal says that they can be made of noncombustible materials (and sends to 703.3.1 of the IBC) or of materials that meet a Class C in accordance with ASTM E84.

This requirement ensures that they cannot simply be made of a highly combustible plastic or plastic composite material (note that wood materials meet a Class C without any treatment), which would introduce a high fuel load into these temporary structures.

The added requirement that “the test specimen remain in place during the test” is the same as is required for plastic composites in both the IBC (section 2612) and the IRC (section R507).

Part 1 addresses the requirements in chapter 10 of the IBC, part 2 addresses the same requirements in Chapter 31 of the IBC and part 3 addresses the same requirements in the IFC.

Cost Impact: The code change proposal will increase the cost of construction
This proposal adds a material fire performance requirement for bleachers and, therefore, it is necessary to state that it "will" increase the cost of construction. However, most bleachers in use are likely to meet the "new" requirements.

E107-21 Part II

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The proposal was disapproved as the provision was not in the correct place. The committee recommended the topic for consideration for ICC 300 or Chapter 10. (Vote: 14-0)

E107-21 Part II

Individual Consideration Agenda

Public Comment 1:

IBC: 3103.5.1

Proponents: Marcelo Hirschler, representing self (mmh@gbhint.com) requests As Modified by Public Comment

Modify as follows:

2021 International Building Code

3103.5 Bleachers,grandstandsandfolding and telescopic seating . Bleachers,grandstandsandfolding and telescopic seating, that are not building elements, shall comply withICC 300, and shall be constructed of materials complying with Section 3103.5.1.

3103.5.1 Materials of construction of bleachers,grandstandsandfolding and telescopic seating . Bleachers,grandstandsandfolding and telescopic seating shall be constructed of materials that comply with any ~~either~~ one of the following requirements:

1. Wood
2. ~~1.~~ 2. Materials shall be noncombustible materials in accordance with Section 703.3.1.
3. ~~2.~~ 3. Materials shall exhibit a Class C flame spread index and smoke developed index when tested in accordance with ASTM E84 or UL 723, with the test specimen remaining in place during the test, or shall comply with the requirements of Section 803.1.1.

Commenter's Reason: ICC 300 is not included in the complete collection of ICC codes. Therefore the code official attempting to look at compliance would need an added document to know whether any specific material is or is not allowed for use in bleachers and grandstands. There has been at least one very severe and tragic fire involving burning of grandstands, in England, on May 11, 1985, killing 56 spectators and injuring at least 265.
It was pointed out during testimony that the proposal as originally written would have required wood materials to be tested to ASTM E84. That is an unnecessary requirement (since wood typically complies with the requirements proposed for other materials. The public comment clarifies that wood materials need to be permitted for construction of bleachers and grandstands.

The new language simply is intended to prevent the use of highly combustible materials.

The same language is also being proposed for Chapter 10.

Cost Impact: The net effect of the public comment and code change proposal will increase the cost of construction
The public comment still attempts to prevent the use of highly flammable materials.

Public Comment# 2281

E107-21 Part III

Proposed Change as Submitted

Proponents: Marcelo Hirschler, GBH International, representing self (mmh@gbhint.com)

2021 International Fire Code

Revise as follows:

3103.1 General. *Tents* and *membrane structures* used for temporary periods shall comply with this section and Section 3106. Seating in tents and membrane structures shall comply with Section 3103.11. Other temporary structures erected for a period of 180 days or less shall comply with the *International Building Code*.

3103.11 Seating arrangements. Seating in *tents* or *membrane structures* shall be in accordance with Chapter 10 and comply with the requirements of Section 3103.11.1.

Add new text as follows:

3103.11.1 Bleachers,grandstandsandfolding and telescopic seating.
Bleachers,grandstandsandfolding and telescopic seating, that are not building elements, shall comply withICC 300. The materials of construction shall comply with either one of the following:

1. Materials shall be noncombustible in accordance with Section 703.3.1 of the International Building Code.
2. Materials shall exhibit a Class C flame spread index and smoke developed index when tested in accordance with ASTM E84 or UL 723, with the test specimen remaining in place during the test, or shall comply with the requirements of Section 803.1.1.

Reason: This proposal is in three parts. All parts require that bleachers meet all the requirements from ICC 300, a standard already referenced in the IBC, in Chapter 10 and in Chapter 16.

ICC 300 is the Standard for Bleachers, Folding and Telescopic Seating, and Grandstands. However, the section on materials in ICC 300 is not very useful, as it states:*302.1 Combustibility and flame spread. Bleachers, folding and telescopic seating, and grandstands shall be permitted to be constructed of combustible or noncombustible materials. Such installations within a building shall not be considered interior finish relative to the application of the building code.*

The requirement that bleachers be constructed of "combustible or noncombustible materials" does not exclude anything, since there is no other option for a material. There is a need to ensure the bleachers are not made of a material that is highly combustible.

This proposal contains a requirement that is pretty straightforward to meet, since traditional bleacher materials (including wood) would meet the requirements. This proposal says that they can be made of noncombustible materials (and sends to 703.3.1 of the IBC) or of materials that meet a Class C in accordance with ASTM E84.

This requirement ensures that they cannot simply be made of a highly combustible plastic or plastic composite material (note that wood materials meet a Class C without any treatment), which would introduce a high fuel load into these temporary structures.

The added requirement that “the test specimen remain in place during the test” is the same as is required for plastic composites in both the IBC (section 2612) and the IRC (section R507).

Part 1 addresses the requirements in chapter 10 of the IBC, part 2 addresses the same requirements in Chapter 31 of the IBC and part 3 addresses the same requirements in the IFC.

Cost Impact: The code change proposal will increase the cost of construction
This proposal adds a material fire performance requirement for bleachers and, therefore, it is necessary to state that it "will" increase the cost of construction. However, most bleachers in use are likely to meet the "new" requirements.

E107-21 Part III

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The committee stated that the reasons for disapproval were that the language in the IFC is duplicated from the IBC which does reference ICC 300 and based on the previous disapproval of Parts I and II by the previous two committees. Additionally, it was stated that ICC 300 addresses new and existing installations of all types of bleacher seating including fixed and folding bleachers and the prevalence of seating in tents and membrane structures tend to be folding chairs. (Vote: 14-0)

E107-21 Part III

Individual Consideration Agenda

Public Comment 1:

IFC: 3103.11, 3103.11.1

Proponents: Marcelo Hirschler, representing self (mmh@gbhint.com) requests As Modified by Public Comment

Modify as follows:

2021 International Fire Code

3103.11 Seating arrangements . Seating in *tents* or *membrane structures* shall be in accordance with Chapter 10 and comply with the requirements of Section 3103.11.1.

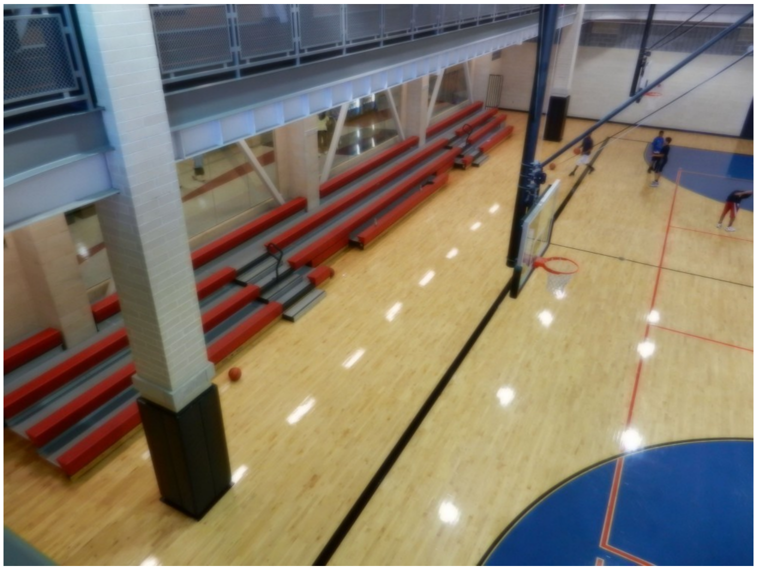
3103.11.1 Bleachers, grandstands and telescopic seating . Bleachers, grandstands and telescopic seating, that are not building elements, shall comply withICC 300. The materials of construction shall comply with any ~~either~~ one of the following:

1. Wood
~~1.~~ 2. Materials shall be noncombustible in accordance with Section 703.3.1 of the International Building Code.
~~2.~~ 3. Materials shall exhibit a Class C flame spread index and smoke developed index when tested in accordance with ASTM E84 or UL 723, with the test specimen remaining in place during the test, or shall comply with the requirements of Section 803.1.1.

Commenter's Reason: ICC 300 is not included in the complete collection of ICC codes. Therefore the code official attempting to look at compliance would need an added document to know whether any specific material is or is not allowed for use in bleachers and grandstands. There has been at least one very severe and tragic fire involving burning of grandstands, in England, on May 11, 1985, killing 56 spectators and injuring at least 265.
It was pointed out during testimony that the proposal as originally written would have required wood materials to be tested to ASTM E84. That is an unnecessary requirement since wood typically complies with the requirements proposed for other materials. The public comment clarifies that wood materials need to be permitted for construction of bleachers and grandstands. The new language simply is intended to prevent the use of highly combustible materials. The proposed language has not been modified with regard to its applicability since that would not be consistent with the ICC 300 standard, the code or other parts of E107.

Note that the definition of folding and telescopic seating in the IBC is as shown below and the requirements of ICC 300 and the code do apply to them:

> **FOLDING AND TELESCOPIC SEATING.** Tiered seating having an overall shape and size that is capable of being reduced for purposes of moving or storing and is not a *building element*.



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Cost Impact: The net effect of the public comment and code change proposal will increase the cost of construction
The public comment still attempts to prevent the use of highly flammable materials.

Public Comment# 2282

E112-21

Proposed Change as Submitted

Proponents: Mike Nugent, Chair, representing ICC Building Code Action Committee (bcac@iccsafe.org)

2021 International Building Code

Revise as follows:

1031.2 Where required. In addition to the *means of egress* required by this chapter, *emergency escape and rescue openings* shall be provided in the following occupancies:

1. Group R-2 occupancies located in stories with only one *exit* or *access* to only one *exit* as permitted by Tables 1006.3.4(1) and 1006.3.4(2).
2. Group R-3 and R-4 occupancies.

Basements and sleeping rooms below the fourth *story above grade plane* shall have not fewer than one *emergency escape and rescue opening* in accordance with this section. Where *basements* contain one or more sleeping rooms, an *emergency escape and rescue opening* shall be required in each sleeping room, but shall not be required in adjoining areas of the *basement*. Such openings shall open directly into a *public way* or to a *yard* or *court* that opens into or has access to a *public way*.

Exceptions:

1. *Basements* with a ceiling height of less than 80 inches (2032 mm) shall not be required to have *emergency escape and rescue openings*.
2. *Emergency escape and rescue openings* are not required from *basements* or sleeping rooms that have an *exit* door or *exit access* door that opens directly into a *public way* or to a *yard*, court or exterior egress balcony that opens to a *public way*.
3. *Basements* without *habitable spaces* and having not more than 200 square feet (18.6 m^2) in floor area shall not be required to have *emergency escape and rescue openings*.
4. Storm shelters are not required to comply with this section where the shelter is constructed in accordance with ICC 500.
5. Within individual *dwelling* and *sleeping units* in Groups R-2 and R-3, where the building is equipped throughout with an *automatic sprinkler system* installed in accordance with Section 903.3.1.1, 903.3.1.2 or 903.3.1.3, *sleeping rooms* in *basements* shall not be required to have *emergency escape and rescue openings* provided that the basement has one of the following:

   5.1. One *means of egress* and one *emergency escape and rescue opening*.

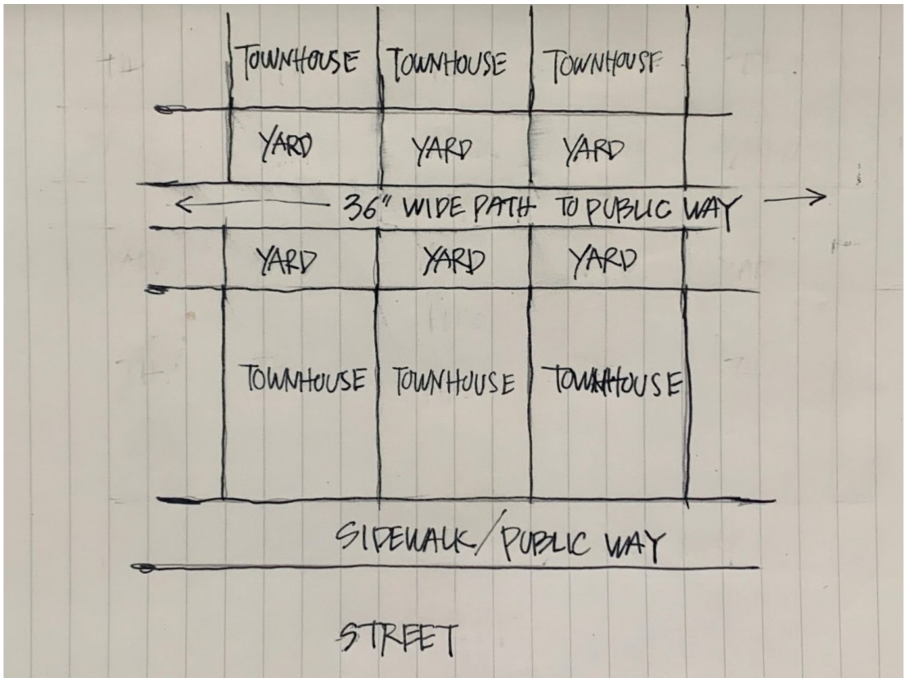
   5.2. Two *means of egress*.

Reason: The purpose of this code change is to allow an EERO to discharge into a fenced yard that does not directly open onto a public way if a path can be provided from the fenced yard to the public way. In many cities, new townhouses are being constructed on infill lots with tight space limitations.

Locating an EERO while also wanting to provide fenced yards is becoming challenging. In some cases, a builder may want to construct two rows of townhouses that are tight up to the street but that have fenced backyards for each unit. Under the current code, the builder would either have to construct a window well in the sidewalk to access a basement EERO or in the backyard and forgo the private fenced yards as there will likely not be enough space to provide a 10 foot wide “public way”.

The issue with placing an EERO in the front to allow a fenced yard in the back include coordinating the location with entry doors and front steps, coordinating the location with utilities, and providing a cover over the window well that prevents passers-by from dropping trash into the window well or getting high heels stuck in the openings of a grate. The problem with forgoing fenced yards is obviously the loss of privacy.

While a 10-foot wide path between back-to-back fenced yards is almost certainly not feasible, a narrower path will be in many cases. The new exception would allow such a path, that occupants could use to get out of their yard after escaping through an EERO, or that firefighters could use to access the fenced yard for firefighting and rescue operations without having to demolish or scale over a series of fences. The assumption is that the yard opens via a gate with access to the public way. Note that an emergency escape and rescue opening is a means of escape, not an ‘exit,’ so the provisions for ‘egress courts’ are not applicable. Yards and courts are both defined as spaces open to the sky.



This proposal is submitted by the ICC Building Code Action Committee (BCAC). BCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2020 the BCAC has held several virtual meetings open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the BCAC website at BCAC.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The code change does not change the requirement to provide an EERO for sleeping rooms and for basements (including each sleeping room in a basement). Thus, there should be no increase in cost as a result of this proposal. There may be a modest savings from the added ability to locate a basement EERO in the rear of the home, where covers may not be required and coordination with utilities is easier.

E112-21

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: This proposal was disapproved because there was concern that it would be difficult to maintain accessways without easement requirements. (Vote: 9-4)

Individual Consideration Agenda

Public Comment 1:

IBC: 1031.2 (IFC:[BE]1031.2)

Proponents: Mike Nugent, representing ICC Building Code Action Committee (bcac@iccsafe.org) requests As Modified by Public Comment

Modify as follows:

2021 International Building Code

1031.2 Where required . In addition to the *means of egress* required by this chapter, *emergency escape and rescue openings* shall be provided in the following occupancies:

1. Group R-2 occupancies located in stories with only one *exit* or *access* to only one *exit* as permitted by Tables 1006.3.4(1) and 1006.3.4(2).
2. Group R-3 and R-4 occupancies.

Basements and sleeping rooms below the fourth *story above grade plane* shall have not fewer than one *emergency escape and rescue opening* in accordance with this section. Where *basements* contain one or more sleeping rooms, an *emergency escape and rescue opening* shall be required in each sleeping room, but shall not be required in adjoining areas of the *basement*. Such openings shall open directly into a *public way* or to a *yard* or *court* that opens ~~into or has access~~ to a *public way*.

Exceptions:

1. *Basements* with a ceiling height of less than 80 inches (2032 mm) shall not be required to have *emergency escape and rescue openings*.
2. *Emergency escape and rescue openings* are not required from *basements* or sleeping rooms that have an *exit* door or *exit access* door that opens directly into a *public way* or to a *yard*, court or exterior egress balcony that opens to a *public way*.
3. *Basements* without *habitable spaces* and having not more than 200 square feet (18.6 m^2) in floor area shall not be required to have *emergency escape and rescue openings*.
4. Storm shelters are not required to comply with this section where the shelter is constructed in accordance with ICC 500.
5. An *emergency escape and rescue opening* shall not be required to open directly into a *yard or court* that opens directly to a *public way* provided the court or *yard* opens to an unobstructed path from the court or *yard* to the *public way*. Such path shall have a width of not less than 36 inches (914 mm).

6. ~~5.~~ Within individual *dwelling* and *sleeping units* in Groups R-2 and R-3, where the building is equipped throughout with an *automatic sprinkler system* installed in accordance with Section 903.3.1.1, 903.3.1.2 or 903.3.1.3, *sleeping rooms* in *basements* shall not be required to have *emergency escape and rescue openings* provided that the basement has one of the following:

   ~~5.1.~~ 6.1. One *means of egress* and one *emergency escape and rescue opening*.

   ~~5.2.~~ 6.2. Two *means of egress*.

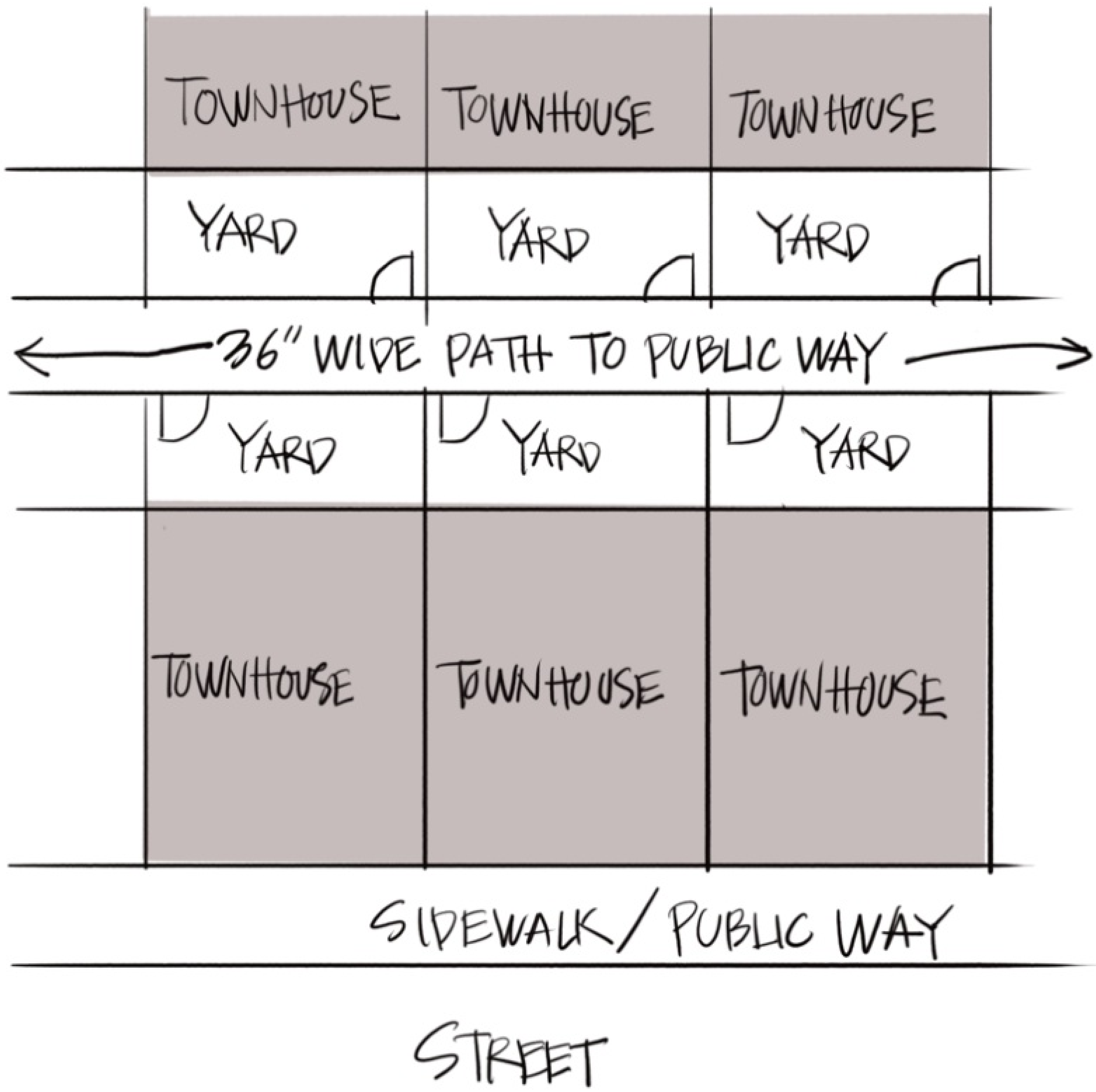
Commenter's Reason: The intent of the original proposal was to allow an EERO to discharge into a fenced yard that does not directly open onto an egress court or public way if a minimum 36” wide path can be provided from the fenced yard to the egress court or public way. During the 2019 CAH, a similar proposal was approved addressing emergency escape in the IRC. This proposal was intended to correlate the language for emergency escape between the IBC and IRC.

The Code Action Committee expressed concern that the 36” wide path may not be maintained unless it was a dedicated easement. Since each of the dwellings has fenced rear yards that would define the property lines, the public way would be for public use and not private use.

An exception has been added to describe that such a path would be required that occupants could use to get escape from a yard after escaping through an EERO, or that the fire service could use to access the fenced yard for rescue operations.

Likewise, the committee felt that there should be required access from the 36” wide path to the yards of each dwelling for use by the fire service. This would be achieved by the use of a swinging gate for each yard that provides such access.

The changes in this public comment take the language that was approved during the 2019 Group B code cycle and correlating that with this proposed change in the IBC allowing a path that occupants of each dwelling to use for escape, or that the fire service could use for access to a fenced yard of each property.



Cost Impact: The net effect of the public comment and code change proposal will not increase or decrease the cost of construction
The code change does not change the requirement to provide an EERO for sleeping rooms and for basements (including each sleeping room in a basement). Thus, there should be no increase in cost as a result of this proposal. There may be a modest savings from the added ability to locate a basement EERO in the rear of the home, where covers may not be required and coordination with utilities is easier.

Public Comment# 2622

E113-21

Proposed Change as Submitted

Proponents: Mike Nugent, Chair, representing ICC Building Code Action Committee (bcac@iccsafe.org)

2021 International Building Code

Revise as follows:

1031.2.1 Operational constraints and opening control devices. *Emergency escape and rescue openings* shall be operational from inside the room without the use of keys or tools. Window-opening control devices and fall prevention devices complying with F2090—17 shall be permitted for use on windows serving as a required *emergency escape and rescue opening*.

1031.3 Emergency escape and rescue openings. *Emergency escape and rescue openings* shall ~~comply~~ have minimum dimensions in accordance with Sections 1031.3.1 through 1031.3.3.

1031.3.3 Maximum height from floor. Where a window is provided as the emergency ~~*Emergency*~~ *escape and rescue openings* , such window shall have the bottom of the clear opening not greater than 44 inches (1118 mm) measured from the floor.

1031.4 Emergency escape and rescue doors. Where a door is provided as the required *emergency escape and rescue opening*, it shall be a ~~swinging~~ side hinged door or a sliding door.

1031.6 Bars, grilles, covers and screens. Where bars, grilles, covers, screens or similar devices are placed over *emergency escape and rescue openings* or area wells that serve such openings, the minimum net clear opening size shall comply with Sections 1031.3 through 1031.3.2 and ~~1031.5~~ 1031.5.1. Such devices shall be releasable or removable from the inside without the use of a key, tool or force greater than that which is required for normal operation of the *emergency escape and rescue opening*.

Reason: The intent of this code change is to complete the coordination for EERO in IBC and IRC where appropriate. There were multiple proposals during the last cycle and this was split between Group A and B, so some items remain to be coordinated There will be proposals in Group B for IRC and IEBC.
1031.2.1 – It was pointed out during the IRC changes that ASTM F2090 was applicable to control devices and fall prevention devices. This revision would also coordinate with IRC Section R310.1.1.

1031.3 – This is a more specific description of the referenced sections. This will coordinate with R310.2.

1031.3.3 - EEROs can be doors or windows. The prosed revision in text would clarify that the bottom of the opening applies to windows. This change is also proposed to IRC R310.2.3.

1031.4 – During the IRC changes it was suggested that 'side-hinged' door was better code language and more consistent with other code text. This change would coordinate with IRC R310.31031.4 - The change in the references provides a more specific reference for the covers by just referencing the section on area well size. This will coordinate with IRC 310.4.3.

This proposal is submitted by the ICC Building Code Action Committee (BCAC). BCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2020 the BCAC has held several virtual meetings open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the BCAC website at BCAC.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
There are not changes to construction requirements. These are clarifications only.

E113-21

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The proposal was disapproved. Why is Section 1031.3.3 limited to only windows? Emergency escape and rescue opening could also be doors or hatches. NFPA 80 uses swinging doors, not side hinged doors. Section 1031.4 should match NFPA 80 terminology. (Vote: 11-3)

Individual Consideration Agenda

Public Comment 1:

IBC: 1031.4 (IFC:[BE] 1031.4)

Proponents: Mike Nugent, representing ICC Building Code Action Committee (bcac@iccsafe.org) requests As Modified by Public Comment

Modify as follows:

2021 International Building Code

1031.4 Emergency escape and rescue doors . Where a door is provided as the required *emergency escape and rescue opening*, it shall be a ~~side hinged~~ swinging door or a sliding door.

Commenter's Reason: The proposal was to coordinate with the EERO changes in the IRC. Last cycle the BCAC worked to extensively revise and clarify the EERO requirements. In hindsight, the proposal, if it had shown the revisions in context of the revised section, would have been much clearer.
Section 1031.4 - the committee said they preferred swinging because that was more consistent with NFPA 80 for fire doors. The code is inconsistent in the usage for doors, so this modification clarifies this is a standard door, not a hatch door.

1031.2.1 – It was pointed out during the IRC changes that ASTM F2090 was applicable to control devices and fall prevention devices. This revision would also coordinate with IRC Section R310.1.1.

1031.3 and 1031.3.3 – the Egress Committee felt that this revision was limiting the EERO to windows only, and not allowing doors. That is incorrect. This section only references windows because only windows have a bottom edge requirement. A door would be controlled through the general door requirements for thresholds and landings, but it can still be an EERO (Section 1031.4). This is the proposed language in context.

1031.3 Emergency escape and rescue openings. *Emergency escape and rescue openings shall ~~comply~~ have minimum dimensions in accordance with Sections 1031.3.1 through 1031.3.3.*

1031.3.1 Minimum size. *Emergency escape and rescue openings shall have a minimum net clear opening of 5.7 square feet (0.53 m2).*

Exception: *The minimum net clear opening for grade floor emergency escape and rescue openings shall be 5 square feet (0.46 m2).*

1031.3.2 Minimum dimensions. *The minimum net clear opening height dimension shall be 24 inches (610 mm). The minimum net clear opening width dimension shall be 20 inches (508 mm). The net clear opening dimensions shall be the result of normal operation of the opening.*

1031.3.3 Maximum height from floor. *Where a window is provided as the emergency ~~Emergency~~ escape and rescue openings , such window shall have the bottom of the clear opening not greater than 44 inches (1118 mm) measured from the floor.*

The change to Section 1031.6 is just a more specific pointer for clarity. The sections taken out of the reference don't have anything to do with size.

Cost Impact: The net effect of the public comment and code change proposal will not increase or decrease the cost of construction
There are not changes to construction requirements. These are clarifications only.

Public Comment# 2624

E118-21

Proposed Change as Submitted

Proponents: David Renn, PE, SE, City and County of Denver, representing Code Change Committee of ICC Colorado Chapter (david.renn@denvergov.org)

2021 International Building Code

Revise as follows:

1105.1.1 Automatic doors. In facilities with the occupancies and building *occupant loads* indicated in Table 1105.1.1, *public entrances* that are required to be *accessible* shall have one door be either a full *power-operated* door or a *low-energy power-operated door*. Where the *public entrance* includes a vestibule, at least one door into and one door out of the vestibule shall meet the requirements of this section.

> **Exception:** For the purpose of determining *power-operated* door requirements, a tenant space with its own exterior *public entrance* shall be considered a separate facility and building.

TABLE 1105.1.1 PUBLIC ENTRANCE WITH POWER-OPERATED DOOR[a]

OCCUPANCY	BUILDING OCCUPANT LOAD GREATER THAN
A-1, A-2, A-3, A-4	300
B, M, R-1	500

a. In mixed-use facilities where the total sum of the building occupant load is greater than those listed, the most restrictive building occupant load shall apply.

Reason: This proposal is intended to clarify how the power-operated door requirement is applied to a tenant space that has its own exterior public entrance. When a tenant space has its own exterior public entrance it functions as a facility that is separate from the building as a whole and should be treated as such for power-operated door requirements. This proposal requires these tenant spaces to be considered a separate facility and building for power-operated door requirements (note that the terms facility and building are both used since this section and associated table use both terms). Following are three scenarios with requirements as this section is currently written and as proposed:
Scenario 1: Tenant space does not exceed occupant limits in Table 1105.1 and remainder of building does not exceed limits, but total building does exceed limits. As currently written, public entrances to the tenant space and the remainder of the building are required to have power-operated doors based on the total building occupant load. As proposed, no power-operated doors are required.

Scenario 2: Tenant space exceeds occupant limits in Table 1105.1 and remainder of building does not exceed limits. As currently written, pubic entrances to the tenant space and the remainder of the building are required to have power-operated doors based on the total building occupant load. As proposed, tenant space is required to have power-operated doors but remainder of building is not.

Scenario 3: Tenant space does not exceed occupant limits in Table 1105.1 and remainder of building does exceed limits. As currently written, public entrances to the tenant space and the remainder of the building are required to have power-operated doors based on the total building occupant load. As proposed, tenant space is not required to have power-operated doors, but remainder of building is.

Cost Impact: The code change proposal will decrease the cost of construction
This proposal will result in power-operated doors being required at fewer locations, so the cost of construction will decrease.

Staff note: E117-21 and E118-21 addresses requirements in a different or contradicting manner. The committee is urged to make their intentions clear with their actions on these proposals.

E118-21

Public Hearing Results

Committee Action: **As Submitted**

Committee Reason: This proposal was approved as it was preferred over E117-21. This would allow for strip malls to not require automatic doors for every small tenant space. There was a concern that this is confusing by using "separate facility or building" when you are not limited by exterior walls or fire walls. (Vote: 14-0)

Staff Analysis: E117-21 and E118-21 addresses requirements in a different or contradicting manner. The committee is urged to make their intentions clear with their actions on these proposals.

E118-21

Individual Consideration Agenda

Public Comment 1:

IBC: 1105.1.1

Proponents: Mike Nugent, representing ICC Building Code Action Committee (bcac@iccsafe.org) requests As Modified by Public Comment

Modify as follows:

2021 International Building Code

1105.1.1 Automatic doors . In facilities with the occupancies and building *occupant loads* indicated in Table 1105.1.1, *public entrances* that are required to be *accessible* shall have one door be either a full *power-operated* door or a *low-energy power-operated door.* Where the *public entrance* includes a vestibule, at least one door into and one door out of the vestibule shall meet the requirements of this section.

> **Exception:** For the purpose of determining *power-operated* door requirements, a tenant space with ~~its own~~ a direct exterior public entrance ~~shall be considered~~ and without interior public access to building areas other than the tenant space shall be considered separately ~~a separate facility and building~~.

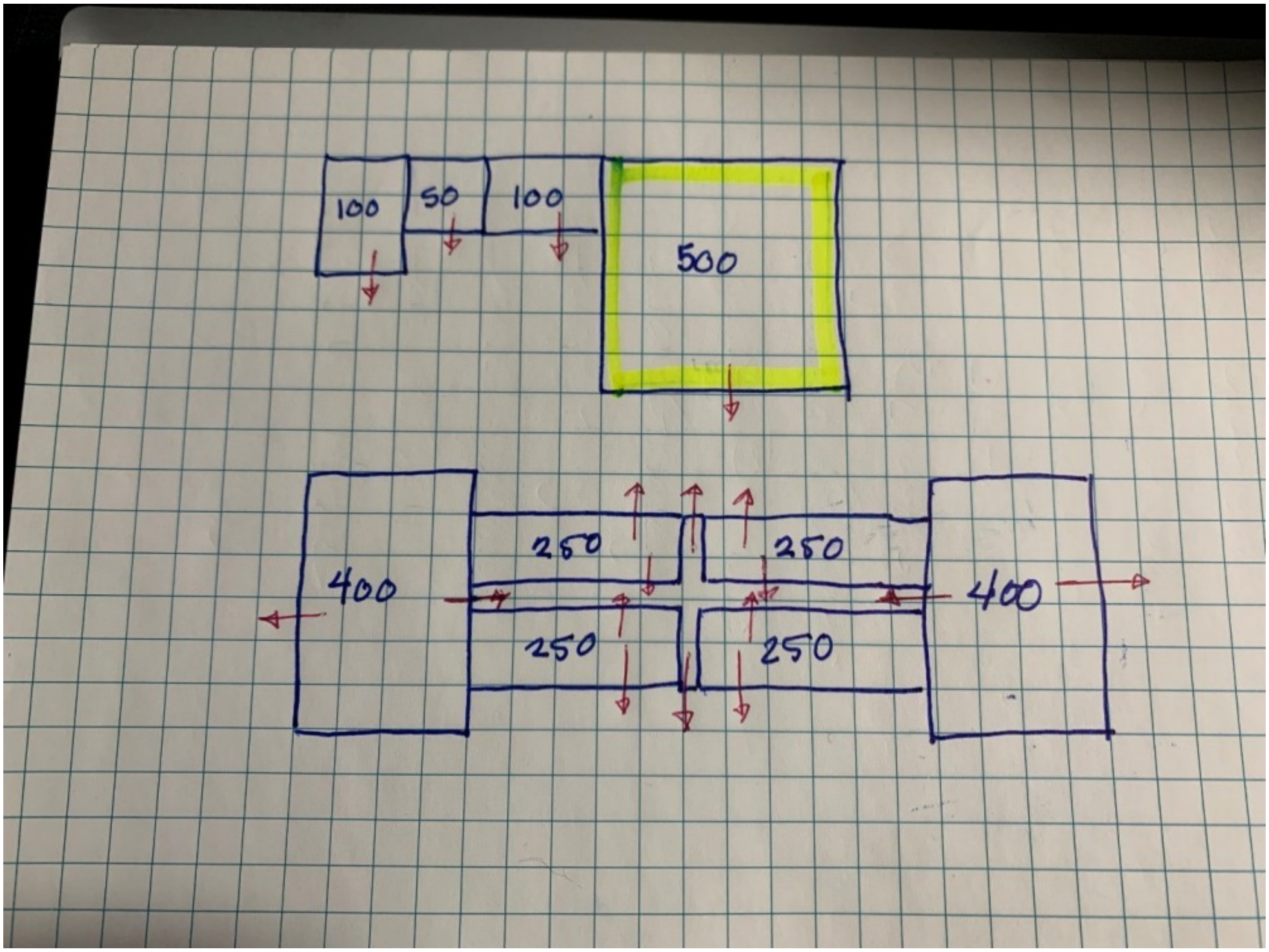
Commenter's Reason: This public comment reflects the intent of the original proponents of Section 1105.1.1.
The purpose of this proposed modification is to improve clarity and address concerns brought up during the testimony for E117-21 and E118-21. The current exception as written would, for a mixed use building with interior and exterior doors to each tenant space, allow for each tenant space to be evaluated separately instead of the building as a whole – thus possibly allowing for a space like an interior mall to not have to have automatic doors.

There is also an issue with “considered a separate …building”, when the IBC says a building is defined by exterior walls and fire walls, not tenant separation walls. This could be confusing.

This public comment clarifies that an individual tenant space without interior public access to other building areas is to be considered separately regarding applicability of 1105.1.1. An example would be a strip mall with separate tenant entrances. The result is if such an individual tenant space (which does not have public access to areas of the building other than the individual tenant space) does not have occupancy and occupant loads greater than Table 1105.1.1, then that individual tenant space would not be required to comply with the power-operated door requirements of 1105.1.1 – and the occupancies and occupant load of such an individual tenant space would not be included in the determination of the applicability of 1105.1.1 to the building.

On the other hand, if an individual tenant space does have interior public access to areas of the building other than the individual tenant space, the occupancies and occupant load of the individual tenant space would be included in the determination of the applicability of 1105.1.1 to the entire building. An example would be an interior mall – where the building should be considered in it’s entirety.

The as submitted text would only require automatic doors at the anchor store for the strip mall in the top example and would exempt the mall at the bottom example in total. The proposed public text would treat the strip mall the same, but would also pick up automatic doors in the mall in the bottom example since there are interior corridors as well as exterior doors.



This proposal is submitted by the ICC Building Code Action Committee (BCAC). BCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2020 the BCAC has held several virtual meetings open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the BCAC website at BCAC.

Cost Impact: The net effect of the public comment and code change proposal will decrease the cost of construction
This proposal will result in power-operated doors being required at fewer locations, so the cost of construction will decrease.

Public Comment# 2625

E121-21

Proposed Change as Submitted

Proponents: Eirene Knott, representing Metropolitan Kansas City Chapter of the ICC (eirene.knott@brrarch.com)

2021 International Building Code

Revise as follows:

1106.3 Groups I-1, R-1, R-2, R-3 and R-4. *Accessible* parking spaces shall be provided in Group I-1, R-1, R-2, R-3 and R-4 occupancies in accordance with the greatest number of parking spaces of any of the following:~~Items 1 through 4 as applicable.~~

1. In Group R-2, R-3 and R-4 occupancies that are required to have Accessible, Type A or *Type B dwelling units* or *sleeping units*, at least 2 percent, but not less than one, of each type of parking space provided shall be accessible.
2. In Group I-1 and R-1 occupancies, accessible parking shall be provided in accordance with Table 1106.2.
3. Where at least one parking space is provided for each *dwelling unit* or *sleeping unit*, at least one *accessible* parking space shall be provided for each *Accessible* and *Type A unit*.
4. ~~Where parking is provided within or beneath a building, *accessible* parking spaces shall be provided within or beneath the building.~~

Add new text as follows:

1106.3.1 Parking beneath a building.
Where parking is provided within or beneath a building, accessible parking spaces shall be provided within or beneath the building.

Reason: To clarify that the required number of parking spaces should result in the greatest number based on the conditions noted. A similar code change was presented as a public comment to E117-18. This proposed language addresses the concerns the committee had with regards to the placement of the clarification language.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
Whether or not the code change proposal will increase or decrease the cost of construction depends upon how jurisdictions have been interpreting item 3 of section 1106.3. If jurisdictions have been interpreting that accessible parking spaces required by item 1 of section 1106.3 do not include the accessible parking spaces required by item 3 of section 1106.3 (which must be also be additionally provided), this will not increase construction costs. The reason for this is that the jurisdiction's interpretation of items 1 and 3 of section 1106.3 is consistent with the code change proposal, that reflects the intent of the code. If jurisdictions have been interpreting that accessible parking spaces required by item 1 of section 1106.3 include the accessible parking spaces required by item 3 of section 1106.3, this will increase construction costs. The reason for this is that the jurisdiction's interpretation of items 1 and 3 of section 1106 3 is not consistent with the code change proposal and additional accessible parking spaces and their accompanying accessible access aisles and accessible routes will be required.

Staff Note: E121-21, E122-21 and E123-21 addresses requirements in a different or contradicting manner. The committee is urged to make their intentions clear with their actions on these proposals.

E121-21

Public Hearing Results

Committee Action: As Submitted

Committee Reason: The proposal was approved as the best option of E121, E122 and E123. The proponents should work together to add the best options from all three in a public comment. Separating parking beneath the building (Item 4) into a new section provides a good clarification. This proposal clarifies that items 1 and 3 are not additive. (Vote: 9-5)

Staff Analysis: E121-21, E122-21 and E123-21 addresses requirements in a different or contradicting manner. The committee is urged to make their intentions clear with their actions on these proposals.

E121-21

Individual Consideration Agenda

Public Comment 1:

IBC: 1106.3, 1106.7.1

Proponents: Eirene Knott, representing Metropolitan Kansas City Chapter of the ICC (eirene.knott@brrarch.com); Stephen Thomas, representing Self (sthomas@coloradocode.net); Gene Boecker, representing Code Consultants, Inc. (geneb@codeconsultants.com) requests As Modified by Public Comment

Further modify as follows:

2021 International Building Code

1106.3 Groups ~~I-1, R-1,~~ R-2, R-3 and R-4 . *Accessible* parking spaces shall be provided in Group ~~I-1, R-1,~~ R-2, R-3 and R-4 occupancies in accordance with the greatest number of parking spaces of any of the following:

1. In Group R-2, R-3 and R-4 occupancies that are required to have Accessible, Type A or *Type B dwelling units* or *sleeping units*, at least 2 pe type of parking space provided shall be accessible.

~~2. In Group I-1 and R-1 occupancies, accessible parking shall be provided in accordance with Table 1106.2.~~

2.~~3.~~ Where at least one parking space is provided for each *dwelling unit* or *sleeping unit*, at least one *accessible* parking space shall be provided f

~~1106.3.1~~ 1106.7.1 Parking located beneath a building . Where parking is provided ~~within or~~ beneath a building, accessible parking spaces shall be provided ~~within or~~ beneath the building.

Commenter's Reason: The committee had a lengthy discussion on E121, E122 and E123. They approved E121 asking the three of us to work together to put together the best options from all three code changes. This public comment is the result of that collaboration. We have moved the parking beneath the building to be in the section which would be more applicable as far as being a subsection of the location of accessible parking. We have removed the references to the I-1 and R-1 occupancies as those are provided for elsewhere.

Cost Impact: The net effect of the public comment and code change proposal will not increase or decrease the cost of construction
There is a possibility that this code change could decrease the cost of construction as it now clearly indicates what accessible parking is required. Previous code language could have been confusing and generating the need for additional accessible parking. Overall, it should not have any impact as it is just providing clear direction on what accessible parking is required.

Public Comment# 2341

E124-21

Proposed Change as Submitted

Proponents: Michael Gentille, PCNA Consulting Group, Inc., representing PCNA Consulting Group, Inc. (michael@pcnagroup.com)

2021 International Building Code

Revise as follows:

1107.2 Electrical vehicle charging stations. Electrical vehicle charging stations shall comply with Sections 1107.2.1 and 1107.2.2.

Exception: Electrical vehicle charging stations provided to serve Group ~~R-2,~~ R-3 and R-4 occupancies are not required to comply with this section.

Reason: Most of the newly constructed Group R-2 occupancy projects are being designed to include Electric Vehicle Charging Stations for use by residents. As such, by incorporating Group R-2 occupancies into the design requirements of Section 1107.2, the residents are guaranteed to be provided with at least one of them to be accessible. At present, they are not. Additionally, the inclusion of these design requirements provides consistency in the design of these features on mixed use projects. At present, if a building has mixed use occupancies (which is quite common in larger and/or high-rise development projects), a designer could arbitrarily designate that 100% of the Electric Vehicle Charging Stations are meant to "serve" the Group R-2 occupants, but not the Group B occupants. This would mean that NONE of the EVCS spaces on a site (or within a parking garage) would be required to incorporate accessibility features. Under current code language, there is no way to determine how these spaces are allocated by occupancy group. Ergo, it is a loophole on mixed-use projects that include an Group R-2 occupancy. Conversely, the concern for Group R-3 or R-4 occupancies is not as relevant, since these groups are significantly less likely to occur within mixed-use buildings.

Cost Impact: The code change proposal will increase the cost of construction
For Group R-2 occupancies only, the cost is the addition of van-accessible signage to 5% of the total number of Electric Vehicle Charging Stations that are designated to serve the Group R-2 occupancies.

E124-21

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The proposal was disapproved as the committee felt that a lower limit should be permitted for small Group R-2 occupancies rather than always requiring electrical vehicle charging stations. Options discussed were where Type B units were required, or based on the total number of units. (Vote: 14-0)

E124-21

Individual Consideration Agenda

Public Comment 1:

IBC: 1107.2

Proponents: Marsha Mazz, representing United Spinal Association (mmazz@accessibility-services.com) requests As Modified by Public Comment

Modify as follows:

2021 International Building Code

1107.2 Electrical vehicle charging stations. Electrical vehicle charging stations shall comply with Sections 1107.2.1 and 1107.2.2.

~~**Exception**~~ **Exceptions:**

1. In Group R-2 occupancies, electrical vehicle charging stations only serving individually owned parking spaces or spaces that are assigned to dwelling units or sleeping units not required to be Accessible, Type A, or Type B units, are not required to comply with Sections 1107.2.1 and 1107.2.2.

2. Electrical vehicle charging stations provided to serve Group R-3 and R-4 occupancies are not required to comply with this section.

Commenter's Reason: As was proposed, this public comment removes the blanket Exception for providing accessible EV charging stations in Group R-2 occupancies. It replaces the exception for Group R-2 occupancies with a new, more limited, exception that is more consistent with the requirements of the ADA and the Federal Fair Housing Act. The new exception would apply only to parking spaces that are individually owned and where they are assigned to dwelling units that are not required to be Accessible units, Type A units, or Type B units.

Fair Housing Act Compliance: The HUD FHA design and construction requirements provide that if different types of parking spaces are provided, a sufficient number of each type must be made accessible. (See the (Fair Housing Act Design Manual at https://www.huduser.gov/portal/publications/destech/fairhousing.html, page 2.23). Although it is arguable that an EV charging station is not always also a parking space, when the amenity is provided for common use, the FHA requires it to be accessible.

ADA Compliance: The 2010 ADA Standards do not yet contain provisions for EV Charging Stations. However, the ADA is a civil rights law and, the Department of Justice ADA regulations would require that the EV charging stations be designed to be usable by individuals with disabilities if they are part of a public accommodation (title III) or located in facility that is subject to the regulations for state and local government facilities and programs (title II). Therefore, where EV charging stations are provided for public use, some charging stations must be accessible, regardless of where they are provided. There is no exception for Group R-2 occupancies.
Exception 2: Aside from the deletion of Group R-2 from the list in Exception 2 that was part of the original proposal, we made an editorial change to the format that ICC staff we consulted recommend. This change is also consistent with the format used in new Exception 1.

We believe this is a reasonable approach to a difficult subject and will give the ICC an opportunity to lead the way with this new technology and all the associated questions it raises. Please consider voting to disapprove the committee action and approve E124-21 as modified by this public comment.

Cost Impact: The net effect of the public comment and code change proposal will increase the cost of construction
There will be some increase in construction cost. However, this cost is offset by the decreased potential liability due to non-compliance with the ADA and the Fair Housing Act.

Public Comment# 2831

E130-21

Proposed Change as Submitted

Proponents: Mike Nugent, Chair, representing ICC Building Code Action Committee (bcac@iccsafe.org)

2021 International Building Code

1108.6.1 Group R-1. *Accessible units* and *Type B units* shall be provided in Group R-1 occupancies in accordance with Sections 1108.6.1.1 and 1108.6.1.2.

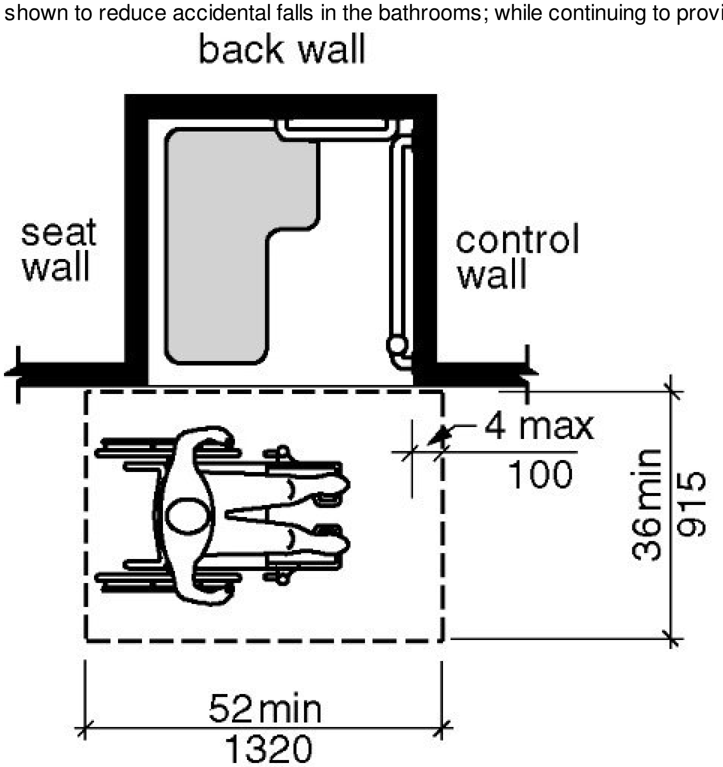
1108.6.1.1 Accessible units. *Accessible dwelling units* and *sleeping units* shall be provided in accordance with Table 1108.6.1.1. On a multiple-building site, where structures contain more than 50 *dwelling units* or *sleeping units*, the number of *Accessible units* shall be determined per structure. On a multiple-building site, where structures contain 50 or fewer *dwelling units* or *sleeping units*, all *dwelling units* and *sleeping units* on a site shall be considered to determine the total number of *Accessible units*. *Accessible units* shall be dispersed among the various classes of units.

Revise as follows:

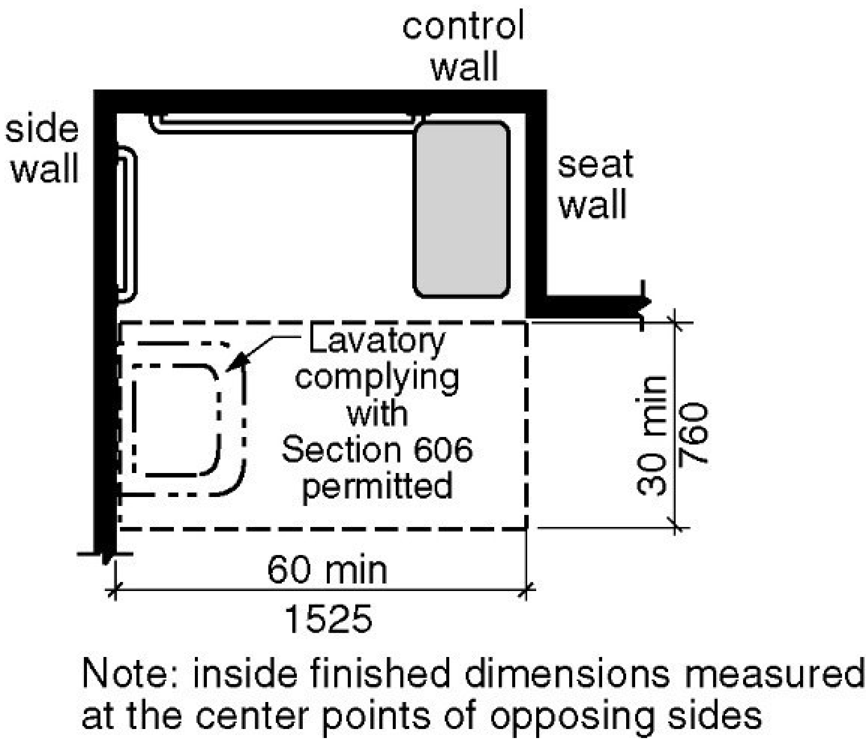
TABLE 1108.6.1.1 ACCESSIBLE DWELLING UNITS AND SLEEPING UNITS

TOTAL NUMBER OF UNITS PROVIDED	~~MINIMUM REQUIRED NUMBER OF ACCESSIBLE UNITS WITHOUT ROLL-IN SHOWERS~~	MINIMUM REQUIRED NUMBER OF ACCESSIBLE UNITS WITH ROLL-IN SHOWERS	TOTAL NUMBER OF REQUIRED ACCESSIBLE UNITS
1 to 25	~~1~~	0	1
26 to 50	~~2~~	0	2
51 to 75	~~3~~	1	4
76 to 100	~~4~~	1	5
101 to 150	~~5~~	2	7
151 to 200	~~6~~	2	8
201 to 300	~~7~~	3	10
301 to 400	~~8~~	4	12
401 to 500	~~9~~	4	13
501 to 1,000	~~2% of total~~	1% of total	3% of total
Over 1,000	~~20, plus 1 for each 100, or fraction thereof, over 1,000~~	10 plus 1 for each 100, or fraction thereof, over 1,000	30 plus 2 for each 100, or fraction thereof, over 1,000

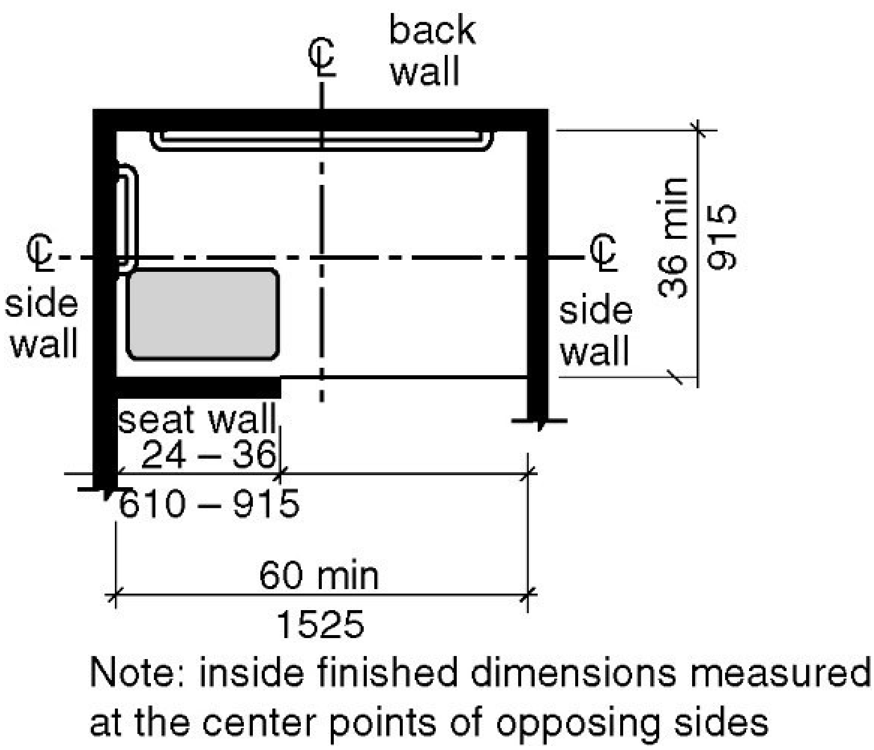
Reason: If a hotel has all showers, Table 1107.6.1.1 could be read to force bathtubs in Accessible rooms. What is the reasoning/justification for this? A roll-in shower with a seat is doing double duty as transfer and roll-in. The table was written originally with the intent to require at least some roll-in showers when hotels typically provided all bathtubs. Designs for bathrooms have changed. Providing showers instead of tubs has been shown to reduce accidental falls in the bathrooms; while continuing to provide accessible options.



Transfer shower



Roll-in shower (also serves as transfer shower)



Alternate roll-in shower (also serves as transfer shower)

This proposal is submitted by the ICC Building Code Action Committee (BCAC). BCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2020 the BCAC has held several virtual meetings open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the BCAC website at BCAC.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This would increase design options for hotels.

Staff Note: E130-21 and E131-21addresses requirements in a different or contradicting manner. The committee is urged to make their intentions clear with their actions on these proposals.

Public Hearing Results

Committee Action: **As Submitted**

Committee Reason: The proposal was approved as this will remove the misinterpretation that a hotel has to put in accessible tubs and could not choose to provide a higher level of accessibility and safety by providing all transfer and roll-in showers in the Accessible units. (Vote: 14-0)

Staff Analysis: E130-21 and E131-21addresses requirements in a different or contradicting manner. The committee is urged to make their intentions clear with their actions on these proposals.

E130-21

Individual Consideration Agenda

Public Comment 1:

Proponents: Gene Boecker, representing Code Consultants, Inc. (geneb@codeconsultants.com) requests Disapprove

Commenter's Reason: The building code action committee got this one wrong as did the hearing committee. This is a provision that is already in the federal ADA Standards. The table looks very much like the one in the IBC:

Table 224.2 Guest Rooms with Mobility Features

Total Number of Guest Rooms Provided	Minimum Number of Required Rooms Without Roll-in Showers	Minimum Number of Required Rooms With Roll-in Showers	Total Number of Required Rooms
1 to 25	1	0	1
26 to 50	2	0	2
51 to 75	3	1	4
76 to 100	4	1	5
101 to 150	5	2	7
151 to 200	6	2	8
201 to 300	7	3	10
301 to 400	8	4	12
401 to 500	9	4	13
501 to 1000	2 percent of total	1 percent of total	3 percent of total
1001 and over	20, plus 1 for each 100, or fraction thereof, over 1000	10, plus 1 for each 100, or fraction thereof, over 1000	30, plus 2 for each 100, or fraction thereof, over 1000

The proposal asked a rhetorical question regarding what the reasoning/justification was for requiring bathtubs. It also made an incorrect statement and equating a roll-in shower with a transfer shower. It is clear that neither the BCPC nor the hearing committee investigated this or contacted the US Access Board for direction. Bathtubs are better when an adult is assisting in bathing a disabled child. Additionally, some adults prefer a bathtub if they can accomplish the transfer because they can use the shower wand and adjust the distance to it by placing the seat where desired.

By trying to eliminate non-roll-in showers (standards roll-in and alternate roll-in) the IBC would be out of step with federal law and once again allow construction that is in violation of the Americans with Disabilities Act. An non-roll-in bathing fixture can be either a bathtub or a transfer shower. This was another misleading statement in the proposal. They are not similar. A roll-in shower is used by individuals who cannot likely stand. A non-roll-in fixture can be used by either transfer or by standing. Some people with disabilities can stand but use a mobility device because standing is difficult.

I urge the membership to vote to overturn the committee. Do not place out code in conflict with federal law.

Bibliography: 2010 ADA Standards for Accessible Design

Cost Impact: The net effect of the public comment and code change proposal will not increase or decrease the cost of construction
No change to code.

Public Comment# 2734

Public Comment 2:

Proponents: Marsha Mazz, representing United Spinal Association (mmazz@accessibility-services.com) requests Disapprove

Commenter's Reason: The committee erred in approving this proposal. They stated that the change would "remove the misinterpretation that a hotel has to put in accessible tubs and could not choose to exceed requirements and provide all roll-in showers".
The current code does not "misinterpret" Section 224.2 of the 2010 ADA Standards. The ADA Standards do require that either a bathtub or transfer shower be provided in the number of rooms not required to provide a roll-in shower. This proposal allows hotels to elect to provide roll-in showers in all accessible guest rooms, and no bathtubs or transfer showers regardless of what type of bathing facilities are provided in inaccessible guest rooms. It removes the choice of type of accessible bathing fixtures for people with disabilities in any hotel where the designer elects to exercise the (now permitted) option to increase the number of roll-in showers provided and decrease, even to the point where there are none, the number of bathtubs or transfer showers.

In their rationale, the proponents make several statements to which we wish to respond:

- *A roll-in shower with a seat is doing double duty as transfer and roll-in.* Response: A roll-in shower differs significantly from a transfer shower. One of the main differences is that a person using a shower wheelchair cannot remain in the wheelchair while showering because it will not fit into the shower. The ability to remain in the wheelchair allows people whose disabilities affect their balance greater safety by avoiding a transfer and avoiding a seat that is not tailored to their disability needs. The additional space in a roll-in shower with a seat can present challenges to people who need to brace themselves against the opposite wall for stability.
- *The table was written originally with the intent to require at least some roll-in showers when hotels typically provided all bathtubs.* Response: The Table comes directly from the 2004 ADAAG which only editorially revised the original 1991 ADA requirements. While originally written to ensure that some roll-in showers would be available, this was because bathtubs were the primary option offered in hotels constructed at that time. Even in 1991, however, the Access Board recognized the value of providing bathing options for people with disabilities. In the history of the IBC, proposals to conform to the requirements of the ADA have unambiguously made clear why both the ADAAG and the IBC contain requirements for roll-in showers as well as bathtubs or transfer showers. The reason statement for Proposal E 176-06/07 states in part: *"This change also meets the intent of the Americans with Disabilities Act Accessibility Guidelines (ADAAG) Section 9.1.4 (1) which requires these facilities to offer persons with disabilities a range of options equivalent to those available to other persons served by the facility. Finally, the modified table is identical to the ADA Draft, "Table 224.2 Guest Rooms with Mobility Features". This draft, published July 23, 2004 awaits final approval from the Department of Justice. The current IBC Table 1107.6.1.1 uses the term "MINIMUM" when referring to the number of rooms associated with roll-in showers. Minimums can always be surpassed, thus allowing roll-in showers to be incorporated in all the accessible units. Some design professionals and hotel chains have done just that, in the belief that roll-in showers were favored by the disabled population. Nothing could be further from the truth. CHOICE and options equivalent to those available without disabilities is the basic premise found in the ADA. Roll-in showers were never intended to replace transfer showers or tubs in accessible rooms. Once again, this is made clear under 9.1.4 (1) of ADA Title III."* This issue was not misconstrued then in 2006/2007 and it should be a simple matter of checking the record. (Please see our bibliography for the cod action referenced here.)
- *Designs for bathrooms have changed. Providing showers instead of tubs has been shown to reduce accidental falls in the bathrooms; while continuing to provide accessible options.* Response: Generally, we agree with this statement although we are unaware of any supporting data using subjects with a variety of disabilities. We believe it should be possible for a hotel to only offer showers, not shower/tubs, in the interest of greater safety. Proposal E-131 would do this.

Proposal E131-21 would have allowed the option to provide all roll-in showers *only* when all guest rooms in the hotel only have showers. While still in conflict with the 2010 ADA Standards, E 131-21 is much narrower in scope than E130-21 and is more consistent with the intent of the 2010 ADA Standards, which is to afford people with disabilities choices of bathing options when others in the same hotel have options.

Please review the reason statement for our public comment supporting approval as submitted for E131-21 and consider disapproving this proposal in favor of E131-21.

Bibliography: See Proposal E176–06/07 Table 1107.6.1.1 at https://www.iccsafe.org/cs/codes/Documents/2006-07cycle/ProposedChanges/volume_1/17-E87-E191.pdf. This proposal was approved as modified. The modification was primarily editorial striking the word "associated" in the column heading reading "MINIMUM REQUIRED NUMBER OF ACCESSIBLE UNITS ASSOCIATED WITH ROLL-IN SHOWERS". The public hearing results can be found at https://www.iccsafe.org/cs/codes/Documents/2006-07cycle/ROH/IBC-MOE.pdf and the

final action results are at https://www.iccsafe.org/cs/codes/Documents/2006-07cycle/ROH/ROH-final.pdf.

Cost Impact: The net effect of the public comment and code change proposal will not increase or decrease the cost of construction
We believe that the proponent's cost statement in Proposal E-130 that "[t]he code change proposal will not increase or decrease the cost of construction" is inaccurate. If approved as submitted, this code change could have profound cost impacts as it fails to match ADA requirements by allowing only roll-in showers to be provided in *all* hotels, including those that provide other bathing options for people who do not require accessible features. If the Federal 2010 ADA Standards are enforced as written, this section would potentially result in costly retrofits

Public Comment# 2598

E131-21

Proposed Change as Submitted

Proponents: Marsha Mazz, Director Accessibility Codes and Standards, United Spinal Association, Accessibility Services, representing United Spinal Association (mmazz@accessibility-services.com); Doug Anderson, representing American Hotel and Lodging Association (danderson@lcmarchitects.com); Gene Boecker, representing Code Consultants, Inc. (geneb@codeconsultants.com)

2021 International Building Code

Revise as follows:

1108.6.1.1 Accessible units. *Accessible dwelling units* and *sleeping units* shall be provided in accordance with Table 1108.6.1.1. On a multiple-building site, where structures contain more than 50 *dwelling units* or *sleeping units*, the number of *Accessible units* shall be determined per structure. On a multiple-building site, where structures contain 50 or fewer *dwelling units* or *sleeping units*, all *dwelling units* and *sleeping units* on a site shall be considered to determine the total number of *Accessible units*. *Accessible units* shall be dispersed among the various classes of units.

> **Exception.** Where all dwelling units and sleeping units contain showers and none contain bath tubs, the total number of required Accessible units specified by Table 1108.6.1.1 shall be permitted to provide standard or alternate roll-in type showers with seats.

Reason: A trend in hotel design is to provide showers and not bathtubs. Although the 2010 ADA Standards require some of the dwelling or sleeping units to have either tubs or transfer showers, the requirement was written in 2004 when this practice was not evident and, in some locations, tubs were required in all units. For most people with disabilities, a roll-in shower with a seat is more accessible than an accessible bathtub or transfer shower. The justification for requiring accessible bathtubs was that some people prefer them and, since other guests have a tub option, people with disabilities should also have that option. However, where the option of a tub instead of a shower is not available to anyone, parity is not at issue and does not make sense.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The exception provides a choice. Depending on the design, applying the exception could result in a decrease in cost because it will minimize the need to design and construct different types of accessible bathrooms.

Staff Note: E130-21 and E131-21addresses requirements in a different or contradicting manner. The committee is urged to make their intentions clear with their actions on these proposals.

E131-21

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The proposal was disapproved as the committee preferred E130-21. This option would only be available if there were no tubs in the entire hotel - including rooms with both a tub and shower. The language does not allow the option for transfer showers. (Vote: 14-0)

Staff Analysis: E130-21 and E131-21addresses requirements in a different or contradicting manner. The committee is urged to make their intentions clear with their actions on these proposals.

E131-21

Individual Consideration Agenda

Public Comment 1:

IBC: 1108.6.1.1

Proponents: Marsha Mazz, representing United Spinal Association (mmazz@accessibility-services.com); Gene Boecker, representing Code Consultants, Inc. (geneb@codeconsultants.com) requests As Modified by Public Comment

Modify as follows:

2021 International Building Code

1108.6.1.1 Accessible units . *Accessible dwelling units* and *sleeping units* shall be provided in accordance with Table 1108.6.1.1. On a multiple-building site, where structures contain more than 50 *dwelling units* or *sleeping units*, the number of *Accessible units* shall be determined per structure. On a multiple-building site, where structures contain 50 or fewer *dwelling units* or *sleeping units*, all *dwelling units* and *sleeping units* on a site shall be considered to determine the total number of *Accessible units*. *Accessible units* shall be dispersed among the various classes of units.

~~Exception~~ Exceptions:

1. Where all dwelling units and sleeping units contain showers and none contain bath tubs, the total number of required Accessible units specified by Table 1108.6.1.1 shall be permitted to provide standard or alternate roll-in type showers with seats.
2. Where Exception 1 to Section 1108.6.1.1 is applicable, transfer showers shall be permitted to be substituted for all but the minimum required number of roll-in showers.

Commenter's Reason: We believe that the Committee erred by disapproving this proposal in favor of E130-21. The Committee's own reason for disapproval is why this proposal should be approved as it more closely follows the 2010 ADA Standards. Committee reasons and responses follow:

- *This option would only be available if there were no tubs in the entire hotel - including rooms with both a tub and shower.* Response: That is correct. This proposal respects the principle of parody reflected in the 1991 and 2010 ADA Standards i.e., where people without disabilities do not have a range of choices in bathing fixtures, people with disabilities are not guaranteed a choice.
- *The language does not allow the option for transfer showers.* Response: Our modification adds an option for transfer showers in hotels without bathtubs. However, it does not replace the requirement for a minimum number of roll-in showers, therefore maintaining consistency with the requirement for some roll-in showers in the 2010 ADA Standards.

Cost Impact: The net effect of the public comment and code change proposal will increase the cost of construction
Like E130-21, this proposal is not in full and strict compliance with the 2010 ADA Standards. However, unlike E 130-21, this proposal limits exposure to ADA law suits by maintaining consistency with the principle of equal treatment which is at the heart of the ADA. Nonetheless, there is a potential that the change could result in a requirement to retrofit some of the dwelling unit bathrooms.

Public Comment# 2630

E132-21

Proposed Change as Submitted

Proponents: Gene Boecker, representing Code Consultants, Inc. (geneb@codeconsultants.com); Marsha Mazz, representing United Spinal Association (mmazz@accessibility-services.com); Matt Lescher, representing Code Consultants, Inc. (mattl@codeconsultants.com)

2021 International Building Code

Revise as follows:

1108.6.2.2.1 Type A units. In Group R-2 occupancies containing more than 20 *dwelling units* or *sleeping units*, at least ~~2~~ 5 percent but not less than one of the units shall be a *Type A unit*. All Group R-2 units on a site shall be considered to determine the total number of units and the required number of *Type A units*. *Type A units* shall be dispersed among the various classes of units.

Exceptions:

1. The number of *Type A units* is permitted to be reduced in accordance with Section 1108.7.
2. *Existing structures* on a site shall not contribute to the total number of units on a site.

Reason: Section 504 of the Rehabilitation Act of 1973 is a federal law, codified at 29 U.S.C. § 794, that prohibits discrimination on the basis of disability in federally-assisted programs or activities. Federal assistance can come in different forms. It may be directly given from the US Department of Housing and Urban Development (HUD). It can also be given through state and local organizations that received HUD moneys and pass that on to applicants. In so doing, they are required to pass along the requirement for compliance with Section 504.
The United States Department of Agriculture (USDA) also has the 5 percent provisions under its Section 504 regulations, which may have more housing that HUD. Every state and local government housing must comply with Title II provisions of the ADA which also have the 5 percent criteria. Additionally, the Architectural Barriers Act (ABA) requires federally owned housing (such as military housing on-base) and housing constructed with federal monies to have the same 5 percent provisions.

Within the pages of the law is the requirement that a number of units meet higher levels of accessibility. These units must comply with either the provisions of the Uniform Federal Accessibility Standards (UFAS) or the 2010 ADA Standards for Accessible Design (2010 Standards). Both contain specific provision that are essentially the same as those for Type A units in the ICC A117.1 standard. However, whereas the IBC requires 2 percent to comply with this level of accessibility, both the federal standards (UFAS and 2010 Standards) require that number to be 5 percent. This proposal would align the IBC provisions with that of HUD for federally assisted projects.

While it is true that not all residential developments are provided with federal assistance, it is also true that the federal government, through HUD, has determined that it is discriminatory to provide fewer than 5 percent of the dwelling units with this higher level of accessibility. Notable exceptions exist. The District of Columbia requires the number of Type A units to be 15 percent. The city of Phoenix requires 6 percent to be Type A units where those dwelling units are located within a close proximity to a light rail station. The state of Washington requires 5 percent; the same as HUD. Illinois and Chicago require 20 percent in certain conditions. The City of New York has incorporated numerous Type A provisions into what they refer to as “B+” units and require those provisions to be applicable to 100 percent of the dwelling units. The state of New Jersey has effectively eliminated Type B units and required all new construction to be Type A.

The United States Department of Agriculture (USDA) also has the 5 percent provisions under its Section 504 regulations, which may have more housing that HUD. Every state and local government housing must comply with Title II provisions of the ADA which also have the 5 percent criteria. Additionally, the Architectural Barriers Act (ABA) requires federally owned housing (such as military housing on-base) and housing constructed with federal monies to have the same 5 percent provisions.

It is time that the ICC recognize the need for increasing the percentage of Type A units as other jurisdictions and multiple federal departments and agencies have already done.

Bibliography: 29 U.S.C. § 794 - Rehabilitation Act of 1973

Cost Impact: The code change proposal will increase the cost of construction
By changing the number of Type A units from two percent to five percent, the difference in cost will be associated with the difference in cost between a Type B unit and a Type A unit. A hard number cannot be determined since the difference is a factor of the overall design concept, any differences in materials and any reconfiguration of layouts. In some instances there will be a definable cost. In some instances there may not be any increase in cost due to the materials and space configuration.

E132-21

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: This proposal was disapproved. The base code does not need to be aligned with federal funding requirements. If this information in needed, it should be in Appendix E and limited to funded projects. An increase in the number of Accessible units has been addressed in the code in assisted living facilities or will be served by market demand. (Vote: 10-4)

E132-21

Individual Consideration Agenda

Public Comment 1:

Proponents: Gene Boecker, representing Code Consultants, Inc. (geneb@codeconsultants.com); Marsha Mazz, representing United Spinal Association (mmazz@accessibility-services.com); Gina Hilberry, representing United Cerebral Palsy (gina@cohenhilberry.com) requests As Submitted

Commenter's Reason: Some on the committee misunderstood the proposal, thinking that it was an attempt to change the code to meet a narrow federal funding situation. Instead, reading the supporting statement shows that it is not only federally funded projects that are addressed. Many funding sources besides the federal government apply these same provisions. And, many municipal jurisdictions have amended the code to include higher percentages of Type A units. The state of New Jersey requires ALL dwelling units to be Type A. The District of Columbia requires 15%. The state of Washington requires 5%. The list is not comprehensive and some jurisdictions have narrow modifications like Phoenix where they require 6% of units to be Type A where located close to the metro rail stops. Also, in St. Louis, Type A units are required where there are 12 or more dwelling units. It isn't a federal issue. More and more jurisdictions are amending the code to up the number of Type A units. The code should be proactive in this case.
The committee also noted that the number of accessible units has been addressed by the number of assisted living units in the code. Many people do not want to move from their community to find assisted living. Ask yourself if you'd prefer to move to an assisted living facility instead of living in your current apartment or moving to a different apartment in the same facility. Why should we be making it harder for people to find suitable housing?

Cost Impact: The net effect of the public comment and code change proposal will increase the cost of construction
As noted in the original proposal the cost will increase the number of Type A units which "could" increase costs. Of course in the places noted above, there would be not increase in cost at all.

Public Comment# 2694

E138-21

Proposed Change as Submitted

Proponents: Marsha Mazz, Director Accessibility Codes and Standards, United Spinal Association, Accessibility Services, representing United Spinal Association (mmazz@accessibility-services.com); Gene H Boecker, Code Consultants, Inc., representing Code Consultants, Inc. (geneb@codeconsultants.com); Matt Lescher, Code Consultants, Inc., representing Code Consultants, Inc. (mattl@codeconsultants.com); Gina Hilberry, UCP, representing United Cerebral Palsy (gina@cohenhilberry.com)

2021 International Building Code

Revise as follows:

1109.2.9.1 Dining surfaces. ~~Where dining~~ Dining surfaces provided for the consumption of food or drink ~~are provided, at least 5 percent, but not less than one, of the dining surfaces for the seating and standing spaces shall be *accessible*~~ shall comply with Section 1110.12. ~~and be distributed throughout the facility and located on a level accessed by an *accessible route*.~~

1110.12 Seating at tables, counters, bars, and work surfaces. Where ~~seating or standing space at~~ fixed , ~~or~~ built-in , or movable tables~~, counters or work surfaces is~~ are provided for the consumption of food or drink ~~in *accessible* spaces~~ , at least 5 percent , but not less than one of the seating and standing spaces at such tables ~~but not less than one,~~ shall be *accessible*. Where fixed or built-in counters or bars are provided for the consumption of food or drink, or fixed or built-in work surface are provided, at least 5 percent, but not less than one, of the seating and standing spaces at such counters, bars, and work surfaces shall be accessible.

Exception: Check-writing surfaces at check-out aisles not required to comply with Section 1110.13.1 are not required to be *accessible*.

1110.12.1 Dispersion. *Accessible* ~~fixed or built-in~~ seating at tables, counters, bars, or work surfaces shall be distributed among similar elements located throughout the space or facility containing such elements and , shall be located on a level accessed by an *accessible route*.

Add new text as follows:

1110.12.2 Semi-ambulatory seating. .
Where seating is provided at tables for the consumption of food or drink, at least 25 percent of the tables in any indoor or outdoor room or space shall be tables not exceeding 34 inches in height above the floor.

Reason: The revision to Section 1109.1 simplifies the code by reducing potential confusion. Why are there two nearly identical sections addressing standing and seating spaces at tables (one for assembly spaces and another for everything else)? This proposal simply cross references the main section for tables in this section as they both require 5% of seating to be accessible; dispersion within the space; and location on levels served by accessible routes. The requirements for dispersion in 1012.1 is slightly more specific regarding dispersion of accessible tables “among similar elements” in the facility.
This proposal contains two major parts: first, Section 1110.12 would apply the scoping to both fixed and movable tables that are provided for the consumption of food or drink. New Section 1110.12.2 would ensure that seating that is at an appropriate height for persons who are semi-ambulatory is provided in addition to the wheelchair spaces.

Applying scoping to movable tables: The Department of Justice (DOJ) Americans with Disabilities Act (ADA) regulations prohibit discrimination on the basis of disability in all services, programs, and activities offered by public entities and in the operation of privately owned places of public accommodation. According to the DOJ in an Advance Notice of Proposed Rulemaking *Nondiscrimination on the Basis of Disability by State and Local Governments and Places of Public Accommodation; Equipment and Furniture* published in the Federal Register in 2010 : "The provision of accessible equipment and furniture has always been required by the ADA and the Department's implementing regulations under the program accessibility, reasonable modification, auxiliary aids and services, and barrier removal requirements". (75 FR 43452 at https://www.ada.gov/anprm2010/equipment_anprm_2010.htm).Strictly speaking, the ADA Standards apply to the built environment only. However, DOJ suggests that in many cases, the ADA Standards should be applied to furniture: "To the extent that ADA standards apply requirements for fixed equipment and furniture, the Department will look to those standards for guidance on accessibility standards for equipment and furniture that are not fixed". (75 FR 43454). Although the Department later withdrew the proposed rule because of the complexities, wide ranging scope of coverage, and enormous undertaking involved with developing new scoping and technical criteria for many of the types of equipment, the Department still maintains that movable equipment and furniture must be accessible to and usable by individuals with disabilities. Normally, we would not seek to apply the code and its referenced accessibility standard to furniture. However, the IBC already contains scoping and technical requirements for fixed tables consistent with the 2010 ADA Standards. As such, these requirements can easily be applied to similar movable elements without requiring additional training for their review and inspection. Furthermore, furniture plans are already subject to review for most occupancies with tables used for the consumption of food or drink. Without better coordination between the IBC and ADA, restaurants, bars, and other similar facilities will continue to be at risk of a lawsuit. Please note that we do not propose to make this change for counters, bars, and workstations.

New provision for semi-ambulatory seating: Maintaining a more balanced mix of high and low tables will allow persons who may, because of age or disability move with difficulty, but who do not require the use of wheelchairs. Such individuals could be little people or individuals who may use canes, crutches, or walkers and be unable to climb up or down from seats at high tables. Currently, high tables are often used for all seating except for the wheelchair seating. Semi-ambulatory individuals, therefore must compete with wheelchair users for the few tables that are not high in order to be safely and comfortably seated. Because such individuals do not require knee and toe space for a wheelchair, the only factor that needs to be controlled is the height of the table.

Cost Impact: The code change proposal will increase the cost of construction
The impact should be minimal because the Department of Justice Americans with Disabilities Act (ADA) regulations already requires non-fixed elements to be accessible in order to avoid discrimination on the basis of disability. Also, DOJ regulations prohibit discrimination on the basis that an individual must use a mobility device, such as canes, crutches, and walkers.

E138-21

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: This proposal was disapproved for several reasons. The new term 'semi-ambulatory seating' is confusing. There was no justification for the 25% of the tables to have a different level of access in addition to the accessible tables. The proposal adds type of seating as a requirement - so how would someone interpret a 'similar element'. Dining surface requirements should stay in Section 1109. A requirement for 5% of fixed seating and 5% of loose seating does not improve accessibility. The proposed language has removed the requirements for work surfaces in other occupancies. What happens when a facility changes furniture or adds tables? (Vote: 12-2)

E138-21

Individual Consideration Agenda

Public Comment 1:

IBC: 1110.12, 1110.12.1, 1110.12.2

Proponents: Gene Boecker, representing Code Consultants, Inc. (geneb@codeconsultants.com) requests As Modified by Public Comment

Modify as follows:

2021 International Building Code

1109.2.9.1 Dining surfaces . Dining surfaces provided for the consumption of food or drink shall comply with Section 1110.12.

1110.12 Seating at tables, counters, bars, and work surfaces . Where fixed, built-in, or movable tables are provided for the consumption of food or drink , at least 5 percent, but not less than one of the seating and standing spaces at such tables shall be *accessible*. Where fixed or built-in counters or bars are provided for ~~the consumption of food or drink, or fixed or built-in~~ work surfac~~e are provided~~, at least 5 percent, but not less than one, of the seating and standing spaces at such ~~counters, bars, and~~ work surfaces shall be accessible.

Exception: Check-writing surfaces at check-out aisles not required to comply with Section 1110.13.1 are not required to be *accessible*.

1110.12.1 Dispersion . *Accessible* ~~seating at~~ tables, counters, bars, or work surfaces shall be distributed among similar elements located throughout the space or facility containing such elements and, shall be located on a level accessed by an *accessible route*.

~~**1110.12.2 Semi-ambulatory seating.** . Where seating is provided at tables for the consumption of food or drink, at least 25 percent of the tables in any indoor or outdoor room or space shall be tables not exceeding 34 inches in height above the floor.~~

Commenter's Reason: To address the committees concerns the proposal relative to semi-ambulatory seating is not being moved forward. It is understood that the concept is confusing and this might not be the best means to address the issue. So, it is proposed to be deleted as part of the public comment. The changes to Section 1110.12 are editorial, dealing with formatting in the original proposal, with one exception. The second sentence clears up some language regarding work surfaces to make it clearer that it's dealing with work surfaces.
The original proposal adds movable (loose) furniture. Contrary to what was said at during committee deliberation, the AHJ already has loose furniture in its purview and is already responsible to review loose furniture in dining areas. Section 1030.13.1 is all about seating at tables and the

needs to create adequate width for aisles and aisle accessways. So, the review of these elements is already a requirement. Because the US Department of Justice views loose dining surfaces that same as fixed dining surfaces, it is important that both be looked at for accessibility compliance.

The original proposal adds "types of seating" was noted. This is true. Again, although the ADA Standards do not address this, the US DOJ does in it's case law under the "spirit and intent" of the law. It is viewed as discriminatory to limit a person to sitting at the bar and not at a table, regardless of whether it is fixed, built-in, or loose. The language was intended to mainstream the provisions to avoid potential legal conflicts in the future.

The committee also mentioned that the provisions for work surfaces was being deleted. That was also a misunderstanding. The first sentence in Section 1110.12 addresses dining surfaces and the second sentence addresses work surfaces. The public comment proposes a clean up in the text to help clarify this.

A question was asked about what happens when a facility changes furniture or adds tables. The answer is the same for this section as it is for Section 1030.13.1. Specifically, if the alteration is significant and requires a permit, the seating must be reviewed. If the change is small enough that a permit isn't required, the facility ownership is responsible for any alterations. This is not an issue.

Finally, the proposal is only trying to streamline the code since the requirement for dining surfaces is practically identical to that for work surfaces. And, the proposal is seeking to include language that will assist in proactively addressing concerns associated with discrimination based on disability.

Bibliography: For the group, a quick search of the DOJ's website, ADA.gov, indicates a number of case laws that address this issue of fixed and loose furnishings as well as dispersion.
They are:

US v Golden Greek Restauranthttps://www.ada.gov/golden_greek_sa.html

US v Harrisburg Millworkshttps://www.ada.gov/harrisburg_millworks_sa.pdf

US v Il Pomod'Oro Restaurant and Pizzeriahttps://www.ada.gov/il_pomodoro_restaurant_sa.html

US v H&A Group (Market Kitchen and Bar)https://www.ada.gov/market_place_sa.html

And the two famous cases:
US v Mrs. K's Toll House Restaurant https://www.ada.gov/mrs_k_sa.htm
US v OPUS 465 and Tresca https://www.ada.gov/opus465_sa.htm

Cost Impact: The net effect of the public comment and code change proposal will increase the cost of construction
Keeping with the intent of the original proposal, any costs would be minimal.

Public Comment# 2704

Public Comment 2:

IBC: 1110.12, 1110.12.1, 1110.12.2

Proponents: Marsha Mazz, representing United Spinal Association (mmazz@accessibility-services.com); Gina Hilberry, representing United Cerebral Palsy (gina@cohenhilberry.com) requests As Modified by Public Comment

Replace as follows:

2021 International Building Code

1110.12 Seating <u>and standing spaces</u> at <u>dining surfaces</u> ~~tables, counters~~ and work surfaces. . Where seating or standing space <u>is provided</u> at ~~fixed or built-in tables, counters~~ <u>dining surfaces</u> or work surfaces ~~is provided~~in accessible spaces, ~~at least 5 percent of the~~ <u>such</u> seating and standing spaces~~, but not less than one,~~ shall be *accessible* <u>and shall comply with Sections 1110.12.1 through 1110.12.3</u>.

~~**Exception:** Check-writing surfaces at check-out aisles not required to comply with Section 1110.13.1 are not required to be *accessible.*~~

<u>1110.12.1</u> <u>Dining Surfaces</u> . <u>At least 5 percent of the seating and standing space provided at fixed, built-in, and moveable dining surfaces shall be accessible.</u>

<u>1110.12.2</u> <u>Work Surfaces</u> . <u>At least 5 percent of the seating and standing spaces at fixed or built-in work surfaces shall be accessible.</u>

Exception: Check-writing surfaces at check-out aisles not required to comply with Section 1110.14.1 are not required to be *accessible.*

~~**1110.12.1**~~ **1110.12.3 Dispersion .** *Accessible* ~~fixed or built-in~~ seating and standing spaces at ~~tables, counters or~~ dining and work surfaces shall be distributed throughout the space or facility containing such elements and shall be located on a level accessed by an *accessible route*.

~~**1110.12.2**~~ **1110.13 Visiting areas .** Visiting areas in judicial facilities and Group I-3 shall comply with Sections ~~1110.12.2.1~~ 1110.13.1 and ~~1110.12.2.2~~ 1110.13.2.

~~**1110.12.2.1**~~ **1110.13.1 Cubicles and counters .** At least 5 percent, but not less than one of the cubicles, shall be *accessible* on both the visitor and detainee sides. Where counters are provided, at least one shall be *accessible* on both the visitor and detainee sides.

Exception: This requirement shall not apply to the detainee side of cubicles or counters at noncontact visiting areas not serving *Accessible unit* holding *cells*.

~~**1110.12.2.2**~~ **1110.13.2 Partitions .** Where solid partitions or security glazing separate visitors from detainees, at least one of each type of cubicle or counter partition shall be *accessible*.

Commenter's Reason: This public comment improves the original proposal by:

1. Dropping the proposed changes to Section 1109.2.9.1 which only apply to assembly areas with fixed seating.
2. Dropping the proposed requirement for semi-ambulatory seating.
3. Reformatting Section 1110.12 by adding new subsections 1110.12.2.1 and 1110.12.2.2. One addresses dining surfaces and the other addresses work surfaces.
4. References to "tables" and "counters" in current Section 1110.12.2 are replaced by the term "dining surfaces" which is the term used in current Section 1109.2.9.1. It really doesn't matter whether you are enjoying a meal or a drink at a table or a counter. Furthermore, the term "counter" is often confused with "service counter" and "bar". This change avoids the need to make that distinction.
5. Current code Section 1110.12.2 Visiting areas is unchanged. However, it is removed from Section 1110.12 and renumbered to be a separate Section 1110.13. Like Section 1112.13 *Service facilities*, this section contains provisions unrelated to dining and work surfaces, such as the requirement for partitions separating visitors to be accessible.

The proposed 5% scoping is retained for fixed, built-in, **and moveable** dining surfaces. Moveable work surfaces would not be counted. Please see the reason statement in the original proposal for the justification for applying the scoping to moveable dining surfaces.

Bibliography: For the group, a quick search of the DOJ’s website, ADA.gov, indicates a number of case laws that address this issue of fixed and loose furnishings as well as dispersion.
They are:

US v Golden Greek Restauranthttps://www.ada.gov/golden_greek_sa.html

US v Harrisburg Millworkshttps://www.ada.gov/harrisburg_millworks_sa.pdf

US v Il Pomod’Oro Restaurant and Pizzeriahttps://www.ada.gov/il_pomodoro_restaurant_sa.html

US v H&A Group (Market Kitchen and Bar)https://www.ada.gov/market_place_sa.html

And the two famous cases:
US v Mrs. K’s Toll House Restaurant https://www.ada.gov/mrs_k_sa.htm
US v OPUS 465 and Tresca https://www.ada.gov/opus465_sa.htm

Cost Impact: The net effect of the public comment and code change proposal will increase the cost of construction
The impact should be minimal because the Department of Justice Americans with Disabilities Act (ADA) regulations already requires non-fixed elements to be accessible in order to avoid discrimination on the basis of disability.

Public Comment# 2837

E139-21

Proposed Change as Submitted

Proponents: Marsha Mazz, representing United Spinal Association (mmazz@accessibility-services.com); Gene Boecker, representing Code Consultants, Inc. (geneb@codeconsultants.com)

2021 International Building Code

Revise as follows:

1110.2 Toilet and bathing facilities. Each toilet room and bathing room shall be *accessible*. Where a floor level is not required to be connected by an *accessible route*, the only toilet rooms or bathing rooms provided within the facility shall not be located on the inaccessible floor. Except as provided for in Sections 1110.2.4 and 1110.2.5, at least one of each type of fixture, element, control or dispenser in each accessible toilet room and bathing room shall be *accessible*.

Exceptions:

1. Toilet rooms or bathing rooms accessed only through a private office, not for *common* or *public use* and intended for use by a single occupant, shall be permitted to comply with the specific exceptions in ICC A117.1.
2. This section is not applicable to toilet and bathing rooms that serve *dwelling units* or *sleeping units* that are not required to be *accessible* by Section 1108 <u>provided that such toilet or bathing rooms are not for public use</u>.
3. Where multiple single-user toilet rooms or bathing rooms are clustered at a single location, at least 50 percent but not less than one room for each use at each cluster shall be *accessible*.
4. Where no more than one urinal is provided in a toilet room or bathing room, the urinal is not required to be *accessible*.
5. Toilet rooms or bathing rooms that are part of critical care or intensive care patient sleeping rooms serving *Accessible units* are not required to be *accessible*.
6. Toilet rooms or bathing rooms designed for bariatrics patients are not required to comply with the toilet room and bathing room requirement in ICC A117.1. The *sleeping units* served by bariatrics toilet or bathing rooms shall not count toward the required number of Accessible *sleeping units*.
7. Where permitted in Section 1108, in toilet rooms or bathrooms serving Accessible units, water closets designed for assisted toileting shall comply with Section 1110.2.2.
8. Where permitted in Section 1108, in bathrooms serving Accessible units, showers designed for assisted bathing shall comply with Section 1110.2.3.
9. Where toilet facilities are primarily for children's use, required *accessible* water closets, toilet compartments and lavatories shall be permitted to comply with children's provision of ICC A117.1.

Reason: This proposal clarifies that toilet and bathing rooms that do not serve dwelling units or sleeping units that are required to be accessible by Section 1108 , but that are also open to the public such as those in a lobby area, must still be accessible.

Cost Impact: The code change proposal will increase the cost of construction
This proposal will increase costs where an Accessible or Type A unit is required by the code, but not required to comply with Federal laws such as the ADA the Architectural Barriers Act, or Section 504 of the Rehabilitation Act of 1973. However, the cost of remediation is very high.

E139-21

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: The proposal was disapproved because the term 'public use' is confusing and could be interpreted incorrectly - such as would this apply inside a unit? (Vote: 12-2)

E139-21

Individual Consideration Agenda

Public Comment 1:

IBC: 1110.2

Proponents: Gene Boecker, representing Code Consultants, Inc. (geneb@codeconsultants.com) requests As Modified by Public Comment

Modify as follows:

2021 International Building Code

1110.2 Toilet and bathing facilities . Each toilet room and bathing room shall be *accessible*. Where a floor level is not required to be connected by an *accessible route*, the only toilet rooms or bathing rooms provided within the facility shall not be located on the inaccessible floor. Except as provided for in Sections 1110.2.4 and 1110.2.5, at least one of each type of fixture, element, control or dispenser in each accessible toilet room and bathing room shall be *accessible*.

Exceptions:

1. Toilet rooms or bathing rooms accessed only through a private office, not for *common* or *public use* and intended for use by a single occupant, shall be permitted to comply with the specific exceptions in ICC A117.1.
2. This section is not applicable to toilet and bathing rooms ~~that serve~~ located within *dwelling units* or *sleeping units* that are not required to be *accessible* by Section 1108 . ~~, provided that such toilet or bathing rooms are not for public use.~~
3. Where multiple single-user toilet rooms or bathing rooms are clustered at a single location, at least 50 percent but not less than one room for each use at each cluster shall be *accessible*.
4. Where no more than one urinal is provided in a toilet room or bathing room, the urinal is not required to be *accessible*.
5. Toilet rooms or bathing rooms that are part of critical care or intensive care patient sleeping rooms serving *Accessible units* are not required to be *accessible*.
6. Toilet rooms or bathing rooms designed for bariatrics patients are not required to comply with the toilet room and bathing room requirement in ICC A117.1. The *sleeping units* served by bariatrics toilet or bathing rooms shall not count toward the required number of Accessible *sleeping units*.
7. Where permitted in Section 1108, in toilet rooms or bathrooms serving Accessible units, water closets designed for assisted toileting shall comply with Section 1110.2.2.
8. Where permitted in Section 1108, in bathrooms serving Accessible units, showers designed for assisted bathing shall comply with Section 1110.2.3.
9. Where toilet facilities are primarily for children's use, required *accessible* water closets, toilet compartments and lavatories shall be permitted to comply with children's provision of ICC A117.1.

Commenter's Reason: The public comment is seeking to address the issue in the current language where it could be interpreted to exclude any toilet facility in a residential complex. That could include the toilet room in the leasing office or the toilet rooms in the community room or by the swimming pool. These "serve" the residents but not in the sense intended. Rather than use the term public, the public comment clarifies that it is only the toilet and bathing room in the units that are being discussed by the exception.

Cost Impact: The net effect of the public comment and code change proposal will not increase or decrease the cost of construction
This is a clarification to address the proper intent of what was originally intended.

Public Comment# 2709

Public Comment 2:

IBC: 1110.2

Proponents: Gina Hilberry, representing United Cerebral Palsy (gina@cohenhilberry.com) requests As Modified by Public Comment

Modify as follows:

2021 International Building Code

1110.2 Toilet and bathing facilities . Each toilet room and bathing room shall be *accessible*. Where a floor level is not required to be connected by an *accessible route*, the only toilet rooms or bathing rooms provided within the facility shall not be located on the inaccessible floor. Except as provided for in Sections 1110.2.4 and 1110.2.5, at least one of each type of fixture, element, control or dispenser in each accessible toilet room and bathing room shall be *accessible*.

Exceptions:

1. Toilet rooms or bathing rooms accessed only through a private office, not for *common* or *public use* and intended for use by a single occupant, shall be permitted to comply with the specific exceptions in ICC A117.1.

~~2.~~ ~~This section is not applicable to toilet and bathing rooms that serve *dwelling units* or *sleeping units* that are not required to be *accessible* by Section 1108 provided that such toilet or bathing rooms are not for public use.~~

2. ~~3.~~ Where multiple single-user toilet rooms or bathing rooms are clustered at a single location, at least 50 percent but not less than one room for each use at each cluster shall be *accessible*.

3. ~~4.~~ Where no more than one urinal is provided in a toilet room or bathing room, the urinal is not required to be *accessible*.

4. ~~5.~~ Toilet rooms or bathing rooms that are part of critical care or intensive care patient sleeping rooms serving *Accessible units* are not required to be *accessible*.

5. ~~6.~~ Toilet rooms or bathing rooms designed for bariatrics patients are not required to comply with the toilet room and bathing room requirement in ICC A117.1. The *sleeping units* served by bariatrics toilet or bathing rooms shall not count toward the required number of Accessible *sleeping units*.

6. ~~7.~~ Where permitted in Section 1108, in toilet rooms or bathrooms serving Accessible units, water closets designed for assisted toileting shall comply with Section 1110.2.2.

7. ~~8.~~ Where permitted in Section 1108, in bathrooms serving Accessible units, showers designed for assisted bathing shall comply with Section 1110.2.3.

8. ~~9.~~ Where toilet facilities are primarily for children's use, required *accessible* water closets, toilet compartments and lavatories shall be permitted to comply with children's provision of ICC A117.1.

Commenter's Reason: The intent of this public comment is to request to delete the exception, rather than to leave the matter as to how it is to be applied unresolved. The ambiguous wording results in commenters and experts having radically differing views regarding which toilet and bathing rooms are eligible for the exception. Some maintain the exception applies to all toilet and bating rooms outside inaccessible dwelling units and not serving accessible units, while others assert it applies to all toilet and bathing rooms inside inaccessible dwelling units.
Exception 2 to Section cannot apply to toilet and bathing rooms within inaccessible units. What would be the purpose of such an exception? The entire dwelling unit is not required to comply with Section 1108. If we need an exception for the toilet or bathing room in such a unit, we logically also need an exception for the kitchen and other living spaces. How about operable parts, storage, etc.? Moreover, the ICC A117.1 contains the scoping for accessible elements interior to each type of accessible dwelling unit. For example ICC A117.1 Section 1102.11.2 requires "at least one" toilet and bathing facility within an Accessible unit; it further requires "at least one" accessible lavatory, water closet, and bathtub or shower. So, even if one is convinced that an exception is needed for toilet and bathing rooms inside dwelling units that are not required to accessible, the ICC A117.1 would be the vehicle for this exception, not the IBC.

Cost Impact: The net effect of the public comment and code change proposal will not increase or decrease the cost of construction
It is hard, if not impossible, to calculate the effect of this code change on construction because the application of the exception is unclear. Removing the exception will decrease confusion but could have a cost to developers accustomed to applying the exception in some way or another.

Public Comment# 2907

Public Comment 3:

Proponents: Marsha Mazz, representing United Spinal Association (mmazz@accessibility-services.com) requests As Submitted

Commenter's Reason: The 2010 ADA Standards contain a General Exception (206.3) that is similar to IBC Exception 2 to Section 110.2. The ADA exception states: *In residential facilities, common use areas that do not serve residential dwelling units required to provide mobility features complying with 809.2 through 809.4 shall not be required to comply with these requirements or to be on an accessible route.*There are several differences between the IBC and ADA exceptions. The ADA exception is far broader than IBC in that it applies to all common use spaces that do not serve units with mobility features, not just toilet and bathing rooms. More importantly, though, it does not exempt any space for public use, including toilet or bathing rooms serving spaces that are otherwise inaccessible. As written, the exception would conflict with the ADA if toilet or bathing rooms are provided for public use and are determined to "serve" dwelling units that are not required to be Accessible, Type A, or Type B units. This scenario occurs frequently. For example, a building, or a portion of a building, not required to provide Accessible, Type A, or Type B units could contain public use space, such as a rental office with toilets. If the rental office toilets *serve* the occupants of the inaccessible dwelling units as well as members of the public visiting the office, the toilets would be exempt according to the current exception because it exempts all toilets and bathing facilities that do not serve units required to be accessible.

This proposal better clarifies what *is not* exempt. The original language remains ambiguous as to what *is* exempt.

The Committee's only reason for disapproval was "because the term 'public use' is confusing and could be interpreted incorrectly - such as would this apply inside a unit?"

- The term "public use" should not be confusing as it is defined in IBC Section 202 as follows: *PUBLIC-USE AREAS. Interior or exterior rooms or spaces that are made available to the general public*.
- The question of whether the current exception applies to toilet and bathing rooms *within* units exists regardless of what action is taken on this public comment because the exception does not categorize the exempt toilets according to who uses them, as long as they are not occupants of dwelling units required to be Accessible, Type A, or Type B units. Approving this public comment will at least take off the table those toilet and bathing rooms used by the general public.

We urge the membership to Disapprove the Committee Vote and ApproveE139-21 as submitted because it harmonizes with the 2010 ADA Standards and will prevent costly non-compliance.

Cost Impact: The net effect of the public comment and code change proposal will not increase or decrease the cost of construction
Given the ambiguity regarding which toilet and bating facilities are exempted by this exception, it is difficult to determine its construction cost.

Public Comment# 2819

E141-21

Proposed Change as Submitted

Proponents: Marsha Mazz, representing United Spinal Association (mmazz@accessibility-services.com)

2021 International Building Code

Revise as follows:

1110.2.1.2 Family or assisted-use toilet rooms. Family or assisted-use toilet rooms shall include only one water closet and only one lavatory. A family or assisted-use bathing room in accordance with Section 1110.2.1.3 shall be considered to be a family or assisted-use toilet room.

Exception: The following additional fixtures shall be permitted in a family or assisted-use toilet room:

1. A urinal.
2. A child-height water closet.
3. A child-height lavatory.
4. <u>An adult changing station.</u>

Reason: This is a companion proposal to our proposal to create a new 1110.3 Adult Changing Stations. Even if the first proposal is not accepted, this one should be approved so that such facilities can be voluntarily provided in family or assisted-use toilet or bathing facilities.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal is an exception and is therefore voluntary.

E141-21

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: This proposal was disapproved as an adult changing table is not a plumbing fixture, so it does not need to be listed as an exception. Adding this could be read by code official as not allowing other common items, such as baby changing tables or lockers - family/assisted use are currently required to provide the same amenities found in the men's or women's rooms. (Vote: 11-2)

E141-21

Individual Consideration Agenda

Public Comment 1:

IBC: 1110.2.1.2

Proponents: Marsha Mazz, representing United Spinal Association (mmazz@accessibility-services.com) requests As Modified by Public Comment

Modify as follows:

2021 International Building Code

1110.2.1.2 Family or assisted-use toilet rooms . Family or assisted-use toilet rooms shall include only one water closet and only one lavatory. A family or assisted-use bathing room in accordance with Section 1110.2.1.3 shall be considered to be a family or assisted-use toilet room.

Exception: The following additional <u>plumbing</u> fixtures shall be permitted in a family or assisted-use toilet room:

1. A urinal.

2. A child-height water closet.
3. A child-height lavatory.

4. An adult changing station <u>also used for bathing .</u>

Commenter's Reason: The Committee disapproved this proposal because the items in the list are all "plumbing" fixtures. While it is atypical, adult changing stations can include plumbing as shown in the images below. We would not want this option to be unavailable if someone wishes to provide a bathing option, particularly when the adult changing station is installed in a family or assisted use bathing room.
To address the committee's assertion that the list only applies to "plumbing" fixtures, we inserted the word "plumbing" before "fixtures" in the first sentence of the exception so that it is clear that non-plumbed elements, such as a typical adult changing station without a bathing option is not disallowed.

Examples of Adult Changing Stations Designed for Bathing and Changing

Cost Impact: The net effect of the public comment and code change proposal will not increase or decrease the cost of construction
This section does not require any elements to be installed.

Public Comment# 2739

E142-21

Proposed Change as Submitted

Proponents: Marsha Mazz, Director Accessibility Codes and Standards, United Spinal Association, Accessibility Services, representing United Spinal Association (mmazz@accessibility-services.com); Jay Richards, Board of Building Standards, State of Ohio, representing Board of Building Standards (jay.richards@com.state.oh.us); Gina Hilberry, UCP, representing United Cerebral Palsy (gina@cohenhilberry.com)

2021 International Building Code

Add new text as follows:

1110.3 Adult Changing Stations.
Where required, adult changing stations shall be accessible and shall comply with Sections 1110.3.1 through 1110.3.4.

1110.3.1 Where required.
At least one adult changing station shall be provided in the building in the occupancies listed below:

1. In assembly and mercantile occupancies, where family or assisted-use toilet or bathing rooms are required to comply with Section 1110.2.1.
2. In a college or university business occupancy, where an aggregate of twelve or more male and female water closets or urinals are provided on any floor in a building.
3. In an elementary or high school educational occupancy with an assembly use, where an aggregate of six or more male and female water closets is required for that assembly use.
4. In highway rest stops and service plazas.

1110.3.2 Room.
Adult changing stations shall be located in toilet rooms open to the public that include only one water closet and only one lavatory. Fixtures located in such rooms shall be included in determining the number of fixtures provided in an occupancy.

Exception:
Adult changing stations shall be permitted to be located in family or assisted toilet rooms required in Section 1110.2.1.

1110.3.3 Prohibited location.
The required accessible routes to adult changing stations shall not pass-through security checkpoints.

1110.3.4 Travel distance.
Where buildings are required to have an adult changing station in accordance with Section 1110.3.1, adult changing stations shall be located such that a person is no more than one story above or below the story with the adult changing station and the path of travel to such facility shall not exceed 2000 feet.

Reason: An adult changing station contains a changing table large enough to accommodate an adult-sized person that is located in proximity to sanitary facilities, such as lavatories and trash disposal. Without such facilities, severely disabled people who cannot use toilets because of their disability suffer from severe isolation because they and their caregivers must return home to be changed. This lack of access has a profound impact not only on the person with a disability, but on their caregivers who are often their immediate family members. Normal activities outside the home such as shopping, entertainment, and travel must be curtailed because of a lack of safe and sanitary places to change. On occasion, caregivers report they have no option other than to change the adults for whom they care on restroom floors. Aside from the obvious sanitation concerns which is far from minimal, this practice raises serious questions about how we as a community afford people with significant disabilities a measure of human dignity and protect their right to privacy.

In order to address this problem, the ICC A117 committee established a task group to develop requirements for adult changing stations. The committee is expected to complete it's work in March, 2021 - in time for consideration by the full committee for inclusion in the next edition of the standard which we expect to be available in time to be referenced by the 2024 IBC. The task group is comprised of committee members and interested parties - many of whom are parents of adult disabled children or who are caring for their parents. While these accommodations are not typically provided in any other type of occupancy, eleven airports, soon to be twelve, in the United States already voluntarily provide adult changing tables. Advocates for adult changing stations have had minimal success outside the code development process through state legislation, such as in California, Georgia, Canada, and the European Union. However, we believe that the building code is a far more appropriate vehicle for solving what amounts to a problem in the built environment and, we are convinced that a patchwork of state and local requirements is inefficient and presents unnecessary compliance challenges to building owners and managers.

Cost Impact: The code change proposal will increase the cost of construction
There will be the cost of a changing table and the increase in room size. We have made every attempt to minimize costs by piggy backing on the existing requirements for family or assisted-use toilet rooms.

Public Hearing Results

Committee Action: **As Submitted**

Committee Reason: The proposal was approved, however it needs a public comment to address some of the language concerns. Adult changing tables are a much needed item to serve some people with disabilities and their caregivers when they are out in public. The technical questions for adult changing table and the rooms they will be located in will be addressed in the next edition of ICC A117.1. Adding to the existing requirements for family/assisted use toilet rooms is a good idea, however the scoping language in Section 1110.3.1 needs some improvement. Section 1110.3.1 Item 2 could be read as the business offices in colleges, and the proponents said the intent was to serve the classrooms and lecture halls. Section 1110.3.1 Item 1 and 3 are redundant. There should be signage requirements for where this is located within the building. Section 1110.3.2 may not be needed if this is addressed in the technical provisions (see the committee action on E141-21). Section 1110.3.4 - if the intent is to require the adult changing tables in every other family/assisted use toilet room in large facilities it may be better to say that rather than set a travel distance that may be read differently. (Vote: 14-0)

E142-21

Individual Consideration Agenda

Public Comment 1:

IBC: 1110.3

Proponents: David Collins, representing The American Institute of Architects (dcollins@preview-group.com) requests As Modified by Public Comment

Further modify as follows:

2021 International Building Code

1110.3 Adult Changing Stations . Where provided, adult changing stations shall be accessible. Where required, adult changing stations ~~shall be accessible and~~ shall also comply with Sections 1110.3.1 through 1110.3.4.

Commenter's Reason: The Code Committees considered two provisions for adult changint tables. E142 added provisions for adult changing tables in Assembly and Mercantile occupancies, college or university business with an aggregate of twelve or more water closets, elementary or high schools with an assembly use with an aggregate of six or more water closets and highway rest stops and service plazas. This change was approved.

P37 included a very general reference that included no occupancy conditions but requiring that those provided “in addition to the requirements of the IBC” must meet the requirements for location, privacy, etc. This section is an extracted provision whose language would not make sense in Chapter 29 of the IBC. This change failed.

An adult changing station, whether required or voluntarily installed, is a feature providing accessibility for adults and should be addressed totally in Chapter 11 of the IBC. That is where the reference to A117.1 is found and where the provisions for the adult changing station should be located whether required or voluntarily installed.

Please approve this change as modified by the public comment.

Cost Impact: The net effect of the public comment and code change proposal will decrease the cost of construction
Installations that are not required will be made simpler and provide better access for users if they are directed to provide an accessible feature that meets the A117.1 standard.

Public Comment# 2620

Public Comment 2:

IBC: 1110.3, 1110.3.1 , 1110.3.2, 1110.3.3, 1110.3.4

Proponents: Marsha Mazz, representing United Spinal Association (mmazz@accessibility-services.com); Gene Boecker, representing Code Consultants, Inc. (geneb@codeconsultants.com); Jay Richards, representing Board of Building Standards (jay.richards@com.state.oh.us); Julius Ballanco, representing Self (jbengineer@aol.com); Gina Hilberry, representing United Cerebral Palsy (gina@cohenhilberry.com); Lawrence Perry, representing self (lperryaia@aol.com); Laurel Wright, representing self (lwwright8481@icloud.com) requests As Modified by Public Comment

Modify as follows:

2021 International Building Code

1110.3 Adult Changing Stations . Where required, adult changing stations shall be accessible and shall comply with Sections 1110.3.1 through 1110.3.4.

1110.3.1 Where required . At least one adult changing station shall be provided in all the following locations ~~the building in the occupancies listed below~~:

1. In assembly and mercantile occupancies, where family or assisted-use toilet or bathing rooms are required by ~~to comply with~~ Section 1110.2.1.
2. ~~In a college or university business occupancy, where an aggregate of twelve or more male and female water closets or urinals are provided on any floor in a building.~~
   In Group B occupancies providing educational facilities for students above the 12th grade, where an aggregate of twelve of more male and female water closets are required to serve the classrooms and lecture halls.
3. ~~In an elementary or high school educational occupancy with an assembly use, where an aggregate of six or more male and female water closets is required for that assembly use.~~ In Group E occupancies, where a room or space used for assembly purposes requires an aggregate of six or more male and female water closets for that room or space.
4. In highway rest stops and highway service plazas.

1110.3.2 Room . Adult changing stations shall be located in toilet rooms ~~open to the public~~ that include only one water closet and only one lavatory. Fixtures located in such rooms shall be included in determining the number of fixtures provided in an occupancy. The occupants shall have access to the required adult changing station at all times that the associated occupancy is occupied.

Exception:
Adult changing stations shall be permitted to be located in family or assisted toilet rooms required in Section 1110.2.1.

1110.3.3 Prohibited location . ~~The required accessible routes to adult changing stations shall not pass-through security checkpoints.~~ The accessible route from separate-sex toilet or bathing rooms to an accessible adult changing station shall not require travel through security checkpoints.

1110.3.4 Travel distance . ~~Where buildings are required to have an adult changing station in accordance with Section 1110.3.1,~~ The adult changing ~~stations~~ station shall be located on an accessible route such that a person is no more than ~~one story~~ two stories above or below the story with the adult changing station and the path of travel to such facility shall not exceed 2000 feet.

Commenter's Reason: This proposal to require adult changing stations was Approved as Submitted with a vote of 14-0. However, during testimony, comments requested some clarifications that would improve the content. This public comment addresses that testimony:
1110.3.1 Where required. We simplified the main text by merely pointing to the locations where an adult changing station is required. There was no need to refer to a "building" or to "occupancies" as the list is sufficient.

- Changes to Item#1 are merely editorial - better code language.
- Changes to Item #2 were made to: (1) avoid any misinterpretation that the requirement for an adult changing station applies to office spaces in college buildings; and (2) clarify that the requirements apply to locations where 12 or more water closest are required to serve classrooms and lecture halls.
- Changes to Item #3 include more precise code language regarding Group E. Also, the changes clarify that the scoping applies to individual assembly spaces, such as basketball gyms or theaters in a school, rather than a combination of all assembly spaces. Of course designers always have the option of designing spaces so that a single installation serves more than one assembly area. However, since assembly spaces are often used for after school activities potentially open to the public as well as in-school activities for students nd faculty, we want to be assured that each space is analyzed separately to ensure an accessible route and that spaces are not locked off by gates or other measures preventing access. We want to note that under other state and federal laws, the school must address needs for students with disabilities occupying classrooms and other spaces not covered by this proposal as part of their educational program.
- The change to Item #4 clarifies that the provision applies to rest stops and service plazas that are integral to the highway system i.e., those that are entered and exited from the highway, not to facilities along a travel route where one could come or go from somewhere other than a highway.

1110.3.2 Room. This change is editorial. In the original proposal, the requirement that the toilet room must be "open to the public" was meant to ensure that adult changing stations are available and not locked off during different operating hours, as is often the case in a school where classroom areas are blocked by gates during evening or weekend events. The committee found the phrase "open to the public" to be ambiguous. This change deletes hat phrase and in its place, adds a new sentence to clarify that the goal is to have access to the required facilities.

1110.3.3 Prohibited location. The change to this section clarifies that the accessible route cannot have security checkpoints between the separate sex toilet and bathing facilities and the adult changing station. For example, if everyone in an assembly or mercantile occupancy must first pass through a security checkpoint before they encounter toilet facilities, then the same would be true for people needing an adult changing station.

1110.3.4 Travel distance. This change was made in recognition of the fact that the provisions of the IPC allow 500 feet and one story travel distance to a restroom and, where required, another 500 feet and one story to get to a family or assisted use toilet room. The intent is to allow some flexibility in very large facilities, so that some, but not all, of the family or assisted use toilet rooms may not be required to provide an adult changing station. We recognize that the vertical portion o f the accessible route will not be a stair, but will likely be an elevator. Therefore, those needing an adult changing station would potentially have to travel in the elevator two stories versus one.

Cost Impact: The net effect of the public comment and code change proposal will increase the cost of construction
In the original proposal, we made every effort to minimize the cost impact. Section 1110.3 of this public comment further minimizes the impact by increasing the travel distance.

Public Comment# 2691

F233-21

Proposed Change as Submitted

Proponents: Michael O'Brian, representing FCAC (fcac@iccsafe.org)

2021 International Fire Code

E103.2 Evaluation questions. The following are sample evaluation questions:

1. What is the material? Correct identification is important; exact spelling is vital. Checking labels and SDS and asking responsible persons should be among the highest priorities.
2. What are the concentration and strength?
3. What is the physical form of the material? Liquids, gases and finely divided solids have differing requirements for spill and leak control and containment.
4. How much material is present? Consider in relation to permit amounts, *maximum allowable quantity per control area* (from Group H occupancy requirements), amounts that require detached storage and overall magnitude of the hazard.
5. What other materials (including furniture, equipment and building components) are close enough to interact with the material?
6. What are the likely reactions?
7. What is the activity involving the material?
8. How does the activity impact the hazardous characteristics of the material? Consider vapors released or hazards otherwise exposed.
9. What must the material be protected from? (For example, other materials, temperature, shock, pressure.)
10. What effects of the material must people and the environment be protected from?
11. How can protection be accomplished? Consider:

    11.1. Proper containers and equipment.

    11.2. Separation by distance or construction.

    11.3. Enclosure in cabinets or rooms.

    11.4. Spill control, drainage and containment.

    11.5. Control system ventilation, special electrical, detection and alarm, extinguishment, explosion venting, limit controls, exhaust scrubbers and excess flow control.

    11.6. Administrative (operational) control signs, ignition source control, security, personnel training, established procedures, storage plans and emergency plans.

Evaluation of the hazard is a strongly subjective process; therefore, the person charged with this responsibility must gather as much relevant data as possible so that the decision will be objective and within the limits prescribed in laws, policies and standards.

It could be necessary to cause the responsible persons in charge to have tests made by qualified persons or testing laboratories to support contentions that a particular material or process is or is not hazardous. See Section 104.8.2

Add new text as follows:

SECTION E104
GHS HAZARDOUS MATERIALS DEFINITIONS CONTENT

E104.1 Hazardous materials definitions.
The categorization and classification of hazardous materials enables the code user to determine the applicability of requirements based on hazard category and class related to the physical and health hazards of materials. The current definitions found in Chapter 2 have been developed using criteria found in NFPA codes and standards, model fire prevention codes, NIOSH, requirements of the U.S. DOT, and by U.S. OSHA.

The chemical industry has grown substantially since the inception of the IFC hazard definitions. Large-scale global production and distribution of common and specialty chemicals has become mainstream. In the 1990s, the United Nations (UN) developed the Globally Harmonized System of Classification and Labeling of Chemicals (GHS) to create international congruency among chemical suppliers. The GHS is an internationally agreed upon standard of classification and labeling that utilizes prescriptive, standardized testing procedures and criteria to classify hazardous materials.

The U.S. Department of Labor's Occupational Safety and Health Administration (OSHA) published a revised Hazard Communication Standard (29 CFR 1910.1200) to align with the GHS in March 2012. It became effective in May 2012. All manufacturers selling, producing or transporting chemicals in the United States are now required to comply with the GHS and provide this standardized hazard information on all Safety Data Sheets (SDSs).

Safety Data Sheets are a primary source of information for identifying hazards for chemicals and mixtures containing hazardous materials. It can be helpful for fire code officials to become familiar with the GHS definitions and how they relate to IFC hazard definitions.

E104.2 GHS Hazardous Materials Definitions Comparison Table.

Table E104.2 provides a tabular presentation of the various definitions published within the International Fire Code. In addition, the table presents corresponding definitions, where available, from the 2012 edition of the Hazard Communication Standard developed by the Occupational Health and Safety Administration (OSHA) along with applicable hazard statement codes. OSHA's 2012 Hazard Communication Standard aligns with the United Nations' Globally Harmonized System of Classification and Labeling of Chemicals (GHS). The Table is not meant to imply perfect alignment between IFC and GHS definitions.

TABLE E104.2 IFC AND GHS HAZARD DEFINITION COMPARISON

IFC MATERIAL	IFC CLASS	IFC DEFINITION	GHS 2017 (REV 7) CLASSIFICATION (H-CODE AND CATEGORY); HAZARD STATEMENT;DEFINITION
Aerosol		A combination of a container, a propellant and a material that is dispensed. Aerosol products shall be classified by means of the calculation of their chemical heats of combustion and shall be designated Level 1, Level 2 or Level 3.	Any non-refillable receptacles made of metal, glass or plastics and containing a gas compressed, liquefied or dissolved under pressure, with or without a liquid, paste or powder, and fitted with a release device allowing the contents to be ejected as solid or liquid particles in suspension in a gas, as a foam, paste or powder or in a liquid state or in a gaseous state
Aerosol	Level 1	Those with a total chemical heat of combustion that is less than or equal to 8,600 Btu/lb (20kJ/g).	H223, Category 3; Pressurized container: May burst if heated: 1) Any aerosol that contains ≤ 1% flammable components (by mass) and that has a heat of combustion < 20 kJ/g; or 2) Any aerosol that contains > 1% (by mass) flammable components or which has a heat of combustion of ≥ 20 kJ/g but which, based on the results of the ignition distance test, the enclosed space ignition test or the aerosol foam flammability test, does not meet the criteria for Category 1 or Category 2
Aerosol	Level 2	Those with a total chemical heat of combustion that is greater than 8,600 Btu/lb (20kJ/g), but less than or equal to 13,000 Btu/lb (30kJ/g).	H223, Category 2; Flammable aerosol. Pressurized container: May burst if heated: 1) Any aerosol that dispenses a spray that, based on the results of the ignition distance test, does not meet the criteria for Category 1, and which has: (a) a heat of combustion of >= 20 kJ/g; (b) a heat of combustion of < 20 kJ/g along with an ignition distance of >= 15 cm; or (c) a heat of combustion of < 20 kJ/g and an ignition distance of < 15 cm along with either, in the enclosed space ignition test a time: (i) - a time equivalent of ≤ 300 s/m3; or (ii) - a deflagration density of ≤ 300 g/m3; or 2) Any aerosol that dispenses a foam that, based on the results of the aerosol foam flammability test, does not meet the criteria for Category 1, and which has a flame height of ≥ 4 cm and a flame duration of ≥ 2 s.
Aerosol	Level 3	Those with a total chemical heat of combustion that is greater than 13,000 Btu/lb (30kJ/g).	H222, Category 1; Extremely flammable aerosol. Pressurized container: May burst if heated: 1) Any aerosol that contains >= 85% flammable components (by mass) and has a heat of combustion of >= 30 kJ/g; 2) Any aerosol that dispenses a spray that, in the ignition distance test, has an ignition distance of >= 75 cm; or 3) Any aerosol that dispenses a foam that, in the foam flammability test, has: (a) a flame height of >= 20 cm and a flame duration of >= 2 s; or (b) a flame height of >= 4 cm and a flame duration of >= 7 s.
Combustible liquid	-	A liquid having a closed cup flash point at or above 100°F (38°C). Combustible liquids shall be subdivided as follows:	A flammable liquid means a liquid having a flash point of not more than 93°C

Combustible liquid	II	Liquids having a closed cup flash point at or above 100°F (38°C) and below 140°F (60°C).	H226, Category 3; Flammable liquid and vapour: Flash point ≥ 23°C and ≤ 60°C
Combustible Liquid	IIIA	Liquids having a closed cup flash point at or above 140°F (60°C) and below 200°F (93°C)	H227, Category 4; Combustible liquid: Flash point > 60°C and ≤ 93°C
Combustible Liquid	IIIB	Liquids having closed cup flash points at or above 200°F (93°C).	N/A
Compressed Gas	-	A material or mixture of materials that: 1) Is a gas at 68°F (20°C) or less at 14.7 psia (101 kPa) of pressure, and 2) Has a boiling point of 68°F (20°C) or less at 14.7 psia (101 kPa) which is either liquefied, nonliquefied or in solution, except those gases which have no other health- or physical-hazard properties are not considered to be compressed until the pressure in the packaging exceeds 41 psia (282 kPa) at 68°F (20°C). States of compressed gases: 1) Nonliquefied compressed gases are gases, other than those in solution, which are in a packaging under the charged pressure and are entirely gaseous at a temperature of 68°F (20°C). 2) Liquefied compressed gases are gases that, in a packaging under the charged pressure, are partially liquid at a temperature of 68°F (20°C). 3) Compressed gases in solution are nonliquefied gases that are dissolved in a solvent. 4) Compressed gas mixtures consist of a mixture of two or more compressed gases contained in a packaging, the hazard properties of which are represented by the properties of the mixture as a whole.	Gases under pressure are gases which are contained in a receptacle at a pressure of 200 kPa (gauge) or more at 20°C, or which are liquefied, or liquefied and refrigerated. - H280, compressed gas; Contains gas under pressure; May explode if heated: A gas which when under pressure is entirely gaseous at -50°C (-58°F), including all gases with a critical temperature ≤ -50°C (-58°F). - H280, liquefied gas; Contains gas under pressure; May explode if heated: A gas which when under pressure is partially liquid at temperatures above -50°C (-58°F). H280, dissolved gas; Contains gas under pressure; May explode if heated: A gas which when under pressure is dissolved in a liquid phase solvent.
Corrosive	-	A chemical that causes visible destruction of, or irreversible alterations in, living tissue by chemical action at the point of contact. A chemical shall be considered corrosive if, when tested on the intact skin of albino rabbits by the method described in DOTn 49 CFR 173.137, such chemical destroys or changes irreversibly the structure of the tissue at the point of contact following an exposure period of 4 hours. This term does not refer to action on inanimate surfaces.	H314, Category 1 (1A, 1B, 1C); Causes severe skin burns and eye damage: Skin corrosion refers to the production of irreversible damage to the skin; namely, visible necrosis through the epidermis and into the dermis occurring after exposure to a substance or mixture.
Cryogenic fluid	-	A fluid having a boiling point lower than -130°F (-89.9°C) at 14.7 pounds per square inch atmosphere (psia) (an absolute pressure of 101.3 kPa)	H281, refrigerated liquefied gas; Contains refrigerated gas; May cause cryogenic burns or injury: A gas which is made partially liquid because of its low temperature.
Cryogenic - Flammable	-	A cryogenic fluid that is flammable in its vapor state.	H220, Category 1A; Extremely flammable gas: Gases, which at 20°C and a standard pressure of 101.3 kPa: (a) are ignitable when in a mixture of 13% or less by volume in air; or (b) have a flammable range with air of at least 12 percentage points regardless of the lower flammability limit unless data show they meet the criteria for Category 1B

			Category 1A includes Pyrophoric gases and Chemically unstable gasesH281, refrigerated liquefied gas would also apply
Cryogenic - Inert	-	A cryogenic fluid that is inert.	H281, refrigerated liquefied gas; Contains refrigerated gas; May cause cryogenic burns or injury: A gas which is made partially liquid because of its low temperature.
Cryogenic - Oxidizing	-	An oxidizing gas in the cryogenic state.	H270, Category 1; May cause or intensify fire; oxidizer: Any gas which may, generally by providing oxygen, cause or contribute to the combustion of other material more than air does. - H281, refrigerated liquefied gas would also apply
Explosives	-	A chemical compound, mixture or device, the primary or common purpose of which is to function by explosion. The term includes, but is not limited to, dynamite, black powder, pellet powder, initiating explosives, detonators, safety fuses, squibs, detonating cord, igniter cord and igniters. - The term "Explosive" includes any material determined to be within the scope of USC Title 18: Ch. 40 and also includes any material classified as an explosive other than consumer fireworks, 1.4G by the hazardous materials regulations of DOTn CFR Parts 100-185.	An explosive substance (or mixture) is a solid or liquid substance (or mixture of substances) which is in itself capable by chemical reaction of producing gas at such a temperature and pressure and at such a speed as to cause damage to the surroundings. Pyrotechnic substances are included even when they do not evolve gases.
Explosives	Unstable Explosives	-	H200; Unstable Explosive: Unstable explosives are those which are thermally unstable and/or too sensitive for normal handling, transport and use. Special precautions are necessary.
Explosives	Division 1.1	Explosives that have a mass explosion hazard. A mass explosion is one which affects almost the entire load instantaneously.	H201; Explosive; mass explosion hazard: Substances, mixtures and articles which have a mass explosion hazard (a mass explosion is one which affects almost the entire quantity present virtually instantaneously).
Explosives	Division 1.2	Explosives that have a projection hazard but not a mass explosion hazard.	H202; Explosive; severe projection hazard: Substances, mixtures and articles which have a projection hazard but not a mass explosion hazard.
Explosives	Division 1.3	Explosives that have a fire hazard and either a minor blast hazard or a minor projection hazard or both, but not a mass explosion hazard.	H203; Explosive; fire, blast or projection hazard: Substances, mixtures, and articles which have a fire hazard and either a minor blast hazard or a minor projection hazard or both, but not a mass explosion hazard: (i) combustion of which gives rise to considerable radiant heat; or (ii) which burn one after another, producing minor blast or projection effects or both;
Explosives	Division 1.4	Explosives that pose a minor explosion hazard. The explosive effects are largely confined to the package and no projection of fragments of appreciable size or range is to be expected. An external fire must not cause virtually instantaneous explosion of almost the entire contents of the package.	H204; Fire or projection hazard: Substances, mixtures and articles which present no significant hazard: substances, mixtures and articles which present only a small hazard in the event of ignition or initiation. The effects are largely confined to the package and no projection of fragments of appreciable size or range is to be expected. An external fire shall not cause virtually instantaneous explosion of almost the entire contents of the package.
Explosives	Division 1.4G	Small fireworks devices containing restricted amounts of pyrotechnic composition designed primarily to produce visual or audible effects by combustion or deflagration that complies with the construction, chemical composition and labeling regulations of the DOTn for fireworks, UN 0336, and the U.S. Consumer Product Safety Commission as set forth in CPSC 16 CFR Parts 1500 and 1507.	N/A
		Very insensitive explosives. This division is	H205; May mass explode in fire: Very insensitive substances or

Explosives	Division 1.5	comprised of substances that have a mass explosion hazard but which are so insensitive that there is very little probability of initiation or of transition from burning to detonation under normal conditions of transport.	mixtures which have a mass explosion hazard: substances and mixtures which have a mass explosion hazard but are so insensitive that there is very little probability or initiation or of transition from burning to detonation under normal conditions.
Explosives	Division 1.6	Extremely insensitive articles which do not have a mass explosion hazard. This division is comprised of articles that contain only extremely insensitive detonating substances and which demonstrate a negligible probability of accidental initiation or propagation.	Extremely insensitive articles which do not have a mass explosion hazard: articles which predominantly contain extremely insensitive substances or mixtures and which demonstrate a negligible probability of accidental initiation or propagation.
Flammable Gas	Gaseous	A material which is a gas at 68°F (20°C) or less at 14.7 psia (101 kPa) of pressure [a material that has a boiling point of 68°F (20°C) or less at 14.7 psia (101 kPa)] which: 1. Is ignitable at 14.7 psia (101 kPa) when in a mixture of 13% or less by volume with air; or 2. Has a flammable range at 14.7 psia (101 kPa) with air of not less than 12%, regardless of the lower limit. The limits specified shall be determined at 14.7 psia (101 kPa) of pressure and a temperature of 68°F (20°C) in accordance with ASTM E681.	A flammable gas is a gas having a flammable range with air at 20°C and a standard pressure of 101.3kPa H220, Category 1A; Extremely flammable gas: Gases, which at 20°C and a standard pressure of 101.3 kPa: (a) are ignitable when in a mixture of 13% or less by volume in air; or (b) have a flammable range with air of at least 12 percentage points regardless of the lower flammability limit unless data show they meet the criteria for Category 1B Category 1A includes Pyrophoric gases and Chemically unstable gases H220, Category 1B; Flammable gas: Gases which meet the flammability criteria for Category 1A, but which are not pyrophoric, nor chemically unstable, and which have at least either: (a) a lower flammability limit of more than 6% by volume in air; or (b) a fundamental burning velocity of less than 10 cm/s H280, compressed gas would also apply
			A flammable gas is a gas having a flammable range with air at 20°C and a standard pressure of 101.3kPa H220, Category 1A; Extremely flammable gas: Gases, which at 20°C and a standard pressure of 101.3 kPa: (a) are ignitable when in a mixture of 13% or less by volume in air; or (b) have a flammable range with air of at least 12 percentage points regardless of the lower flammability limit unless data show they meet the criteria for Category 1B Category 1A includes Pyrophoric gases and Chemically unstable gases H220, Category 1B; Flammable gas: Gases which meet the

Flammable Gas	Liquified	A liquefied compressed gas which, under a charged pressure, is partially liquid at a temperature of 68°F (20°C) and which is flammable.	flammability criteria for Category 1A, but which are not pyrophoric, nor chemically unstable, and which have at least either: (a) a lower flammability limit of more than 6% by volume in air; or (b) a fundamental burning velocity of less than 10 cm/s AND A gas which when packaged under pressure, is partially liquid at temperatures above -50°C. A distinction is made between: (a) High pressure liquefied gas: a gas with a critical temperature between -50°C and +65°C and (b) Low pressure liquefied gas: a gas with a critical temperature above +65°C. Refrigerated liquified gas A gas which when packaged is made partially liquid because of its low temperature. Dissolved gas A gas which when packaged under pressure is dissolved in a liquid phase solvent. H280, liquefied gas would also apply
Flammable Liquid	-	A liquid having a closed cup flash point below 100°F (38°C). Flammable liquids are further categorized into a group known as Class I liquids. The Class I category is subdivided as follows	A liquid having a flash point of not more than 93°C. A flammable liquid is classified in one of the four categories for this class according to the following table:
Flammable Liquid	IA	Liquids having a flash point below 73°F (23°C) and having a boiling point below 100°F (38°C).	H224, Category 1; Extremely flammable liquid and vapour: Flash point < 23°C and initial boiling point <= 35°C
Flammable Liquid	IB	Liquids having a flash point below 73°F (23°C) and having a boiling point at or above 100°F (38°C).	H225, Category 2; Highly flammable liquid and vapour. Flash point < 23°C and initial boiling point > 35°C
Flammable Liquid	IC	Liquids having a flash point at or above 73°F (23°C) and below 100°F (38°C).	H226, Category 3; Flammable liquid and vapour. Flash point >= 23°C and <= 60°C
Flammable Solid	-	A solid, other than a blasting agent or explosive, that is capable of causing fire through friction, absorption of moisture, spontaneous chemical change or retaining heat from manufacturing or processing, or which has an ignition temperature below 212°F (100°C) or which burns so vigorously and persistently when ignited as to create a serious hazard. A chemical shall be considered a flammable solid as determined in accordance with the test method of CPSC 16 CFR Part 1500.44, if it ignites and burns with a self-sustained flame at a rate greater than 0.0866 inch (2.2 mm) per second along its major axis.	A flammable solid is a solid which is readily combustible, or may cause or contribute to fire through friction. A flammable solid is classified in one of the two categories for this class using method N.1 as described in Part III, sub-section 33.2.1 of the Manual of Tests and Criteria, according to: H228, Category 1; Flammable solid: Burning rate test: Substances or mixtures other than metal powders: (a) wetted zone does not stop fire; and (b) burning time < 45 s or burning rate > 2.2 mm/s Metal powders: burning time <=5 min H228, Category 2; Flammable solid: Burning rate test: Substances or mixtures other than metal powders:

			(c) wetted zone stops the fire for at least 4 min; and (d) burning time < 45 s or burning rate > 2.2 mm/s Metal powders: burning time > 5 min and <= 10 min
Highly Toxic		A material which produces a lethal dose or lethal concentration which falls within any of the following categories: 1. A chemical that has a median lethal dose (LD50) of 50 mg or less per kg of body weight when administered orally to albino rats weighing between 200 and 300 g each. 2. A chemical that has a medial lethal dose (LD50) of 200 mg or less per kg of body weight when administered by continuous contact for 24 hrs (or less if death occurs within 24 hrs) with the bare skin of albino rabbits weighing between 2 and 3 kg each. 3. A chemical that has a median lethal concentration (LC50) in air of 200 ppm by volume or less of gas or vapor, or 2 mg/l or less of mist, fume or dust, when administered by continuous inhalation for 1 hr (or less if death occurs within 1 hr) to albino rats weighing between 200 and 300 g.	Acute toxicity refers to serious adverse health effects (i.e., lethality) occurring after a single or short-term oral, dermal or inhalation exposure to a substance or mixture. Oral H300, Category 1; Fatal if swallowed: LD50 ≤ 5 mg/kg bodyweight H300, Category 2; Fatal if swallowed: LD50 > 5 ≤ 50 mg/kg bodyweight Dermal H310, Category 1; Fatal in contact with skin: LD50 ≤ 50 mg/kg bodyweight H310, Category 2; Fatal in contact with skin: LD50 > 50 ≤ 200 mg/kg bodyweight Inhalation H330, Category 1; Fatal if inhaled: Gases: LC50 ≤ 100 ppm (4 hr) ≈ 200 ppm (1 hr) Vapours: LC50 ≤ 0.5 mg/l (4 hr) ≈ 2 mg/l (1 hr) Dust/mist: LC50 ≤ 0.05 mg/l (4 hr) ≈ 0.2 mg/l (1 hr)
Inert Gas		A gas that is capable of reacting with other materials only under abnormal conditions such as high temperatures, pressures and similar extrinsic physical forces. Within the context of the code, inert gases do not exhibit either physical or health hazard properties as defined (other than acting as a simple asphyxiant) or hazard properties other than those of a compressed gas. Some of the more common inert gases include argon, helium, krypton, neon, nitrogen, and xenon.	Gases under pressure are gases which are contained in receptacles at a pressure of 200 kPa (gauge) or more at 20°C or which are liquefied or liquefied and refrigerated. They comprise compressed gases, liquefied gases, dissolved gases, and refrigerated liquefied gases. *See Compressed gases/Gases under pressure.*
		An organic compound that contains the bivalent -O-O- structure and which may be considered to be a	Organic peroxides are liquid or solid organic substances which contain the bivalent -O-O- structure and may be considered derivatives of hydrogen peroxide, where one or both of the hydrogen atoms have been replaced by organic radicals. The term also includes organic peroxide formulations (mixtures). Organic peroxides are thermally unstable substances or mixtures, which may undergo exothermic self-accelerating

Organic Peroxide	-	structural derivative of hydrogen peroxide where one or both of the hydrogen atoms have been replaced by an organic radical. Organic peroxides can present an explosion hazard (detonation or deflagration) or they can be shock sensitive. They can also decompose into various unstable compounds over an extended period of time.	decomposition. In addition, they may have one or more of the following properties: (a) be liable to explosive decomposition; (b) burn rapidly; (c) be sensitive to impact or friction; (d) react dangerously with other substances.
Organic peroxide	UD	Organic peroxides that are capable of detonation. These peroxides pose an extremely high-explosion hazard through rapid explosive decomposition	H240, Organic Peroxide, Type A; Heating may cause an explosion: (a) Any organic peroxide which, as packaged, can detonate or deflagrate rapidly will be defined as organic peroxide TYPE A;
Organic Peroxide	I	Describes those formulations that are capable of deflagration but not detonation.	H241, Organic Peroxide, Type B; Heating may cause a fire or explosion: (b) Any organic peroxide possessing explosive properties and which, as packaged, neither detonates nor deflagrates rapidly, but is liable to undergo a thermal explosion in that package will be defined as organic peroxide TYPE B;
Organic Peroxide	II	Describes those formulations that burn very rapidly and that pose a moderate reactivity hazard	H242, Organic Peroxide, Type C; Heating may cause a fire: (c) Any organic peroxide possessing explosive properties when the substance or mixture as packaged cannot detonate or deflagrate rapidly or undergo a thermal explosion will be defined as organic peroxide TYPE C; H242, Organic Peroxide, Type D; Heating may cause a fire: (d) Any organic peroxide which in laboratory testing: (i) detonates partially, does not deflagrate rapidly and shows no violent effect when heated under confinement; or (ii) does not detonate at all, deflagrates slowly and shows no violent effect when heated under confinement; or (iii) does not detonate or deflagrate at all and shows a medium effect when heated under confinement; will be defined as organic peroxide TYPE D;
Organic Peroxide	III	Describes those formulations that burn rapidly and that pose a moderate reactivity hazard.	H242, Organic Peroxide, Type E; Heating may cause a fire: (e) Any organic peroxide which, in laboratory testing, neither detonates nor deflagrates at all and shows low or no effect when heated under confinement will be defined as organic peroxide TYPE E;
Organic Peroxide	IV	Describes those formulations that burn in the same manner as ordinary combustibles and that pose a minimal reactivity hazard.	H242, Organic Peroxide, Type F; Heating may cause a fire: (f) Any organic peroxide which, in laboratory testing, neither detonates in the cavitated state nor deflagrates at all and shows only a low or no effect when heated under confinement as well as low or no explosive power will be defined as organic peroxide TYPE F;

Organic peroxide	V	Describes those formulations that burn with less intensity than ordinary combustibles or do not sustain combustion and that pose no reactivity hazard.	H240, Organic Peroxide, Type G; Heating may cause a fire: (g) Any organic peroxide which, in laboratory testing, neither detonates in the cavitated state nor deflagrates at all and shows no effect when heated under confinement nor any explosive power, provided that it is thermally stable (self-accelerating decomposition temperature is 60°C or higher for a 50 kg package), and, for liquid mixtures, a diluent having a boiling point of not less than 150 °C is used for desensitization, will be defined as organic peroxide TYPE G. If the organic peroxide is not thermally stable or a diluent having a boiling point less than 150 °C is used for desensitization, it shall be defined as organic peroxide TYPE F.
Oxidizer		A material that readily yields oxygen or other oxidizing gas, or that readily reacts to promote or initiate combustion of combustible materials and, if heated or contaminated, can result in vigorous self-sustained decomposition.	An oxidizing solid is a solid which, while in itself is not necessarily combustible, may, generally by yielding oxygen, cause, or contribute to, the combustion of other material. An oxidizing liquid is a liquid which, while in itself not necessarily combustible, may, generally by yielding oxygen, cause, or contribute to, the combustion of other material.
Oxidizer	4	An oxidizer that can undergo an explosive reaction due to contamination or exposure to a thermal or physical shock that causes a severe increase in the burning rate of combustible materials with which it comes into contact. Additionally, the oxidizer causes a severe increase in the burning rate and can cause spontaneous ignition of combustibles.	H271, Category 1; May cause fire or explosion; strong oxidizer: Criteria for solids (based on Test O.1 or O.3 in Part III of UN Recommendations on the Transport of Dangerous Goods, Manual of Tests and Criteria): Test O.1—Any substance or mixture which, in the 4:1 or 1:1 sample-to-cellulose ratio (by mass) tested, exhibits a mean burning time less than the mean burning time of a 3:2 mixture (by mass) of potassium bromate and cellulose. Test O.3—Any substance or mixture which, in the 4:1 or 1:1 sample-to-cellulose ratio (by mass) tested, exhibits a mean burning rate greater than the mean burning rate of a 3:1 mixture (by mass) of calcium peroxide and cellulose. Criteria for liquids (based on Test O.2 in Part III of UN Recommendations on the Transport of Dangerous Goods, Manual of Tests and Criteria): Any substance or mixture which, in the 1:1 mixture, by mass, of substance (or mixture) and cellulose tested, spontaneously ignites; or the mean pressure rise time of a 1:1 mixture, by mass, of substance and cellulose is less than that of a 1:1 mixture, by mass, of 50% perchloric acid and cellulose.
Oxidizer	3	An oxidizer that causes a severe increase in the burning rate of combustible materials with which it comes in contact.	H271, Category 1; May cause fire or explosion; strong oxidizer: Criteria for solids (based on Test O.1 or O.3 in Part III of UN Recommendations on the Transport of Dangerous Goods, Manual of Tests and Criteria): Test O.1—Any substance or mixture which, in the 4:1 or 1:1 sample-to-cellulose ratio (by mass) tested, exhibits a mean burning time less than the mean burning time of a 3:2 mixture (by mass) of potassium bromate and cellulose. Test O.3—Any substance or mixture which, in the 4:1 or 1:1 sample-to-cellulose ratio (by mass) tested, exhibits a mean burning rate greater than the mean burning rate of a 3:1 mixture (by mass) of calcium peroxide and cellulose. Criteria for liquids (based on Test O.2 in Part III of UN Recommendations on the Transport of Dangerous Goods, Manual of Tests and Criteria): Any substance or mixture which, in the 1:1 mixture, by mass, of substance (or mixture) and cellulose tested, spontaneously ignites; or the mean pressure rise time of a 1:1 mixture, by mass, of substance and cellulose is

			less than that of a 1:1 mixture, by mass, of 50% perchloric acid and cellulose.
Oxidizer	2	An oxidizer that will cause a moderate increase in the burning rate of combustible materials with which it comes in contact.	H272, Category 2; May intensify fire, oxidizer Criteria for solids (based on Test O.1 or O.3 in Part III of UN Recommendations on the Transport of Dangerous Goods, Manual of Tests and Criteria): Test O.1—Any substance or mixture which, in the 4:1 or 1:1 sample-to-cellulose ratio (by mass) tested, exhibits a mean burning time equal to or less than the mean burning time of a 2:3 mixture (by mass) of potassium bromate and cellulose and the criteria for Category 1 are not met. Test O.3—Any substance or mixture which, in the 4:1 or 1:1 sample-to-cellulose ratio (by mass) tested, exhibits a mean burning rate equal to or greater than the mean burning rate of a 1:1 mixture (by mass) of calcium peroxide and cellulose and the criteria for Category 1 are not met. Criteria for liquids (based on Test O.2 in Part III of UN Recommendations on the Transport of Dangerous Goods, Manual of Tests and Criteria): Any substance or mixture which, in the 1:1 mixture, by mass, of substance (or mixture) and cellulose tested, exhibits a mean pressure rise time less than or equal to the mean pressure rise time of a 1:1 mixture, by mass, of a 40% aqueous sodium chlorate solution and cellulose; and the criteria for Category 1 are not met.
Oxidizer	1	An oxidizer that does not moderately increase the burning rate of combustible materials.	H272, Category 3; May intensify fire, oxidizer Criteria for solids (based on Test O.1 or O.3 in Part III of UN Recommendations on the Transport of Dangerous Goods, Manual of Tests and Criteria): Test O.1—Any substance or mixture which, in the 4:1 or 1:1 sample-to-cellulose ratio (by mass) tested, exhibits a mean burning time equal to or less than the mean burning time of a 3:7 mixture (by mass) of potassium bromate and cellulose and the criteria for Categories 1 and 2 are not met. Test O.3—Any substance or mixture which, in the 4:1 or 1:1 sample-to-cellulose ratio (by mass) tested, exhibits a mean burning rate equal to or greater than the mean burning rate of a 1:2 mixture (by mass) of calcium peroxide and cellulose and the criteria for Categories 1 and 2 are not met. Criteria for liquids (based on Test O.2 in Part III of UN Recommendations on the Transport of Dangerous Goods, Manual of Tests and Criteria): Any substance or mixture which, in the 1:1 mixture, by mass, of substance (or mixture) and cellulose tested, exhibits a mean pressure rise time less than or equal to the mean pressure rise time of a 1:1 mixture, by mass, of a 65% aqueous nitric acid solution and cellulose; and the criteria for Categories 1 and 2 are not met.
Oxidizing gas	Gaseous	A gas that can support and accelerate combustion of other materials more than air does.	Any gas which may, generally by providing oxygen, cause or contribute to the combustion of other material more than air does. H270, Category 1; May cause or intensify fire; oxidizer: Any gas which may, generally by providing oxygen, cause or contribute to the combustion of other material more than air does.

			H280, compressed gas would also apply
Oxidizing gas	Liquified	An oxidizing gas that is liquefied (liquefied gases are gases that, in a packaging under the charged pressure, are partially liquid at 68°F (20°C).	Any gas which may, generally by providing oxygen, cause or contribute to the combustion of other material more than air does. - H270, Category 1; May cause or intensify fire; oxidizer: Any gas which may, generally by providing oxygen, cause or contribute to the combustion of other material more than air does. H280, liquefied gas would also apply
Pyrophoric		A chemical with an autoignition temperature in air, at or below a temperature of 130℉ (54 ℃).	*Separate definitions based upon physical state, see below:*
Pyrophoric	Solid	A solid with an autoignition temperature in air, at or below a temperature of 130℉ (54 ℃).	H250, Category 1; Pyrophoric solid, Catches fire spontaneously if exposed to air: A pyrophoric solid is a solid which, even in small quantities, is liable to ignite within five minutes after coming into contact with air. Classification criteria: The solid ignites within 5 min of coming into contact with air.
Pyrophoric	Liquid	A liquid with an autoignition temperature in air, at or below a temperature of 130℉ (54 ℃).	H250, Category 1; Pyrophoric liquid, Catches fire spontaneously if exposed to air: A pyrophoric liquid is a liquid which, even in small quantities, is liable to ignite within five minutes after coming into contact with air. Classification criteria: The liquid ignites within 5 min when added to an inert carrier and exposed to air, or it ignites or chars a filter paper on contact with air within 5 min. Testing is performed at 25 ±2℃ and 50 ±5% relative humidity.
Pyrophoric	Gas	A gas with an autoignition temperature in air, at or below a temperature of 130℉ (54 ℃).	H220, Category 1A; Extremely flammable gas. May ignite spontaneously if exposed to air: A pyrophoric gas is a flammable gas that is liable to ignite spontaneously in air at a temperature of 54°C or below. H280, compressed (or liquefied) gas would also apply.
		A chemical falling within any of the following categories: 1. A chemical that has a median lethal dose (LD50) of more than 50 mg per kg, but not more than 500 mg per kg of body weight when administered orally to albino rats weighing between 200 and 300 g each. 2. A chemical that has a medial lethal dose (LD50) of more than 200 mg per kg but not more than 1,000	Acute toxicity refers to serious adverse health effects (i.e., lethality) occurring after a single or short-term oral, dermal or inhalation exposure to a substance or mixture. - Oral H301, Category 3; Toxic if swallowed: LD50 > 50 ≤ 300 mg/kg bodyweight - H302, Category 4; Harmful if swallowed: LD50 > 300 ≤ 2,000 mg/kg bodyweight - Dermal H311, Category 3, Toxic in contact with skin: LD50 > 200 ≤ 1,000 mg/kg bodyweight - Inhalation

Toxic		mg per kg of body weight when administered by continuous contact for 24 hrs (or less if death occurs within 24 hrs) with the bare skin of albino rabbits weighing between 2 and 3 kg each. 3. A chemical that has a median lethal concentration (LC50) in air of more than 200 ppm but not more than 2,000 ppm by volume or less of gas or vapor, or more than 2 mg/l but not more than 20 mg/l of mist, fume or dust, when administered by continuous inhalation for 1 hr (or less if death occurs within 1 hr) to albino rats weighing between 200 and 300 g	H330, Category 2; Fatal if inhaled: Gases: LC50 > 100 ppm (4 hr) ≈ 200 ppm (1 hr) ≤ 500 ppm (4 hr) ≈ 1,000 ppm (1 hr) Vapours: LC50 > 0.5 mg/l (4 hr) ≈ 2 mg/l (1 hr) ≤ 2 mg/l (4 hr) ≈ 8 mg/l (1 hr) Dust/mist: LC50 > 0.05 mg/l (4 hr) ≈ 0.2 mg/l (1 hr) ≤ 0.5 mg/l (4 hr) ≈ 2 mg/l (1 hr) H331, Category 3; Toxic if inhaled: Gases: LC50 > 500 ppm (4 hr) ≈ 1,000 ppm (1 hr) ≤ 2,500 ppm (4 hr) ≈ 5,000 ppm (1 hr) Vapours: LC50 > 2 mg/l (4 hr) ≈ 8 mg/l (1 hr) ≤ 10 mg/l (4 hr) ≈ 40 mg/l (1 hr) Dust/mist: LC50 > 0.5 mg/l (4 hr) ≈ 2 mg/l (1 hr) ≤ 1 mg/l (4 hr) ≈ 4 mg/l (1 hr)
Unstable (reactive)		A material, other than an explosive, which in the pure state or as commercially produced, will vigorously polymerize, decompose, condense or become self-reactive and undergo other violent chemical changes, including explosion, when exposed to heat, friction or shock, or in the absence of an inhibitor, or in the presence of contaminants, or in contact with incompatible materials. Unstable (reactive) materials are subdivided as follows:	Self-reactive substances or mixtures are thermally unstable liquids or solid substances or mixtures liable to undergo a strongly exothermic decomposition even without participation of oxygen (air). This definition excludes substances and mixtures classified under the GHS as explosives, organic peroxides or as oxidizing. A self-reactive substance or mixture is regarded as possessing explosive properties when in laboratory testing the formulation is liable to detonate, to deflagrate rapidly or to show a violent effect when heated under confinement.
Unstable (reactive)	4	Materials that in themselves are readily capable of detonation or of explosive decomposition or explosive reaction at normal temperatures and pressures. This class includes materials that are sensitive to mechanical or localized thermal shock at normal temperatures and pressures.	H240, Type A; Heating may cause an explosion: (a) Any self-reactive substance or mixture which can detonate or deflagrate rapidly, as packaged, will be defined as self-reactive substance TYPE A;
Unstable (reactive)	3	Materials that in themselves are capable of detonation or of explosive decomposition or explosive reaction but which require a strong initiating source or which must be heated under confinement before initiation. This class includes materials that are sensitive to thermal or mechanical shock at the elevated temperatures and pressures.	H241, Type B; Heating may cause a fire or explosion: (b) Any self-reactive substance or mixture possessing explosive properties and which, as packaged, neither detonates nor deflagrates rapidly, but is liable to undergo a thermal explosion in that package will be defined as self-reactive substance TYPE B;
			H242, Type C; Heating may cause a fire: (c) Any self-reactive substance or mixture possessing explosive properties when the substance or mixture as packaged cannot detonate or deflagrate rapidly or undergo a thermal explosion will be defined as self-reactive substance TYPE C;

Unstable (reactive)	2	Materials that in themselves are normally unstable and readily undergo violent chemical change but do not detonate. This class includes materials that can undergo chemical change with rapid release of energy at normal temperatures and pressures, and that can undergo violent chemical change at elevated temperatures and pressures.	H242, Type D; Heating may cause a fire: (d) Any self-reactive substance or mixture which in laboratory testing: (i) detonates partially, does not deflagrate rapidly and shows no violent effect when heated under confinement; or (ii) does not detonate at all, deflagrates slowly and shows no violent effect when heated under confinement; or (iii) does not detonate or deflagrate at all and shows a medium effect when heated under confinement; will be defined as self-reactive substance TYPE D;
Unstable (Reactive)	1	Materials that in themselves are normally stable but which can become unstable at elevated temperatures and pressures.	H242, Type E; Heating may cause a fire: (e) Any self-reactive substance or mixture which, in laboratory testing, neither detonates nor deflagrates at all and shows low or no effect when heated under confinement will be defined as self-reactive substance TYPE E; H242, Type F; Heating may cause a fire: (f) Any self-reactive substance or mixture which, in laboratory testing, neither detonates in the cavitated state nor deflagrates at all and shows only a low or no effect when heated under confinement as well as low or no explosive power will be defined as self-reactive substance TYPE F; (g) Any self-reactive substance or mixture which, in laboratory testing, neither detonates in the cavitated state nor deflagrates at all and shows no effect when heated under confinement nor any explosive power, provided that it is thermally stable (self-accelerating decomposition temperature is 60 °C to 75 °C for a 50 kg package), and, for liquid mixtures, a diluent having a boiling point greater than or equal to 150 °C is used for desensitization will be defined as self-reactive substance TYPE G. If the mixture is not thermally stable or a diluent having a boiling point less than 150°C is used for desensitization, the mixture shall be defined as self-reactive substance TYPE F
Unstable (reactive) gas	Gaseous		A chemically unstable gas is a flammable gas that is able to react explosively even in the absence of air or oxygen. H220, Category 1A, Category A; Extremely flammable gas. May react explosively even in the absence of air: Flammable gases which are chemically unstable at 20°C and a standard pressure of 101.3 kPa. H220, Category 1A, Category B; Extremely flammable gas. May react explosively even in the absence of air at elevated pressure and/or temperature: Flammable gases which are chemically unstable at a temperature greater than 20°C and/or a standard pressure greater than 101.3 kPa. H280, compressed gas would also apply.
			H260, Category 1; In contact with water releases flammable

Water reactive	3	Materials that react explosively with water without requiring heat or confinement.	gases which may ignite spontaneously: Any substance or mixture which reacts vigorously with water at ambient temperatures and demonstrates generally a tendency for the gas produced to ignite spontaneously, or which reacts readily with water at ambient temperatures such that the rate of evolution of flammable gas is equal to or greater than 10 liters per kilogram of substance over any one minute. (UN/DOT test methods: Test N.5, Part III, sub-section 33.4.1.4)
Water reactive	2	Materials that react violently with water or have the ability to boil water. Materials that produce flammable, toxic or other hazardous gases, or evolve enough heat to cause autoignition of combustibles upon exposure to water or moisture.	H261, Category 2; In contact with water releases flammable gas: Any substance or mixture which reacts readily with water at ambient temperatures such that the maximum rate of evolution of flammable gas is equal to or greater than 20 liters per kilogram of substance per hour, and which does not meet the criteria for Category 1.
Water reactive	1	Materials that react with water with some release of energy, but not violently.	H261, Category 3; In contact with water releases flammable gas: Any substance or mixture which reacts slowly with water at ambient temperatures such that the maximum rate of evolution of flammable gas is equal to or greater than 1 liters per kilogram of substance per hour, and which does not meet the criteria for Categories 1 and 2.

a. The table illustrates that there is not perfect alignment between the IFC and GHS definitions and provides information on similarities and difference between the two classification systems.

Revise as follows:

TABLE ~~E104.1~~ E105.1 REFERENCED STANDARDS

STANDARD ACRONYM	STANDARD NAME	SECTIONS HEREIN REFERENCED
CGA P-20—2009	*Standard for Classification of Toxic Mixtures*	E103.1.3.1
CGA P-23—2008	*Standard for Categorizing Gas Mixtures Containing Flammable and Nonflammable Components*	E102.1.2
UN (Rev.7, 2017)	UN Recommendations on the Transport of Dangerous Goods, Globally Harmonized System of Classification and Labelling of Chemicals (GHS), Part 2: Physical Hazards	Table E104.2

SECTION ~~E104~~ E105
REFERENCED STANDARDS

Add new standard(s) as follows:

UN

United Nations Statistics Division
New York , NY 10017
USA

UN Rev.7, 2017
UN Recommendations on the Transport of Dangerous Goods, Globally Harmonized System of Classification and Labelling of Chemicals (GHS), Part 2: Physical Hazards

Reason: Fire Code officials must enforce the hazardous materials provisions of the International Fire Code (IFC) and the International Building Code (IBC) to ensure that people and property in our communities are safe. Consequences of missing or incorrect classification include increased fire and life safety risk and can lead to misclassification of an occupancy.
United Nations (UN) reference is added to provide Fire Code officials the option to compare IFC and GHS hazardous materials definitions. The UN's Globally Harmonized System (GHS) is an internationally agreed upon standard of classification and labeling that utilizes prescriptive, standardized testing procedures and criteria to classify hazardous materials. Federal law (29 CFR 1910.1200 and 49 CFR 173.127) mandates that manufacturers selling, producing or transporting chemicals in the United States classify chemicals according to the GHS system and make the information readily available in product Safety Data Sheets (SDSs). Adding a comparison between IFC and GHS definitions to illustrate the differences and similarities better informs code officials faced with validating classifications of hazardous materials.

This proposal is submitted by the ICC Fire Code Action Committee (FCAC). The FCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance assigned International Codes with regard to fire and life safety in new and existing buildings and facilities as well as the protection of life and property in wildland urban interface areas. In 2020 and 2021 the Fire-CAC held multiple virtual meetings that were open to any interested party. In addition, there were numerous virtual specific working group meetings that were also open to any interested parties, to develop, discuss and debate the proposed changes. Related documentation and reports are posted on the FCAC website at: https://www.iccsafe.org/products-and-services/i-codes/code-development/cs/fire-code-action-committee-fcac/

Cost Impact: The code change proposal will not increase or decrease the cost of construction
If the GHS categories were used to inform IFC hazard classification, there would be no change in the cost of construction.

Staff Analysis: A review of the standard proposed for inclusion in the code, UN Rev.7, 2017 UN Recommendations on the Transport of Dangerous Goods, Globally Harmonized System of Classification and Labelling of Chemicals (GHS), Part 2: Physical Hazards, Chapter 2.13 and 2.14, with regard to some of the key ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before March 20, 2021.

F233-21

Public Hearing Results

Committee Action: **As Submitted**

Committee Reason: This proposal was approved based upon the action on F232-21 and due to the need to transition the hazardous materials classifications to the globally harmonized standard (GHS). (Vote: 14-0)

Individual Consideration Agenda

Public Comment CCC01-21:

IFC: TABLE E104.2

Proponents:
Michael O'Brian, representing FCAC (fcac@iccsafe.org)
requests As Modified by Public Comment

Modify as follows:

2021 International Fire Code

TABLE E104.2 IFC AND GHS HAZARD DEFINITION COMPARISON

Portions of table not shown remain unchanged.

IFC MATERIAL	IFC CLASS	IFC DEFINITION	GHS 2017 (REV 7) CLASSIFICATION (H-CODE AND CATEGORY); HAZARD STATEMENT;DEFINITION
Organic peroxide	V	Describes those formulations that burn with less intensity than ordinary combustibles or do not sustain combustion and that pose no reactivity hazard.	~~H240,~~ Organic Peroxide, Type G; ~~Heating may cause a fire:~~ (g) Any organic peroxide which, in laboratory testing, neither detonates in the cavitated state nor deflagrates at all and shows no effect when heated under confinement nor any explosive power, provided that it is thermally stable (self-accelerating decomposition temperature is 60°C or higher for a 50 kg package), and, for liquid mixtures, a diluent having a boiling point of not less than 150 °C is used for desensitization, will be defined as organic peroxide TYPE G. If the organic peroxide is not thermally stable or a diluent having a boiling point less than 150 °C is used for desensitization, it shall be defined as organic peroxide TYPE F.

a. The table illustrates that there is not perfect alignment between the IFC and GHS definitions and provides information on similarities and difference between the two classification systems.

Commenter's Reason: This public comment is simply correcting an error in correlation from GHS to this table.

Cost Impact: The net effect of the public comment and code change proposal will not increase or decrease the cost of construction
Simply an editorial clean up to more closely match GHS. Cost impact is unchanged from the original proposal.

Public Comment# 2309