



PROJECT MANUAL FOR:

**WEST FIELD SR. SEMINARY**

Ogden, UT

PROPERTY NUMBER: 501-9820

PROJECT NUMBER: 2154

DATE: 01.06.23

**STUDIO 333 ARCHITECTS**

333 24TH STREET  
OGDEN, UT 84401  
801.394.3033

STUDIO333ARCHITECTS.COM

SET NO.

# STUDIO 333

## ARCHITECT

STUDIO 333 ARCHITECTS  
333 24<sup>TH</sup> Street  
Ogden, Utah 84401  
801.394.3033

## CIVIL

GARDNER ENGINEERING  
PO Box 3725  
Ogden, UTAH 84409  
801.476.0202

## STRUCTURAL

ARW ENGINEERS  
1594 W PARK CIRCLE  
OGDEN, UT 84404  
801.782.6008

## ELECTRICAL & TECHNOLOGY

SPECTRUM ENGINEERS  
324 S. STATE ST. STE 400  
SALT LAKE CITY, UTAH 84111  
800.678.7077

## MECHANICAL

OLSEN & PETERSON ENGINEERING  
14 E 2700 S  
SALT LAKE CITY, UTAH 84115  
801.699.8549

## LANDSCAPE

E.A. LYMAN & Associates  
8188 Highland Dr. STE D7  
SANDY, UTAH 84093  
801.943.6564

ARCHITECT'S SEAL:



## WEST FIELD SENIOR SEMINARY

2200 SOUTH 4300 WEST  
OGDEN, UTAH 84404

PROPERTY NUMBER: 501-9820  
PROJECT NUMBER: 2154

DATE: 01.06.23

### STUDIO 333 ARCHITECTS

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## INVITATION TO BID (U.S.)

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**1. PROJECT:**

West Field Sr. Seminary

**2. LOCATION:**

2200 South 4300 West  
Ogden, Utah

**3. OWNER:**

The Church of Jesus Christ of Latter-day Saints, a Utah corporation sole  
c/o  
Utah Ogden PM Office  
PO Box 13328  
Ogden, Utah 84412

**4. CONSULTANT:**

Studio 333 Architects  
333 24<sup>th</sup> Street  
Ogden, Utah 84401

**5. DESCRIPTION OF PROJECT:**

- A. A 14,629 S.F. single-story, wood-framed, 8-classroom custom seminary building.
- B. Products or systems may be provided under a Value Managed Relationship (VMR) the Owner has negotiated with the supplier. VMR products and systems are indicated as such in the Specifications.

**6. TYPE OF BID:** Bids will be on a lump-sum basis. Segregated bids will not be accepted.

**7. TIME OF SUBSTANTIAL COMPLETION:** The time limit for substantial completion of this work will be Three Hundred (300) calendar days and will be as noted in the Agreement.

**8. BID OPENING:** Sealed bids will be received via Conslog Bidding software until \_\_\_\_\_.  
Bids will be publicly opened at that time.

**9. BIDDING DOCUMENTS:**

- A. Bidding Documents may be examined at the following plan room locations:
  - 1. McGraw-Hill Construction Dodge at: [www.construction.com/projectcenter/](http://www.construction.com/projectcenter/)
  - 2. Mountainlands Plan Room - SLC  
583 West 3560 South Ste 4  
Salt Lake City, Utah 84115  
801-288-1188  
Fax 801-288-1184
- B. Bidding Documents may be obtained at the Architect's office and are to be returned in good condition within five days of bid opening.

**10. BID BOND:** Bid security in the amount of 5 percent (5%) of the bid will accompany each bid in accordance with the Instruction to Bidders.

11. **BIDDER'S QUALIFICATIONS:** Bidding by the General Contractors will be by invitation only.
12. **OWNER'S RIGHT TO REJECT BIDS:** The Owner reserves the right to reject any or all bids and to waive any irregularity therein.

**END OF DOCUMENT**

## INSTRUCTIONS TO BIDDERS (U.S.)

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### 1. DEFINITIONS:

- A. The definitions set forth in Section 1 of the General Conditions are applicable to the documents included under Bidding Requirements.
- B. Bidding Documents include the Bidding Requirements and the proposed Contract Documents. The proposed Contract Documents consist of the documents identified as Contract Documents in the Form of Agreement, except for Modifications. The Bidding Requirements are those documents identified as such in the proposed Project Manual.
- C. Addenda are written or graphic documents issued by the Architect prior to execution of the Contract which modify or interpret the Bidding Documents. They become part of the Contract Documents as noted in the Form of Agreement upon execution of the Contract.

### 2. BIDDER'S REPRESENTATIONS:

- A. By submitting a bid, the bidder represents that
  - 1) Bidder has carefully studied and compared the Bidding Documents with each other. Bidder understands the Bidding Documents and the bid is fully in accordance with the requirements of those documents,
  - 2) Bidder has thoroughly examined the site, has become familiar with local conditions which might directly or indirectly affect the contract work, and has correlated its personal observations with the requirements of the proposed Contract Documents, and
  - 3) Bid is based on the materials, equipment, and systems required by the Bidding Documents without exception.

### 3. BIDDING DOCUMENTS:

- A. Copies
  - 1) Bidding Documents may be obtained as set forth in the Invitation to Bid.
  - 2) Partial sets of Bidding Documents will not be issued.
  - 3) Bidders will use complete sets of Bidding Documents in preparing bids and make certain that those submitting sub-bids to them have access to all portions of the documents that pertain to the work covered by sub-bid, including General Conditions, Supplementary Conditions, and Division 01. Bidder assumes full responsibility for errors or misinterpretations resulting from use of partial sets of Bidding Documents by itself or any sub-bidder.
- B. Interpretation or Correction of Bidding Documents
  - 1) Bidders will request interpretation or correction of any apparent errors, discrepancies and omissions in the Bidding Documents.
  - 2) Corrections or changes to Bidding Documents will be made by written addenda.
- C. Substitutions and Equal Products
  - 1) Generally speaking, substitutions for specified products and systems, as defined in the Uniform Commercial Code, are not acceptable. However, equal products may be approved upon compliance with Contract Document requirements.
  - 2) The terms *'Acceptable Manufacturers'*, *'Approved Manufacturers'*, *'Suppliers'*, *'Installers'* and *'VMR (Value Managed Relationship) Manufacturers / Suppliers / Installers'* are used throughout the Project Manual to differentiate among the options available to Contractor regarding specified products, manufacturers, and suppliers. See Section 016000 for options available regarding acceptance of equal products.

- 3) Base bid only on materials, equipment, systems, suppliers or performance qualities specified in the Bidding Documents.
  - 4) Architect is only authorized to consider requests for approval of equal products to replace specified products in Sections where the heading '*Acceptable Manufacturers*' is used and statement, '*Equal as approved by Architect before bidding. See Section 016000*' or '*Equal as approved by Architect before installation. See Section 016000*,' appears. In Sections where the afore-mentioned statements do not appear and a different heading is used, Architect is authorized as Owner's representative to decline consideration of requests for approval of equal products. Approvals of equal products in such Sections must be made by Owner and will generally be for subsequent Projects.
- D. Addenda - Addenda will be sent to bidders and to locations where Bidding Documents are on file no later than one week prior to bid opening or by fax no later than 48 hours prior to bid opening.

#### 4. BIDDING PROCEDURES:

##### A. Form and Style of Bids

- 1) Use Owner's Conslog Bidding App.
- 2) Fill in all blanks on Bid Form.
- 3) Bids will bear no information other than that requested on bid form. Do not delete from or add to the information requested on the bid form.

##### B. Bid Security

- 1) Each bid will be accompanied by a bid bond naming Owner, as listed in the Agreement, as obligee. If Bidder refuses to enter into a Contract or fails to provide bonds and insurance required by the General Conditions, amount of bid security will be forfeited to Owner as liquidated damages, not as a penalty.
- 2) Bid bond will be issued by a surety company meeting requirements of the General Conditions for surety companies providing bonds and will be submitted on AIA Document A310, Bid Bond or AIA authorized equivalent provided by surety company. The attorney-in-fact who executes the bond on behalf of the surety will affix to the bond a certified and current copy of the power of attorney.
- 3) Owner may retain bid security of bidders to whom an award is being considered until -
  - a. Contract has been executed and bonds have been furnished,
  - b. Specified time has elapsed so bids may be withdrawn, or
  - c. All bids have been rejected.

##### C. Submission of Bids

- 1) Submit bid via Conslog Bidding Software.

BID FOR

WEST FIELD SR. SEMINARY  
501982021010101

- 2) It is bidder's sole responsibility to see that its bid is received at specified time. Bids received after specified bid opening time will not be accepted.
- 3) No oral, facsimile transmitted, telegraphic, or telephonic bids, modifications, or cancellations will be considered.

##### D. Modification or Withdrawal of Bid

- 1) Bidder guarantees there will be no revisions or withdrawal of bid amount for 45 days after bid opening.
- 2) Prior to bid opening, bidders may withdraw bid.

**5. CONSIDERATION OF BIDS:**

- A. Opening of Bids - See Invitation to Bid.
- B. Rejection of Bids - Owner reserves right to reject any or all bids and to waive any irregularity therein.
- C. Acceptance of Bid
  - 1) No bidder will consider itself under contract after opening and reading of bids until Agreement between Owner and Contractor is fully executed.
  - 2) Bidder's past performance, organization, subcontractor selection, equipment, and ability to perform and complete its contract in manner and within time specified, together with amount of bid, will be elements considered in award of contract.

**6. POST-BID INFORMATION:**

- A. The conditionally accepted bidder submitting a bid involving subcontractors will submit its list of proposed subcontractors in a meeting to be held immediately after bid opening.

**7. PERFORMANCE BOND AND PAYMENT BOND:**

- A. Bond Requirements - Performance Bond and Labor and Material Payment bond will be required for this Project as specified in the General Conditions.
- B. Time of Delivery of Bonds - Bonds will be delivered to Owner with Agreement signed by bidder.

**8. FORM OF AGREEMENT BETWEEN OWNER AND CONTRACTOR:**

- A. Agreement form will be "Agreement Between Owner and Contractor for a Fixed Sum (U.S.)" provided by Owner.

**9. MISCELLANEOUS:**

- A. Pre-Bid Conference
  - 1) A pre-bid conference will be held at a time and place to be announced.
- B. Liquidated Damages - Conditions governing liquidated damages are specified in the General Conditions and in the Supplementary Conditions.
- C. Exemption from local taxes - See Supplementary Conditions

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## INFORMATION AVAILABLE TO BIDDERS (U.S.)

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### 1. GEOTECHNICAL DATA

#### A. Geotechnical Report -

- 1) Owner has secured the services of a geotechnical engineer to aid in design of the Project. Following conditions apply -
  - a) A geotechnical report has been prepared by Applied Geotechnical Engineering Consultants (AGEC), referred to as the Geotechnical Engineer.
  - b) A copy of this report will be issued to each invited Contractor.
  - c) This report was obtained solely for use in design by Consultant and is not a part of the Contract Documents. It is not intended that Contractor rely on geotechnical engineer's report.
  - d) Reports are provided for Contractor's information but are not a warranty of subsurface conditions.
- 2) Prior to bidding, Contractor may make his own subsurface investigations to satisfy himself with site and subsurface conditions.

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## SUBCONTRACTORS AND MAJOR MATERIALS SUPPLIERS LIST

Project Name: West Field Sr. Seminary Date: \_\_\_\_\_

Stake: Ogden Utah West Stake Project No: 501-9820

General Contractor: \_\_\_\_\_

General Contractor is to provide the names of the following subcontractors and suppliers to the Owner's Project Manager immediately following the bid opening:

### VMR SUBCONTRACTORS

Doors, Frames & Hardware \_\_\_\_\_

Storefronts \_\_\_\_\_

Millwork \_\_\_\_\_

### SUBCONTRACTORS AND SUPPLIERS

Aggregate Piers \_\_\_\_\_

Grading / Site work \_\_\_\_\_

Site Utilities \_\_\_\_\_

Termite Control \_\_\_\_\_

Site Concrete \_\_\_\_\_

Architectural Concrete \_\_\_\_\_

Irrigation System \_\_\_\_\_

Landscaping \_\_\_\_\_

Building Concrete \_\_\_\_\_

Masonry \_\_\_\_\_

Structural Steel \_\_\_\_\_

Framing \_\_\_\_\_

Trusses \_\_\_\_\_

Insulation \_\_\_\_\_

Roofing \_\_\_\_\_

Soffit \_\_\_\_\_

Glass Partition System \_\_\_\_\_

Drywall \_\_\_\_\_  
Ceramic Tile \_\_\_\_\_  
Acoustical Tile \_\_\_\_\_  
Painting \_\_\_\_\_  
Wall Graphics/Applied Films \_\_\_\_\_  
Carpeting \_\_\_\_\_  
Fire Sprinklers \_\_\_\_\_  
Plumbing \_\_\_\_\_  
HVAC \_\_\_\_\_  
Electrical \_\_\_\_\_  
Controls \_\_\_\_\_  
Audio/Video \_\_\_\_\_

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## EQUAL PRODUCT APPROVAL REQUEST FORM (U.S.)

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Project Name: West Field Sr. Seminary Request Number: \_\_\_\_\_

TO: \_\_\_\_\_

FROM: \_\_\_\_\_

BID DATE: \_\_\_\_\_

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A proposed product is not legally approved and cannot legally be included in a bid or used in the Work until it appears in an Addendum or other Contract Modification as defined in the General Conditions. See Instructions To Bidders Paragraph 3.C, General Conditions, and Section 01 6000.

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### PROPOSED EQUAL PRODUCT:

Specification Section: \_\_\_\_\_

Specified Products: \_\_\_\_\_

Proposed Product: \_\_\_\_\_

The Undersigned certifies:

1. Proposed equal product has been fully investigated and determined to be equal or superior in all respects to specified products.
2. Same warranty will be furnished for proposed equal product as for specified products.
3. Same maintenance service and source of replacement parts, as applicable, is available.
4. Proposed equal product will have no adverse effect on other trades and will not affect or delay progress schedule.
5. Proposed equal product does not affect dimensions and functional clearances.

### ATTACHMENTS:

Include the following attachments -

1. Copy of the Project Manual Section where the proposed equal product would be specified, rewritten or red-lined to include any changes necessary to correctly specify the proposed equal product. Identify completely changes necessary to the original Project Manual Section.
2. Copies of details, elevations, cross-sections, and other elements of the Project Drawings redone as necessary to show changes necessary to accommodate proposed equal product. Identify completely the changes from the original Drawings.
3. Complete product literature and technical data, installation and maintenance instructions, test results, and other information required to show complete conformance with requirements of the Contract Documents.

### SIGNED:

\_\_\_\_\_  
Printed Name \_\_\_\_\_

Company \_\_\_\_\_

Address \_\_\_\_\_

City, State, Zip Code \_\_\_\_\_

Telephone \_\_\_\_\_ Fax \_\_\_\_\_

**REVIEW COMMENTS:**

\_\_\_\_\_ Accepted. See Addenda Number \_\_\_\_\_.

\_\_\_\_\_ Submission not in compliance with instructions. Respond to attached comments and resubmit.

\_\_\_\_\_ Proposed equal product not acceptable. Use specified products.

\_\_\_\_\_ Not Reviewed. Submission received too late. Use specified products.

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**ADDITIONAL COMMENTS:**

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BY: \_\_\_\_\_ DATE: \_\_\_\_\_





# AGREEMENT BETWEEN OWNER AND CONTRACTOR FOR A FIXED SUM (U.S.)

The Church of Jesus Christ of Latter-day Saints, a Utah corporation sole ("Owner") and \_\_\_\_\_ ("Contractor") hereby enter into this *Agreement Between Owner and Contractor for a Fixed Sum (U.S.)* ("Agreement") and agree as follows:

1. **Property/Project.**

Property/Project Number:  
Property Address ("Project Site"):

Project Type:  
Project Name ("Project"):

Stake Name:

2. **Scope of the Work.** Contractor will furnish all labor, materials, equipment, construction, and services necessary to complete the Work in accordance with the Contract Documents.

3. **Contract Documents.**

a. The Contract Documents consist of:

- 1) This Agreement;
- 2) The General Conditions for a Fixed Sum (U.S.), the Supplementary Conditions for a Fixed Sum (U.S.), and the Specifications (Divisions 01 through 49) contained in the Project Manual entitled \_\_\_\_\_, dated \_\_\_\_\_ and prepared by \_\_\_\_\_ ("Architect");
- 3) The Drawings prepared by Architect entitled \_\_\_\_\_, sheet numbers \_\_\_\_\_, dated \_\_\_\_\_;
- 4) Addendum No. \_\_\_\_\_ dated \_\_\_\_\_; and
- 5) All Modifications to the Contract Documents.

b. The Contract Documents are incorporated into this Agreement by reference as if fully set forth herein.

c. The definitions set forth in the General Conditions for a Fixed Sum (U.S.) will apply to the Contract Documents.

d. The Contract Documents contain the entire and integrated agreement between the parties hereto and supersede all prior negotiations, representations, or agreements, either written or oral.

e. Modifications or other amendments to the Contract Documents must be in writing and as provided in the General Conditions for a Fixed Sum (U.S.).

4. **Time of Commencement and Substantial Completion.**

a. Contractor will commence the Work on the date for commencement set forth in the Written Notice to proceed from Owner to Contractor.

b. Contractor will achieve Substantial Completion and have the Work ready for Owner's inspection no later than \_\_\_\_\_ (\_\_\_\_\_) days from the date of commencement set forth in the Written Notice to proceed from Owner to Contractor, as adjusted in accordance with the Contract Documents.

c. Time is of the essence.

5. **Contract Sum.**

a. Owner will pay Contractor for performance of Contractor's obligations under the Contract Documents the Contract Sum in the amount of \_\_\_\_\_ Dollars (\$\_\_\_\_\_), subject to additions and deductions as provided in the Contract Documents.

b. Owner will make payments to Contractor in accordance with the Contract Documents.

6. **Independent Contractor Relationship.** Contractor is an independent contractor and is not the agent or employee of Owner.

7. **Assignment.** Neither party to this Agreement will assign any right or obligation hereunder without the prior written consent of the other, which consent may be granted or withheld in such party's absolute discretion. Contractor will not assign moneys due or to become due to Contractor hereunder, nor will Contractor pledge the credit of Owner or bind Owner to any third party.

- 8. **Notice.** The parties designate the addresses, facsimile numbers, and email addresses as set forth in the signature blocks below to be used for sending Written Notice to the other party:
- 9. **Effective Date.** The effective date of this Agreement is the date indicated by the Owner's signature.

<b>OWNER:</b> The Church of Jesus Christ of Latter-day Saints, a Utah corporation sole	<b>CONTRACTOR:</b> (company)
Signature:	Signature:
Print Name:	Print Name:
Title:	Title:
Address:	Address:
Telephone No:	Telephone No:
Facsimile No:	Facsimile No:
Email:	Email:
Effective Date:	Fed. I.D. or SSN:
	License No:
Reviewed By:	Date Signed:

FORM OF AGREEMENT

# GENERAL CONDITIONS

## For a Fixed Sum (U.S.)

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### SECTION 1 - GENERAL PROVISIONS

#### 1.1 DEFINITIONS

- A. Adverse Weather: weather conditions that are seasonally abnormal and could not have been reasonably anticipated.
- B. Agreement: the document entitled "Agreement Between Owner and Contractor for a Fixed Sum (U.S.), executed by Owner and Contractor for performance of the Work.
- C. Architect: the entity identified as such in the Agreement.
- D. Change In The Work: a modification to the requirements of the Contract Documents or a delay in Substantial Completion resulting from an instruction from Owner or Architect to Contractor or from another event or circumstance.
- E. Change Order: a written instrument prepared by Architect and signed by Owner, Contractor, and Architect stating their agreement upon the following: (1) the occurrence of a Change in the Work; (2) the amount of the adjustment, if any, in the Contract Sum as a result of the Change in the Work; and (3) the extent of the adjustment, if any, in the Contract Time as a result of the Change in the Work.
- F. Construction Change Directive: a written order prepared by Architect and signed by Architect and Owner which: (1) orders a Change in the Work if the terms of a Change Order cannot be agreed upon prior to performance of a Change in the Work described in Section 7.1 or after occurrence of an event or circumstance described in Section 7.2; and (2) states a proposed basis for adjustment, if any, in the Contract Sum, the Contract Time, or both, resulting from the Change in the Work.
- G. Contract Documents: the documents identified as such in the Agreement.
- H. Contract Sum: the total amount set forth in the Agreement payable by Owner to Contractor for performance of the Work.
- I. Contract Time: the period of time set forth in the Agreement for the Substantial Completion of the Work.
- J. Contractor: the entity identified as such in the Agreement.
- K. Day: calendar day unless otherwise specifically defined.
- L. Direct Costs: actual costs for labor, materials, equipment, insurance, bonds, subcontract costs and onsite supervision relating to the Project. They do not include labor costs for project managers or other off-site administration.
- M. Drawings: the documents identified as such in the Agreement.
- N. Field Change: a written order prepared by Architect and signed by Architect and Contractor for a minor Change in the Work consistent with the general intent of the Contract Documents costing \$1,000 or less, resulting in no time extension, and which is necessary to avoid delaying the Work.
- O. Modification: a written amendment to the Contract Documents in the form of a:
  - 1. Change Order;
  - 2. Construction Change Directive; or
  - 3. Field Change.
- P. Owner: the entity identified as such in the Agreement.
- Q. Project: the total construction designed by Architect of which the Work performed under the Contract Documents may be the whole or a part.

- R. Product Data: standard illustrations, schedules, performance charts, instructions, brochures, diagrams, and other information furnished by Contractor to illustrate details regarding materials or equipment to be used in the Work, or the manner of installation, operation, or maintenance of such materials or equipment.
- S. Project Manual: the document identified as such in the Agreement.
- T. Samples And Mock-ups: physical examples that illustrate materials, equipment, or workmanship and establish standards by which the Work will be judged.
- U. Shop Drawings: drawings, diagrams, illustrations, schedules, performance charts, fabrication and installation drawings, setting diagrams, patterns, templates, and other data which illustrate some portion of the Work and confirm dimensions and conformance to the Contract Documents specially prepared by Contractor or any Subcontractor, manufacturer, supplier, or distributor.
- V. Specifications: the documents identified as such in the Agreement.
- W. Subcontractor: any entity supplying labor, materials, equipment, construction or services for the Work under separate contract with Contractor or any other Subcontractor.
- X. Submittals: Shop Drawings, Product Data, Samples and Mock-ups and any other documents or items furnished by Contractor or its Subcontractors to Owner or Architect to demonstrate how any portion of the Work will be accomplished or the type of materials or products that will be used in the Work.
- Y. Substantial Completion: Completion of the Work to a point where Owner can use the Work for its intended purposes. The date of Substantial Completion is the date certified as such by Architect in accordance with the Contract Documents.
- Z. Work: all labor, materials, equipment, construction, and services required by the Contract Documents.
- AA. Written Notice: notice in writing given from one party to the other at the addresses or facsimile numbers listed in the Agreement, or at such other addresses or facsimile numbers as the parties will designate from time to time by Written Notice, and will be effective at the earliest of:
  1. The date of personal delivery to the other party with signed acknowledgment of receipt; or
  2. The date sent by facsimile transmission to the other party provided receipt of the facsimile is verified by an electronic confirmation report by the party sending the facsimile transmission and further provided that a confirmation copy is sent to the other party by courier or by registered or certified mail within twenty-four (24) hours after the time and date of the facsimile transmission; or
  3. The date of receipt by the other party as stated on the return receipt if sent by registered or certified mail, or by courier.

## 1.2 CORRELATION AND INTENT OF CONTRACT DOCUMENTS

- A. The intent of the Contract Documents is to require Contractor to provide all labor, materials, equipment, construction, and services necessary for the proper execution and completion of the Work. The Contract Documents are complementary and what is required by any one will be as binding as if required by all. Contractor will perform the Work in accordance with the requirements expressly set forth in or reasonably inferable from the Contract Documents.
- B. The organization of the Contract Documents is not intended to control Contractor in dividing the Work among Subcontractors or to establish the extent of the Work to be performed by any trade.
- C. Words used in the Contract Documents that have well known technical or trade meanings are used therein in accordance with such recognized meanings.
- D. In the interest of brevity, the Contract Documents may omit modifying words such as "all" and "any" and articles such as "the" and "an," but the fact that a modifier or an article is absent from one statement and appears in another is not intended to affect the interpretation of either statement.

## 1.3 OWNERSHIP AND USE OF CONTRACT DOCUMENTS

The Drawings, the Project Manual, and copies thereof are the property of Owner. Contractor will not use these documents on any other project. Contractor may retain one copy of the Drawings and the Project Manual as a contract record set and will return or destroy all remaining copies following final completion of the Work.

## 1.4 PUBLIC STATEMENTS REGARDING PROJECT

Contractor will not make any statements or provide any information to the media about the Project without the prior written consent of Owner. If Contractor receives any requests for information from media, Contractor will refer such requests to Owner.

## 1.5 OWNERSHIP AND USE OF RENDERINGS AND PHOTOGRAPHS

Renderings representing the Work are the property of Owner. All photographs of the Work, whether taken during performance of the Work or at completion, are the property of the Owner. The Owner reserves all rights including copyrights to renderings and photographs of the Work. No renderings or photographs shall be used or distributed without written consent of the Owner.

## **1.6 NO COMMERCIAL USE OF TRANSACTION OR RELATIONSHIP**

Without the prior written consent of Owner, which Owner may grant or withhold in its sole discretion, neither Contractor nor Contractor's affiliates, officers, directors, agents, representatives, shareholders, members, Subcontractors, Sub-subcontractors or employees shall make any private commercial use of their relationship to Owner or the Project, including, without limitation:

- A. By referring to this Agreement, Owner, or the Project verbally or in any sales, marketing or other literature, letters, client lists, press releases, brochures or other written materials except as may be necessary for Contractor to perform Contractor's obligations under the terms of this Agreement;
- B. By using or allowing the use of any photographs of the Project or any part thereof, or of any service marks, trademarks or trade names or other intellectual property now or which may hereafter be associated with, owned by or licensed by Owner in connection with any service or product; or
- C. By contracting with or receiving money or anything of value from any person or commercial entity to facilitate such person or entity obtaining any type of commercial identification, advertising or visibility in connection with the Project.

Notwithstanding the foregoing, Contractor may include a reference to Owner and the services and equipment provided under this Agreement in a professional résumé or other similar listing of Contractor's references without seeking Owner's written consent in each instance; provided, that such reference to Owner, the services and equipment is included with at least several other similar references and is given no more prominence than such other references.

## **1.7 CONFIDENTIALITY / PROPERTY RIGHTS**

- A. Owner will retain ownership and intellectual property rights in all plans, designs, drawings, documents, concepts, and materials provided by or on behalf of Owner to Contractor and to all work products of Contractor for or relative to Work performed under this Agreement, such products, services, and Work of Contractor constituting works made for hire. Contractor will not reuse any portions of such items provided by Owner or developed by Contractor for Owner pursuant to this Agreement, or disclose any such items to any third party without the prior written consent of Owner. Owner may withhold its consent in its' absolute discretion.
- B. In addition, Contractor shall ensure that Contractor, Subcontractors, and the employees, agents and representatives of Contractor and its Subcontractors maintain in strict confidence, and shall use and disclose only as authorized by Owner all Confidential Information of Owner that Contractor receives in connection with the performance of this Agreement. Notwithstanding the foregoing, Contractor may use and disclose any information to the extent required by an order of any court or governmental authority, but only after it has notified Owner and Owner has had an opportunity to obtain reasonable protection for such information in connection with such disclosure. For purposes of this Agreement, "Confidential Information" means:
  - 1. The name or address of any affiliate, customer or contractor of Owner or any information concerning the transactions of any such person with Owner;
  - 2. Any information relating to contracts, agreements, business plans, budgets or other financial information of Owner to the extent such information has not been made available to the public by the Owner; and
  - 3. Any other information that is marked or noted as confidential by the Owner at the time of its disclosure.

## **1.8 COMPLY WITH INTELLECTUAL PROPERTY RIGHTS OF OTHERS**

Contractor represents and warrants that no Work (with its means, methods, goods, and services attendant thereto), provided to Owner will infringe or violate any right of any third party and that Owner may use and exploit such Work, means, methods, goods, and services without liability or obligation to any person or entity (specifically and without limitation, such Work, means, methods, goods, and services will not violate rights under any patent, copyright, trademark, or other intellectual property right or application for the same).

## **SECTION 2 - OWNER**

### **2.1 OWNER'S DESIGNATED REPRESENTATIVE**

Owner will designate in writing a representative who will have express authority to bind Owner with respect to all matters requiring Owner's approval or authorization.

### **2.2 INFORMATION AND SERVICES REQUIRED OF OWNER**

- A. Owner will be responsible for establishment of property lines and benchmarks for grading.
- B. Owner will furnish to Contractor any information or services it is required to furnish under the Contract Documents with reasonable promptness to avoid delay in the orderly progress of the Work.
- C. Owner will furnish to Contractor a reasonable number of copies of the Drawings, the Project Manual, and the Addenda.

### **2.3 OWNER'S RIGHT TO INSPECT THE WORK**

Owner and its representatives will have the right to inspect any portion of the Work wherever located at any time.

### **2.4 OWNER'S RIGHT TO STOP THE WORK**

If Contractor fails to carry out the Work in accordance with the Contract Documents or fails to correct Work which is not in accordance with the Contract Documents in a timely manner, Owner may order Contractor in writing to stop the Work, or any portion thereof, until the cause for that order has been eliminated.

## **SECTION 3 - CONTRACTOR**

### **3.1 REVIEW OF CONTRACT DOCUMENTS AND FIELD CONDITIONS BY CONTRACTOR**

- A. By executing the Agreement, Contractor represents that it has visited the Project site, familiarized itself with the local conditions under which the Work is to be performed, and correlated its own observations with the requirements of the Contract Documents.
- B. Contractor will carefully review and compare the Contract Documents and any other available information relating to the Project prior to commencing and during performance of each portion of the Work and will immediately report to Architect any errors, inconsistencies, and omissions it discovers.
- C. Should Contractor or any of its Subcontractors become aware of any question regarding the meaning or intent of any part of the Contract Documents prior to commencing that portion of the Work about which there is a question, Contractor will request an interpretation or clarification from Architect before proceeding. Contractor proceeds at its own risk if it proceeds with the Work without first making such a request and receiving an interpretation or clarification from Architect. If neither Contractor nor its Subcontractors become aware of the question until after work on the relevant portion of the Work has commenced, then the following precedence will govern for purposes of determining whether resolution of the question constitutes a Change in the Work:
  - 1. The Agreement takes precedence over all other Contract Documents.
  - 2. The Supplementary Conditions take precedence over the General Conditions.
  - 3. The General Conditions and Supplementary Conditions take precedence over the Drawings and the Specifications.
  - 4. An Addendum or a Modification takes precedence over the document(s) modified by the Addendum or Modification.
  - 5. The Specifications take precedence over the Drawings.
  - 6. Within the Drawings, larger scale drawings take precedence over smaller scale drawings, figured dimensions over scaled dimensions, and noted materials over graphic indications.
- D. Contractor will give Architect notice of any additional drawings, specifications, or instructions required to define the Work in greater detail, or to permit the proper progress of the Work, sufficiently in advance of the need for information so as not to delay the Work.
- E. It is not Contractor's responsibility to ascertain that the Contract Documents are in accordance with requirements of applicable laws, statutes, ordinances, building codes, rules and regulations. However, if Contractor observes that portions of the Contract Documents are at variance with those requirements, Contractor will immediately notify Architect in writing. Contractor will not proceed unless Owner and/or Architect effects Modifications to the Contract Documents required for compliance with such requirements. Contractor will be fully responsible for any work knowingly performed contrary to such requirements and will fully indemnify Owner against loss and bear all costs and penalties arising therefrom.
- F. Contractor will take field measurements and verify field conditions and will compare such field measurements and conditions and other information known to Contractor with the Contract Documents before ordering any materials or commencing construction activities. Contractor will immediately report errors, inconsistencies, and omissions that it discovers to Architect. If Contractor orders materials or commences construction activities before taking field measurements and verifying field conditions, Contractor will not be entitled to any compensation for additional costs to Contractor resulting from field measurements or conditions different from those anticipated by Contractor which would have been avoided had Contractor taken field measurements and verified field conditions prior to ordering the materials or commencing construction activities.
- G. If site conditions indicated in the Contract Documents or other information provided by Owner or Architect to Contractor differ materially from those Contractor encounters in performance of the Work, Contractor will immediately notify Architect in writing of such differing site conditions.
- H. Where the Contract Documents require the Contractor to provide professional services for architecture or engineering, the Contractor shall cause such services to be performed by appropriately licensed professionals.

### **3.2 SUPERVISION OF CONSTRUCTION PROCEDURES**

- A. Contractor will supervise and direct the Work. Contractor will be solely responsible for all construction means, methods, techniques, sequences, and procedures and for coordinating all portions of the Work. All loss, damage, liability, or cost of correcting defective work arising from the use of any construction means, methods, techniques, sequences or procedures will be borne by Contractor, notwithstanding that such construction means, methods, techniques, sequences or procedures are referred to, indicated or implied by the Contract Documents, unless Contractor has given timely notice to Owner and Architect in writing that such means, methods, techniques, sequences or procedures are not safe or suitable, and Owner has then instructed Contractor in writing to proceed at Owner's risk.
- B. Contractor will utilize its best skill, efforts, and judgment to provide efficient business administration and supervision, to furnish at all times an adequate supply of workers and materials, and to perform the Work in an expeditious and economical manner consistent with the interests of Owner.
- C. Contractor will be responsible for:
  - 1. The proper observance of property lines and set back requirements as shown in the Contract Documents;

- 2. The location and layout of the Work as shown in the Contract Documents with respect to the position of the Work on the property and the elevation of the Work in relation to grade; and
  - 3. Setting and maintaining construction stakes.
- D. Contractor will be responsible to Owner for the acts and omissions of its employees and Subcontractors as well as persons either directly or indirectly employed by Subcontractors.
  - E. Contractor will not be relieved of its obligation to perform the Work in accordance with the Contract Documents as a result of any tests, inspections, or approvals by Owner, Architect or their consultants.
  - F. Contractor will be responsible for inspection of portions of the Work already completed to determine that such portions are in proper condition to receive subsequent portions of the Work.
  - G. Contractor recognizes that the Project site and the surrounding area is frequently visited by the public and is important to Owner's image and function and will maintain the premises free from debris and waste materials resulting from Construction. At the completion of Construction, Contractor shall promptly remove construction equipment, tools, surplus materials, waste materials and debris.

### **3.3 LABOR AND MATERIALS**

- A. Unless otherwise provided in the Contract Documents, Contractor will provide and pay for all labor, materials, equipment, tools, water, heat, utilities, transportation, and other facilities and services necessary for the proper execution and completion of the Work.
- B. Contractor will at all times enforce strict discipline and good order among those performing the Work and will not permit employment of any unfit person or anyone not skilled in the tasks assigned to them.
- C. Contractor is fully responsible for the Project and all materials and work connected therewith until Owner has accepted the Work in writing. Contractor will replace or repair at its own expense any materials or work damaged or stolen, regardless of whether it has received payment for such work or materials from the Owner.
- D. Contractor will remedy all damage or loss to any property caused in whole or in part by Contractor, any Subcontractor, or by anyone for whose acts any of them may be liable.
- E. Contractor will be responsible for determining that all materials furnished for the Work meet all requirements of the Contract Documents. Architect may require Contractor to produce reasonable evidence that a material meets such requirements, such as certified reports of past tests by qualified testing laboratories, reports of studies by qualified experts, or other evidence which, in the opinion of Architect, would lead to a reasonable certainty that any material used, or proposed to be used, in the work meets the requirements of the Contract Documents. All such data will be furnished at Contractor's expense. This provision will not require Contractor to pay for periodic testing of different batches of the same material, unless such testing is specifically required by the Contract Documents to be performed at Contractor's expense.
- F. Contractor will coordinate and supervise the work performed by Subcontractors so that the Work is carried out without conflict between trades and so that no trade, at any time, causes delay to the general progress of the Work. Contractor and all Subcontractors will at all times afford each trade, any separate contractor, or Owner, reasonable opportunity for the installation of Work and the storage of materials.
- G. Contractor warrants to Owner that the materials and equipment furnished for the Work will be new unless otherwise specified by the Contract Documents, and that the Work will be free from defects, and will conform with the requirements of the Contract Documents. Work not conforming to these requirements, including substitutions not properly approved and authorized, may be considered defective in the discretion of Owner. If required by Architect, Contractor will furnish satisfactory evidence as to the kind and quality of the materials and equipment used in performing the Work.
- H. Owner may elect to purchase materials required for the Work. In that event, Contractor will comply with the procedures set forth in the Contract Documents relating to such materials.

### **3.4 COMPLIANCE WITH LAWS**

Contractor will comply with all applicable laws, ordinances, rules, regulations, and orders of any public authorities relating to performance of the Work.

### **3.5 TAXES**

- A. Contractor will pay all sales, use, consumer, payroll, workers compensation, unemployment, old age pension, surtax, and similar taxes assessed in connection with the performance of the Work.
- B. Owner will pay all taxes and assessments on the real property comprising the Project site.

### **3.6 PERMITS AND FEES**

- A. Owner will obtain and pay for all zoning and use permits and permanent easements necessary for completion of the Work.



- B. Contractor will obtain and pay for the building permit, and all other permits, governmental fees, licenses and inspections necessary for the proper execution and completion of the Work.
- C. Contractor will secure any certificates of inspection and of occupancy required by authorities having jurisdiction over the Work. Contractor will deliver these certificates to Architect prior to issuance of the Certificate of Substantial Completion by Architect.

### **3.7 CONTRACTOR'S ON-SITE REPRESENTATIVE**

Contractor will employ a competent representative acceptable to Owner to supervise the performance of the Work. This representative will be designated in writing by Contractor prior to commencement of work and will not be changed prior to final inspection of the Work without prior written consent of Owner. This representative will represent Contractor for all purposes, including communication with Owner.

### **3.8 CONTRACTOR'S CONSTRUCTION SCHEDULES**

- A. Contractor will prepare and submit for Owner's and Architect's information Contractor's construction schedule for the Work in accordance with the requirements of the Contract Documents.
- B. Contractor will prepare and maintain a Submittal schedule which is coordinated with Contractor's construction schedule and sets forth specified times for Architect to review Submittals.

### **3.9 DOCUMENTS AND SUBMITTALS AT THE SITE**

Contractor will keep at the Project site for use by Owner, Architect, or their representatives, a record copy of the Project Manual, the Drawings, all Addenda, and all Modifications. These documents will be maintained in good order and currently marked to record changes and selections made during construction. In addition, Contractor will keep at the Project site one copy of all Submittals.

### **3.10 SUBMITTALS**

- A. Submittals are not Contract Documents and do not alter the requirements of the Contract Documents unless incorporated into the Contract Documents by a Modification.
- B. Contractor will review, approve, and submit to Architect Submittals in accordance with the Contract Documents. By approving Submittals, Contractor represents that it has determined and verified field measurements, field construction criteria, materials, catalog numbers, and similar data, and that it has checked and coordinated each Submittal with the requirements of the Work and of the Contract Documents or will make such determination, verification, check, and coordination prior to commencing the relevant portion of the Work. In reviewing Submittals Architect will be entitled to rely upon Contractor's representation that such information is correct and accurate.
- C. Contractor will inform Architect in writing at the time of submission of any Submittal or portion thereof which deviates from the requirements of the Contract Documents. Contractor will provide Architect with documentation demonstrating to Architect that the Submittal is equal to or better than the specified product or work. Contractor will not be relieved of responsibility for deviations from the requirements of the Contract Documents by Architect's acceptance of a Submittal unless Contractor has informed Architect in writing of the deviation and Architect has incorporated the deviation into the Contract Documents by a Modification.
- D. Contractor will not perform any portions of the Work requiring Submittals until the respective Submittal has been reviewed and accepted in writing by Architect.
- E. When professional certification of performance criteria of materials, systems or equipment is required by the Contract Documents, Owner will be entitled to rely upon such certifications, and neither Owner nor Architect will be expected to make any independent examination with respect thereto.
- F. Submittals not required by the Contract Documents may be returned to Contractor without action.

### **3.11 CUTTING AND PATCHING**

Contractor will be responsible for any cutting, fitting, and patching that may be required to complete the Work and make its parts fit together properly.

### **3.12 ACCESS TO WORK**

Contractor will permit Owner, Architect, their representatives and consultants, access to the Work wherever located at any time.

### **3.13 ROYALTIES AND PATENTS**

Contractor will pay all royalties and license fees required by the Work or by Contractor's chosen method of performing the Work. Contractor will defend and hold Owner harmless from all suits or claims for infringement of any patent, license or other intellectual property rights or any loss on account thereof.

### **3.14 INDEMNIFICATION**

- A. Contractor will indemnify and hold harmless Owner and Owner's representatives, employees, agents, architects, and consultants from and against any and all claims, damages, liability, demands, costs, judgments, awards, settlements, causes of action, losses and expenses (collectively "Claims" or "Claim"), including but not limited to attorney fees, consultant fees, expert fees, copy costs, and other expenses, arising out of or resulting from performance of the Work, attributable to bodily injury, sickness, disease, or death, or to injury to or destruction of real or personal property, including loss of use resulting therefrom, except to the extent that such liability arises out of the negligence of Owner, its representatives, agents, and employees. This indemnity includes, without limitation, indemnification of Owner from all losses or injury to Owner's property, except to the extent that such loss or injury arises out of the negligence of Owner, its representatives, agents, and employees. This indemnity applies, without limitation, to include Claims occurring both during performance of the Work and/or subsequent to completion of the Work. In the event that any Claim is caused in part by a party indemnified hereunder, that party will bear the cost of such Claim to the extent it was the cause thereof. In the event that a claimant asserts a Claim for recovery against any party indemnified hereunder, the party indemnified hereunder may tender the defense of such Claim to Contractor. If Contractor rejects such tender of defense and it is later determined that the negligence of the party indemnified hereunder did not cause all of the Claim, Contractor will reimburse the party indemnified hereunder for all costs and expenses incurred by that party in defending against the Claim. Contractor will not be liable hereunder to indemnify any party for damages resulting from the sole negligence of that party.
- B. In addition to the foregoing, Contractor will be liable to defend Owner in any lawsuit filed by any Subcontractor relating to the Project. Where liens have been filed against Owner's property, Contractor (and/or its bonding company which has issued bonds for the Project) will obtain lien releases and record them in the appropriate county and/or local jurisdiction and provide Owner with a title free and clear from any liens of Subcontractors. In the event that Contractor and/or its bonding company are unable to obtain a lien release, Owner in its absolute discretion may require Contractor to provide a bond around the lien or a bond to discharge the lien, at Contractor's sole expense.
- C. In addition to the foregoing, Contractor will indemnify and hold Owner harmless from any claim of any other contractor resulting from the performance, nonperformance or delay in performance of the Work by Contractor.
- D. The indemnification obligation herein will not be limited by a limitation on the amount or type of damages, compensation or benefits payable by or for Contractor or a Subcontractor under worker's compensation acts, disability benefit acts, or other employee benefit acts.

### **3.15 PROJECT MEETINGS**

Contractor will attend and participate in meetings as required by the Contract Documents.

## **SECTION 4 - ADMINISTRATION OF THE CONTRACT**

### **4.1 ARCHITECT**

In the event that Owner terminates its contractual relationship with Architect, Owner will appoint in writing another architect, whose status under the Contract Documents will be that of the former Architect in all respects.

### **4.2 ARCHITECT'S ADMINISTRATION OF THE CONTRACT**

- A. Architect will make periodic visits to the site to familiarize itself generally with the progress and quality of the Work and to determine if the Work is proceeding in accordance with the Contract Documents. Although Architect is required to make periodic inspections, it is not required to make exhaustive or continuous onsite inspections. On the basis of its observations while at the site, Architect will keep Owner informed of the progress of the Work and will endeavor to guard Owner against defects and deficiencies in the Work. Architect's failure to observe a defect or deficiency in the Work will not relieve Contractor of its duty to perform the Work in accordance with the Contract Documents.
- B. Architect will review Contractor's payment requests and determine the amounts due Contractor in accordance with Section 9.
- C. Communications between Contractor and Owner relating to the Work will be through Architect. Communications between Owner or Contractor with Architect's consultants relating to the Work will be through Architect. Communications between Owner or Architect and subcontractors relating to the Work will be through Contractor. Communications between Contractor and any separate contractor will be through Architect, except as otherwise specified in the Contract Documents.
- D. Owner and/or Architect will have the right to reject and require removal of the following at Contractor's expense:
  1. Any portion of the Work that does not meet the requirements of the Contract Documents.
  2. Any portion of the Work damaged or rendered unsuitable during installation or resulting from failure to exercise proper protection.
- E. Architect will have authority to suspend the Work, with concurrence of Owner, whenever such suspension may be necessary in its reasonable opinion to insure the proper performance of the Work.
- F. Architect will review Contractor's Submittals and will accept or take other appropriate action regarding the Submittals. Architect's review of the Submittals will be for the limited purpose of checking for general conformance with the Contract Documents and will not be conducted for the purpose of determining the accuracy and completeness of details such as dimensions and quantities, or for substantiating instructions for installation or performance of equipment or systems, all of which remain the responsibility of Contractor. Architect's review of Submittals will not relieve Contractor of its obligations under the Contract Documents. Architect's review of Submittals will not constitute acceptance of safety precautions or construction

means, methods, techniques, sequences or procedures. Architect's acceptance of a specific item will not indicate acceptance of an assembly of which the item is a component.

- G. Architect has authority to order Construction Change Directives and Field Changes in accordance with Section 7.
- H. Architect will conduct inspections to determine the dates of Substantial Completion and final completion, will receive and review written guarantees and related documents required by the Contract and assembled by Contractor, and will review and certify or reject Contractor's final payment request.
- I. Architect will be the interpreter of the performance and requirements of the Contract Documents. Architect's interpretations will be in writing or in the form of drawings.
- J. Architect's decisions in matters relating to aesthetic effect will be final if consistent with the Contract Documents and approved by Owner.

## **SECTION 5 - SUBCONTRACTORS**

### **5.1 AWARD OF SUBCONTRACTS FOR PORTIONS OF THE WORK**

- A. Contractor will enter into contracts with Subcontractors to perform all portions of the Work that Contractor does not customarily perform with its own employees.
- B. Contractor will not contract with any Subcontractor who has been rejected by Owner. Contractor will not be required to contract with any Subcontractor against whom it has a reasonable objection.
- C. If Owner rejects any Subcontractor proposed by Contractor, Contractor will propose an acceptable substitute to whom Owner has no reasonable objection.
- D. Contractor will not make any substitution for any Subcontractor that has been accepted by Owner and Architect without the prior written approval of Owner and Architect.

### **5.2 SUBCONTRACTUAL RELATIONS**

- A. Contractor's responsibility for the Work includes the labor and materials of all Subcontractors, including those recommended or approved by Owner. Contractor will be responsible to Owner for proper completion and guarantee of all workmanship and materials under any subcontracts. Any warranties required for such work will be obtained by Contractor in favor of Owner and delivered to Architect. It is expressly understood and agreed that there is no contractual relationship between Owner and any Subcontractor, and under no circumstances will Owner be responsible for the non-performance or financial failure of any Subcontractor or any effects therefrom.
- B. Contractor agrees to pay the Subcontractors promptly upon receipt of payment from Owner for that portion of the funds received which represents the Subcontractor's portion of the Work completed to Contractor's satisfaction for which Owner has made payment.
- C. Contractor will require each Subcontractor to:
  - 1. Be licensed by the state in which the Project is located where such licensing is required by the governing authority;
  - 2. Be bound by the terms of the Contract Documents as far as they are applicable to the Subcontractor's work;
  - 3. Assume toward Contractor the same obligations Contractor has assumed toward Owner, including the prompt payment of its Subcontractors;
  - 4. Submit its applications for payment to Contractor in time to permit Contractor to make timely application to Owner;
  - 5. Execute claim or lien releases or lien waivers for payments made by Contractor; and
  - 6. Make all claims for Changes in the Work to Contractor in the same manner as Contractor is required to make such claims to Owner.

## **SECTION 6 - CONSTRUCTION BY OWNER OR BY SEPARATE CONTRACTORS**

### **6.1 OWNER'S RIGHT TO PERFORM WORK OR AWARD SEPARATE CONTRACTS**

- A. Owner reserves the right to perform work itself or to award separate contracts in connection with the Project.
- B. When separate contracts are awarded, "Contractor" in the Contract Documents in each case will mean the contractor who signs each separate contract.

### **6.2 MUTUAL RESPONSIBILITY**

- A. Contractor will afford other contractors reasonable opportunity to place and store their materials and equipment on site and to perform their work and will properly connect and coordinate its Work with theirs where applicable.
- B. If any part of Contractor's Work depends upon the work of any separate contractor for proper performance or results, Contractor will inspect and promptly report to Architect any apparent discrepancies or defects in such work that render it unsuitable for

proper performance and results. Failure of Contractor to so inspect and report will constitute an acceptance of the work of the separate contractor as fit and proper to receive Contractor's Work, except as to defects not then reasonably discoverable.

- C. Contractor will promptly remedy damage caused by Contractor or any Subcontractor to the completed or partially completed work of other contractors or to the property of Owner or other contractors.

### **6.3 OWNER'S RIGHT TO CLEAN UP**

If a dispute arises among Contractor and separate contractors as to the responsibility under their separate contracts for maintaining the Project free from waste materials and rubbish, Owner may clean the Project, allocate the cost among those responsible as Owner and Architect determine to be just, and withhold such cost from any amounts due or to become due to Contractor.

## **SECTION 7 - CHANGES IN THE WORK**

### **7.1 CHANGES IN THE WORK RESULTING FROM AN INSTRUCTION BY OWNER OR ARCHITECT TO CONTRACTOR**

- A. If Owner or Architect gives Contractor an instruction that modifies the requirements of the Contract Documents or delays Substantial Completion, Contractor may be entitled to an adjustment in the Contract Sum and/or the Contract Time. If compliance with the instruction affects the cost to Contractor to perform the Work, the Contract Sum will be adjusted to reflect the reasonable increase or decrease in cost subject to the conditions set forth in Section 7.1, Paragraphs B through G. If compliance with the instruction delays Substantial Completion, the Contract Time will be extended for a period of time commensurate with such delay subject to the conditions set forth in Section 7.1, Paragraphs B through G and Section 7.3, Paragraph A and Contractor will be paid liquidated damages for the delay as set forth in Section 7.3, Paragraph B.
- B. If Contractor receives an instruction from Owner or Architect that Contractor considers to be a Change in the Work, Contractor, before complying with the instruction, will notify Architect in writing that Contractor considers such instruction to constitute a Change in the Work. If Architect agrees that compliance with the instruction will constitute a Change in the Work, Contractor will furnish a proposal for a Modification in accordance with Section 7.1, Paragraphs C. and D. within ten (10) days.
- C. If Contractor claims that it is entitled to an adjustment in the Contract Sum (including without limitation costs related to a time extension) as a result of an instruction by Owner or Architect, Contractor will furnish a proposal for a Change Order containing a price breakdown itemized as required by Owner. The breakdown will be in sufficient detail to allow Owner to determine any increase or decrease in Direct Costs as a result of compliance with the instruction. Any amount claimed for subcontracts will be supported by a similar price breakdown and will itemize the Subcontractor's profit and overhead charges. Profit and overhead will be subject to the following limitations:
  - 1. The Subcontractor's profit and overhead will not exceed ten (10) percent of its Direct Costs on work performed. Subcontractor's profit and overhead will not exceed five (5) percent on work performed by its sub-subcontractors.
  - 2. Contractor's profit and overhead on work performed by its own crews will not exceed ten (10) percent of its Direct Costs.
  - 3. Contractor's profit and overhead mark up on work performed by its Subcontractors will not exceed five (5) percent of the Subcontractors' charges for such work.
  - 4. Amounts due Owner as a result of a credit change will be the actual net savings to Contractor from the Change in the Work as confirmed by Architect. On credit changes, profit and overhead on the originally estimated work will not be credited back to Owner. If both additions and credits are involved in a single Change in the Work, overhead and profit will be figured on the basis of net increase, if any, related to that Change in the Work.
- D. If Contractor claims that it is entitled to an adjustment in the Contract Time as a result of an instruction from Owner or Architect, Contractor will include in its proposal justification to support Contractor's claim that compliance with the instruction will delay Substantial Completion.
- E. Upon receipt of Contractor's proposal for Modification, Architect and Owner will determine whether to proceed with the Change in the Work. If Architect and Owner determine to proceed with the Change in the Work, they will issue a Change Order, a Construction Change Directive or a Field Change as appropriate.
- F. Contractor agrees that if it complies with an instruction from Owner or Architect without first giving written notice to Architect as provided in Section 7.1., Paragraph B, and receiving a Change Order, Construction Change Directive or Field Change, Contractor will not be entitled to any adjustment in the Contract Sum or the Contract Time as a result of the instruction and waives any claim therefor.
- G. If Contractor is instructed to perform work which it claims constitutes a Change in the Work but which Owner and Architect do not agree constitutes a Change in the Work, Contractor will comply with the instruction. Contractor may submit its claim for adjustment to the Contract Sum, the Contract Time, or both as a dispute pursuant to Section 13 within thirty (30) days after compliance with the instruction. Contractor agrees that if it fails to submit its claim for resolution pursuant to Section 13 within thirty (30) days after compliance with the instruction, then Contractor will not be entitled to any adjustment in the Contract Sum or the Contract Time as a result of the instruction and waives any claim therefor.
- H. Contractor agrees that it is responsible for submitting accurate cost and pricing data to support its Change Order Proposals. Owner will have the right to examine the Contractor's records to verify the accuracy and appropriateness of the pricing data used to price change order proposals.

### **7.2 CHANGE IN THE WORK RESULTING FROM AN EVENT OR CIRCUMSTANCE**

- A. If an event or circumstance other than an instruction from Owner or Architect affects the cost to Contractor of performing the Work or delays Substantial Completion, Contractor may be entitled to an adjustment in the Contract Sum and/or the Contract

Time. If the circumstance or event affects the cost to Contractor to perform the Work and is caused by a willful or negligent act or omission of Owner or Architect, the Contract Sum will be adjusted to reflect the reasonable increase or decrease in Contractor's cost to perform the Work resulting from the event or circumstance, subject to the conditions set forth in Section 7.2, Paragraphs B through F. If the event or circumstance delays Substantial Completion and is described in Section 7.3, Paragraph A, the Contract Time will be extended for a period of time commensurate with such delay subject to the conditions set forth in such section. If the circumstance or event delays Substantial Completion and is caused by a willful or negligent act or omission of Owner or Architect, then Contractor will be compensated for costs incident to the delay in accordance with Section 7.3, Paragraph B. Contractor will not be entitled to any adjustment to the Contract Sum or other damages from Owner as a result of any event or circumstance unless the event or circumstance results from a willful or negligent act or omission of Owner or Architect.

- B. If a Change in the Work results from any event or circumstance caused by the willful or negligent act or omission of Owner or Architect, Contractor will give Owner Written Notice of such event or circumstance within twenty-four (24) hours after commencement of the event or circumstance so that Owner can take such action as is necessary to mitigate the effect of the event or circumstance. Contractor will not be entitled to any adjustment in either the Contract Time or the Contract Sum based on any damages or delays resulting from such event or circumstance during a period more than twenty-four (24) hours prior to Contractor giving such Written Notice to Owner.
- C. Contractor will submit in writing any claims for an adjustment in the Contract Time and/or the Contract Sum resulting from an event or circumstance within the time limits set forth below. In the event that Contractor fails to submit its claim in writing within the time limits set forth below, then Contractor agrees it will not be entitled to any adjustment in the Contract Time or the Contract Sum or to any other damages from Owner due to the circumstance or event and waives any claim therefor.
  - 1. Claims for an adjustment in the Contract Time due to Adverse Weather will be made by the tenth (10th) of the month following the month in which the delay occurred.
  - 2. Claims for an adjustment in the Contract Time and/or the Contract Sum due to any other circumstance or event will be submitted within seven (7) days after the occurrence of the circumstance or event.
- D. If Contractor claims that it is entitled to an adjustment in the Contract Sum (including without limitation costs related to a time extension) because of an event or circumstance resulting from the willful or negligent act or omission of Owner or Architect, Contractor will furnish a proposal for a Change Order containing a price breakdown as described in Section 7.1, Paragraph C. Any amount claimed for increased labor costs as a result of the event or circumstance must be supported by a certified payroll. Any claim for rented equipment or additional material costs must be supported by invoices.
- E. If Contractor claims that it is entitled to an adjustment in the Contract Time as a result of an event or circumstance, Contractor will include with its claim copies of daily logs, letters, shipping orders, delivery tickets, Project schedules, and other supporting information necessary to justify Contractor's claim that the event or circumstance delayed Substantial Completion. If Contractor is entitled to an adjustment in the Contract Time as a result of an event or circumstance caused by the willful or negligent act or omission of Owner or Architect, Contractor will be compensated for all costs related to the delay in accordance with Section 7.3, Paragraph B.
- F. Within thirty (30) days after receipt of Contractor's claim, Architect will either deny the claim or recommend approval to Owner. If Owner approves the claim, the adjustment in the Contract Time and/or Contract Sum will be reflected in a Change Order pursuant to Section 7.5 or a Construction Change Directive pursuant to Section 7.6. If Owner or Architect denies Contractor's claim, Contractor may submit its claim as a dispute pursuant to Section 13 within thirty (30) days of receipt of the denial of the claim. If Contractor fails to submit its claim for resolution pursuant to Section 13 within the thirty (30) day time period, then Contractor agrees it is not entitled to any adjustment in the Contract Time and/ or Contract Sum or any other damages as a result of the event or circumstance and waives any claim therefor.

### **7.3 EXTENSIONS OF TIME**

- A. If Substantial Completion of the Project is delayed because of any of the following causes, then the Contract Time will be extended by Change Order for a period of time equal to such delay:
  - 1. Labor strikes or lock-outs;
  - 2. Adverse weather;
  - 3. Unusual delay in transportation;
  - 4. Unforeseen governmental requests or requirements;
  - 5. A Change in the Work resulting from an instruction by Owner or Architect to Contractor subject to the conditions set forth in Section 7.1; or
  - 6. Any other event or circumstance caused by the willful or negligent act or omission of Owner or Architect.
- B. Contractor will not be entitled to any compensation for delay described in Section 7.3, Paragraph A, subparagraphs 1, 2, 3 and 4. For each day of delay in Substantial Completion described in Section 7.3, Paragraph A, subparagraphs 5 and 6, Contractor will be paid liquidated damages in the amount per day set forth in the Supplementary Conditions to compensate Contractor for all damages resulting from any delay including but not limited to damages for general conditions costs, additional job site costs, additional home office overhead costs, disruption costs, acceleration costs, increase in labor costs, increase in subcontract costs, increase in materials costs, and any other costs incident to the delay. Contractor will be entitled to no other compensation relating to the delay.
- C. In no event will any time extension or cost adjustment be given on account of delay which reasonably should have been anticipated by the Contractor or in circumstances where performance of the Work is, was, or would have been, delayed by any other cause for which the Contractor is not entitled to an extension.

### **7.4 DOCUMENTATION OF CHANGES IN THE WORK**

Every Change in the Work will be documented by a Change Order, a Construction Change Directive or a Field Change. If Owner, Architect and Contractor reach agreement regarding the adjustment in the Contract Sum, if any, and the adjustment in the Contract Time, if any, resulting from a Change in the Work, then the parties will execute a Change Order pursuant to Section 7.5. If Owner, Architect and Contractor cannot reach agreement regarding the adjustment in Contract Sum or the adjustment in Contract Time resulting from a Change in the Work, then Owner and Architect will issue a Construction Change Directive pursuant to Section 7.6. Field Changes require the agreement of Architect and Contractor only.

## **7.5 CHANGE ORDERS**

Contractor's signature upon a Change Order is Contractor's acknowledgment that it is not entitled to any additional adjustment in the Contract Sum or the Contract Time or any other damages or compensation as a result of the Change in the Work other than that provided for in the Change Order, irrespective of whether a subsequent claim for additional compensation or time extensions relating to the Change in the Work is described as a change in the requirements of the Contract Documents, a delay, a disruption of the Work, an acceleration of the Work, an impact on the efficiency of performance of the Work, an equitable adjustment, or other claim and irrespective of whether the impact of the Change in the Work is considered singly or in conjunction with the impact of other Changes in the Work.

## **7.6 CONSTRUCTION CHANGE DIRECTIVES**

- A. Contractor will promptly comply with all Construction Change Directives.
- B. Pending final resolution of any adjustment in the Contract Sum or Contract Time relating to a Construction Change Directive, the amounts proposed by Owner in the Construction Change Directive may be included in Contractor's payment requests once the work relating thereto is completed.
- C. If after the work described in the Construction Change Directive is completed, Owner, Architect, and Contractor reach agreement on adjustments in the Contract Sum, Contract Time, or both, such agreement will be reflected in an appropriate Change Order.
- D. If the parties do not reach agreement regarding an adjustment to the Contract Sum, Contract Time, or both relating to the Construction Change Directive within thirty (30) days of the completion of the work described therein, then Contractor may submit its claim for an adjustment pursuant to Section 13 within thirty (30) days of the completion of such work. Contractor agrees that if it fails to submit its claim for resolution pursuant to Section 13 within thirty (30) days of completion of the work described in the Construction Change Directive, then it will not be entitled to an adjustment in Contract Sum or Contract Time resulting from such work except as set forth in the Construction Change Directive and waives any claim therefor.

## **7.7 FIELD CHANGES**

Architect and Contractor will sign a Field Change order listing the Change In The Work and the Contract Sum including markups before Contractor proceeds with the Field Change.

## **7.8 WAIVER OF CLAIMS**

Except as set forth in Section 7, Contractor will not be entitled to any adjustment in the Contract Sum or the Contract Time or for any damages of any kind whatsoever resulting from an instruction from Owner or Architect, any event or circumstance, or any act or omission of Owner or Architect and Contractor expressly waives any and all claims therefor.

# **SECTION 8 - TIME**

## **8.1 TIME IS OF THE ESSENCE**

All time limits stated in the Contract Documents are of the essence. By executing the Agreement, Contractor confirms that the Contract Time is a reasonable period for performing the Work. Contractor will proceed expeditiously with adequate resources and will achieve Substantial Completion within the Contract Time.

## **8.2 COMMENCEMENT OF THE WORK**

Contractor will not commence work on the Project site until the date set forth in the Written Notice to proceed. However, Contractor may enter into subcontracts and secure material for the Project after receipt of the Agreement with Owner's authorized signature. Owner will issue the Written Notice to proceed within forty-five (45) days after Owner receives acceptable bonds and evidence of insurance pursuant to Section 11 unless Owner earlier terminates the Agreement pursuant to Section 14.

## **8.3 DELAY IN COMPLETION OF THE WORK**

- A. For each day after the expiration of the Contract Time that Contractor has not achieved Substantial Completion, Contractor will pay Owner the amount set forth in the Supplementary Conditions as liquidated damages for Owner's loss of use of the Project and the added administrative expense to Owner to administer the Project during the period of delay. In addition, Contractor will reimburse Owner for any additional Architect's fees, attorney fees, expert fees, consultant fees, copy costs, and other expenses incurred by Owner as a result of the delay. Owner may deduct any liquidated damages or reimbursable expenses from any money due or to become due to Contractor. If the amount of liquidated damages and reimbursable expenses exceeds any amounts due to Contractor, Contractor will pay the difference to Owner within ten (10) days after receipt of a written request from Owner for payment.

- B. At the time Architect certifies that Contractor has achieved Substantial Completion, Architect will identify the remaining items to be completed for final completion of the Work and will establish with Contractor a reasonable time for completion of those items. Architect will set forth the items to be completed and the time established for their completion in a Certificate of Substantial Completion. For each day that Contractor exceeds the time allowed for completion of the items set forth in the Certificate of Substantial Completion, Contractor will pay to Owner as liquidated damages for additional administrative expenses the amount set forth in the Supplementary Conditions. In addition, Contractor will reimburse Owner for any additional Architect's fees, attorney fees, expert fees, consultant fees, copy costs, and other expenses incurred by Owner as a result of the delay in completing such items.

## **SECTION 9 - PAYMENTS AND COMPLETION**

### **9.1 SCHEDULE OF VALUES**

Contractor will submit to Architect a schedule of values which allocates the Contract Sum to various portions of the Work. The schedule of values will be supported by such data to substantiate its accuracy as required by Architect. This schedule, when accepted by Owner and Architect, will be used as a basis for reviewing Contractor's payment requests.

### **9.2 PAYMENT REQUESTS**

- A. Not more than once a month, Contractor will submit a payment request to Architect for Work completed, materials stored on the site, and for materials stored offsite as of the date of the payment request. The amount of the payment request will be based upon the schedule of values and will be equal to the value of the Work completed:
  - 1. Less retention;
  - 2. Less all prior amounts paid by Owner to Contractor as part of the Contract Sum; and
  - 3. Less allowable offsets.The payment request may include Changes in the Work that have been performed by Contractor and authorized by Owner and/or Architect pursuant to Section 7. If a payment request includes materials stored offsite, Contractor will include with the payment request a list of the materials, the location where they are stored and the written request of Contractor and its performance bond surety that payment be made for such materials.
- B. Contractor warrants and guarantees that upon the receipt of payment for materials and equipment, whether incorporated in the Project or not, title to such materials and equipment will pass to Owner free and clear of all liens, claims, security interests, or encumbrances. Notwithstanding this payment and passage of title, Contractor will remain responsible for all such materials and equipment until actual delivery to the project site, incorporation into the Work, and final acceptance by Owner. Contractor further warrants that no material or equipment covered by a payment request is subject to an agreement under which an interest therein or an encumbrance thereon is retained by the seller or any other person or entity.

### **9.3 PAYMENT REQUEST CERTIFICATION**

- A. Architect will, within seven (7) days after receipt of Contractor's payment request, forward to Owner the payment request certified for such amount as Architect determines is properly due. If Architect certifies less than the full amount of the payment request, Architect will notify Contractor and Owner of Architect's reasons for withholding certification of the full amount requested.
- B. The certification of the payment request will constitute a representation by Architect to Owner based upon Architect's observations at the site and the data comprising the payment request, that the Work has progressed to the point indicated and that, to the best of Architect's knowledge, information, and belief, the quality of the Work is in accordance with the Contract Documents. The foregoing representations are subject to an evaluation of the Work for conformance with the Contract Documents upon Substantial Completion, to results of subsequent tests and inspections, to minor deviations from the Contract Documents correctable prior to completion, and to specific qualifications expressed by Architect. However, the certification of the payment request will not constitute a representation that Architect has:
  - 1. Conducted exhaustive or continuous on-site inspections to check the quantity or quality of the Work;
  - 2. Reviewed construction means, methods, techniques, sequences, or procedures;
  - 3. Reviewed copies of requisitions received from Subcontractors or other data requested by Owner to substantiate Contractor's right to payment; or
  - 4. Made examination to ascertain how or for what purpose Contractor has used money previously paid on account of the Contract Sum.
- C. In taking action on Contractor's payment request, Owner will be entitled to rely on the accuracy and completeness of the information furnished by Contractor.

### **9.4 DECISIONS TO WITHHOLD CERTIFICATION AND PAYMENT**

- A. Architect may withhold certification of a payment request in whole or in part to the extent reasonably necessary to protect Owner if, in the opinion of Architect, the representations to Owner required by Section 9.3, Paragraph B cannot be accurately made. If Architect is unable to certify payment in the amount of the payment request, Architect will notify Contractor and Owner as provided in Section 9.3, Paragraph A. If Contractor and Architect cannot agree on a revised amount, Architect will promptly certify a payment request for the amount for which Architect is able to make such representations to Owner. Architect may also decide not to certify payment or, because of subsequently discovered evidence or subsequent observations, may nullify the whole or a part of a payment request previously certified, to such extent as may be necessary in Architect's opinion to protect Owner from loss because of:
  - 1. Defective work not remedied;

2. Third-party claims filed or reasonable evidence indicating probable filing of such claims;
  3. Failure of Contractor to make payments properly to Subcontractors for labor, materials, equipment, construction or services;
  4. Reasonable evidence that the Work cannot be completed for the unpaid balance of the Contract Sum;
  5. Damage to Owner or another contractor for which Contractor is responsible;
  6. Reasonable evidence that the Work will not be completed within the Contract Time and that the unpaid balance will not be adequate to cover the cost of completing the Work and damages for the anticipated delay; or
  7. Contractor's persistent failure to carry out the Work in accordance with the Contract Documents.
- B. Owner reserves the right to withhold payments to Contractor, subsequent to Architect's certification of any payment request, in order to protect Owner from loss due to any condition described in Section 9.4, Paragraph A, Subparagraphs 1 through 7. Upon satisfactory resolution of any such conditions, payments so withheld will be made.

## **9.5 PROGRESS PAYMENTS**

- A. Owner will pay Contractor progress payments within the parameters of Section 9.2 within fifteen (15) days after Owner receives the certified payment request from Architect.
- B. Owner will make payments to Contractor by either placing the payments in the mail addressed to Contractor or by electronic transfer at Owner's discretion.
- C. Upon receipt of any payment from Owner, Contractor will pay to each Subcontractor the amount paid to Contractor on account of such Subcontractor's portion of the Work.
- D. Contractor will maintain a copy of each payment request at the Project site for review by the Subcontractors.
- E. No payment made under the Contract Documents, either in whole or in part, will be construed to be an acceptance of defective or improper materials or workmanship.
- F. In addition and notwithstanding the foregoing, Owner will also withhold and retain 10% of payments made to Contractor.
- G. Owner will pay any unpaid retention less any amounts withheld pursuant to Section 9.4 within forty-five (45) days after Contractor achieves Substantial Completion, submits its payment request for retained funds, delivers to the Architect Owner's form entitled "Contractor's Substantial Completion Affidavit and Consent of Surety" fully executed by Contractor and its surety, obtains Waiver and Release documents executed by all subcontractors and suppliers having claim against the retained funds, and Owner receives a certificate of occupancy.

## **9.6 FINAL PAYMENT**

- A. Owner will make full and final payment of the Contract Sum within thirty (30) days of the completion of all of the following requirements:
  1. Contractor has submitted its final payment request;
  2. Architect has declared to Owner in writing that the Work is complete;
  3. Contractor has obtained waiver and release upon final payment documents executed by all of the subcontractors performing work and/or providing materials covered by the Contractor's final payment request; and
  4. Contractor has collected and provided to Owner all manufacturers' and other guaranties and warranties, properly signed and endorsed to Owner, that are required by the Contract Documents that extend for a period beyond one year after substantial completion. (Delivery of such guaranties and warranties will not relieve Contractor for any obligation assumed under any other provision of the Contract Documents.)
- B. Acceptance of final payment by Contractor or any Subcontractor will constitute a waiver of claims by the payee except for those claims previously made in writing pursuant to Section 7 and identified by Contractor in its affidavit as still pending.
- C. If the aggregate of previous payments made by Owner exceeds the amount due Contractor, Contractor will reimburse the difference to Owner.

# **SECTION 10 - PROTECTION OF PERSONS AND PROPERTY**

## **10.1 SAFETY PRECAUTIONS AND PROGRAMS**

Contractor will be responsible to Owner for initiating and supervising all safety programs in connection with the performance of the Work.

## **10.2 SAFETY OF PERSONS AND PROPERTY**

- A. Contractor will take reasonable precautions to prevent damage, injury, or loss to:
  1. All persons on the site;
  2. The Work and materials and equipment to be incorporated into the Work; and
  3. Other property at the site or adjacent to it.
- B. Contractor will give notices and comply with applicable laws, ordinances, rules, regulations, and other lawful requirements of public authorities bearing on the safety or protection of persons and property. No work will be performed that may pose an undue safety hazard to Contractor, Contractor's employees, or any other person.



- C. Contractor will designate a responsible member of its organization at the site whose duty will be the prevention of accidents. This person will be Contractor's onsite representative unless otherwise designated in writing by Contractor to Owner and Architect.

### 10.3 EMERGENCIES

In case of an emergency endangering life or threatening the safety of any person or property, Contractor may, without waiting for specific authorization from Architect or Owner, act at its own discretion to safeguard persons or property. Contractor will immediately notify Architect of such emergency action and make a full written report to Architect within five (5) days after the event.

### 10.4 HAZARDOUS MATERIALS

In the event the Contractor encounters on the site material reasonably believed to be hazardous materials which have not been rendered harmless, the Contractor shall immediately stop Work in the area affected and report the condition to the Owner and Architect in writing. The Work in the affected area shall be resumed in the absence of hazardous materials, or when it has been rendered harmless, by written agreement of the Owner and Contractor.

## SECTION 11 - INSURANCE AND BONDS

### 11.1 CONTRACTOR'S LIABILITY INSURANCE

- A. Contractor will obtain the following insurance and provide evidence thereof as described below prior to commencement of the Work or within ten (10) days after signing the Agreement, whichever is earlier:
  - 1. Workers Compensation Insurance.
  - 2. Employers Liability Insurance with minimum limits of the greater of \$500,000 E.L. each accident, \$500,000 E. L. disease- each employee, \$500,000 E.L. disease-policy limit or as required by the law of the state in which the Project is located.
  - 3. Commercial General Liability Insurance – ISO Form CG 00 01 (12/07) or equivalent Occurrence policy which will provide primary coverage to the additional insureds (the Owner and the Architect) in the event of any Occurrence, Claim, or Suit with:
    - a. Limits of the greater of Contractor's actual coverage amounts or the following:
      - 1) \$2,000,000 General Aggregate;
      - 2) \$2,000,000 Products - Comp/Ops Aggregate;
      - 3) \$1,000,000 Personal and Advertising Liability;
      - 4) \$1,000,000 Each Occurrence;
      - 5) \$50,000 Fire Damage to Rented Premises (Each Occurrence).
    - b. Endorsements attached to the General Liability policy including the following or their equivalent:
      - 1) ISO Form CG 25 03 (05/09), Amendment of Limits of Insurance (Designated Project or Premises), describing the Agreement and specifying limits as shown above.
      - 2) ISO Form CG 20 10 (07/04), Additional Insured -- Owners, Lessees, Or Contractors (Form B), naming Owner and Architect as additional insureds.
  - 4. Automobile Liability Insurance, with:
    - a. Combined Single Limit each accident in the amount of \$1,000,000 or Contractor's actual coverage, whichever is greater; and
    - b. Coverage applying to "Any Auto."
- B. Contractor will provide evidence of such insurance to Owner as follows:
  - 1. Deliver to Owner a Certificate of Liability Insurance, on ACORD 25 (2010/05) Form, or equivalent:
    - a. Listing Owner and its consultants as the Certificate Holders and Additional Insured on the general liability and any excess liability policies;
    - b. Attaching the ISO or equivalent endorsements set forth above to the Certificate of Liability Insurance;
    - c. Identifying the Project;
    - d. Listing the insurance companies providing coverage (All companies listed must be rated in A.M. Best Company Key Rating Guide-Property-Casualty and each company must have a rating of B+ Class VII or better. Companies which are not rated are not acceptable); and
    - e. Bearing the name, address and telephone number of the producer and signed by an authorized representative of the producer. The signature may be original, stamped, or electronic.
- C. Contractor will maintain, from commencement of the Work, Insurance coverage required herein as follows:
  - 1. Commercial General Liability Insurance through expiration of warranty period specified in Section 12.2, Paragraph B. including completion of any warranty repairs; and
  - 2. All other insurance through Final Payment.
- D. Owner reserves the right to reject any insurance company, policy, endorsement, or certificate of insurance with or without cause.
- E. Owner may, in writing and at its sole discretion, modify the insurance requirements.
- F. The cost of insurance as required above will be the obligation of Contractor. Contractor will be responsible for payment of all deductible amounts under all insurance.
- G. Owner will provide builders risk insurance for the cost of the Project. The policy will be written on an all risk basis with coverage for perils of wind, flood, earthquake, and terrorism, with exclusions standard for the insurance industry. The policy will be subject to a \$5,000 deductible per occurrence which will be the responsibility of Contractor and will not be a reimbursable

expense. Owner will provide a copy of the terms and conditions of the builders risk policy to Contractor upon Contractor's request. Contractor will comply with terms, conditions, and deadlines of the builders risk policy. The terms, conditions, and deadlines of the builders risk policy shall govern coverage. In addition, when there is a loss which may be covered by the builders risk insurance policy, Contractor will comply with the following:

1. Contractor will report the loss immediately to builders risk commercial insurer by calling 1-866-537-7475 and shall make such further written submissions as required and otherwise comply with all requirements of the builders risk policy.
2. Contractor will report the loss immediately to the Owner.
3. Contractor will immediately notify its general liability insurance carrier of the loss.
4. Contractor will take all necessary and appropriate actions to protect the property and individuals from further loss, harm, and injury. In the event there are damages resulting from fire or water, restoration shall be performed only by a certified restoration contractor.
5. To the extent possible, Contractor will preserve and not disturb the evidence of the loss until after the builders risk commercial insurer and all interested parties and their insurance carriers have had the opportunity to view and investigate the site and loss.
6. Contractor will cooperate with Owner and the builders risk commercial insurer in the investigation, documentation, and settlement of loss claims, including without limitation promptly responding to all requests for information and documentation from the builders risk commercial insurer and/or Owner.

## **11.2 PERFORMANCE BOND AND LABOR AND MATERIAL PAYMENT BOND**

- A. Prior to commencement of the Work or within ten (10) days after signing the Agreement, whichever is earlier, Contractor will furnish to Owner a performance bond and a labor and material payment bond each in an amount equal to one hundred percent (100%) of the Contract Sum as security for all obligations arising under the Contract Documents. Such bonds will:
  1. Be written on Form AIA Document A312 (1984).
  2. Be issued by a surety company or companies licensed in the state in which the Project is located and holding valid certificates of authority under Sections 9304 to 9308, Title 31, of the United States Code as acceptable sureties or reinsurance companies on federal bonds.
  3. Have a penal sum obligation not exceeding the authorization shown in the current revision of Circular #570 as issued by the United States Treasury Department, i.e. "Treasury List".
  4. Be accompanied by a certified copy of the power of attorney stating the authority of the attorney-in-fact executing the bonds on behalf of the surety.
- B. Owner reserves the right to reject any surety company, performance bond, or labor and material payment bond with or without cause.
- C. The cost of the bonds as required above will be the obligation of Contractor.

## **SECTION 12 - UNCOVERING AND CORRECTION OF WORK**

### **12.1 UNCOVERING OF WORK**

Contractor will notify Architect at least twenty-four (24) hours in advance of performing work that would cover up work or otherwise make it difficult to perform inspections required by the Specifications or by applicable governing authorities. Should any such work be covered without proper notification having been given to Architect, Contractor will uncover that work for inspection at its own expense.

### **12.2 CORRECTION OF WORK**

- A. Contractor will promptly correct any portion of the Work that is rejected by Architect or which fails to conform to the requirements of the Contract Documents, whether observed before or after Substantial Completion and whether or not fabricated, installed, or completed. Contractor will bear the cost of correcting such rejected Work, including additional testing and inspection costs, compensation for Architect's services, and any other expenses made necessary thereby.
- B. Contractor will remedy any defects due to faulty materials, equipment, or workmanship which appear within a period of one (1) year from the date of Substantial Completion or within such longer period of time as may be prescribed by law or by the terms of any applicable special warranty required by the Contract Documents. Contractor will pay all costs of correcting faulty work, including without limitation additional Architect's fees, attorney fees, expert fees, consultant fees, copy costs, and other expenses when incurred.
- C. Nothing in the Contract Documents will be construed to establish a period of limitation within which Owner may enforce the obligation of Contractor to comply with the Contract Documents. The one-year period specified above has no relationship to the time within which compliance with the Contract Documents may be sought to be enforced, nor to the time within which proceedings may be commenced to establish Contractor's liability with respect to Contractor's obligations.

### **12.3 ACCEPTANCE OF NONCONFORMING WORK**

- A. If Owner prefers to accept any portion of the Work not in conformance with the Contract Documents, Owner may do so instead of requiring removal and correction of the nonconforming Work. In that event, the Contract Sum will be reduced by an amount agreed upon by the parties that reflects the difference in value to Owner between the Work as specified and the nonconforming Work. Such adjustment may consider increased maintenance costs, early replacement costs, increased inefficiency of use, and the like and will be effective whether or not final payment has been made. Such adjustment will be reflected in a Change Order pursuant to Section 7.5.

- B. Temporary or trial usage by Owner or Architect of mechanical devices, machinery, apparatus, equipment, or other work or materials supplied under the Contract Documents prior to written acceptance by Architect, will not constitute Owner's acceptance.

## **SECTION 13 - RESOLUTION OF DISPUTES**

### **13.1 SUBMITTAL OF DISPUTE**

In the event there is any dispute arising under this Agreement which cannot be resolved by agreement between the parties, either party may submit the dispute with all documentation upon which it relies to the Director of Architecture, Engineering, and Construction, Meetinghouse Facilities Department, 50 East North Temple, Salt Lake City, Utah 84150, who will convene a dispute resolution conference within thirty (30) days. The dispute resolution conference will constitute settlement negotiations and any settlement proposal made pursuant to the conference will not be admissible as evidence of liability. In the event that the parties do not resolve their dispute pursuant to the dispute resolution conference, either party may commence legal action to resolve the dispute. Any such action must be commenced within six (6) months from the first day of the dispute resolution conference or be time barred. Submission of the dispute to the Director as outlined above is a condition precedent to the right to commence legal action to resolve any dispute. In the event that either party commences legal action to adjudicate any dispute without first submitting the dispute to the Director, the other party will be entitled to obtain an order dismissing the litigation without prejudice and awarding such other party any costs and attorney fees incurred by that party in obtaining the dismissal, including without limitation copy costs, and expert and consultant fees and expenses.

### **13.2 CONTRACTOR TO PROCEED WITH DILIGENCE**

Pending final resolution of a dispute hereunder, Contractor will proceed diligently with the performance of its obligations under this Agreement.

## **SECTION 14 - TERMINATION**

### **14.1 TERMINATION BY CONTRACTOR**

In the event Owner materially breaches any term of the Contract Documents, Contractor will promptly give Written Notice of the breach to Owner. If Owner fails to cure the breach within ten (10) days of the Written Notice, Contractor may terminate the Agreement by giving Written Notice to Owner and recover from Owner the percentage of the Contract Sum represented by the Work completed on the Project site as of the date of termination together with any out of pocket loss Contractor has sustained with respect to materials and equipment as a result of the termination prior to completion of the Work, less any offsets. Contractor will not be entitled to unearned profits or any other compensation or damages as a result of the termination and hereby waives any claim therefor. Contractor will provide to Owner all warranty, as built, inspection, and other close out documents as well as materials that Contractor has in its possession or control at the time of termination. Without limitation, Contractor's indemnities and obligations under section 3.14 as well as all warranties in the specifications relative to Work provided through the date of termination survive a termination hereunder.

### **14.2 TERMINATION BY OWNER FOR CAUSE**

Should Contractor fail to provide Owner with the bonds and certificates of insurance required by Section 11 within the time specified therein, make a general assignment for the benefit of its creditors, fail to apply enough properly skilled workmen or specified materials to properly prosecute the Work in accordance with Contractor's schedule, or otherwise materially breach any provision of the Contract Documents, then Owner may, without any prejudice to any other right or remedy, give Contractor Written Notice thereof. If Contractor fails to cure its default within ten (10) days, Owner may terminate the Agreement by giving Written Notice to Contractor. In such case, Owner may, in Owner's sole discretion, take legal assignment of subcontracts and other contractual rights of Contractor and/or take possession of the premises and all materials, tools, equipment, and appliances thereon, and finish the Work by whatever method Owner deems expedient. Contractor will not be entitled to receive any further payment until the Work is finished. If the unpaid balance of the Contract Sum exceeds the expense of finishing the Work, including compensation for additional administrative, architectural, consultant, and legal services (including without limitation attorney fees, expert fees, copy costs, and other expenses), such excess will be paid to Contractor. If such expense exceeds the unpaid balance, Contractor will pay the difference to Owner. Contractor will provide to Owner all warranty, as built, inspection, and other close out documents as well as materials that Contractor has in its possession or control at the time of termination. Without limitation, Contractor's indemnities and obligations under section 3.14 as well as all warranties in the specifications relative to Work provided through the date of termination survive a termination hereunder.

### **14.3 TERMINATION BY OWNER FOR CONVENIENCE**

Notwithstanding any other provision contained in the Contract Documents, Owner may, without cause and in its absolute discretion, terminate the Agreement at any time. In the event of such termination, Contractor will be entitled to recover from Owner the percentage of the Contract Sum equal to the percentage of the Work which Architect determines has been completed on the Project site as of the date of termination together with any out of pocket loss Contractor has sustained with respect to materials and equipment as a result of the termination prior to completion of the Work, less any offsets. Contractor will not be entitled to unearned profits or any other compensation as a result of the termination and hereby waives any claim therefor. Contractor will provide to Owner all warranty, as built, inspection, and other close out documents as well as materials that Contractor has in its possession or control at the time of termination. Owner may, in Owner's sole discretion, take legal assignment of subcontracts and other contractual rights of Contractor. Without limitation, Contractor's indemnities and obligations under section 3.14 as well as all warranties in the specifications relative to Work provided through the date of termination survive a termination hereunder.

## **SECTION 15 - MISCELLANEOUS PROVISIONS**

### **15.1 GOVERNING LAW**

The parties acknowledge that the Contract Documents have substantial connections to the State of Utah. The Contract Documents will be deemed to have been made, executed, and delivered in Salt Lake City, Utah. To the maximum extent permitted by law, (i) the Contract Documents and all matters related to their creation and performance will be governed by and enforced in accordance with the laws of the State of Utah, excluding conflicts of law rules; and (ii) all disputes arising from or related to the Contract Documents will be decided only in a state or federal court located in Salt Lake City, Utah and not in any other court or state. Toward that end, the parties hereby consent to the jurisdiction of the state and federal courts located in Salt Lake City, Utah and waive any other venue to which they might be entitled by virtue of domicile, habitual residence, place of business, or otherwise.

### **15.2 NO WAIVER**

No action or failure to act by Owner, Architect, or Contractor will constitute a waiver of a right or duty afforded them under the Contract Documents, nor will such action or failure to act constitute approval of or acquiescence in a breach thereunder, except as may be specifically agreed in writing.

### **15.3 RULE OF CONSTRUCTION**

Owner and Contractor agree that the Contract Documents will be deemed to have been drafted by both Owner and Contractor and will not be construed against either Owner or Contractor because of authorship.

### **15.4 ENFORCEMENT**

In the event either party commences legal action to enforce or rescind any provision of the Contract Documents, the prevailing party will be entitled to recover its attorney fees and costs, including without limitation all copy costs and expert and consultant fees and expenses, incurred in that action and on all appeals, from the other party.

### **15.5 TESTS AND INSPECTIONS**

- A. Owner and Architect have the right to have tests made when they deem it necessary. Tests conducted by Owner or Architect will be paid for by Owner. Should a test reveal a failure of the Work to meet Contract Document requirements, the cost of the test as well as subsequent tests related to the failure necessary to determine compliance with the Contract Documents will be paid for by Owner, with the cost thereof deducted from the Contract Sum by Modification.
- B. Tests will be made in accordance with recognized standards by a competent, independent testing laboratory. Materials found defective or not in conformity with Contract Document requirements will be promptly replaced or repaired at the expense of Contractor.
- C. Owner and Architect have the right to obtain samples of materials to be used in the Work and to test samples for determining whether they meet Contract Document requirements. Samples required for testing will be furnished by Contractor and selected as directed by Architect. Samples may be required from the sample's source, point of manufacture, point of delivery, or point of installation at Architect's discretion. Samples not required as a Submittal in the Specifications will be paid for by Owner. Should tests reveal a failure of the Sample to meet the Contract Document requirements, Contractor will provide other Samples that comply with the requirements of the Contract Documents.

END OF DOCUMENT

## **SUPPLEMENTARY CONDITIONS - FIXED SUM (U.S.)**

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### **ITEM 1 - GENERAL**

1. Conditions of the Agreement and General Conditions apply to each Division of the Specifications.
2. Provisions contained in Division 01 apply to all Divisions of the Specifications.

### **ITEM 2 - LIQUIDATED DAMAGE AMOUNTS:**

1. The amount of liquidated damages to the benefit of the Contractor for delays under General Conditions Section 7.3, Paragraph B is \$500 per day.
2. The amount of liquidated damages to the benefit of the Owner for delays in Substantial Completion of the Work under General Conditions Section 8.3, Paragraph A is \$500 per day.
3. The amount of liquidated damages to the benefit of the Owner for delays in completing work itemized on the Substantial Completion Certificate under General Conditions Section 8.3, Paragraph B is \$200 per day.

### **ITEM 3 - STATE SPECIFIC SUPPLEMENTARY CONDITIONS**

#### **Utah**

#### **RETENTION APPLIED TO CONTRACTOR PAYMENTS FOR PROJECTS IN UTAH:**

*Replace section 9.5.F of the General Conditions with the following:*

- F. In addition and notwithstanding the foregoing, Owner may also withhold and retain 5% of payments made to Contractor. These retention funds will be held in an interest bearing account.

#### **PAYMENT OF RETAINED FUNDS IN UTAH:**

*Replace section 9.5.G of the General Conditions with the following:*

- G. After Contractor achieves Substantial Completion and submits its payment request for retained funds and delivers to the Architect Owner's form entitled "Contractor's Substantial Completion Affidavit and Consent of Surety" fully executed by Contractor and its surety, if any, and provides statutory Conditional Waiver and Release documents executed by all subcontractors and suppliers having claim against the retained funds, Owner will pay any unpaid retention less any amounts withheld pursuant to Section 9.4 within forty-five (45) days from the later of (a) the date Owner received Contractor's payment request for retained funds and fully executed Contractor's Substantial Completion Affidavit and Consent of Surety, (b) the date a certificate of occupancy is issued; (c) the date that a building inspector having authority to issue its own certificate of occupancy does not issue that certificate but permits occupancy.

#### **UTAH STATE SALES TAX:**

*Add the following to the General Conditions:*

1. Contractors should be exempt on purchases of material installed or converted into real property to be used by the Owner. The Contractor will furnish each vendor with a completed Exemption Certificate Form TC-721. The certificate will be prepared by the Contractor for each vendor in order to obtain the exemption.
2. The Owner's tax exempt number is 11871701-002-STC.

## **UTAH NOTICE OF INTENT TO OBTAIN FINAL COMPLETION:**

*Add the following to the General Conditions:*

- A. Contractor will file with the State Construction Registry, on its own behalf and/or on behalf of Owner, a notice of intent to obtain final completion at least 45 days before the day on which the Owner or Contractor files or could file a notice of completion under Utah Code Ann. Section 38-1a-506 if:
  - 1. The completion of performance time under the original contract for construction work is greater than 120 days;
  - 2. The total original construction contract price exceeds \$500,000; and
  - 3. The original contractor or owner has not obtained a payment bond in accordance with Utah Code Ann. Section 14-2-1.

## **UTAH NOTICE OF COMPLETION:**

*Add the following to the General Conditions:*

- A. Within five (5) calendar days of final completion of the Project and in compliance with Section 38-1a-507 Utah Code Annotated, Contractor will file with the State Construction Registry, and copy to Owner, a notice of completion which will include, without limitation, the following:
  - 1. The name, address, telephone number, and email address of the person filing the notice of completion;
  - 2. The name of the county in which the Project and/or Project site is located;
  - 3. The date on which final completion is alleged to have occurred;
  - 4. The method used to determine final completion; and
  - 5. One of the following:
    - a. The tax parcel identification number of each parcel included in the Project and/or Project site;
    - b. The entry number of a preliminary notice on the same project that includes the tax parcel identification number of each parcel included in the Project and/or Project site; or
    - c. The entry number of the building permit issued for the Project.
- B. Notwithstanding any other provision of the Contract Documents to the contrary, Contractor and Owner agree that any breach or failure to comply with this Section by the Contractor will constitute a breach of contract and the Contractor will be liable for any direct, indirect, or consequential damages to the Owner flowing from this breach.

## **UTAH PROGRESS PAYMENTS AND FINAL PAYMENT:**

*Replace Section 9.5.A of the General Conditions with the following:*

### **9.5 PROGRESS PAYMENTS**

- A. Owner will pay Contractor progress payments within the parameters of Section 9.2 within fifteen (15) days after:
  - 1. Contractor has submitted a progress payment request;
  - 2. Contractor has obtained Conditional Waiver and Release Upon Progress Payment documents (in content complying with Utah Code § 38-1a-802) executed by each of the subcontractors performing work and/or providing materials covered by the Contractor's progress payment request; and
  - 3. Owner receives the certified payment request from Architect.

*Replace Section 9.6.A.3 of the General Conditions with the following:*

## **9.6 FINAL PAYMENT**

3. Contractor has obtained Waiver and Release Upon Final Payment documents (in content complying with Utah Code § 38-1a-802) executed by each of the subcontractors performing work and/or providing materials covered by the Contractor's final payment request;

END OF DOCUMENT

## **AGGREGATE PIER GROUND IMPROVEMENT**

### **PART 1: GENERAL REQUIREMENTS**

#### **1.1 DESCRIPTION**

- A. Work shall consist of designing, furnishing and installing aggregate pier ground improvement to the lines and grades designated on the project foundation plan and as specified herein. Aggregate pier ground improvement as referenced in this specification shall be constructed by either vibro-replacement stone columns or Rammed Aggregate Pier® systems. The aggregate piers shall be in a columnar-type configuration and shall be used to mitigate liquefaction potential

#### **1.2 WORK INCLUDED**

- A. Provision of all equipment, material, labor, and supervision to design and install aggregate piers. Design shall rely on subsurface information presented in the project geotechnical report. Layout of aggregate piers, spoil removal (as required), footing excavations, and subgrade preparation following aggregate pier installation is not included.
- B. The aggregate pier design and installation shall adhere to all methods and standards described in this Specification.
- C. Drawings and General Provisions of the Contract, including General and Supplemental Conditions, and Division 1 Specifications, apply to the work in this specification.

#### **1.3 APPROVED INSTALLERS**

- A. The Aggregate Pier Installer (the Installer) shall be approved by the Owner's Engineer prior to bid opening. Without exception, no alternate installer will be accepted unless approved by the Owner's Engineer at least two (2) weeks prior to bid opening.
- B. Installers of aggregate pier foundation systems shall have a minimum of 5 years of experience with the installation of aggregate pier systems and shall have completed at least 50 projects.
- C. Installers licensed by the Aggregate Pier system manufacturer will be accepted as approved installers.

#### **1.4 REFERENCE STANDARDS**

- A. Design Standard
  - 1. "Control of Settlement and Uplift of Structures Using Short Aggregate Piers," by Evert C. Lawton (Assoc. Prof., Dept. of Civil Eng., Univ. of Utah), Nathaniel S. Fox (President, Geopier Foundation Co., Inc.), and Richard L. Handy (Distinguished Prof. Emeritus, Iowa State Univ., Dept. of Civil Eng.), reprinted from IN-SITU DEEP SOIL IMPROVEMENT, Proceedings of sessions sponsored by the Geotechnical Engineering Division/ASCE in conjunction with the ASCE National Convention held October 9-13, 1994, Atlanta, Georgia.
  - 2. "Settlement of Structures Supported on Marginal or Inadequate Soils Stiffened



- with Short Aggregate Piers,” by Evert C. Lawton and Nathaniel S. Fox. Geotechnical Special Publication No. 40: Vertical and Horizontal Deformations of Foundations and Embankments, ASCE, 2, 962-974.
3. “Behavior of Geopier®-Supported Foundation Systems during Seismic Events,” by Kord Wissmann, Evert C. Lawton, and Tom Farrell. Geopier Foundation Company, Inc. Blacksburg, VA ©1999.
  4. “The design of vibro replacement.” H.J. Priebe. Ground Engineering, London. Dec 1995.
  5. Standard-of-practice liquefaction susceptibility and evaluation publications.
- B. Quality Control Testing
1. ASTM D 1143 - Pile Load Test Procedures
  2. ASTM D 1194 - Spread Footing Load Test
  3. ASTM D 5778 – Standard Test Method for Electronic Friction Cone and Piezocone Penetration Testing of Soils (e.g. Cone Penetration (CPT) probes)
- C. Materials and Inspection
1. ASTM D 1241 - Aggregate Quality
  2. ASTM D 422 - Gradation of Soils
- D. Where specifications and reference documents conflict, the Aggregate Pier Designer shall make the final determination of the applicable document.

## **1.5 CERTIFICATIONS AND SUBMITTALS**

- A. Design Calculations - The Installer shall submit detailed design calculations and construction drawings prepared by the Aggregate Pier Designer (the Designer) for review and approval by the Owner or Owner's Engineer. All plans shall be sealed by a Professional Engineer in the State in which the project is constructed.
- B. Professional Liability Insurance - The Aggregate Pier Designer shall have Errors and Omissions design insurance for the work. The insurance policy should provide a minimum coverage of \$2 million per occurrence.
- C. Modulus Test Reports - A modulus test(s), when required, is performed on a non-production Aggregate Pier element as required by the Aggregate Pier Designer to verify the design assumptions. The Installer shall furnish the General Contractor a description of the installation equipment, installation records, complete test data, analysis of the test data and verification of the design parameter values based on the modulus test results. The report shall be prepared under direction of a Registered Professional Engineer.
- D. Daily Aggregate Pier Progress Reports - The Installer shall furnish a complete and accurate record of Aggregate Pier installation to the General Contractor. The record shall indicate the pier location, length, volume of aggregate used or number of lifts, densification forces during installation, and final elevations or depths of the base and top of piers. The record shall also indicate the type and size of the installation equipment used, and the type of aggregate used. The Installer shall immediately report any unusual conditions encountered during installation to the General Contractor, to the Designer and to the Testing Agency.

## **PART 2 - PRODUCTS**

### **2.1 SYSTEM**

- A. **Basis of Design: Geopier Foundation Company "Rammed Aggregate Piers";**  
www.geopier.com
- B. Alternate systems shall be submitted for review by the Architect and the Structural Engineer prior to the receipt of bids. Alternative systems are subject to all requirements of these specifications. Documentation shall verify compliance with design criteria outlined herein and as shown on the Drawings.

## 2.2 AGGREGATE

- A. Aggregate used by the Aggregate Pier Installer for pier construction shall be pre-approved by the Designer and shall demonstrate suitable performance during modulus testing. Typical aggregate consists of Type 1 Grade B in accordance with ASTM D-1241-68, No. 57 stone, recycled concrete or other graded aggregate approved by the Designer.
- B. Potable water or other suitable source shall be used to increase aggregate moisture content where required. The General Contractor shall provide such water to the Installer.

## 2.3 DESIGN REQUIREMENTS

- A. Aggregate Pier Design
  - 1. The design of the Aggregate Pier system shall be based on the service load bearing pressure and the allowable total and differential settlement criteria of all footings indicated by the design team for support by the Aggregate Pier system. The Aggregate Pier system shall be designed in accordance with generally-accepted engineering practice and the methods described in Section 1 of these Specifications.
    - a. The design life of the structure shall be 50 years.
    - b. Seismic design parameters  $M=X.X$  and  $PGA=0.XXg$ .
  - 2. The design shall meet the following criteria:
    - a. Maximum Allowable Bearing Pressure for Footings Supported by Aggregate Pier Reinforced Soils:  $X,XXX$  psf
    - b. Estimated Total Long-Term Settlement for Footings: less than or equal to  $X$  inch
    - c. Estimated Long-Term Differential Settlement of Adjacent Footings: less than or equal to  $X$  inch
    - d. Minimum improvement depth of  $XX$  feet. The Aggregate Pier designer may specify a greater depth in order to maintain the maximum settlement value.
    - e. Estimated Total Seismic Settlement for Footings: less than or equal to  $X$  inch
- B. Design Submittal
  - 1. The Installer shall submit detailed design calculations, construction drawings, and shop drawings, (the Design Submittal), for approval at least two week(s) prior to the beginning of construction. A detailed explanation of the design parameters for settlement calculations shall be included in the Design Submittal. Additionally, the quality control test program for Aggregate Pier system, meeting these design requirements, shall be submitted. All computer-generated calculations and drawings shall be prepared and sealed by a Professional Engineer, licensed in the State or Province where the piers are to be built. Submittals will be submitted electronically only unless otherwise required by specific submittal instructions.

## PART 3 - EXECUTION

### 3.1 APPROVED INSTALLATION PROCEDURES

- A. The following sections provide general criteria for the construction of the Aggregate Piers. Unless otherwise approved by the Designer, the installation method used for Aggregate Pier construction shall be that as used in the construction of the successful modulus test.
- B. Aggregate Piers Installed using augered Rammed Aggregate Pier systems -
1. Augered Rammed Aggregate Pier systems shall be pre-augered using mechanical drilling or excavation equipment.
  2. If cave-ins occur during excavation such that the sidewalls of the hole are deemed to be unstable, steel casing shall be used to stabilize the cavity or a displacement Rammed Aggregate Pier system may be used.
  3. Aggregate shall be placed in the augered cavity in compacted lift thicknesses no greater than 24 inches as determined by the Aggregate Pier Designer.
  4. Should cave-ins occur on top of a lift of aggregate such that the volume of the caved soil is greater than 10 percent of the volume of the aggregate in the lift, then the aggregate shall be considered contaminated and shall be removed and replaced with uncontaminated aggregate.
  5. A specially-designed beveled tamper and high-energy impact densification apparatus shall be employed to densify lifts of aggregate during installation. The tamper diameter shall be at least 80% of the pre-augered hole diameter. The apparatus shall apply direct downward impact energy to each lift of aggregate.
- C. Aggregate Piers Installed using Vibro-Replacement Stone Columns
1. If vibro-replacement stone column construction is used to construct the Aggregate Piers, the Installer shall use an electric down-hole vibroflot (probe) capable of providing at least 200 HP of rated energy and a centrifugal force of 30 tons. The vibroflot diameter must be at least 60% of the Aggregate Pier design diameter. An appropriate metering device should be provided at such a location that inspection of amperage build-up may be verified during the operation of the equipment. Metering device may be an ammeter directly indicating the performance of the vibroflot tip of the eccentric. Complete equipment specifications should be submitted to the Engineer prior to commencement of the fieldwork.
  2. The probe and follower tubes shall be of sufficient length to reach the elevations shown on the installer's approved construction drawings. Pre-augering of each hole is required.
  3. The probe shall penetrate into the foundation soil layer to the minimum depths required in the installer's construction plans. After penetration to the required depth, the probe shall not be withdrawn more than 2 feet at any time unless the stone stops flowing to the bottom of the probe.
  4. Redriving the probe into the treated depth shall be attempted at approximately 12 to 18-inch intervals to observe resistance to penetration and amperage build-up. During redriving, the probe tip shall penetrate to within 1 foot of the previous redriving depth.
  5. Amperage build-up and backfill quantities will be contingent upon the type of probe used and procedures. Prior to commencement of work, the Contractor shall discuss the equipment capabilities with the Engineer to determine if trial probes will be necessary.
  6. The Installer shall provide a full-time quality control technician on-site during the installation process.
- D. Displacement Rammed Aggregate Pier Systems

1. Displacement Rammed Aggregate Pier systems shall be constructed by advancing a specially designed mandrel with a minimum 10-ton static force augmented by dynamic vertical ramming energy to the full design depth. The hollow-shaft mandrel, filled with aggregate, is incrementally raised, permitting the aggregate to be released into the cavity, and then lowered by vertically advancing and/or ramming to densify the aggregate and force it laterally into the adjacent soil. The cycle of raising and lowering the mandrel is repeated to the top of pier elevation. The cycle distance shall be determined by the Rammed Aggregate Pier designer.

2. Special high-energy impact densification apparatus shall be employed to vertically densify the Rammed Aggregate Pier elements during installation of each constructed lift of aggregate.

3. Densification shall be performed using a mandrel/tamper. The mandrel/tamper foot is required to adequately increase the lateral earth pressure in the matrix soil during installation.

4. Downward crowd pressure shall be applied to the mandrel during installation.

E. Plan Location and Elevation of Aggregate Piers

1. The as-built center of each pier shall be within 6 inches of the locations indicated on the plans. Piers installed outside of the above tolerances and deemed not acceptable shall be rebuilt at no additional expense to the Owner.

F. Rejected Aggregate Piers

1. Aggregate Pier elements installed beyond the maximum allowable tolerances shall be abandoned and replaced with new piers, unless the Designer approves the condition or provides other remedial measures. All material and labor required to replace rejected piers shall be provided at no additional cost to the Owner, unless the cause of rejection is due to an obstruction or mislocation.

### 3.2 QUALITY CONTROL

A. Control Technician

1. The Installer shall have a full-time, on-site Control Technician to verify and report all installation procedures. The Installer shall immediately report any unusual conditions encountered during installation to the Aggregate Pier Designer, the General Contractor, and to the Testing Agency. The quality control procedures shall include the preparation of Aggregate Pier Progress Reports completed during each day of installation containing the following information:

- a. Footing and Aggregate Pier location.
- b. Pre-auger diameter and soil conditions encountered during drilling (if required).
- c. Aggregate Pier length.
- d. Planned and actual Aggregate Pier elevations at the top and bottom of the Aggregate Pier.
- e. Average lift thickness of each Aggregate Pier.
- f. Volume of aggregate used in each Aggregate Pier.
- g. Documentation of any unusual conditions encountered.
- h. Type and size of densification equipment used.

B. Aggregate Pier Modulus Test

1. When authorized, an Aggregate Pier Modulus Test(s) shall be performed at locations agreed upon by the Aggregate Pier Designer and the Testing Agency to verify or modify Aggregate Pier designs. Modulus Test Procedures shall utilize appropriate portions of ASTM D 1143 and ASTM D 1194, as outlined in the Aggregate Pier design submittal. Aggregate Piers shall be tested to 150 percent of the maximum design stress as shown in the aggregate pier design submittal. The modulus tests shall be of the type and installed in a manner specified herein.
2. A telltale shall be installed at the bottom of the test pier so that bottom-of-pier deflections may be determined. Acceptable performance is indicated when the bottom of the pier deflection is no more than 30% of the top of pier deflection at the design stress level.
3. ASTM D-1143 general test procedures shall be used as a guide to establishing load increments, load increment duration, and load decrements. As a minimum, the following loading increments, decrements and duration shall be used.

Increment	Approximate Load (percent design)	Minimum Duration (min)	Maximum Duration (min)
Seat	< 9	0	N/A
1	17	15	60
2	33	15	60
3	50	15	60
4	67	15	60
5	83	15	60
6	100	15	60
7	117	60	120
8	133	15	60
9	150	15	60
10	100	N/A	N/A
11	66	N/A	N/A
12	33	N/A	N/A
13	0	N/A	N/A

- C. With the exception of the load increment representing approximately 117% of the design maximum top of Aggregate Pier stress, all load increments shall be held for a minimum of 15 minutes. Loads are then maintained until the rate of deflection reduces to 0.01 inch per hour or for the maximum of 1 hour, whichever is occurs first.
- D. The load increment that represents approximately 117% of the design maximum stress on the Aggregate Pier shall be held for a minimum of 15 minutes. Loads are then maintained until the rate of deflection reduces to 0.01 inch per hour or for the maximum of 4 hours, whichever is occurs first.
- E. A seating load equal to 5 percent of the total load shall be applied to the loaded steel plate prior to application of load increments and prior to measurement of deflections to compensate for surficial disturbance.
- F. Bottom Stabilization Testing (BSTs) / Crowd Stabilization Testing (CSTs)
  1. Bottom stabilization testing (BSTs) or Crowd stabilization testing (CSTs) shall be performed by the Control Technician during the installation of the modulus test pier. The tests are performed by applying downward vertical energy to the tamper, mandrel or probe following lift construction and monitoring the amount of additional deflection from the applied energy. Additional testing as required by the Aggregate Pier Designer (typically 10% of the production Aggregate Piers) shall be performed on selected production Aggregate Pier elements to compare results with the modulus test pier.
- G. A minimum of **XXX (X)** Cone Penetration Test probe(s) shall be conducted within improved areas and appropriate calculations shall be provided by the Installer to confirm

that the design criteria have been met.

### **3.3 QUALITY ASSURANCE**

- A. Independent Engineering Testing Agency (Owner's Quality Assurance)
- B. The Aggregate Pier Installer shall provide full-time Quality Control monitoring of Aggregate Pier construction activities. The Owner or General Contractor is responsible for retaining an independent engineering testing firm to provide Quality Assurance services.
- C. Responsibilities of Independent Engineering Testing Agency
- D. The Testing Agency shall monitor the modulus test pier installation and testing. The Installer shall provide and install all dial indicators and other measuring devices.
- E. The Testing Agency shall monitor the installation of Aggregate Piers to verify that the production installation practices are similar to those used during the installation of the modulus test elements.
- F. The Testing Agency shall report any discrepancies to the Installer and General Contractor immediately.
- G. The Testing Agency shall observe the excavation, compaction and placement of the foundations as described in Section 7.05. Dynamic Cone Penetration testing may be performed to evaluate the footing bottom condition as determined by the Testing Agency.

### **3.4 RESPONSIBILITIES OF THE GENERAL CONTRACTOR**

- A. Site Preparation and Protection
  1. The General Contractor shall locate and protect underground and aboveground utilities and other structures from damage during installation of the Aggregate Piers.
  2. Site grades for aggregate pier installation shall be within 1 foot of the top of footing elevation or finished grade elevation to minimize aggregate pier installation depths. Ground elevations and bottom of footing elevations shall be provided to the Rammed Aggregate Pier Installer in sufficient detail to estimate installation depth elevations to within 3 inches.
  3. The General Contractor will provide site access to the Installer, after earthwork in the area has been completed. A working surface shall be established and maintained by the General Contractor to provide wet weather protection of the subgrade and to provide access for efficient operation of the Aggregate Pier installation.
  4. Prior to, during and following Aggregate Pier installation, the General Contractor shall provide positive drainage to protect the site from wet weather and surface ponding of water.
  5. If spoils are generated by aggregate pier installation, spoil removal from the aggregate pier work area in a timely manner to prevent interruption of aggregate pier installation is required.
- B. Aggregate Pier Layout
  1. The location of aggregate pier-supported foundations for this project, including layout of individual aggregate pier elements, shall be marked in the field using survey stakes or similar means at locations shown on the drawings.

- C. Contractor's / Owner's Independent Testing Agency (Owner's Quality Assurance)
1. General Contractor is responsible for acquiring an Independent Testing Agency (Quality Assurance) as required. Testing Agency roles are as described in Part 6 of this specification. The Aggregate Pier Installer will provide Quality Control services as described in Part 5 of this specification.
- D. Excavations for Obstructions
1. Should any obstruction be encountered during Aggregate Pier installation, the General Contractor shall be responsible for promptly removing such obstruction, or the pier shall be relocated or abandoned. Obstructions include, but are not limited to, boulders, timbers, concrete, bricks, utility lines, etc., which shall prevent placing the piers to the required depth, or shall cause the pier to drift from the required location.
  2. Dense natural rock or weathered rock layers shall not be deemed obstructions, and piers may be terminated short of design lengths on such materials.
- E. Utility Excavations
1. The General Contractor shall coordinate all excavations made subsequent to Aggregate Pier installations so that excavations do not encroach on the piers as shown in the Aggregate Pier construction drawings. Protection of completed Aggregate Piers is the responsibility of the General Contractor. In the event that utility excavations are required in close proximity to the installed Aggregate Piers, the General Contractor shall contact the Aggregate Pier Designer immediately to develop construction solutions to minimize impacts on the installed Aggregate Pier elements.
- F. Footing Bottoms
1. Excavation and surface compaction of all footings shall be the responsibility of the General Contractor.
  2. Foundation excavations to expose the tops of Aggregate Piers shall be made in a workman-like manner, and shall be protected until concrete placement, with procedures and equipment best suited to (1) avoid exposure to water, (2) prevent softening of the matrix soil between and around the Aggregate Piers before pouring structural concrete, and (3) achieve direct and firm contact between the dense, undisturbed Aggregate Piers and the concrete footing.
  3. All excavations for footing bottoms supported by Aggregate Pier foundations shall be prepared in the following manner by the General Contractor.  
Recommended procedures for achieving these goals are to:
    - a. Limit over-excavation below the bottom of the footing to 3-inches (including disturbance from the teeth of the excavation equipment).
    - b. Compaction of surface soil and top of Aggregate Piers shall be prepared using a motorized impact compactor ("Wacker Packer," "Jumping Jack," or similar). Sled-type tamping devices shall only be used in granular soils and when approved by the designer. Loose or soft surficial soil over the entire footing bottom shall be recompacted or removed, respectively. The surface of the aggregate pier shall be recompacted prior to completing footing bottom preparation.
    - c. Place footing concrete immediately after footing excavation is made and approved, preferably the same day as the excavation. Footing concrete must be placed on the same day if the footing is bearing on moisture-sensitive soils. If same day placement of footing concrete is not possible, open excavations shall be protected from surface water accumulation. A lean concrete mud-mat may be used to accomplish this. Other methods must be pre-approved by the Designer.
  4. The following criteria shall apply, and a written inspection report sealed by the project Testing Agency shall be furnished to the Installer to confirm:

- a. That water has not been allowed to pond in the footing excavation at any time.
  - b. That all Aggregate Piers designed for each footing have been exposed in the footing excavation.
  - c. That immediately before footing construction, the tops of Aggregate Piers exposed in each footing excavation have been inspected and recompactd as necessary with mechanical compaction equipment.
  - d. That no excavations or drilled shafts (elevator, etc) have been made after installation of Aggregate Pier elements within the excavation limits described in the Aggregate Pier construction drawings, without the written approval of the Installer or Designer.
5. Failure to provide the above inspection and certification by the Testing Agency, which is beyond the responsibility of the Aggregate Pier Installer, may void any written or implied warranty on the performance of the Aggregate Pier system.

### **3.5 PAYMENT**

- A. Measurement of the aggregate piers is on a lump sum basis.
- B. Payment shall cover design, supply and installation of the aggregate pier foundation system. Excavation of unsuitable materials, delays, re-engineering, and remobilization as documented and approved by the Owner or Owner's Engineer, shall be paid for under separate pay items.

**END OF SECTION**



**DIVISION 01 - GENERAL REQUIREMENTS**

01 1100	Summary of the Work
01 1200	Multiple Contract Summary
01 1400	Work Restrictions
01 2900	Payment Procedures
01 3100	Project Management and Coordination
01 3200	Construction Progress Documentation
01 3300	Submittal Procedures
01 3500	Special Procedures
01 4000	Quality Requirements
01 4200	References
01 4301	Quality Assurance-Qualifications
01 4523	Testing and Inspection Services
01 4546	Duct Testing, Adjusting, and Balancing
01 5100	Temporary Utilities
01 5200	Construction Facilities
01 5400	Construction Aids
01 5600	Temporary Barriers and Enclosures
01 5700	Temporary Controls
01 5800	Project Identification
01 6100	Common Product Requirements
01 6200	Product Options
01 6400	Owner-Furnished Products
01 6600	Delivery, Storage, and Handling Requirements
01 7300	Execution
01 7400	Cleaning and Waste Management
01 7700	Closeout Procedures
01 7800	Closeout Submittals

# SECTION 01 1100 - SUMMARY OF WORK

## PART 1 - GENERAL

### 1.1 SUMMARY

- A. Section Includes But is Not Limited To:
  - 1. Administrative and procedural requirements Summary of Work requirements.

### 1.2 WORK COVERED BY CONTRACT DOCUMENTS

- A. Provisions contained in Division 01 apply to Sections of Divisions 02 through 49 of Specifications. Instructions contained in Specifications are directed to Contractor. Unless specifically provided otherwise, obligations set forth in Contract Documents are obligations of Contractor.
- B. Contractor shall furnish total labor, materials, equipment, and services necessary to perform The Work in accordance with Contract Documents.

### 1.3 WORK BY OWNER

- A. Owner will furnish and install some portions of The Work with its own forces. Contractor will be provided with schedule of when these items are to be performed.
  - 1. General:
    - a. Complete work necessary to accommodate work to be performed by Owner before scheduled date for performance of such work. Contractor will be back charged for actual expenses incurred by Owner for failure to timely complete such work.
    - b. Store and protect completed work provided by Owner until date of Substantial Completion.
  - 2. Work furnished and installed by Owner include, but are not limited to, following:
    - a. Electronic door access system.
    - b. Residential appliances.
    - c. Furnishings
    - d. Carpeting
    - e. Equipment
    - f. Writable wall marker boards
    - g. Resilient base

## PART 2 - PRODUCTS Not Used

## PART 3 - EXECUTION Not Used

END OF SECTION

## SECTION 01 1200 - MULTIPLE CONTRACT SUMMARY

### PART 1 - GENERAL

#### 1.1 SUMMARY

A. Section Includes But is Not Limited To:

1. Administrative and procedural requirements for Multiple Contracts.

#### 1.2 SUMMARY OF CONTRACTS

A. Owner has issued or will issue separate contracts for operations scheduled to be completed between Notice to Proceed and Substantial Completion.

1. General:
  - a. Schedule performance of work covered by such separate contracts in Contractor's Construction Schedule so as to avoid delays in Substantial Completion. Give written notice to such contractors and to Owner of any revisions to scheduled delivery and work dates at least 90 days in advance.
  - b. Complete work necessary to accommodate items provided under such separate contracts before scheduled date for performance of such work. Contractor will be back charged for actual expenses incurred by Owner for failure to timely complete such work including, but not limited to, cost of crews during downtime or for call backs and costs to correct substrate deficiencies.
  - c. Store and protect completed work provided under separate contracts until date of Substantial Completion.
2. Carpeting. See Section 09 6813 and 09 6816.
3. Resilient base. See section 09 6513.
4. Soap dispensers, paper towel dispensers, and toilet tissue dispensers. See Section 10 2813.
5. Testing and Inspection. See Section 01 4523 "Testing and Inspection" for testing and inspection, and testing laboratory services for materials, products, and construction methods:
  - a. Aggregate Piers. See Section 31 6421.
  - b. Aggregate Base. See Section 31 1123.
  - c. Air System Testing, Adjusting, and Balance. See Section 01 4546.
  - d. Concrete. See Section 03 3111.
  - e. Drill-In Mechanical Anchors / Adhesive Anchors / Screw Anchors. See Section 03 1511 and Section 04 0519.
  - f. Fill / Engineering Fill. See Section 31 2323.
  - g. Masonry (Non-structural). Tests and inspections is not required. See Section 04 0501 'Common Masonry Requirements'.
  - h. Shop-Fabricated Wood Trusses: Metal Plate Connected Wood Trusses. See Section 06 1753.
  - i. Structural Steel Framing. See Section 05 1200.
  - j. Wood Panel Product Sheathing. See Section 06 1636.

B. Owner has issued or will issue separate contracts for operations normally scheduled to follow Substantial Completion.

1. General:
  - a. Give written notice to such contractors and to Owner of any revisions of scheduled date of Substantial Completion at least 90 days in advance. Contractor will be back charged for actual expenses incurred by Owner for failure to accurately report date of Substantial Completion.

- b. Complete work necessary to accommodate items provided under such separate contracts before Substantial Completion. Contractor will be back charged for actual expenses incurred by Owner for failure to complete such work before Substantial Completion.

**PART 2 - PRODUCTS Not Used**

**PART 3 - EXECUTION Not Used**

**END OF SECTION**

## SECTION 01 1400 -WORK RESTRICTIONS

### PART 1 - GENERAL

#### 1.1 SUMMARY

A. Section Includes But is Not Limited To:

1. Administrative and procedural requirements for Work Restrictions.

#### 1.2 PROJECT CONDITIONS

A. During construction period, Contractor will have use of premises for construction operations. Contractor will ensure that Contractor, its employees, subcontractors, and their employees comply with following requirements:

1. Confine operations to areas within Contract limits shown on Drawings. Do not disturb portions of site beyond Contract limits.
2. Do not allow alcoholic beverages, illegal drugs, or persons under their influence on Project site.
3. Do not allow use of tobacco in any form on Project Site.
4. Do not allow pornographic or other indecent materials on site.
5. Do not allow work on Project site on Sundays except for emergency work.
6. Refrain from using profanity or being discourteous or uncivil to others on Project Site or while performing The Work.
7. Wear shirts with sleeves, wear shoes, and refrain from wearing immodest, offensive, or obnoxious clothing, while on Project Site.
8. Do not allow playing of obnoxious and loud music on Project Site. Do not allow playing of any music within existing facilities.
9. Do not build fires on Project Site.
10. Do not allow weapons on Project Site, except those carried by law enforcement officers or other uniformed security personnel who have been retained by Owner or Contractor to provide security services.

B. Do not load or permit any part of the structure to be loaded with a weight that will endanger its safety. Questions of structural loading as part of construction means and methods shall be addressed by a licensed structural engineer engaged by Contractor, subject to the review by Architect.

### PART 2 - PRODUCTS Not Used

### PART 3 - EXECUTION Not Used

END OF SECTION

## SECTION 01 2900 - PAYMENT PROCEDURES

### PART 1 - GENERAL

#### 1.1 SUMMARY

A. Section Includes But is Not Limited To:

1. Administrative and procedural requirements to prepare and process Applications for Payments.

#### 1.2 PAYMENT REQUESTS

A. Use Payment Request forms provided by Owner.

B. Each Payment Request will be consistent with previous requests and payments certified by Architect and paid for by Owner.

C. Request Preparation:

1. Complete every entry on Payment Request form.
2. Entries will match data on approved schedule of values and Contractor's Construction Schedule. Use updated schedules if revisions have been made.
3. Submit signed Payment Request to Architect with current Construction Schedule.

D. Provide following submittals before or with submittal of Initial Payment Request:

1. List of Subcontractors.
2. Initial progress report.
3. Contractor's Construction Schedule.
4. Submittal Schedule.

E. Provide Affidavit of Contractor and Consent of Surety with Payment Request following Substantial Completion.

#### 1.3 SCHEDULE OF VALUES

A. Submit schedule of values on Owner's standard form to Architect 20 days minimum before submission of Initial Payment Request as a necessary condition before payment will be processed. Coordinate preparation of schedule of values with preparation of Contractor's Construction Schedule. Correlate line items in Schedule of Values with other required administrative schedules and forms, including:

1. Contractor's Construction Schedule.
2. Payment Request form.

### PART 2 - PRODUCTS Not Used

### PART 3 - EXECUTION Not Used

END OF SECTION

## SECTION 01 3100 - PROJECT MANAGEMENT AND COORDINATION

### PART 1 - GENERAL

#### 1.1 SUMMARY

A. Section Includes But is Not Limited To:

1. Administrative and procedural requirements for Project Management and Coordination on Projects.

#### 1.2 PROJECT COORDINATION

A. Project designation for this Project is LDS 501-9820-210101.

B. This Project designation will be included on documents generated for Project by Contractor and Subcontractors or be present on a cover letter accompanying such documents.

#### 1.3 MULTIPLE CONTRACT COORDINATION

A. Contractor shall be responsible for accurately maintaining and reporting schedule of The Work from Notice to Proceed to date of Substantial Completion.

B. Contractor shall be responsible for providing Temporary Facilities And Controls for those who perform work on Project from Notice to Proceed to date of Substantial Completion.

C. Contractor shall be responsible for providing Construction Waste Management And Disposal services for those who perform work on Project from Notice to Proceed to date of Substantial Completion.

D. Contractor shall be responsible for Final Cleaning for entire Project.

#### 1.4 PROJECT MEETINGS AND CONFERENCES

A. Preconstruction Conference:

1. Attend preconstruction conference and organizational meeting scheduled by Architect at Project site or other convenient location.
2. Be prepared to discuss items of significance that could affect progress, including such topics as:
  - a. Construction schedule.
  - b. Critical Work sequencing.
  - c. Current problems.
  - d. Designation of responsible personnel.
  - e. Distribution of Contract Documents.
  - f. Equipment deliveries and priorities.
  - g. General schedule of inspections by Architect and its consultants.
  - h. General inspection of tests.
  - i. Office, work, and storage areas.
  - j. Preparation of record documents and O & M manuals.
  - k. Procedures for processing interpretations and Modifications.
  - l. Procedures for processing Payment Requests.
  - m. Project cleanup.

- n. Security.
  - o. Status of permits.
  - p. Submittal of Product Data, Shop Drawings, Samples, Quality Assurance / Control submittals.
  - q. Use of the premises.
  - r. Work restrictions.
  - s. Working hours.
3. Architect will record minutes of meetings and distribute copies to Owner and Contractor within three (3) working days.
- B. Progress Meetings:
- 1. Attend progress meetings at Project site at regularly scheduled intervals determined by Architect, at least once a month.
  - 2. Progress meetings will be open to Owner, Architect, Subcontractors, and anyone invited by Owner, Architect, and Contractor.
  - 3. Be prepared to discuss items of significance that could affect progress, including following:
    - a. Progress since last meeting.
    - b. Whether Contractor is on schedule.
    - c. Activities required to complete Project within Contract Time.
    - d. Labor and materials provided under separate contracts.
    - e. Off-site fabrication problems.
    - f. Access.
    - g. Site use.
    - h. Temporary facilities and services.
    - i. Hours of work.
    - j. Hazards and risks.
    - k. Project cleanup.
    - l. Quality and Work standards.
    - m. Status of pending modifications.
    - n. Documentation of information for Payment Requests.
    - o. Maintenance of Project records.
  - 4. Architect will prepare minutes of progress meetings and distribute copies of minutes to Owner and Contractor within three (3) working days.
- C. Pre-Installation Conferences:
- 1. Attend pre-installation conferences specified in Contract Document.
    - a. If possible, schedule these conferences on same day as regularly scheduled Progress Meetings. If this is not possible, coordinate scheduling with Architect.
    - b. Request input from attendees in preparing agenda.
  - 2. Be prepared to discuss following items:
    - a. Requirements of Contract Documents.
    - b. Completed work necessary for installation of items or systems.
    - c. Conditions not in compliance with installation requirements.
    - d. Installation and inspection schedule.
    - e. Coordination between trades.
    - f. Space and access limitations.
    - g. Testing.
  - 3. Architect will prepare meeting minutes and distribute minutes to Owner and Contractor within three (3) working days.



**PART 2 - PRODUCTS Not Used**

**PART 3 - EXECUTION Not Used**

**END OF SECTION**

## SECTION 01 3200 - CONSTRUCTION PROGRESS DOCUMENTATION

### PART 1 - GENERAL

#### 1.1 SUMMARY

A. Section Includes But is Not Limited To:

1. Administrative and procedural requirements for documenting the progress of construction during performance of the Work.

#### 1.2 SCHEDULING OF WORK

A. Bar Chart Schedule:

1. Submit horizontal bar chart schedule before Preconstruction Conference. Provide separate time bar for each construction activity listed on Owner's payment request form. Within each time bar, show estimated completion percentage. Provide continuous vertical line to identify first working day of each week. Show each activity in chronological sequence. Show graphically sequences necessary for completion of related portions of The Work. As The Work progresses, place contrasting mark in each bar to indicate actual completion.
2. Provide copies of schedule for Architect and Owner and post copy in field office.
3. Revise schedule monthly. Send copy of revised schedule to Owner and Architect and post copy in field office.
4. Project Management Software Programs:
  - a. Any software project management program capable of Bar Chart Scheduling for projects of equal size and complexity is approved by Contractor and approved by Owner's Project Manager.

B. Daily Construction Reports:

1. Prepare daily reports of operations at Project including at least following information:
  - a. List of Subcontractors at site.
  - b. Approximate count of personnel at site by trade.
  - c. High and low temperatures, general weather conditions.
  - d. Major items of equipment on site.
  - e. Materials, equipment, or Owner-furnished items arriving at or leaving site.
  - f. Accidents and unusual events.
  - g. Site or structure damage by water, frost, wind, or other causes.
  - h. Meetings, conferences, and significant decisions.
  - i. Visitors to the job including meeting attendees.
  - j. Stoppages, delays, shortages, losses.
  - k. Any tests made and their result if known.
  - l. Meter readings and similar recordings.
  - m. Emergency procedures.
  - n. Orders and requests of governing authorities.
  - o. Modifications received, carried out.
  - p. Services connected, disconnected.
  - q. Equipment or system tests and start-ups.
  - r. Brief summary of work accomplished that day.
  - s. Signature of person preparing report.
2. Submit daily reports to Architect at least weekly.
3. Maintain copies of daily reports at field office.

**PART 2 - PRODUCTS Not Used**

**PART 3 - EXECUTION Not Used**

**END OF SECTION**

## SECTION 01 3300 - SUBMITTAL PROCEDURES

### PART 1 - GENERAL

#### 1.1 SUMMARY

- A. Section Includes But is Not Limited To:
  - 1. Administrative and procedural requirements for Submittal Procedures.
- B. Related Requirements:
  - 1. Section 01 7800: 'Closeout Submittals' for administrative and procedural requirements for closeout submittals.

#### 1.2 SUBMITTAL SCHEDULE

- A. Furnish submittal schedule within 20 days after receipt of Notice to Proceed, listing items specified to be furnished for review to Architect including product data, shop drawings, samples, and Informational submittals.
  - 1. Coordinate submittal schedule with Contractor's construction schedule.
  - 2. Enclose the following information for each item:
    - a. Scheduled date for first submittal.
    - b. Related Section number.
    - c. Submittal category.
    - d. Name of Subcontractor.
    - e. Description of part of the Work covered.
    - f. Scheduled date for resubmittal.
    - g. Scheduled date for Architect's final release or approval.
- B. Print and distribute copies to Architect and Owner and post copy in field office. When revisions are made, distribute to same parties and post in same location.
- C. Revise schedule monthly. Send copy of revised schedule to Owner and Architect and post copy in field office.

#### 1.3 SUBMITTAL PROCEDURES

- A. Coordination:
  - 1. Coordinate preparation and processing of submittals with performance of construction activities. Transmit each submittal sufficiently before performance of related construction activities to avoid delay.
    - a. Coordinate each submittal with fabrication, purchasing, testing, delivery, other submittals, and related activities that require sequential activity.
    - b. Coordinate transmittal of different types of submittals required for related elements of The Work so processing will not be delayed by need to review submittals concurrently for coordination. Architect reserves right to withhold action on a submittal requiring coordination with other submittals until related submittals are received.
  - 2. Processing Time:
    - a. Allow sufficient review time so installation will not be delayed by time required to process submittals, including time for resubmittals.

- 1) Allow 21 days for initial review. Allow additional time if processing must be delayed allowing coordination with subsequent submittals. Architect will promptly advise Contractor when submittal being processed must be delayed for coordination.
- 2) If an intermediate submittal is necessary, process same as initial submittal.
- 3) Allow 10 days for reprocessing each submittal.
- 4) No extension of Contract Time will be authorized because of failure to transmit submittals to Architect in sufficient time before work is to be performed to allow processing.

3. Identification:

- a. Place permanent label or title block on each submittal for identification. Include name of entity that prepared each submittal on label or title block.
  - 1) Provide space approximately 4 by 5 inches on label or beside title block on Shop Drawings to record Contractor's review and approval markings and action taken.
  - 2) Include following information on label for processing and recording action taken:
    - a) Project name.
    - b) Date.
    - c) Name and address of Architect.
    - d) Name and address of Contractor.
    - e) Name and address of Subcontractor.
    - f) Name and address of supplier.
    - g) Name of manufacturer.
    - h) Number and title of appropriate Specification Section.
    - i) Drawing number and detail references, as appropriate.

4. Transmittal:

- a. Package each submittal appropriately for transmittal and handling. Transmit each submittal from Contractor to Architect using transmittal letter. On transmittal, record relevant information and requests for data. Include Contractor's certification that information complies with Contract Document requirements, or, on form or separate sheet, record deviations from Contract Document requirements, including minor variations and limitations.
- b. Submittals received from sources other than Contractor or not marked with Contractor's approval will be returned without action.

## 1.4 ACTION SUBMITTALS

A. Product Data:

1. Submit Product Data, as required by individual Sections of Specifications.
2. Mark each copy of each set of submittals to show choices and options used on Project. Where printed Product Data includes information on products that are not required for Project, mark copies to indicate information relating to Project.
3. Certify that proposed product complies with requirements of Contract Documents. List any deviations from those requirements on form or separate sheet.
4. Submit electronic files PDF: Architect will return a PDF copy marked with action taken and with corrections or modifications required.

B. Shop Drawings:

1. Submit newly prepared graphic data to accurate scale. Except for templates, patterns, and similar full-size Drawings, submit Shop Drawings on sheets at least 8-1/2 by 11 inches but no larger than 36 by 48 inches. Highlight, encircle, or otherwise show deviations from Contract Documents. Include following information as a minimum:
  - a. Dimensions.
  - b. Identification of products and materials included.

- c. Compliance with specified standards.
  - d. Notation of coordination requirements.
  - e. Notation of dimensions established by field measurement.
2. Do not reproduce Contract Documents or copy standard information as basis of Shop Drawings. Standard printed information prepared without specific reference to Project is not acceptable as Shop Drawings.
  3. Review and designate (stamp) approval of shop drawings. Unless otherwise specified, submit to Architect six copies of shop drawings required by Contract Documents. Shop drawings not required by Contract Documents, but requested by Contractor or supplied by Subcontractor, need not be submitted to Architect for review.

C. Samples:

1. Submit full-size, fully fabricated Samples cured and finished as specified and physically identical with material or product proposed. Samples include partial sections of manufactured or fabricated components, cuts or containers of materials, color range sets, and swatches showing color, texture, and pattern.
  - a. Mount, display, or package Samples to ease review of qualities specified. Prepare Samples to match samples provided by Architect, if applicable. Include following:
    - 1) Generic description of Sample.
    - 2) Sample source.
    - 3) Product name or name of manufacturer.
    - 4) Compliance with recognized standards.
    - 5) Availability and delivery time.
2. Submit Samples for review of kind, color, pattern, and texture, for final check of these characteristics with other elements, and for a comparison of these characteristics between final submittal and actual component as delivered and installed.
  - a. Where variations in color, pattern, texture or other characteristics are inherent in material or product represented, submit set of three samples minimum that show approximate limits of variations.
  - b. Refer to other specification Sections for requirements for Samples that illustrate workmanship, fabrication techniques, details of assembly, connections, operation and similar construction characteristics.
  - c. Refer to other Sections for Samples to be returned to Contractor for incorporation into The Work. Such Samples shall be undamaged at time of use. On transmittal, indicate special requests regarding disposition of Sample submittals.
3. Where Samples are for selection of color, pattern, texture, or similar characteristics from a range of standard choices, submit full set of choices for material or product. Preliminary submittals will be reviewed and returned with Architect's mark indicating selection and other action.
4. Except for Samples illustrating assembly details, workmanship, fabrication techniques, connections, operation, and similar characteristics, submit three sets. One will be returned marked with action taken.
5. Samples, as accepted and returned by Architect, will be used for quality comparisons throughout course of construction.
  - a. Unless noncompliance with Contract Documents is observed, submittal may serve as final submittal.
  - b. Sample sets may be used to obtain final acceptance of construction associated with each set.

## 1.5 INFORMATIONAL SUBMITTALS

- A. Informational submittals are design data, test reports, certificates, manufacturer's instructions, manufacturer's field reports, and other documentary data affirming quality of products and installations. Submit five copies of each required submittal unless otherwise required. Architect will return three copies marked with action taken and with corrections or modifications required. [or] Submit electronic files: PDF. Architect will return a PDF copy marked with action taken and with corrections or modifications required.
1. Certificates: Describe certificates intended to document affirmations by Contractor or others that the work is in accordance with the Contract Documents, but do not repeat provisions of Parts 2 or 3.

2. Delegated Design Submittals / Design Data: Describe submittals intended to demonstrate design work prepared by Contractor's licensed professionals.
3. Test And Evaluation Reports: Describe submittal of test reports or evaluation service reports intended to document required tests.
4. Manufacturer Instructions: Describe submittals intended to document manufacturer instructions.
5. Source Quality Control Submittals: Describe submittal of source quality control documentation.
6. Field Quality Control Submittals: Describe submittal of field quality control documentation.
7. Manufacturer Reports: Describe submittal of Manufacturer reports as documentation of manufacturer activities.
8. Special Procedure Submittals: Describe submittals intended to document special procedures. An example would be construction staging or phasing for remodeling an existing facility while keeping it in operation. While the Contractor would normally be responsible for managing this, submittal of his plan as documentation could be specified.
9. Qualification Statements: Describe submittals intended to document qualifications of entities employed by Contractor.

## 1.6 CLOSEOUT SUBMITTALS

- A. This title groups submittals that occur during project closeout. Coordinate with section 01 7800 Closeout Submittals.
  1. As Built Record Drawings as defined in the Agreement.
  2. Project Manual: Complete Project Manual including Addenda and Modifications as defined in General Conditions.
  3. Maintenance Contracts: Describe submittal of the maintenance contract specific to the Section.
  4. Operations & Maintenance Data: Describe submittal of operation and maintenance data necessary for products of the Section.
  5. Warranty Documentation: Describe submittal of final executed warranty document specific to the Section.
  6. Record Documentation: Describe submittal of record documentation specific to the Section.
  7. **Software:** Describe submittal system software and programming software specific to the Section.

## 1.7 MAINTENANCE MATERIAL SUBMITTALS

- A. This title groups maintenance material required submittals specific to the Section. Items may be provided at completion of Work or submitted with section 01 7800 Closeout Submittals:
  1. Spare Parts: Describe spare parts necessary for Owner's use in facility operation and maintenance. 'Parts' are generally understood to be items such as filters, motor drive belts, lamps, and other similar manufactured items that require only simple replacement.
  2. Extra Stock Materials: Describe extra stock materials to be provided for Owner's use in facility operation and maintenance. Extra stock materials are generally understood to be items such as ceiling tiles, flooring, paint etc.
  3. Tools:
    - a. Describe tools to be provided for Owner's use in facility operation and maintenance. Tools are generally understood to be wrenches, gauges, circuit setters, etc, required for proper operation or maintenance of a system.

## PART 2 - PRODUCTS Not Used

## PART 3 - EXECUTION Not Used

**END OF SECTION**

# SECTION 01 3500 - SPECIAL PROCEDURES

## PART 1 - GENERAL

### 1.1 SUMMARY

A. Section Includes But is Not Limited To:

1. Administrative and procedural requirements for Special Procedures.

### 1.2 REFERENCES

A. Association Publications:

1. U.S. Department of Labor, Occupational Safety and Health Administration:
  - a. 29 CFR 1926 OSHA, 'Construction Industry Regulations' (January 2014 or latest version).
    - 1) 29 CFR 1926.20, 'General Safety And Health Provisions'.
    - 2) 29 CFR 1926.64, 'Hot Work Permit'.
    - 3) 29 CFR 1926.352, 'Fire Prevention'.
    - 4) 29 CFR 1926.500, 'Fall Protection'.

### 1.3 ADMINISTRATIVE REQUIREMENTS

A. Acceleration of Work:

1. Complete The Work in accordance with Construction Schedule. If Contractor falls behind schedule, take such actions as are necessary, at no additional expense to Owner, to bring progress of The Work back in accordance with schedule.
2. Owner may request proposal for completion of The Work at date earlier than expiration of Contract Time:
  - a. Promptly provide requested proposal showing cost of such acceleration of The Work. Consult with Owner and Architect regarding possible options to decrease cost of such acceleration.
  - b. If Owner determines to order acceleration of The Work, change in Contract Sum and Contract Time resulting from acceleration will be included in a Change Order.

### 1.4 QUALITY ASSURANCE

A. Regulatory Agency Sustainability Approvals:

1. Meet regulations of 29 CFR 1926 OSHA, 'Construction Industry Regulations'.
2. Owner's Safety Requirements:
  - a. Personal Protection:
    - 1) Contractor shall ensure:
      - a) Positive means of fall protection, such as guardrails system, safety net system, personal fall arrest system, etc, is provided to employees whenever exposed to a fall 6 feet or more above a lower level.
      - b) Personnel working on Project shall wear hard hats and safety glasses as required by regulation and hazard.



- c) Personnel working on Project shall wear long or short sleeve shirts, long pants, and hard-toed boots or other sturdy shoes appropriate to type and phase of work being performed.
- b. Contractor Tools And Equipment:
  - 1) Contractor shall ensure:
    - a) Tools and equipment are in good working condition, well maintained, and have necessary guards in place.
    - b) Ground Fault Circuit Interrupters (GFCI) is utilized on power cords and tools.
    - c) Scaffolding and man lifts are in good working condition, erected and maintained as required by governmental regulations.
    - d) Ladders are in good condition, well maintained, used as specified by Manufacturer, and secured as required.
- c. Miscellaneous:
  - 1) Contractor shall ensure:
    - a) Protection is provided on protruding rebar and other similar objects.
    - b) General Contractor Superintendent has completed the OSHA 10-hour construction outreach training course or equivalent.
    - c) Implementation and administration of safety program on Project.
    - d) Material Safety Data Sheets (MSDS) are provided for substances or materials for which an MSDS is required by governmental regulations before bringing on site.
    - e) Consistent safety training is provided to employees on Project.
    - f) Implement and coordinate Lockout / Tagout procedures with Owner's Representative as required.
  - 2) Report accidents involving injury to employees on Project that require off-site medical treatment to Owner's designated representative.
- d. Hot Work Permit:
  - 1) Permit shall document that fire prevention and protection requirements in 29 CFR 1926.352, 'Fire Prevention' have been implemented prior to beginning hot work operations.
  - 2) Required for doing hot work involving open flames or producing heat or sparks such as:
    - a) Brazing.
    - b) Cutting.
    - c) Grinding.
    - d) Soldering.
    - e) Thawing pipe.
    - f) Torch applied roofing.
    - g) Welding.

**PART 2 - PRODUCTS Not Used**

**PART 3 - EXECUTION Not Used**

**END OF SECTION**

## SECTION 01 4000 - QUALITY REQUIREMENTS

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General Conditions and Division 01 Specification Sections, apply to this Section.

#### 1.2 SUMMARY

- A. This Section includes administrative and procedural requirements for quality assurance and quality control.
- B. Related Requirements:
  - 1. Section 01 3100: 'Project Management and Coordination' for Pre-Installation Conferences for testing and inspection.
  - 2. Section 01 3200: 'Construction Progress Documentation' for developing a schedule of required tests and inspections.
  - 3. Section 01 3300: 'Submittal Procedures'.
  - 4. Section 01 4301: 'Quality Assurance - Qualifications' establishes minimum qualification levels required.
  - 5. Section 01 4523: 'Testing and Inspecting Services' for testing and inspection, and testing laboratory services for materials, products, and construction methods.
  - 6. Section 01 7300: 'Executions' for cutting and patching for repair and restoration of construction disturbed by testing and inspecting activities.
  - 7. Divisions 01 thru 49 establish responsibility for providing specific testing and inspections.

#### 1.3 REFERENCES

- A. Definitions:
  - 1. Accreditation: Process in which certification of competency, authority, or credibility is presented. Verify that laboratories have an appropriate quality management system and can properly perform certain test methods (e.g., ANSI, ASTM, and ISO test methods) and calibration parameters according to their scopes of accreditation.
  - 2. Approved: To authorize, endorse, validate, confirm, or agree to.
  - 3. Experienced: When used with an entity, "experienced" means having successfully completed a minimum of five previous projects similar in size and scope to this Project; being familiar with requirements indicated; and having complied with requirements of authorities having jurisdiction.
  - 4. Installer/Applicator/Erector: Contractor or another entity engaged by Contractor as an employee, Subcontractor, or Sub-subcontractor, to perform a construction operation, including installation, erection, application, and similar operations.
    - a. Using a term such as "carpentry" does not imply that certain construction activities must be performed by accredited or unionized individuals of corresponding generic name, such as "carpenter." It also does not imply that requirements specified apply exclusively to trades people of corresponding generic name.
  - 5. Mockups: Full-size, physical assemblies that are constructed on-site. Mockups are used to verify selections made under sample submittals, to demonstrate aesthetic effects and, where indicated, qualities of materials and execution, and to review construction, coordination, testing, or operation; they are not Samples. Approved mockups establish standard by which the Work will be judged.
  - 6. Observation: Visual observation of building / site elements or structural system by registered design professional for general conformance to approved construction documents at significant construction stages and at completion. Observation does not include or waive responsibility for performing inspections or special inspections.
  - 7. Preconstruction Testing: Tests and inspections that are performed specifically for Project before products and materials are incorporated into the Work to verify performance or compliance with specified criteria.

8. Product Testing: Tests and inspections that are performed by testing agency qualified to conduct product testing and acceptable to authorities having jurisdiction, to establish product performance and compliance with industry standards.
9. Service Provider: Agency or firm qualified to perform required tests and inspections.
10. Source Quality Control Testing: Tests and inspections that are performed at source, i.e., plant, mill, factory, or shop.
11. Testing Agency: Entity engaged to perform specific tests, inspections, or both.
12. Testing Agency Laboratory: Agency or firm qualified to perform field and laboratory tests to determine characteristics and quality of materials and workmanship.
13. Verification: Act of reviewing, inspecting, testing, etc. to establish and document that product, service, or system meets regulatory, standard, or specification requirements.

B. Reference Standards:

1. International Code Council (IBC) (2015 or most recent edition adopted by AHJ):
  - a. IBC Chapter 17, 'Structural Tests and Special Inspections'.

## 1.4 ADMINISTRATIVE REQUIREMENTS

A. Conflicting Requirements:

1. General:
  - a. If compliance with two or more standards is specified and standards establish different or conflicting requirements for minimum quantities or quality levels, comply with most stringent requirement.
  - b. Refer uncertainties and requirements that are different, but apparently equal, to Architect for a decision before proceeding.
2. Minimum Quantity or Quality Levels:
  - a. Quantity or quality level shown or specified shall be minimum provided or performed.
  - b. Actual installation may comply exactly with minimum quantity or quality specified, or it may exceed minimum within reasonable limits.
  - c. To comply with these requirements, indicated numeric values are minimum or maximum, as appropriate, for context of requirements.
  - d. Refer uncertainties to Architect for decision before proceeding.

B. Coordination:

1. Coordinate sequence of activities to accommodate required quality assurance and quality control services with minimum of delay and to avoid necessity of removing and replacing construction to accommodate testing and inspecting.

C. Scheduling:

1. Schedule times for tests, inspections, obtaining samples, and similar activities.

## 1.5 QUALITY ASSURANCE

A. Testing and inspecting services are used to verify compliance with requirements specified or indicated. These services do not relieve Contractor of responsibility for compliance with Contract Document requirements.

1. Specific quality assurance and quality control requirements for individual construction activities are specified in Sections that specify those activities and Section 01 4523. Requirements in those Sections may also cover production of standard products.

2. Specified tests, inspections, and related actions do not limit Contractor's other quality control procedures that facilitate compliance with Contract Document requirements.
  3. Requirements for Contractor to provide quality assurance and quality control services required by Architect, Owner, or authorities having jurisdiction are not limited by provisions of this Section.
- B. Quality Assurance Services:
1. Activities, actions, and procedures performed before and during execution of the Work to verify compliance and guard against defects and deficiencies and substantiate that proposed construction will comply with requirements.
  2. Owner or Owner's designated representative(s) will perform quality assurance to verify compliance with Contract Documents.
- C. Activities performed by Owner's Quality Assurance Testing Agency include, but are not limited to following:
1. Individual Sections in Division 01 through Division 49:
    - a. Pre-Installation Conference agenda review items for:
      - 1) Schedule requirements.
      - 2) Testing and inspection requirements:
      - 3) Requirements and frequency of testing and inspections.
      - 4) Mock-up or sample requirements.
      - 5) Submittals requirements.
    - b. Quality Assurance personal qualifications.
      - 1) Qualification documentation including certificates if required.
    - c. Non-Conforming Work:
      - 1) Prepare non-compliance log to track non-compliant testing or inspections.
  2. Weekly Activities:
    - a. Summarize and track any non-compliance issues.
    - b. Provide summary report of previous week's performed Work.
    - c. Visit contractors periodically to find out if they have any concerns with Quality Assurance inspectors and check on any schedule changes.
    - d. Visit Owner's Representatives periodically to find out if they have any concerns with how project is progressing.
- D. Mockups: Before installing portions of the Work requiring mockups, build mockups for each form of construction and finish required to comply with following requirements, using materials indicated for completed Work:
1. Coordinate with individual section in Division 01 through Division 49 if there are any additional requirements or modification to these requirements:
    - a. Build mockups in location and of size indicated or, if not indicated, as directed by Architect.
    - b. Notify Architect seven days in advance of dates and times when mockups will be constructed.
    - c. Demonstrate proposed range of aesthetic effects and workmanship.
    - d. Obtain Architect's approval of mockups before starting work, fabrication, or construction.
      - 1) Allow seven days for initial review and each re-review of each mockup.
    - e. Maintain mockups during construction in undisturbed condition as standard for judging completed Work.
      - 1) Demolish and remove mockups when directed, unless otherwise indicated.

## 1.6 QUALITY CONTROL

- A. Quality Control Services:
1. Quality Control will be sole responsibility of Contractor.
    - a. Tests, inspections, procedures, and related actions during and after execution of the Work to evaluate that actual products incorporated into the Work and completed construction comply with requirements performed by Contractor:
      - 1) They do not include inspections, tests or related actions performed by Architect, Owner, governing authorities or independent agencies hired by Owner or Architect.
      - 2) Quality assurance performed by Owner will be used to validate Quality Control performed by Contractor.
    - b. Where services are indicated as Contractor's responsibility, engage a qualified Testing Agency to perform these quality control services.
      - 1) Contractor shall not employ same testing entity engaged by Owner, without Owner's written approval.
- B. Manufacturer's Field Services: Where indicated, engage factory-authorized service representative to inspect field-assembled components and equipment installation, including service connections. Report results in writing as specified in Section 01 3300: 'Submittal Procedures'.
- C. Associated Services: Cooperate with agencies performing required tests, inspections, and similar quality control services, and provide reasonable auxiliary services as requested. Notify Testing Agency sufficiently in advance of operations to permit assignment of personnel. Provide following:
1. Access to the Work.
  2. Incidental labor and facilities necessary to facilitate tests and inspections.
  3. Adequate quantities of representative samples of materials that require testing and inspecting. Assist Testing Agency in obtaining samples.
  4. Facilities for storage and field curing of test samples.
  5. Delivery of samples to testing agencies.
  6. Preliminary design mix proposed for use for material mixes that require quality control by Testing Agency.
  7. Security and protection for samples and for testing and inspecting equipment at Project site.
- D. Testing Agency Responsibilities: Cooperate with Architect and Contractor in performance of duties. Provide qualified personnel to perform required tests and inspections:
1. Civil And Structural Testing:
    - a. Civil and structural field tests, laboratory testing, and inspections are provided by Owner's independent Testing Agency as specified in Section 01 4523 'Testing And Inspection Services'. Quality Control is sole responsibility of Contractor:
      - 1) Owner's employment of an independent Testing Agency does not relieve Contractor of Contractor's obligation to perform testing and inspection as part of his Quality Control:
        - a) Testing and inspections, if performed by Contractor, will be responsibility of Contractor to be performed by an independent entity.
      - 2) Contractor bears full responsible for compliance with all contract requirements and quality control on project and will be responsible for quality of asphalt mixture and asphalt installation.
    - b. Weekly Activities:
      - 1) Ensure that non-compliance log is current.

- 2) Provide summary reports of performed Work.

## **PART 2 - PRODUCTS Not Used**

## **PART 3 - EXECUTION**

### **3.1 REPAIR AND PROTECTION**

- A. General: On completion of testing, inspecting, sample taking, and similar services, repair damaged construction and restore substrates and finishes.
  1. Provide materials and comply with installation requirements specified in other Specification Sections. Restore patched areas and extend restoration into adjoining areas with durable seams that are as invisible as possible.
  2. Comply with Contract Document requirements for Section 01 7300 'Execution' for cutting and patching.
- B. Protect construction exposed by or for Quality Assurance and Quality Control activities.
- C. Repair and protection are Contractor's responsibility, regardless of assignment of responsibility for Quality Assurance and Quality Control Services.

**END OF SECTION**

# SECTION 01 4200 - REFERENCES

## PART 1 - GENERAL

### 1.1 SUMMARY

#### A. Section Includes But is Not Limited To:

1. Reference standards, definitions, specification format, and industry standards.

### 1.2 REFERENCES

#### A. Definitions:

1. Approved: The term "approved," when used to convey Architect's action on Contractor's submittals, applications, and requests, is limited to Architect's duties and responsibilities as stated in the Conditions of the Contract.
2. Directed: The term "directed" is a command or instruction by Architect. Other terms including "requested," "authorized," "selected," "approved," and "permitted" have the same meaning as "directed."
3. Experienced: The term "experienced," when used with an entity, means having successfully completed a minimum of ten previous projects similar in size and scope to this Project; being familiar with the special requirements indicated, and having complied with requirements of authority having jurisdiction.
4. Furnish: The term "furnish" means supply and deliver to Project site, ready for unloading, unpacking, assembly, installation, and similar operations.
5. General: Basic Contract definitions are included in the Conditions of the Contract.
6. Indicated: The term "indicated" refers to requirements expressed by graphic representations, or in written form on Drawings, in Specifications, and in other Contract Documents. Terms such as "shown," "noted," "scheduled," and "specified" are used to help the user locate the reference.
7. Install: The term "install" describes operations at Project site including unloading, temporary storage, unpacking, assembling, erecting, placing, anchoring, applying, working to dimension, finishing, curing, protecting, cleaning, and similar operations.
8. Installer: An "Installer" is the Contractor, or another entity engaged by the Contractor, as an employee, Subcontractor, or Sub-subcontractor, to perform a particular construction operation, including installation, erection, application, and similar operations.
9. Project Site: The term "Project site" means the space available for performing construction activities. The extent of the Project site is shown on the Drawings and may not be identical with the description of the land on which the Project is to be built.
10. Provide: The term "provide" means to furnish and install, complete and ready for the intended use.
11. Regulations: The term "regulations" includes laws, ordinances, statutes, and lawful orders issued by authorities having jurisdiction, and rules, conventions, and agreements within the construction industry that control performance of the Work.
12. Submitted: The terms "submitted," "reported," "satisfactory" and similar words and phrases means submitted to Architect, reported to Architect and similar phrases.
13. Testing Agencies: A "testing agency" is an independent entity engaged to perform specific inspections or tests, either at the Project site or elsewhere, or to report on and, if required, to interpret results of those inspections or tests.
14. Trades: Using terms such as "carpentry" does not imply that certain construction activities must be performed by accredited or unionized individuals of a corresponding generic name, such as "carpenter." It also does not imply that requirements specified apply exclusively to tradespersons of the corresponding generic name.

#### B. References Standards:

1. Specification Format: Specifications will follow MasterFormat™ 2004 for organizing numbers and titles. (The Construction Specifications Institute, Project Resource Manual/CSI Manual of Practice, 5<sup>th</sup> Edition. New York, McGraw-Hill, 2005).

#### a. Specification Identifications:

- 1) The Specifications use section numbers and titles to help cross referencing in the Contract Documents.
- 2) Sections in the Project Manual are in numeric sequence; however, the sequence is incomplete. Consult the table of contents at the beginning of the Project Manual to determine numbers and names of sections in the Contract Documents.

b. Specification Language:

- 1) Specifications should be prepared, with concern and respect for their legal status. Specifications should be Clear, Concise, Correct and Complete.
- 2) Streamlining: Streamlining is used to list products, materials, reference standards, and other itemized specifications. This technique places the subject first and provides keywords for quick reference

c. Sentence Structure:

- 1) Specifications to be written in the "Imperative Mood".
  - a) The verb that clearly defines the action becomes the first word in the sentence.
  - b) The imperative sentence is concise and readily understandable.
- 2) Streamlining is used to list products, materials, reference standards, and other itemized specifications. This technique places the subject first and provides keywords for quick reference.

d. Abbreviated Language:

- 1) Abbreviations should be used only on drawings and schedules where space is limited.
- 2) Abbreviations with multiple meanings should be avoided, unless used in different disciplines where their meaning is clear from the context in which they are used.
- 3) Abbreviations should be limited to five or fewer letters
  - a) The verb that clearly defines the action becomes the first word in the sentence.

e. Symbols:

- 1) Caution should apply to symbols substituted for words or terms.

f. Numbers:

- 1) The use of Arabic numerals rather than words for numbers is recommended.

C. Industry Standards:

1. Except where Contract Documents specify otherwise, construction industry standards will apply and are made a part of Contract Documents by reference.
2. Where compliance with two or more standards is specified and standards apparently establish different or conflicting requirements for minimum quantities or quality levels, refer to Architect for decision before proceeding. Quantity or quality level shown or specified will be minimum provided or performed. Actual installation may comply exactly with minimum quantity or quality specified, or it may exceed minimum within reasonable limits. In complying with these requirements, indicated numeric values are minimum or maximum, as appropriate for context of requirements. Refer uncertainties to Architect for decision before proceeding.
3. Each entity engaged in construction on Project is required to be familiar with industry standards applicable to that entity's construction activity. Copies of applicable standards are not bound with Contract Documents. Where copies of standards are needed for performance of a required construction activity, Contractor will obtain copies directly from publication source.
4. Trade Association names and titles of general standards are frequently abbreviated. The following acronyms or abbreviations, as referenced in Contract Documents, are defined to mean association names. Names and addresses are subject to change and are believed to be, but are not assured to be, accurate and up to date as of date of Contract Documents.



AABC	Associated Air Balance Council	Washington	DC	(202) 737-0202	www.aabchq.com
AAMA	American Architectural Manufacturers Association	Schaumburg	IL	(847) 303-5664	www.aamanet.org
AASHTO	American Association of State Highway & Transportation Officials	Washington	DC	(202) 624-5800	www.aashto.org
AAMA	American Architectural Manufacturers Association	Schaumburg	IL	(847) 303-5774	www.aamanet.org
AASHTO	American association of State Highways and Transportation Officials	Washington	DC		www.transportation.org www.aashto.org
ACI	American Concrete Institute International	Farmington Hills	MI	(248) 848-3700	www.aci-int.org
AGA	American Gas Association	Washington	DC	(202) 824-7000	www.aga.org
AHRI	Air Conditioning Heating & Refrigeration Institute	Arlington	VA	(703) 524-8800	www.ari.org
AIA	American Institution of Architects	Washington	DC	(202) 626-7300	www.aia.org
AISC	American Institute of Steel Construction	Chicago	IL	(312) 670-2400	www.aisc.org
ISI	American Iron & Steel Institute	Washington	DC	(202) 452-7100	www.steel.org
AITC	American Institution of Timber Construction	Englewood	CO	(303) 792-9559	www.aitc-glulam.org
AMCA	Air Movement & Control Association International	Arlington Heights	IL	(847) 394-0150	www.amca.org
ANSI	American National Standards Institute	New York	NY	(212) 642-4900	www.ansi.org
APA	APA-Engineered Wood Association	Tacoma	WA	(253) 565-6600	www.apawood.org
API	American Petroleum Institute	Washington	DC	(202) 682-8000	www.api.org
AQMD	South Coast Air Quality Management District	Diamond Bar	CA	(909) 396-2000	www.aqmd.gov
ASHRAE	American Society of Heating, Refrigerating, & Air-Conditioning Engineers	Atlanta	GA	(404) 636-8400	www.ashrae.org
ASME	American Society of Mechanical Engineers International	New York	NY	(800) 843-2763	www.asme.org
ASTM	ASTM International	West Conshohocken	PA	(610) 832-9500	www.astm.org
AWI	Architectural Woodwork Institute	Potomac Falls	VA	(571) 323-3636	www.awinet.org
AWPA	American Wood Protection Association	Birmingham	AL	(205) 733-4077	www.awpa.com
AWS	American Welding Society	Miami	FL	(800) 443-9353	www.aws.org
AWWA	American Water Works Assoc	Denver	CO	(303) 794-7711	www.awwa.org
BHMA	Builders Hardware Manufacturers Association	New York	NY	(212) 297-2122	www.buildershardware.com
BIA	Brick Industry Association	Reston	VA	(703) 620-0010	www.bia.org
CFI	International Certified Floorcovering Installers, Inc.	Kansas City	MO	(816) 231-4646	www.cfi-installers.org
CRI	Carpet & Rug Institution	Dalton	GA	(706) 278-3176	www.carpet-rug.com
CRSI	Concrete Reinforcing Steel Institute	Schaumburg	IL	(847) 517-1200	www.crsi.org
CISPI	Cast Iron Soil Pipe Institute	Chattanooga	TN	(423) 892-0137	www.cispi.org
DHI	Door & Hardware Institute	Chantilly	VA	(703) 222-2010	www.dhi.org
DIPRA	Ductile Iron Pipe Research Association.	Birmingham	AL	(205) 402-8700	www.dipra.org
EIMA	EIFS Industry Members Association	Morrow	GA	(800) 294-3462	www.eima.com
FM	FM Global	Johnston	RI	(401) 275-3000	www.fmglobal.com

FSC	Forest Stewardship Council	Bonn, Germany		+49 (0) 228 367 66 0	www.fsc.org
GA	Gypsum Association	Hyattsville	MD	(301) 277-8686	www.gypsum.org
GS	Green Seal	Washington	DC	(202) 872-6400	www.greenseal.org
HPVA	Hardwood Plywood & Veneer Association	Reston	VA	(703) 435-2900	www.hpva.org
ICC	International Code Council	Washington	DC	(888) 422-7233	www.iccsafe.org
ICC-ES	ICC Evaluation Service	Whittier	CA	(562) 699-0543	www.icc-es.org
ICBO	International Conference of Building Officials				(See ICC)
ISO	International Organization for Standardization	Geneva, Switzerland			www.iso.org
ISSA	International Slurry Surfacing Association	Annapolis	MD	(410) 267-0023	www.slurry.org
KCMA	Kitchen Cabinet Manufactures Association	Reston	VA	(703) 264-1690	www.kcma.org
LPI	Lightning Protection Institute	Maryville	MO	(800) 488-6864	www.lightning.org
MFMA	Maple Flooring Manufacturers' Association	Deerfield	IL	(888) 480-9138	www.maplefloor.org
MSS	Manufacturer's Standardization Society of The Valve and Fittings Industry	Vienna	VA	(703) 281-6613	www.mss-hq.com
NAAMM	National Association of Architectural Metal Manufacturers	Glen Ellyn	IL	(630) 942-6591	www.naamm.org
NEC	National Electric Code	(from NFPA).			
NEMA	National Electrical Manufacturer's Association	Rosslyn	VA	(703) 841-3200	www.nema.org
NFPA	National Fire Protection Association	Quincy	MA	(800) 344-3555	www.nfpa.org
NFRC	National Fenestration Rating Council	Greenbelt	MD	(301) 589-1776	www.nfrc.org
NSF	NSF International	Ann Arbor	MI	(734) 769-8010	www.nsf.org
PCA	Portland Cement Association	Skokie	IL	(847) 966-6200	www.cement.org
PCI	Precast / Prestressed Concrete Institute	Chicago	IL	(312) 786-0300	www.pci.org
PEI	Porcelain Enamel Institute	Norcross	GA	(770) 676-9366	www.porcelainenamel.com
RFCI	Resilient Floor Covering Institute	LaGrange	GA	(706) 882-3833	www.rfci.com
SCTE	Society of Cable Telecommunications Engineers	Exton	PA	(800) 542-5040	www.scte.org
SDI	Steel Deck Institute	Fox River Grove	IL	(847) 458-4647	www.sdi.org
SDI	Steel Door Institute	Westlake	OH	(440) 899-0010	www.steeldoor.org
SIGMA	Sealed Insulating Glass Manufacturer's Association	Chicago	IL	(312) 644-6610	www.arcacat.com
SJI	Steel Joist Institute	Myrtle Beach	SC	(843) 293-1995	www.steeljoist.org
SMACNA	Sheet Metal & Air Conditioning Contractors National Association	Chantilly	VA	(703) 803-2980	www.smacna.org
SPIB	Southern Pine Inspection Bureau	Pensacola	FL	(850) 434-2611	www.spib.org
SSMA	Steel Stud Manufacturer's Association	Glen Ellyn	IL	(630) 942-6592	www.ssma.com
TCNA	Tile Council of North America	Anderson	SC	(864) 646-8453	www.tileusa.com
TPI	Truss Plate Institute	Alexandria	VA	(703) 683-1010	www.tpinst.org
TPI	Turfgrass Producers International (formally American Sod Producers Association)	East Dundee	IL	(847) 649-5555	www.turfgrasssod.org
UL	Underwriters Laboratories	Camas	WA	(877) 854-3577	www.ul.com
WDMA	Window and Door Manufacturer's Association	Chicago	IL	(312) 321-6802	www.nwwda.org

WWPA	Western Wood Products Association	Portland	OR	(503) 224-3930	www.wwpa.org
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D. Federal Government Agencies:

- Names and titles of federal government standard or specification producing agencies are often abbreviated. Following acronyms or abbreviations referenced in Contract Documents represent names of standard or specification producing agencies of federal government. Names and addresses are subject to change but are believed to be, but are not assured to be, accurate and up to date as of date of Contract Documents.

CS	Commercial Standard (U S Department of Commerce)	Washington	DC	(202) 512-0000	www.doc.gov
EPA	Environmental Protection Agency	Washington	DC	(202) 272-0167	www.epa.gov
FCC	Federal Communications Commission	Washington	DC	(888) 225-5322	www.fcc.gov
FS	Federal Specifications Unit (Available from GSA)	Washington	DC	(202) 619-8925	www.gsa.gov
MIL	Military Standardization Documents (U S Department of Defense)	Philadelphia	PA	(215) 697-2179	www.dod.gov
NIST	National Institute of Standards and Technology, technology Administration (US Department of Commerce)	Gaithersburg	MD	(301) 975-4500	www.ts.nist.gov
OSHA	Occupational Safety & Health Administration (U S Department of Labor)	Washington	DC	202) 219-8148	www.osha.gov
PS	Product Standard of NBS (U S Department of Commerce)	Washington	DC	(202) 512-1800	www.doc.gov

E. Governing Regulations / Authorities:

- Contact authorities having jurisdiction directly for information and decisions having a bearing on the Work.
- Obtain copies of regulations required to be retained at Project Site, available for reference by parties who have a reasonable need for such reference.

**PART 2 - PRODUCTS Not Used**

**PART 3 - EXECUTION Not Used**

**END OF SECTION**

## SECTION 01 4301 - QUALITY ASSURANCE - QUALIFICATIONS

### PART 1 - GENERAL

#### 1.1 SUMMARY

A. Related Documents:

1. Drawings and general provisions of the Contract, including General Conditions and Division 01 Specification Sections, apply to this Section.

B. Related Requirements:

1. Section 01 4000: 'Quality Requirements' includes administrative and procedural requirements for quality assurance and quality control.
2. Section 01 4523: 'Testing and Inspecting Services' for testing and inspection, and testing laboratory services for materials, products, and construction methods.

#### 1.2 REFERENCES

A. Definitions:

1. Accreditation: Process in which certification of competency, authority, or credibility is presented. Verify that laboratories have an appropriate quality management system and can properly perform certain test methods (e.g., ANSI, ASTM, and ISO test methods) and calibration parameters according to their scopes of accreditation.
2. Quality-Assurance Services: Activities, actions, and procedures performed before and during execution of the Work to guard against defects and deficiencies and substantiate that proposed construction will comply with requirements.
3. Testing Agency: Entity engaged to perform specific tests, inspections, or both.
4. Testing Agency Laboratory: Agency or firm qualified to perform field and laboratory tests to determine characteristics and quality of materials and workmanship.

B. Reference Standards:

1. ASTM International:
  - a. ASTM E329-18, 'Standard Specification for Agencies Engaged in Construction Inspection and/or Testing.'

#### 1.3 QUALIFICATIONS

A. Qualifications: Qualifications paragraphs in this Article establish minimum qualification levels required; individual Specification Sections specify additional requirements:

1. Manufacturers / Distributors / Fabricator / Suppliers / Installers Qualifications: Firm experienced in producing products similar to those indicated for this Project and with record of successful in-service performance, as well as sufficient production capacity to produce required units.
  - a. Owner established Relationships:
    - 1) Where heading 'Category One, Two, or Three Approved' *Manufacturers / Suppliers / Distributors / Installers* is used to identify list Owner established Relationships, Owner has established relationships that extend beyond requirements of this Project.
    - 2) No other *Manufacturers / Suppliers / Distributors / Installers* will be acceptable.

- 3) Follow specified procedures to preserve relationships between Owner and specified *Manufacturers / Suppliers / Distributors / Installers* and advantages that accrue to Owner from those relationships.
- 4) Following areas of the Work have restrictions on sub-bids by Contractor:
  - a) Aluminum-Framed Entrances And Storefronts, Section 08 4113: Category Three Approved, no other Manufacturer / Installers accepted.
  - b) Common Finish Hardware Requirements, Section 08 7101: Category Three Approved, no other Supplier accepted:
    - (1) Accessories, Section 08 7109.
    - (2) Closing Devices, Section 08 7106.
    - (3) Hanging Devices, Section 08 7102.
    - (4) Operating Trim, Section 08 7104.
    - (5) Securing Devices, Section 08 7103.
    - (6) Stops and Holders, Section 08 7108.
  - c) Flush Wood Doors: Factory Finished, Clear, Section 08 1429: Category Three Approved, no other Supplier accepted.
  - d) Polyvinyl-Chloride Roofing: PVC, Section 07 5419: Category Three Approved, no other Manufacturer / Installers accepted.
  - e) Wood Framing, Division 06 'Wood', Category Three Approved, no other Supplier accepted for USA Projects Only except approved Supplier:
    - (1) Structural Composite Lumber, Section 06 1712.
    - (2) Wood Framing, Section 06 1100.
    - (3) Wood 'I' Joists, Section 06 1733.
    - (4) Wood-Panel Product Sheathing, Section 06 1636.

b. Approved:

- 1) Where heading '*Approved Suppliers / Distributors / Installers / Applicators / Fabricators*' is used to identify list of specified suppliers / distributors / installers / applicators / fabricators, use only listed suppliers / installers / fabricators.
- 2) No substitutions will be allowed.
- 3) Following areas of the Work have restrictions on sub-bids by which may be accepted by Contractor:
  - a) Architectural Woodwork, Sections 06 4001: Fabricator approved by Architect before bidding.
  - b) Audio Systems, Section 27 5117: Alternate Installers approved by Owner before bidding.
  - c) Ceramic Tiling, Section 09 3013: No other Suppliers accepted.
  - d) Electric And Electronic Control System for HVAC, Section 23 0933, No other Distributors accepted.
  - e) Painting And Coating, Sections Under 09 9000 heading of Table of Contents: Applicators approved by Architect before bidding.
  - f) Rough Carpentry, Sections 06 1100, 06 1636, 06 1712, 06 1733, and 06 1800: Alternate Supplier approved by Architect before bidding.

2. Factory-Authorized Service Representative Qualifications:

- a. Authorized representative of manufacturer who is trained and approved by manufacturer to inspect installation of manufacturer's products that are similar in material, design, and extent to those indicated for this Project.

3. Installer Qualifications:

- a. Firm or individual experienced in installing, erecting, or assembling work similar in material, design, and extent to that indicated for this Project, whose work has resulted in construction with a record of successful in-service performance.

4. Manufacturer Qualifications:
  - a. Firm experienced in manufacturing products or systems similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.
5. Manufacturer's Field Services Qualifications:
  - a. Experienced authorized representative of manufacturer to inspect field-assembled components and equipment installation, including service connections.
6. Professional Engineer Qualifications:
  - a. Professional engineer who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing engineering services of kind indicated. Engineering services are defined as those performed for installations of system, assembly, or products that are similar to those indicated for this Project in material, design, and extent.
7. Specialists:
  - a. Certain sections of Specifications require that specific construction activities shall be performed by entities who are recognized experts in those operations.
  - b. Specialists shall satisfy qualification requirements indicated and shall be engaged for activities indicated.
  - c. Requirement for specialists shall not supersede building codes and regulations governing the Work.
8. Testing Agency Qualifications:
  - a. Independent Testing Agency with experience and capability to conduct testing and inspecting indicated, as documented according to ASTM E329; and with additional qualifications specified in individual Sections; and where required by authorities having jurisdiction, that is acceptable to authorities.
    - 1) Testing Laboratory:
      - a) AASHTO Materials Reference Laboratory (AMRL) Accreditation Program.
      - b) Cement and Concrete Reference Laboratory (CCRL).
      - c) Nationally Recognized Testing Laboratory (NRTL): Nationally recognized testing laboratory according to 29 CFR 1910.7.
      - d) National Voluntary Laboratory (NVLAP): Testing Agency accredited according to National Institute of Standards and Technology (NIST) Technology Administration, U. S. Department of Commerce Accreditation Program.

**PART 2 - PRODUCTS Not Used**

**PART 3 - EXECUTION Not Used**

**END OF SECTION**

## SECTION 01 4523 - TESTING AND INSPECTING SERVICES

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General Conditions and Division 01 Specification Sections, apply to this Section

#### 1.2 SUMMARY

- A. This Section includes testing, inspections, special testing, special inspections, and testing laboratory services for materials, products, and construction methods as specified hereafter for the Work.
- B. Specified tests, inspections, and related actions do not limit Contractor's quality control procedures to fully comply with Contract Document requirements in all regards.
- C. Costs: Costs of initial services for testing and inspection personnel will be paid by Owner unless otherwise noted.
  - 1. If initial tests indicate non-compliance with contract document requirements, any subsequent testing will be performed by same personnel and paid for by Contractor.
- D. Related Requirements:
  - 1. Section 01 4000: 'Quality Requirements' includes administrative and procedural requirements for quality assurance and quality control.
  - 2. Section 01 4301: 'Quality Assurance – Qualifications' establishes minimum qualification levels required.
  - 3. Division 01 through Division 49 establish responsibility for providing specific testing and inspections and Field Tests and Inspections.

#### 1.3 REFERENCES

- A. Association Publications:
  - 1. Council of American Structural Engineers. CASE Form 101: *Statement of Special Inspections*. Washington, DC: CASE, 2001. (c/o American Council of Engineering Companies, 1015 15<sup>th</sup> St., NW, Washington, DC 20005; 202-347-7474; [www.acec.org](http://www.acec.org)).
  - 2. International Code Council (IBC):
    - a. IBC Chapter 17, 'Structural Tests and Special Inspections'.
- B. Definitions:
  - 1. Accreditation: Process in which **certification** of competency, authority, or credibility is presented. Verify that laboratories have an appropriate quality management system and can properly perform certain test methods (e.g., ANSI, ASTM, and ISO test methods) and calibration parameters according to their scopes of accreditation.
  - 2. Approved: To authorize, endorse, validate, confirm, or agree to.
  - 3. Field Quality Control: Testing, Inspections, Special Testing and Special Inspections to assure compliance to Contract Documents.
  - 4. Inspection/Special Inspection:
    - a. Inspection: Not required by code provisions but may be required by Contract Documents.

- b. Special Inspection: Inspection required of materials, installation, fabrication, erection or placement of components and connections requiring special expertise to ensure compliance with approved construction documents and reference standards (required by code provisions and by Contract Documents).
  - c. Special Inspection-Continuous: Full-time observation of the Work requiring inspection by approved inspector who is present in area where the Work is being performed.
  - d. Special Inspection-Periodic: Part-time or intermittent observation of the Work requiring inspection by approved inspector who is present in area where the Work has been or is being performed and at completion of the Work.
5. Mockups: Full-size, physical assemblies that are constructed on-site. Mockups are used to verify selections made under sample submittals, to demonstrate aesthetic effects and, where indicated, qualities of materials and execution, and to review construction, coordination, testing, or operation. They are not samples. Approved mockups establish standard by which the Work will be judged.
  6. Observation: Visual observation of building / site elements or structural system by registered design professional for general conformance to approved construction documents at significant construction stages and at completion. Observation does not include or waive responsibility for performing inspections or special inspections.
  7. Preconstruction Testing: Tests and inspections that are performed specifically for Project before products and materials are incorporated into the Work to verify performance or compliance with specified criteria.
  8. Quality Assurance: Testing, Inspections, Special Testing and Special Inspections provided for by Owner.
  9. Quality Control: Testing, Inspections, Special Testing and Special Inspections provided for by Contractor.
  10. Special Inspection: See Inspection.
  11. Special Inspector: Certified individual or firm that implements special inspection program for project.
  12. Special Test: See Test.
  13. Test/Special Test: Field or laboratory tests to determine characteristics and quality of building materials and workmanship:
    - a. Test: Not required by code provisions but may be required by Contract Documents.
    - b. Special Test: Required by code provisions and by Contract Documents.
  14. Testing Agency: Entity engaged to perform specific tests, inspections, or both.
  15. Testing Agency Laboratory: Agency or firm qualified to perform field and laboratory tests to determine characteristics and quality of materials and workmanship.
  16. Verification: Act of reviewing, inspecting, testing, etc. to establish and document that product, service, or system meets regulatory, standard, or specification requirements.

C. Reference Standards:

1. ASTM International:
  - a. ASTM A898/A898M-17, 'Standard Specification for Straight Beam Ultrasonic Examination of Rolled Steel Structural Shapes'.
  - b. ASTM C42/C42M-18, 'Standard Test Method for Obtaining and Testing Drilled Cores and Sawed Beams of Concrete'.
  - c. ASTM C138/C138M-17a, 'Standard Test Method for Density (Unit Weight), Yield, and Air Content (Gravimetric) of Concrete'.
  - d. ASTM C597-16, 'Standard Test Method for Pulse Velocity Through Concrete'.
  - e. ASTM C803/C803M-18, 'Standard Test Method for Penetration Resistance of Hardened Concrete'.
  - f. ASTM C805/C805M-13a, 'Standard Test Method for Rebound Number of Hardened Concrete'.
  - g. ASTM C1019-18, 'Standard Test Method for Sampling and Testing Grout'.
  - h. ASTM C1021-08(2014), 'Standard Practice for Laboratories Engaged in Testing of Building Sealants'.
  - i. ASTM C1077-17, 'Standard Practice for Agencies Testing Concrete and Concrete Aggregates for Use in Construction and Criteria for Testing Agency Evaluation'.
  - j. ASTM C1093-15a, 'Standard Practice for Accreditation of Testing Agencies for Masonry'.
  - k. ASTM D3666-16, 'Standard Specification for Minimum Requirements for Agencies Testing and Inspecting Road and Paving Materials'.
  - l. ASTM D3740-12a, 'Standard Practice for Minimum Requirements for Agencies Engaged in Testing and/or Inspection of Soil and Rock as Used in Engineering Design and Construction'.
  - m. ASTM E114-15, 'Standard Practice for Ultrasonic Pulse-Echo Straight-Beam Examination by the Contact Method'.
  - n. ASTM E164-13, 'Standard Practice for Contact Ultrasonic Testing of Weldments'.



- o. ASTM E329-18, 'Standard Specification for Agencies Engaged in Construction Inspection and/or Testing'.
  - p. ASTM E488-18, 'Standard Test Methods for Strength of Anchors in Concrete Elements'.
  - q. ASTM E543-15, 'Standard Specification for Agencies Performing Nondestructive Testing'.
  - r. ASTM E587-15, 'Standard Practice for Ultrasonic Angle-Beam Examination by the Contact Method'.
  - s. ASTM E709-15, 'Standard Guide for Magnetic Particle Testing'.
  - t. ASTM E1212-17, 'Standard Practice for Quality Management Systems for Nondestructive Testing Agencies'.
  - u. ASTM F710-17, 'Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring'.
  - v. ASTM F2170-18, 'Standard Test Method for Determining Relative Humidity in Concrete Floor Slabs Using in situ Probes'.
2. Code of Federal Regulations:
- a. 29 CFR 1910, Subpart A, Section 1910.7, 'Definition and Requirements for a Nationally Recognized Testing Laboratory'.
3. International Code Council Code (IBC) (2018 or most recent edition adopted by AHJ):
- a. IBC Chapter 17, 'Special Inspections And Tests'.
    - 1) Section 1704, 'Special Inspections And Tests, Contractor Responsibility And Structural Observations'.
    - 2) Section 1705, 'Required Special Inspection And Tests'.
      - a) Section 1705.2, 'Steel Construction'.

#### 1.4 SUBMITTALS

##### A. Informational Submittals:

- 1. General: Additional submittal requirements are specified in Individual Sections in Division 01 through Division 50.
- 2. Certificates:
  - a. Testing Agency will submit certified written report of each inspection, test, or similar service.
- 3. Tests and Evaluation Reports:
  - a. Testing Agency or Agencies will prepare logs, test reports, and certificates applicable to specific tests and inspections and deliver copies (or electronic record) distributed as follows:
    - 1) 1 copy to Owner's Representative.
    - 2) 1 copy to Architect.
    - 3) 1 copy to Consulting Engineers (Engineer of Record).
    - 4) 1 copy to General Contractor.
    - 5) 1 copy to Authorities Having Jurisdiction (if required).
  - b. Other tests, certificates, and similar documents will be obtained by Contractor and delivered to Owner's Representative and Architect in such time as not to delay progress of the Work or final payment therefore.
  - c. Submittal Format:
    - 1) Schedule of Tests and Inspections: Prepare in tabular form and include following:
      - a) Specification Section number and title.
      - b) Description of test and inspection.
      - c) Identification of applicable standards.
      - d) Identification of test and inspection methods.
      - e) Number of tests and inspections required.

- f) Time schedule or time span for tests and inspections.
  - g) Entity responsible for performing tests and inspections.
  - h) Requirements for obtaining samples.
- 2) Certified written reports of each inspection, test, or similar service will include, but not be limited:
- a) Date of issue.
  - b) Project title and number.
  - c) Name, address, and telephone number of Testing Agency.
  - d) Dates and locations of samples and tests or inspections.
  - e) Names of individuals making tests and inspections.
  - f) Description of the Work and test and inspection method.
  - g) Identification of product and Specification Section.
  - h) Complete test or inspection data.
  - i) Test and inspection results and an interpretation of test results.
  - j) Record of temperature and weather conditions at time of sample taking and testing and inspecting.
  - k) Comments or professional opinion on whether tested or inspected Work complies with Contract Document requirements.
  - l) Name and signature of laboratory inspector.
  - m) Recommendations on retesting and re-inspecting.
4. Source Quality Control Submittals:
- a. Testing Agency will submit following prior to commencing the Work:
    - 1) Qualifications of Testing Agency management and personnel designated to project.
    - 2) Testing Agency 'Written Practice for Quality Assurance'.
    - 3) Qualification records for Inspector and non-destructive testing technicians designated for project.
    - 4) Testing Agency non-destructive testing procedures, equipment calibration records, and personnel training records.
    - 5) Testing Agency Quality Control Plan for monitoring and control of testing operations.

## 1.5 QUALITY ASSURANCE

- A. Owner or Owner's designated representative(s) will perform quality assurance. Owner's quality assurance procedures may include observations, inspections, testing, verification, monitoring and any other procedures deemed necessary by Owner to verify compliance with Contract Documents.
- B. Owner will employ independent Testing Agencies to perform certain specified testing, as Owner deems necessary.
- C. Certification:
  - 1. Product producers and associations, which have instituted approved systems of quality control and which have been approved by document approval agencies, are not required to have further testing.
  - 2. Concrete mixing plants, plants producing fabricated concrete and wood or plywood products certified by agency, lumber, plywood grade marked by approved associates, and materials or equipment bearing underwriters' laboratory labels require no further testing and inspection.
- D. Written Practice for Quality Assurance:
  - 1. Testing Agency will maintain written practice for selection and administration of inspection personnel, describing training, experience, and examination requirements for qualification and certification of inspection personnel.
  - 2. Written practice will describe testing agency procedures for determining acceptability of structure in accordance with applicable codes, standards, and specifications.

3. Written practice will describe Testing Agency inspection procedures, including general inspection, material controls, visual welding inspection, and bolting inspection.

## 1.6 QUALITY CONTROL

- A. Quality Control will be sole responsibility of Contractor. Contractor will be responsible for testing and inspections, coordination, start-up, operational checkout, and commissioning of all items of the Work included in Project. All costs for these services will be included in Contractor's cost of the Work.
- B. Contractor will assign one (1) employee to be responsible for Quality Control. This individual may have other responsibilities and may be Contractor's Project superintendent or Contractor's Project Manager.
- C. Notify results of all Testing and Inspection performed by Contractor's independent Testing Agencies to Architect and Owner's Representative within twenty four (24) hours of test or inspection having been performed.
  1. Testing and Inspection Reports will be distributed as follows:
    - a. 1 copy to Owner's Representative.
    - b. 1 copy to Architect.
    - c. 1 copy to Consulting Engineer(s) (Engineer of Record).
    - d. 1 copy to Authorities Having Jurisdiction (if required).
- D. Contractor's Responsibility:
  1. Owner's employment of an independent Testing Agency does not relieve Contractor of Contractor's obligation to perform the Work in strict accordance with requirements of Contract Documents.
  2. Tests and inspections that are not explicitly assigned to Owner are responsibility of Contractor.
  3. Cooperate with Testing Agency(s) performing required inspections, tests, and similar services and provide reasonable auxiliary services as requested. Notify Testing Agency before operations to allow assignment of personnel. Auxiliary services required include but are not limited to:
    - a. Providing access to the Work and furnishing incidental labor, equipment, and facilities deemed necessary by Testing Agency to facilitate inspections and tests at no additional cost to Owner.
    - b. Taking adequate quantities of representative samples of materials that require testing or helping Testing Agency in taking samples.
    - c. Providing facilities for storage and curing of test samples, and delivery of samples to testing laboratories.
    - d. Providing Testing Agency with preliminary design mix proposed for use for materials mixes that require control by Testing Agency.
  4. Contractor will integrate Owner's independent Testing Agency services within Baseline Project Schedule and with other Project activities.
  5. For any requested inspection, Contractor will complete prior inspections to ensure that items are ready for inspection.
  6. All Work is subject to testing and inspection and verification of correct operation prior to 100% payment to Contractor of line item(s) pertaining to that aspect of the Work.
  7. Comply:
    - a. Upon completion of Testing Agency's inspection, testing, sample-taking, and similar services, repair damaged construction and restore substrates and finishes to eliminate deficiencies, including deficiencies in visual qualities of exposed finishes.
    - b. Comply with Contract Documents in making such repairs.
  8. Data: Furnish records, drawings, certificates, and similar data as may be required by testing and inspection personnel to assure compliance with Contract Documents.

9. Defective Work (Non-Conforming Work): Non-conforming Work as covered in General Conditions applies, but is not limited to following requirements:
  - a. Where results of inspections, tests, or similar services show that the Work does not comply with Contract Document requirements, correct deficiencies in the Work promptly to avoid Work delays.
  - b. Where testing personnel take cores or cut-outs to verify compliance, repair prior to acceptance.
  - c. Contractor responsible for any and all costs incurred resulting from inspection that was scheduled prematurely or retesting due to failed tests.
  - d. Remove and replace any Work found defective or not complying with contract document requirements at no additional cost to Owner.
  - e. Should test return unacceptable results, Contractor will bear all costs of retesting and re-inspection as well as cost of all material consumed by testing, and replacement of unsatisfactory material and/or workmanship.
  
10. Protection:
  - a. Protect construction exposed by or for quality assurance and quality control service activities, and protect repaired construction.
  
11. Scheduling: Contractor is responsible for scheduling times for inspections, tests, taking samples, and similar activities:
  - a. Schedule testing and inspections in advance so as not to delay the Work and to eliminate any need to uncover Work for testing or inspection.
  - b. Notify Testing Agency and Architect as noted in Sections in Division 01 through Division 50 prior to any time required for such services.
  - c. Incorporate adequate time for performance of all inspections and correction of noted deficiencies.
  - d. Schedule sequence of activities to accommodate required services with minimum of delay.
  - e. Schedule sequence of activities to avoid necessity of removing and replacing construction to accommodate testing and inspections
  
12. Test and Inspection Log:
  - a. Provide system of tracking all field reports, describing items noted, and resolution of each item. Prepare record of tests and inspections. Include following:
    - 1) Date test or inspection was conducted.
    - 2) Description of the Work tested or inspected.
    - 3) Date test or inspection results were transmitted to Architect.
    - 4) Identification of Testing Agency or inspector conducting test or inspection.
  
  - b. Maintain log at Project site:
    - 1) Post changes and modifications as they occur.
    - 2) Provide access to test and inspection log for Architect's reference during normal working hours.

## **1.7 TESTING AND INSPECTIONS - GENERAL**

- A. Testing specifically identified to be conducted by Owner, will be performed by an independent entity and will be arranged and paid for by Owner.
  
- B. Individual Sections in Division 01 through Division 49 indicate if Owner will provide testing and inspection of the Work of that Section.
  
- C. Tests include but not limited to those described in detail in 'Field Quality Control' in Part 3 of Individual Sections in Divisions 01 through Division 49.

- D. Owner may engage additional consultants for testing, air balancing, commissioning, or other special services:
1. Activities of any such Owner consultants are in addition to Contractor testing of materials or systems necessary to prove that performance is in compliance with Contract requirements.
  2. Contractor must cooperate with persons and firms engaged in these activities.
- E. Taking Specimens:
1. Except as may be specifically otherwise approved by Architect, only testing laboratory shall secure, handle, transport, or store any samples and specimens for testing.
- F. Scheduling Testing Agency:
1. Contractor will coordinate the Work and facilitate timeliness of such testing and inspecting services so as not to delay the Work.
  2. Contractor will notify Testing Agency and Architect to schedule tests and / or inspections.

## 1.8 TESTING AGENCY SERVICES AND RESPONSIBILITIES

- A. Testing Agency, including independent testing laboratories, will be licensed and authorized to operate in jurisdiction in which Project is located.
1. Approved Testing Agency Qualifications: Requirements of Section 01 4301 apply.
- B. Testing and Inspection Services:
1. Testing Agency will not release, revoke, alter, or increase Contract Document requirements or approve or accept any portion of the Work.
  2. Testing Agency will not give direction or instruction to Contractor.
  3. Testing Agency will have full authority to see that the Work is performed in strict accordance with requirements of Contract Documents and directions of Owner's Representative and/or Architect.
  4. Testing Agency will not provide additional testing and inspection services beyond scope of Work without prior approval of Owner's Representative and / or Architect.
- C. Testing Agency Duties:
1. Independent Testing Agency engaged to perform inspections, sampling, and testing of materials and construction specified in individual specification Sections will cooperate with Architect and Contractor in performance of its duties and will provide qualified personnel to perform required inspections and tests.
  2. Testing Agency will test or obtain certificates of tests of materials and methods of construction, as described herein or elsewhere in technical specification.
  3. Testing Agency will provide management, personnel, equipment, and services necessary to perform testing functions as outlined in this section.
  4. Testing Agency must have experience and capability to conduct testing and inspecting indicated by ASTM standards and that specializes in types of tests and inspections to be performed.
  5. Testing Agency will comply with requirements of ASTM E329, ASTM E543, ASTM C1021, ASTM C1077, ASTM C1093, ASTM D3666, ASTM D3740, and other relevant ASTM standards.
  6. Testing Agency must calibrate all testing equipment at reasonable intervals (minimum yearly) with accuracy traceable to either National Bureau of Standards or accepted values of natural physical constants.
- D. Testing and Inspection Reports:
1. Conduct and interpret tests and inspections and state in each report whether tested and inspected the Work complies with or deviates from requirements.
  2. Laboratory Reports: Testing Agency will furnish reports of materials and construction as required, including:

- a. Description of method of test.
  - b. Identification of sample and portion of the Work tested.
    - 1) Description of location in the Work of sample.
    - 2) Time and date when sample was obtained.
    - 3) Weather and climatic conditions at time when sample was obtained.
  - c. Evaluation of results of tests including recommendations for action.
3. Inspection Reports:
- a. Testing Agency will furnish 'Inspection at Site' reports for each site visit documenting activities, observations, and inspections.
  - b. Include notation of weather and climatic conditions, time and date conditions and status of the Work, actions taken, and recommendations or evaluation of the Work.
4. Reporting Testing and Inspection (Conforming Work):
- a. Submit testing and inspection reports as required within twenty four (24) hours of test or inspection having been performed.
5. Reporting Testing and Inspection Defective Work (Non-Conforming Work):
- a. Testing Agency, upon determination of irregularities, deficiencies observed or test failure(s) observed in the Work during performance of its services of test or inspection having been performed, will:
    - 1) Verbally notify results to Architect, Contractor, and Owner's Representative within one hour of test or inspection having been performed (if Defective Work (Non-Conforming Work) is incorporated into project).
    - 2) Submit written inspection report and test results as required within twenty four (24) hours of test or inspection having been performed.
  - b. Prepare non-compliance log to track non-compliant testing or inspections.
6. Final Report:
- a. Submit final report of tests and inspections at Substantial Completion, which identify unresolved deficiencies.

## **1.9 ARCHITECT'S RESPONSIBILITIES**

### **A. Architect Duties:**

- 1. Notify Owner's Representative before each test and/or inspection.

## **PART 2 - PRODUCTS Not Used**

## **PART 3 - EXECUTION**

### **3.1 FIELD QUALITY CONTROL**

#### **A. Field Tests And Inspections:**

1. Field Tests and Inspections requirements are described in 'Field Quality Control' of individual Sections in Division 01 through Division 49.

**END OF SECTION**

# SECTION 01 4546 - DUCT TESTING, ADJUSTING, AND BALANCING

## PART 1 - GENERAL

### 1.1 SUMMARY

A. Includes But Is Not Limited To:

1. Test, balance, and adjust air duct systems services provided by Owner as described in Contract Documents.

B. Related Requirements:

1. Section 01 1200: 'Multiple Contracts Summary': Owner will provide test, balance, and adjust air duct systems. PART 3 of this Section establishes requirements for field tests of 'Testing Agency'.
2. Section 01 4523: 'Testing and Inspecting Services' for testing and inspection, and testing laboratory services for materials, products, and construction methods.
3. Division 23:
  - a. Completing installation and start-up of mechanical systems, and changing sheaves, belts, and dampers as required for correct balance.
  - b. Maintain HVAC system and equipment in full operation each working day of testing, balancing, and adjusting.

### 1.2 ADMINISTRATIVE REQUIREMENTS

A. Coordination:

1. Contractor to assist Testing Agency in testing and balancing of mechanical system.

B. Scheduling:

1. Contractor to schedule this work in cooperation with other Sections involved and to comply with completion date for test, balance, and adjust air duct systems as described in Contract Documents.
2. Contact Testing Agency and coordinate date(s) for test and balance work when following is completed:
  - a. HVAC and exhaust systems including installation of specialties, devices, and new filters.
  - b. Proper function of control system components including electrical interlocks, damper sequences, air and water reset, and fire and freeze stats has been verified.
  - c. Automatic temperature controls have been calibrated and set for design operating conditions.
  - d. Verification of proper thermostat calibration and setting of control components such as static pressure controllers and other devices that may need set points changed during process of balancing system.
3. If, in opinion of Testing Agency, systems are not ready for test and balance, reschedule as required.

### 1.3 SUBMITTALS

A. Informational Submittals:

1. Test and Evaluation Reports:
  - a. Preliminary Report(s):



- 1) Four copies to be given to Owner's Representative.
- b. Final Report :
  - 1) Four copies to be given to Owner's Representative.
- B. Closeout Submittals:
  1. Include following in Operations And Maintenance Manual specified in Section 01 7800:
    - a. Record Documentation:
      - 1) Testing and Inspection Reports:
        - a) Testing Agency Testing and Evaluation Final Report of testing, balancing, and adjusting air duct systems. Bind approved copy of Testing and Evaluation Report in Operations And Maintenance Manual for Division 23.

#### **1.4 QUALITY ASSURANCE**

- A. Qualifications:
  1. Approved Testing Agency. Section 01 4301 applies, but is not limited to following:
    - a. Testing Agency shall specialize in testing and balancing of heating, ventilating, and cooling systems to balance, adjust, and test air moving equipment, air distribution, and exhaust systems.
    - b. Testing Agency shall provide proof of having successfully completed at least five years of specialized experience in air and hydronic system balancing.
    - c. Testing Agency shall provide testing under direct supervision of qualified heating and ventilating engineer.
    - d. Neither Architect's engineering consultant nor anyone performing work on this Project under other Sections of Division 23 shall be permitted to do this work.

#### **PART 2 - PRODUCTS: Not Used**

#### **PART 3 - EXECUTION**

##### **3.1 OWNER-FURNISHED TESTING AND INSPECTION**

- A. Owner to provide Testing and Inspection for testing, balancing, and adjusting air duct systems:
  1. See Section 01 1200: Multiple contracts for administrative and procedural requirements for Testing and Inspection services.

##### **3.2 FIELD QUALITY CONTROL**

- A. Field Tests
  1. Air System Testing, Adjusting, And Balance:
    - a. Inspections and site visits. (For paragraph a thru c, note deficiencies, if any, that needs to be corrected and report this to Owner's Representative, Architect, and Mechanical Engineer):

- 1) Site visit for test and balance. Before commencing test and balance, perform an inspection to verify 100 percent completion of system. Confirm completion of work, correction of previously noted deficiencies, and look for new deficiencies not noted in previous inspections. If the work is complete, then proceed with test and balance. If the work is not complete and ready for test and balance, inform Contractor and submit an invoice to Owner's Representative for compensation for travel time, expenses, and time on site. Report deficiencies or incomplete work to Owner's Representative, Architect, and Mechanical Engineer.
  - 2) Additional site visits (beyond those set forth above) to complete the work after issues are resolved may be needed and will be paid for separately from compensation for services set forth in this Agreement, pursuant to hourly rates and conditions set forth in Attachment "A".
- b. Checklist for Inspections and site visits:
- 1) Pre-Startup Inspection – use for inspections and site visits a thru d in paragraph 1 above. All pertinent items shall be checked, including but not limited to following:
    - a) Removal of shipping blocks and stops.
    - b) Vibration isolators' alignment and adjustment.
    - c) Flexible connections properly installed and aligned.
    - d) Safety controls, safety valves and high or low limits in operation.
    - e) All systems properly filled.
    - f) Filters in place and seal provided around edges.
    - g) Filters and strainers are clean.
    - h) Fire damper installation and operation, and access door installation.
    - i) Installation of all gauges on equipment.
    - j) Control system is operating.
    - k) All dampers, valves, and operators are properly installed and operating.
    - l) All ductwork is installed and sealed.
    - m) Voltage to unit matches nameplate voltage.
  - 2) First Run Inspection – use for inspections and site visits d and e in paragraph 1 above. Recheck items in Pre-Startup list, and check for following items:
    - a) Excessive vibration or noise.
    - b) Loose components.
    - c) Initial control settings.
    - d) Motor amperages.
    - e) Heat buildup in motors.
    - f) Control system is calibrated and functioning as required.
  - 3) System Operation Inspection – use for inspections and site visits d and e in paragraph 1 above. Observe mechanical systems under operation for sufficient amount of time to ensure proper operation in all running modes. Check following items periodically.
    - a) Filters and strainers.
    - b) Filters and strainers.
    - c) Check for system leaks at seals and valves.
- c. Performance Requirements:
- 1) Testing and balancing in complete accordance with Associated Air Balance Council (AABC) Standards for Field Measurement & Instructions, Form P1266, Volume I.
- d. Site tests: Air Test and Balancing Procedure:
- 1) Instruments used by Consultant shall be accurately calibrated and maintained in good working order.

- 2) All supply air and return air fans in all HVAC zone systems, energy recovery ventilators, and exhaust fans in building shall be operating when final setup of all units is performed.
- 3) Perform tests at high and low speeds of multi-speed systems and single speed systems.
- 4) Perform following testing and balancing functions in accordance with Associated Air Balance Council National Standards.
  - a) Fan Speeds - Air handling units (with variable pitch pulleys and sheaves): Test and adjust fan RPM to achieve design CFM requirements.
  - b) Fan Speeds - Furnaces (with direct drive motors): Set fan speed to lowest possible setting that will achieve design CFM requirements. Adjust down from Contractor setting, if necessary. Adjust low voltage fan speed jumpers (provided and installed by installing contractor) as necessary to achieve design cooling air flow at lowest possible setting. An exception to this would be when furnace is variable speed blower for dehumidification applications.
  - c) Current And Voltage: Measure and record motor current and voltage.
  - d) Pitot-Tube Traverse Method:
    - (1) Make measurements in duct where velocity is uniform, 7-1/2 duct diameters downstream and 2 duct diameters minimum upstream from any turbulence, i.e., elbow, damper, take-off, etc.
    - (2) Perform pitot-tube traverse of outdoor ventilation air duct serving each piece of air moving equipment.
    - (3) Where single outdoor ventilation air trunk duct serves multiple pieces of equipment, perform pitot-tube traverse of duct branch serving each piece of equipment as well as pitot-tube traverse of total air flow in trunk with all pieces of equipment operating.
  - e) Where pitot-tube traverse is not possible or if pitot-tube traverse is unreliable, flow hood measurement over exterior intake louver or grille is acceptable for measuring outdoor ventilation air.
  - f) Use proportionate method of air balance leaving fan at lowest possible speed and at least one branch balance damper fully open.
- 5) Static Pressure: Test and record system static pressures, including suction and discharge static pressure of each fan.
- 6) Air Temperature: Take dry bulb air temperatures on entering and leaving side of each cooling coil. Dry bulb temperatures shall be taken on entering and leaving side of each heating unit.
- 7) Zone Ducts: Adjust zone ducts to within design CFM requirements. At least one zone balancing damper shall be completely open.
- 8) Branch Ducts: Adjust branch ducts to within design CFM requirements. Multi-diffuser branch ducts shall have at least one outlet or inlet volume damper completely open.
- 9) Tolerances: Test and balance all fans, zone ducts, registers, diffusers etc. to + or - 10 percent of design CFM.
- 10) Identification: Identify location and area of each grille, diffuser, register, and terminal box. Record on air outlet data sheets.
- 11) Description: Record size, type, and manufacturer of each diffuser, grille, and register on air outlet data sheets.
- 12) Drafts: Adjust diffusers, grilles, and registers to minimize drafts. For high sidewall supply air diffusers install horizontal blade core to direct air flow upward 15 degree and set adjustable vertical blades to spread air flow horizontally and evenly in fan pattern.
- 13) Permanently mark all outside air, supply air, and return air damper positions after balancing has been completed.
- 14) Smoke testing: Smoke testing, or some other approved means, may be required to determine leak locations if air balance report indicates that any system's CFM total is less than 90 percent of design CFM. Prior to test, verify that system's duct joints have been sealed as specified and that air moving device in question is supplying required design system air flow. Mechanical Engineer will approve test method required. If smoke test is selected, use following procedure. Provide necessary precautions to protect those performing or observing test from being exposed to smoke.
  - a) Use zinc chloride smoke candles, titanium tetrachloride ampules or sticks, or other devices acceptable to Mechanical engineer to generate smoke.
  - b) Close openings in duct except for one opening at farthest end of duct run.
  - c) Circulate smoke at pressurized condition of 1/2 inch minimum water gauge static pressure.
  - d) Report findings to mechanical engineer in writing.

- e. Air System Test and Evaluation Report:
  - 1) Record test data on AABC standard forms or facsimile.
  - 2) Preliminary Report: Provide and deliver four copies of complete data for evaluation and approval to Owner.
  - 3) Final report: Provide and deliver complete four copies of final report to Owner prior to project Substantial Completion date.
  - 4) Complete with logs, data, and records as required herein. Print logs, data, and records on white bond paper bound together in report form.
  - 5) Certified accurate and complete by Consultant's certified test and balance engineer.
  - 6) Contain following general data in format selected by Consultant:
    - a) Project Number.
    - b) Project Title.
    - c) Project Location.
    - d) Project Architect and Mechanical Engineer.
    - e) Consultant and Certified Engineer.
    - f) Contractor and mechanical sub-contractor.
    - g) Dates tests were performed.
    - h) Certification Document.
    - i) Report Forms similar to AABC Standard format.
  - 7) Report shall include following:
    - a) Instrumentation List including type, model, manufacturer, serial number, and calibration dates.
    - b) HVAC zone identification to include reduced ductwork floor plan from project documents with outlets and inlets numbered to match written test and balance report. This page may be oversized but it should fold up neatly within standard 8 1/2 x 11 report paper size.
    - c) Record following for each piece of air handling equipment:
      - (1) Manufacturer, model number, and serial number.
      - (2) Design and manufacture rated data.
      - (3) Actual CFM.
      - (4) Suction and discharge static pressure of each fan.
      - (5) Outdoor-ventilation-air and return-air total CFM.
      - (6) Final RPM of each motor or speed tap.
      - (7) Actual operating current and voltage of each fan motor.
      - (8) Fan and motor sheave manufacturer, model, size, number of grooves and center distance.
      - (9) Belt size and quantity.

### 3.3 PREPARATION

- A. Heating, ventilating, and cooling systems and equipment shall be in full operation and continue in operation during each working day of testing and balancing.

**END OF SECTION**

## SECTION 01 5100 - TEMPORARY UTILITIES

### PART 1 - GENERAL

#### 1.1 SUMMARY

A. Section Includes But is Not Limited To:

1. Administrative and procedural requirements for Temporary Utilities.

#### 1.2 ADMINISTRATIVE REQUIREMENTS

- A. Where necessary, engage appropriate local utility companies to install temporary service or connect to existing service. Where utility company provides only part of service, provide remainder with matching, compatible materials and equipment. Comply with utility company's recommendations.
1. Comply with industry standards and applicable laws and regulations of authorities having jurisdiction.
  2. Arrange for authorities having jurisdiction to inspect and test each temporary utility before use. Obtain required certifications and permits.
  3. Arrange with utility company and existing users for time when service can be interrupted, where necessary, to make connections for temporary services.
  4. Provide adequate capacity at each stage of construction. Before temporary utility availability, provide trucked-in services.
  5. Obtain construction easements necessary to bring temporary and/or permanent utilities to site.
  6. Use qualified personnel for installation and maintenance of temporary facilities. Locate temporary utilities where they will serve Project adequately and result in minimum interference with the Work of Owner or other Contractors on Project Site. Relocate and modify temporary utilities as required.
  7. Pay cost and use charges for temporary and permanent utilities until Substantial Completion has been granted by Owner.
- B. Prepare schedule indicating dates for implementation and termination of each temporary utility. At earliest feasible time, change over from use of temporary service to use of permanent service.
- C. Keep temporary utilities clean and neat in appearance. Operate in safe and efficient manner. Take necessary fire prevention measures. Do not overload utilities, or allow them to interfere with progress of The Work. Do not allow hazardous, dangerous or unsanitary conditions, or public nuisances to develop or persist on Project site.
- D. Limit availability of temporary utilities to essential and intended uses to reduce waste and abuse.
- E. Maintain temporary utilities in good operating condition until removal. Protect from damage by freezing temperatures and similar elements.
1. Maintain operation of temporary enclosures, heating, cooling, humidity control, ventilation, and similar facilities on 24-hour day basis where required to achieve indicated results and to avoid possibility of damage.
  2. Prevent water filled piping from freezing. Maintain markers for underground lines. Protect from damage during excavation operations.
- F. Remove each temporary utility and control when need has ended, or when replaced by permanent utility, but not later than Substantial Completion. Complete permanent construction that may have been delayed because of interference with temporary utility. Repair damaged work, clean exposed surfaces, and replace construction that cannot be satisfactorily repaired.
1. Materials and facilities that make up temporary utilities are property of Contractor.
  2. By Substantial Completion, clean and renovate permanent utilities used during construction period, including but not limited to:

- a. Replace air filters and clean inside of ductwork and housings.
- b. Replace significantly worn parts and parts subjected to unusual operating conditions.
- c. Replace lamps that are burned out or noticeably dimmed by substantial hours of use.

### 1.3 TEMPORARY ELECTRIC POWER

- A. Provide weatherproof, grounded electric power service and distribution system of sufficient size, capacity, and power characteristics during construction period.

### 1.4 TEMPORARY FIRE PROTECTION

- A. Install and maintain temporary fire protection facilities of types needed to protect against predictable and controllable fire losses. At a minimum, provide and maintain in working order two Standard UL Labeled ABC all-purpose 10 lb fire extinguishers. Do not incorporate these extinguishers into final Project.
  1. Locate fire extinguishers where convenient and effective for their intended purpose, but not less than one extinguisher on each floor at or near each usable stairwell.
  2. Store combustible materials in containers in fire-safe locations.
  3. Maintain unobstructed access to fire extinguishers, fire hydrants, temporary fire protection facilities, stairways, and other access routes for fighting fires.
  4. Provide supervision of welding operations, combustion type temporary heating units, and similar sources of fire ignition.
  5. At earliest feasible date in each area of Project, complete installation of permanent fire protection facility, including connected services, and place into operation and use. Instruct key personnel on use of facilities.

### 1.5 HEATING, COOLING, AND VENTILATING:

- A. Install and operate temporary heating, cooling, and ventilating units including fuel, temporary piping, fittings, wiring, and connections necessary to provide environmental conditions specified for various portions of the Work. Coordinate ventilation requirements to produce ambient conditions required and reduce consumption of energy.
- B. Repair damage to building and contents caused by cold, heat, dampness, and/or heating, cooling, and ventilating equipment. Select equipment that will not have harmful effect on completed installations or on elements being installed.
- C. Maintain safe conditions for use of temporary heating, cooling, and ventilating systems including, but not limited to, following requirements:
  1. Operate equipment according to equipment manufacturer's instructions.
  2. Provide fresh air ventilation required by equipment manufacturer.
  3. Keep temperature of fuel containers stabilized.
  4. Secure fuel containers from overturning.
  5. Operate equipment away from combustible materials.
- D. Permanent mechanical system may be operated subject to following conditions:
  1. Do not operate system when work causing air-borne dust is occurring or when dust caused by such work is present without installation of temporary filtering system approved by Architect.
  2. Operate system at no cost to Owner, including cost of fuel.
  3. Assume all responsibility and risk for operation of system.
  4. Return permanent mechanical equipment to 'like-new' condition for Substantial Completion Inspection.

## **1.6 TEMPORARY LIGHTING**

- A. Install and operate temporary lighting that will provide adequate illumination for construction operations and traffic conditions.

## **1.7 TEMPORARY TELEPHONES**

- A. Provide temporary telephone service for all personnel engaged in construction activities, throughout construction period.
- B. Contractor will pay for Local calls. Party making call will pay for long-distance and toll calls.
- C. At each telephone, post list of important telephone numbers.

## **1.8 TEMPORARY WATER SERVICE**

- A. Install water service and distribution piping of sizes and pressures adequate for construction until permanent water service is in use.

## **PART 2 - PRODUCTS Not Used**

## **PART 3 - EXECUTION Not Used**

**END OF SECTION**

## SECTION 01 5200 -CONSTRUCTION FACILITIES

### PART 1 - GENERAL

#### 1.1 SUMMARY

A. Section Includes But is Not Limited To:

1. Administrative and procedural requirements for Construction Facilities.

#### 1.2 ADMINISTRATIVE REQUIREMENTS

- A. Prepare schedule indicating dates for implementation and termination of each temporary facility.
- B. Keep temporary facilities clean and neat in appearance. Operate in safe and efficient manner. Take necessary fire prevention measures. Do not overload facilities, or allow them to interfere with progress of The Work. Do not allow hazardous, dangerous or unsanitary conditions, or public nuisances to develop or persist on Project site.
- C. Maintain facilities in good operating condition until removal.
- D. Remove each temporary facility when need has ended, or when replaced by authorized use of permanent facility, or by Substantial Completion. Complete permanent construction that may have been delayed because of interference with temporary facility. Repair damaged work, clean exposed surfaces, and replace construction that cannot be satisfactorily repaired.
1. Materials and facilities that make up temporary facilities are property of Contractor.
  2. By Substantial Completion, clean and renovate permanent facilities used during construction period.

#### 1.3 FIELD OFFICES

- A. Provide and maintain insulated, weather tight temporary office of sufficient size to accommodate Contractor's personnel at Project site and for use by Owner, Architect and Subcontractors.
1. Keep office clean and orderly.
  2. Heat and cool office as needed.
  3. Furnish office with locking door, light(s), table(s), bench(es), rack(s) for drawings, telephone, and FAX machine.
  4. Make office available for progress meetings.
  5. Provide an operable fire extinguisher in facility.
  6. Provide hardhats for Owner's Representatives for site visits.
- B. If Owner agrees to permit removal of temporary office before Substantial Completion, Contractor may use a room as an office after temporary office is removed. Equip room as specified above and restore to 'like-new' condition before Substantial Completion.

#### 1.4 SANITARY FACILITIES

- A. Provide temporary sanitary toilet. Service and maintain temporary toilet in a clean, sanitary condition.



**PART 2 - PRODUCTS Not Used**

**PART 3 - EXECUTION Not Used**

**END OF SECTION**

## **SECTION 01 5400 - CONSTRUCTION AIDS**

### **PART 1 - GENERAL**

#### **1.1 SUMMARY**

A. Section Includes But is Not Limited To:

1. Administrative and procedural requirements for Construction Aids.

#### **1.2 SCAFFOLDING, PLATFORMS, STAIRS, ETC**

- A. Furnish and maintain equipment such as temporary stairs, ladders, ramps, platforms, scaffolds, hoists, runways, derricks, chutes, and elevators as required for proper execution of The Work.
- B. Apparatus, equipment, and construction shall meet requirements of applicable laws and safety regulations.

### **PART 2 - PRODUCTS Not Used**

### **PART 3 - EXECUTION Not Used**

**END OF SECTION**

# SECTION 01 5600 - TEMPORARY BARRIERS AND ENCLOSURES

## PART 1 - GENERAL

### 1.1 SUMMARY

- A. Section Includes But is Not Limited To:
  - 1. Administrative and procedural requirements for Temporary Barriers and Enclosures.

### 1.2 ADMINISTRATIVE REQUIREMENTS

- A. Protection Of Existing Improvements: Protect streets, private roads, and sidewalks, including overhead protection where required. Repair damage to existing improvements caused by construction activities.
- B. Protection Of Adjacent Property: Provide necessary protection for adjacent property and lateral support thereof.
- C. Proprietary Camera Services: In its absolute discretion, and with or without notice to Contractor, Owner may provide from time to time, but is not obligated to provide, one or more cameras on or about Project site and/or signage or notices of the same:
  - 1. If provided by Owner, such camera(s) and/or signage and notices are solely for Owner's benefit and convenience and shall not be for benefit of Contractor, Subcontractor(s) or for any third person.
  - 2. Owner shall have no liability, obligation, or responsibility to Contractor, Subcontractors, or any third person relative to such camera(s), signage, or notices, or absence of camera(s), signage, or notices, including without limitation, installation, maintenance, operation, repair, testing, functionality, capacity, recording, monitoring, posting, etc., of the same (hereafter 'Proprietary Camera Services').
  - 3. Contractor, with Owner's prior consent (which shall not be unreasonably withheld), may relocate such camera(s), signage, or notices as necessary to not unreasonably, materially and physically interfere with work at Project Site.
  - 4. Contractor's obligations under Contract Documents, including but not limited to, Contractor's obligation for security of Project Site, are not modified by Owner's opportunity to provide, actually providing, or not providing Proprietary Camera Services and/or signage or notices regarding the same.
  - 5. This Specification Section does not preclude Contractor from providing its own camera(s), signage, or notices pursuant to terms and conditions of this Agreement. Neither does this Section reduce, expand or modify any other right or obligation of Owner pursuant to terms of this Agreement.

### 1.3 TEMPORARY BARRICADES

- A. Comply with standards and code requirements in erecting barricades, warning signs, and lights.
- B. Take necessary precautions to protect persons, including members of the public, from injury or harm.

### 1.4 TEMPORARY FENCING

- A. Before construction begins, install 6 foot high enclosure fence with lockable entrance gates. Locate where shown on Drawings. If not shown on Drawings, enclose entire site or portion sufficient to accommodate construction operations.

### 1.5 TEMPORARY SECURITY BARRIERS

- A. Install temporary enclosures of partially completed areas of construction. Provide locking entrances to prevent unauthorized entrance, vandalism, theft, and other violations of security.

- B. Secure materials and equipment stored on site.
- C. Secure building at the end of each work day.
- D. Maintain exterior building security until Substantial Completion.

**1.6 TEMPORARY TREE AND PLANT PROTECTION**

A. Protection:

- 1. Before commencing site work, build and maintain protective fencing around existing trees and vegetation which are shown to remain and are located in area of site to be disturbed.
- 2. Individual trees will have protective fencing built beyond drip line.
- 3. Keep areas within protective fencing undisturbed and do not use for any purpose.

B. Maintenance:

- 1. Maintain existing tree, shrubs, and vegetation as indicated in Contract Documents:
  - a. Remove and replace vegetation that dies or is damaged beyond repair due to construction activities.
  - b. Damage to any tree that has been indicated to remain and be protected, will have a cost associated with it. This includes branches, trunk, and root systems:
    - 1) Trees: \$1,000.00.

**PART 2 - PRODUCTS Not Used**

**PART 3 - EXECUTION Not Used**

**END OF SECTION**

## SECTION 01 5700 -TEMPORARY CONTROLS

### PART 1 - GENERAL

#### 1.1 SUMMARY

A. Section Includes But is Not Limited To:

1. Administrative and procedural requirements for Temporary Controls.

#### 1.2 TEMPORARY EROSION AND SEDIMENT CONTROL

- A. Take precautions necessary to prevent erosion and transportation of soil downstream, to adjacent properties, and into on-site or off-site drainage systems.
- B. Develop, install, and maintain an erosion control plan if required by law.
- C. Repair and correct damage caused by erosion.

#### 1.3 TEMPORARY ENVIRONMENTAL CONTROLS

- A. Provide protection, operate temporary facilities, and conduct construction in ways and by methods that comply with environmental regulations, and reduce possibility that air, waterways, and subsoil might be contaminated or polluted, or that other undesirable effects might result:
  1. Avoid use of tools and equipment that produce harmful noise.
  2. Restrict use of noise making tools and equipment to hours that will minimize complaints from persons or firms near site.
- B. Provide protection against weather (rain, winds, storms, frost, or heat) to maintain all work, materials, apparatus, and fixtures free from injury or damage.
- C. Protect excavation, trenches, and building from damage from rain water, spring water, ground water, backing up of drains or sewers, and all other water:
  1. For temporary drainage and dewatering facilities and operations not directly associated with construction activities included under individual Sections, comply with requirements of applicable local regulations. Where feasible, use permanent facilities.
  2. If sewers are not available or cannot be used, provide drainage ditches, dry wells, stabilization ponds, and similar facilities. Filter out excessive amounts of soil, construction debris, chemicals, oils and similar contaminants that might clog sewers or pollute waterways before discharge.
- D. Comply with governing ordinances relating to weed control and removal.

### PART 2 - PRODUCTS Not Used

### PART 3 - EXECUTION Not Used

END OF SECTION

## **SECTION 01 5800 - PROJECT IDENTIFICATION**

### **PART 1 - GENERAL**

#### **1.1 SUMMARY**

A. Section Includes But is Not Limited To:

1. Administrative and procedural requirements for Project Identification.

#### **1.2 TEMPORARY PROJECT SIGNAGE**

A. Contractor may, at its option, erect a temporary project identification sign.

1. Sign may be free-standing or attached to temporary field office or storage shed.
2. No other signs or advertisements are allowed on building site.
3. Sign will be no larger than 4 feet by 8 feet and include following information:
  - a. Project Name as shown in Contract Documents.
  - b. Contractor's name.
  - c. Architectural firm name.
4. Owner reserves the right to remove and/or take possession of any project identification sign.

### **PART 2 - PRODUCTS Not Used**

### **PART 3 - EXECUTION Not Used**

**END OF SECTION**

## SECTION 01 6100 - COMMON PRODUCT REQUIREMENTS

### PART 1 - GENERAL

#### 1.1 SUMMARY

A. Section Includes But is Not Limited To:

1. Administrative and procedural requirements for Common Product Requirements.

#### 1.2 ADMINISTRATIVE REQUIREMENTS

- A. Provide products that comply with Contract Documents, that are undamaged, and, unless otherwise indicated, new and unused at time of installation. Provide products complete with accessories, trim, finish, safety guards, and other devices and details needed for complete installation and for intended use and effect.
- B. Except for required labels and operating data, do not attach or imprint manufacturer's or producer's nameplates or trademarks on surfaces of products that will be exposed to view in occupied spaces or on building exterior.
1. Locate required product labels and stamps on concealed surface or, where required for observation after installation, on accessible surface that is not conspicuous.
  2. Provide permanent nameplates on items of service-connected or power-operated equipment. Locate on easily accessible surface that is inconspicuous in occupied spaces. Nameplate will contain following information and other essential operating data:
    - a. Name of product and manufacturer.
    - b. Model and serial number.
    - c. Capacity.
    - d. Speed.
    - e. Ratings.
- C. Where specifications describe a product or assembly by specifying exact characteristics required, with or without use of brand or trade name, provide product or assembly that provides specified characteristics and otherwise complies with Contract requirements.
- D. Where Specifications require compliance with performance requirements, provide products that comply with these requirements and are recommended by manufacturer for application described. General overall performance of product is implied where product is specified for specific application. Manufacturer's recommendations may be contained in published product literature, or by manufacturer's certification of performance.
- E. Where specifications only require compliance with an imposed code, standard, or regulation, select product that complies with standards, codes or regulations specified.
- F. Where Specifications require matching an established Sample, Architect's decision will be final on whether proposed product matches satisfactorily. Where no product available within specified category matches satisfactorily nor complies with other specified requirements, refer to Architect.
- G. Where specified product requirements include phrase *'... as selected from manufacturer's standard colors, patterns, textures...'* or similar phrase, select product and manufacturer that comply with other specified requirements. Architect will select color, pattern, and texture from product line selected.
- H. Remove and replace products and materials not specified in Contract Documents but installed in the Work with specified products and materials at no additional cost to Owner and for no increase in Contract time.

I. Informational Submittals:

1. Sustainable Design Submittals:

- a. Submit electronic files: PDF. Architect will return a PDF copy marked with action taken and with corrections or modifications required.

**PART 2 - PRODUCTS Not Used**

**PART 3 - EXECUTION Not Used**

**END OF SECTION**



## SECTION 01 6200 - PRODUCT OPTIONS

### PART 1 - GENERAL

#### 1.1 SUMMARY

A. Section Includes But is Not Limited To:

1. Administrative and procedural requirements for Product Options.

#### 1.2 ADMINISTRATIVE REQUIREMENTS

A. Product Selection:

1. When option of selecting between two or more products is given, product selected will be compatible with products previously selected, even if previously selected products were also options.

- a. Regional materials.

B. Non-Conforming Work:

1. Non-conforming work as covered in Article 12.3 of General Conditions applies, but is not limited, to use of non-specified products or manufacturers.

C. Product selection is governed by Contract Documents and governing regulations, not by previous Project experience. Procedures governing product selection include:

1. Substitutions And Equal Products:

- a. Generally speaking, substitutions for specified products and systems, as defined in the Uniform Commercial Code, are not acceptable. However, equal products may be approved upon compliance with Contract Document requirements.

- b. Approved Products / Manufacturers / Suppliers / Distributors / Fabricators / Installers:

- 1) Category One:

- a) Owner has established 'Relationships' that extend beyond requirements of this Project. No substitutions or equal products will be allowed on this Project.

- b) Specification Sections specify Owner Furnished and Owner Installed Manufacturers or Products.

- c) Follow specified procedures to preserve relationships between Owner and specified manufacturers / suppliers and advantages that accrue to Owner from those relationships.

- 2) Category Two:

- a) Owner has established 'Relationships' that contain provisions extending beyond requirements of this Project. No substitutions or equal products will be allowed on this Project.

- b) Specification Sections specify Owner Furnished and Contractor Installed Manufacturers, Suppliers, Distributors or Products.

- c) Follow specified procedures to preserve relationships between Owner and specified manufacturers / suppliers and advantages that accrue to Owner from those relationships.

- 3) Category Three:

- a) Owner has established 'Relationships' that contain provisions extending beyond requirements of this Project. Use these products to preserve advantages that accrue to Owner from those programs. No substitutions or equal products will be allowed on this Project.
  - b) Specification Sections specify Contractor Furnished and Contractor Installed Manufacturers, Suppliers, Distributors, Fabricators or Products.
- 4) Category Four:
- a) Provide only specified products available from manufacturers listed. No substitutions, private-labeled, or equal products, or mixing of manufacturers' products is allowed on this Project.
  - b) In Sections where lists recapitulating Manufacturers previously mentioned in Section are included under heading '*Manufacturers*' or '*Approved Manufacturers*', this is intended as a convenience to Contractor as a listing of contact information only. It is not intended that all manufacturers in list may provide products where specific products and manufacturers are listed elsewhere in Section.
- c. Acceptable Products / Manufacturers / Suppliers / Installers:
- 1) Type One: Use specified products / manufacturers unless approval to use other products / manufacturers has been obtained from Architect by Addendum.
  - 2) Type Two: Use specified products / manufacturers unless approval to use other products and manufacturers has been obtained from Architect in writing before installing or applying unlisted or private-labeled products.
  - 3) Use 'Equal Product Approval Request Form' to request approval of equal products, manufacturers, or suppliers before bidding or before installation, as noted in individual Sections.
- d. Quality / Performance Standard Products / Manufacturers:
- 1) Class One: Use specified product / manufacturer or equal product from specified manufacturers only.
  - 2) Class Two: Use specified product / manufacturer or equal product from any manufacturer.
  - 3) Products / manufacturers used shall conform to Contract Document requirements.

**PART 2 - PRODUCTS Not Used**

**PART 3 - EXECUTION Not Used**

**END OF SECTION**

# SECTION 01 6400 - OWNER - FURNISHED PRODUCTS

## PART 1 - GENERAL

### 1.1 SUMMARY

- A. Administrative and procedural requirements for Owner-Furnished Products. Install items furnished by Owner or receive and store in safe condition items purchased directly by Owner according to requirements of Contract Documents:
  - 1. Fixed Markerboards. See Section 10 1116.
  - 2. Interior Signage. See Section 10 1495.
  - 3. Network Streaming Equipment: See Section 27 4117 and Section 27 5117.
  - 4. Serving Area Appliances. See Section 11 3114.

### 1.2 ADMINISTRATIVE REQUIREMENTS

- A. General:
  - 1. Review 'Contractor Notice of Owner Furnished Materials' notice listing Owner-furnished products to be delivered for Project:
    - a. Review due (delivery) dates and vendor lead times for each item and coordinate with construction schedule. Immediately report recommended changes to Owner's Purchasing Coordinator listed in 'Contractor Notice of Owner Furnished Materials'. Contact vendors directly if changes to delivery dates become necessary during construction.
    - b. Report problems in coordinating due (delivery) dates with construction schedule to Architect and Owner's Purchasing Coordinator.
  - 2. Receive unload, store and protect Owner-furnished materials and products.
    - a. Provide labor and equipment necessary to receive, unload, and store materials and products.
    - b. Count number of pieces received and note any discrepancies on Delivery Receipt before driver leaves:
      - 1) Compare 'Contractor Notice of Owner Furnished Materials' notice' with packing slips.
      - 2) Note discrepancies in number, size, color, model numbers, etc. on Delivery Receipt.
    - c. Include Project Name and Project Number on Delivery Receipt.
    - d. Check for visible evidence of damage such as holes, tears, or crushed portions of cartons and note on Delivery Receipt before driver leaves:
      - 1) Include Project Name and Project Number on Delivery Receipt.
      - 2) If you are unsure if carton is damaged, take photo of cartons and share it with Owner's Purchasing Coordinator.
    - e. Properly store and protect all deliveries of Owner Furnished materials and Products.
  - 3. Within forty-eight (48) hours of delivery:
    - a. Open and inspect each piece of freight delivered. Take picture of any concealed damage not reported at time of delivery and report it to Owner's Purchasing Coordinator.
    - b. Compare 'Contractor Notice of Owner Furnished Materials' with packing slips. Note discrepancies in number, size, color, model numbers, etc.
    - c. Deliver copy of Delivery Receipt (bill of lading) on which you have noted any loss or damage to Owner's Purchasing Coordinator. Include in your submission any report of concealed damage, discrepancies or photos.

4. Failure to strictly follow above procedures will result in your assumption of all financial responsibility for this shipment. All replacement and reorders must be made through Owner's Purchasing Coordinator and must allow Owner's vendor sufficient lead time to produce and ship new product.
5. When above procedures are strictly followed, shortages and damaged items will be replaced by Owner at Owner's cost.

**PART 2 - PRODUCTS Not Used**

**PART 3 - EXECUTION Not Used**

**END OF SECTION**

# SECTION 01 6600 - PRODUCT DELIVERY, STORAGE, AND HANDLING REQUIREMENTS

## PART 1 - GENERAL

### 1.1 SUMMARY

A. Section Includes But is Not Limited To:

1. Administrative and procedural requirements for Product Delivery, Storage, and Handling Requirements.

### 1.2 ADMINISTRATIVE REQUIREMENTS

A. Deliver, store, and handle products according to manufacturer's recommendations, using means and methods that will prevent damage, deterioration, and loss, including theft.

### 1.3 DELIVERY AND ACCEPTANCE REQUIREMENTS

A. Schedule delivery to reduce long-term storage at site and to prevent overcrowding of construction spaces.

B. Coordinate delivery with installation time to ensure minimum holding time for items that are flammable, hazardous, easily damaged, or sensitive to deterioration, theft, and other losses.

C. Deliver products to site in manufacturer's original sealed container or other packaging system, complete with labels and instructions for handling, storing, unpacking, protecting, and installing.

D. Inspect products upon delivery to ensure compliance with Contract Documents, and to ensure that products are undamaged and properly protected.

### 1.4 STORAGE AND HANDLING REQUIREMENTS

A. Store products at site in manner that will simplify inspection and measurement of quantity or counting of units.

B. Store heavy materials away from Project structure so supporting construction will not be endangered.

C. Store products subject to damage by elements above ground, under cover in weathertight enclosure, with ventilation adequate to prevent condensation. Maintain temperature and humidity within range required by manufacturer's instructions.

## PART 2 - PRODUCTS Not Used

## PART 3 - EXECUTION Not Used

END OF SECTION

## SECTION 01 7300 - EXECUTION

### PART 1 - GENERAL

#### 1.1 SUMMARY

A. Section Includes But is Not Limited To:

1. Administrative and procedural requirements for governing Execution of the Work.

#### 1.2 COMMON INSTALLATION PROVISIONS

- A. Manufacturer's Instructions: Comply with Manufacturer's installation instructions and recommendations to extent that those instructions and recommendations are more explicit or stringent than requirements contained in Contract Documents. Notify Architect of conflicts between Manufacturer's installation instructions and Contract Document requirements.
- B. Provide attachment and connection devices and methods necessary for securing Work. Secure work true to line and level. Anchor each product securely in place, accurately located, and aligned with other Work. Allow for expansion and building movement.
- C. Visual Effects: Provide uniform joint widths in exposed work. Arrange joints in exposed work to obtain best visual effect. Refer questionable choices to Architect for final decision.
- D. Install each component during weather conditions and Project status that will ensure best possible results. Isolate each part of completed construction from incompatible material as necessary to prevent deterioration.
- E. Coordinate temporary enclosures with required inspections and tests, to reduce necessity of uncovering completed construction for that purpose.
- F. Mounting Heights: Where mounting heights are not shown, install individual components at standard mounting heights recognized within the industry or local codes for that application. Refer questionable mounting height decisions to Architect for final decision.

### PART 2 - PRODUCTS Not Used

### PART 3 - EXECUTION Not Used

END OF SECTION

## SECTION 01 7400 - CLEANING AND WASTE MANAGEMENT

### 1.1 SUMMARY

- A. Includes But Not Limited To:
  - 1. Administrative and procedural requirements for Cleaning and Waste Management as described in Contract Documents.
- B. Related Requirements:
  - 1. Section 01 1200: Coordination of responsibilities for waste management.
  - 2. Section 01 6400: Waste removal of Owner furnished products.
  - 3. In addition to standards described in this section, comply with all requirements for cleaning-up as described in various other Sections of these Specifications.

### 1.2 REFERENCES

- A. Definitions:
  - 1. Asphalt Pavement, Brick, and Concrete (ABC) Rubble: Rubble that contains only weathered (cured) asphalt pavement, clay bricks and attached mortar normally used in construction, or concrete that may contain rebar. The rubble shall not be mixed with, or contaminated by, another waster or debris.
  - 2. Construction Waste: Building and site improvement materials and other solid waste resulting from construction, remodeling, renovation, or repair operations. Construction waste includes packaging.
  - 3. Demolition Waste: Building and site improvement materials resulting from demolition or selective demolition operations.
  - 4. Disposal: Removal off-site of demolition and construction waste and subsequent sale, recycling, reuse, or deposit in landfill or incinerator acceptable to authorities having jurisdiction.
  - 5. Recycle: Recovery of demolition or construction waste for subsequent processing in preparation for reuse.
  - 6. Salvage: Recovery of demolition or construction waste and subsequent sale or reuse in another facility.
  - 7. Salvage and Reuse: Recovery of demolition or construction waste and subsequent incorporation into the Work.

## PART 2 - PRODUCTS: Not Used

## PART 3 - EXECUTION

### 3.1 PROGRESS CLEANING

- A. Comply with regulations of authorities having jurisdiction and safety standards for cleaning.
- B. Keep premises broom clean during progress of the Work.
- C. Keep site and adjoining streets reasonably clean. If necessary, sprinkle rubbish and debris with water to suppress dust.
- D. During handling and installation, protect construction in progress and adjoining materials in place. Apply protective covering where required to ensure protection from soiling, damage, or deterioration until Substantial Completion.
- E. Clean and maintain completed construction as frequently as necessary throughout construction period. Adjust and lubricate operable components to ensure ability to operate without damaging effects.
- F. Supervise construction activities to ensure that no part of construction completed or in progress, is subject to harmful, dangerous, damaging, or otherwise deleterious exposure during construction period.

- G. Before and during application of painting materials, clear area where such work is in progress of debris, rubbish, and building materials that may cause dust. Sweep floors and vacuum as required and take all possible steps to keep area dust free.
- H. Clean exposed surfaces and protect as necessary to avoid damage and deterioration.
- I. Place extra materials of value remaining after completion of associated work have become Owner's property as directed by Owner or Architect.
- J. Construction Waste Management And Disposal:
  - 1. Remove waste materials and rubbish caused by employees, Subcontractors, and contractors under separate contract with Owner and dispose of legally. Remove unsuitable or damaged materials and debris from building and from property.
    - a. Provide adequate waste receptacles and dispose of materials when full.
    - b. Properly store volatile waste and remove daily.
    - c. Do not deposit waste into storm drains, sanitary sewers, streams, or waterways. Do not discharge volatile, harmful, or dangerous materials into drainage systems.
  - 2. Do not burn waste materials or build fires on site. Do not bury debris or excess materials on Owner's property.

### 3.2 FINAL CLEANING

- A. Immediately before Substantial Completion, thoroughly clean building and area where The Work was performed. Remove all rubbish from under and about building, landscaped areas and parking lot and leave building and Project Site ready for occupancy by Owner.
- B. Comply with individual manufacturer's cleaning instructions.
- C. Clean each surface or unit to condition expected in normal, commercial building cleaning and maintenance program, including but not limited to:
  - 1. Interior Cleaning:
    - a. Clean inside glazing, exercising care not to scratch glass.
    - b. Remove marks, stains, fingerprints and dirt.
    - c. Clean and polish woodwork and finish hardware.
    - d. Remove labels that are not permanent labels.
    - e. Clean plumbing fixtures and tile work. Remove spots, soil or paint.
    - f. Clean surfaces of mechanical and electrical equipment. Remove excess lubrication and other substances. Clean light fixtures and lamps.
    - g. Clean other fixtures and equipment and remove stains, paint, dirt, and dust.
    - h. Remove temporary floor protection and clean floors.
  - 2. Exterior Cleaning:
    - a. Clean outside glazing, exercising care not to scratch glass.
    - b. Remove marks, stains, and dirt from exterior surfaces.
    - c. Clean and polish finish hardware.
    - d. Remove temporary protection systems.
    - e. Clean dirt, mud, and other foreign material from paving, sidewalks, and gutters.
    - f. Clean drop inlets, through-curb drains, and other drainage structures.
    - g. Remove trash, debris, and foreign material from landscaped areas.

**END OF SECTION**



## SECTION 01 7700 - CLOSEOUT PROCEDURES

### PART 1 - GENERAL

#### 1.1 SUMMARY

- A. Section Includes But is Not Limited To:
  - 1. Administrative and procedural requirements for Closeout Procedures.

#### 1.2 GENERAL

- A. Closeout process consists of three specific project closeout inspections. Contractor shall plan sufficient time in construction schedule to allow for required inspections before expiration of Contract Time.
- B. Contractor shall conduct his own inspections of The Work and shall not request closeout inspections until The Work of the contract is reasonably complete and correction of obvious defects or omissions are complete or imminent.
- C. Date of Substantial Completion shall not occur until completion of construction work, unless agreed to by Architect and included on Certificate of Substantial Completion.

#### 1.3 PRELIMINARY CLOSEOUT REVIEW

- A. When Architect, Owner and Contractor agree that project is ready for closeout, Pre-Substantial Inspection shall be scheduled. Preparation of floor substrate to receive carpeting and any work which could conceivably damage or stain carpet must be completed, as carpet installation will be scheduled immediately following this inspection.
- B. Prior to this inspection, completed test and evaluation reports for HVAC system and font, where one occurs, are to be provided to Project Manager, Architect, and applicable consultants.
- C. Architect and his appropriate consultants, together with Contractor and mechanical, plumbing, fire protection, and electrical sub-contractors shall conduct a space by space and exterior inspection to review materials and workmanship and to demonstrate that systems and equipment are operational.
  - 1. Punch list of items requiring completion and correction will be created.
  - 2. Time frame for completion of punch list items will be established, and date for Substantial Completion Inspection shall be set.

#### 1.4 SUBSTANTIAL COMPLETION INSPECTION

- A. When Architect, Owner and Contractor agree that project is ready for Substantial Completion, an inspection is held. Punch list created at Pre-Substantial Inspection is to be substantially complete.
- B. Prior to this inspection, Contractor shall discontinue or change over and remove temporary facilities from the site, along with construction tools, mock-ups and similar elements.
- C. Architect, Owner and Contractor review completion of punch list items. When Owner and Architect confirm that Contractor has achieved Substantial Completion of The Work, Owner, Architect and Contractor will execute Certificate of Substantial Completion that contains:
  - 1. Date of Substantial Completion.

2. Punch List Work not yet completed, including seasonal and long lead items.
  3. Amount to be withheld for completion of Punch List Work.
  4. Time period for completion of Punch List Work.
  5. Amount of liquidated damages set forth in Supplementary Conditions to be assessed if Contractor fails to complete Punch List Work within time set forth in Certificate.
- D. Contractor shall present Closeout Submittals to Architect and place tools, spare parts, extra stock, and similar items required by Contract Documents in locations as directed by Facilities Manager.

## **1.5 FINAL ACCEPTANCE MEETING**

- A. When punch list items except for any seasonal items or long lead items which will not prohibit occupancy are completed, Final Acceptance Meeting is held.
- B. Owner, Architect and Contractor execute Owner's Project Closeout - Final Acceptance form, and verify:
1. All seasonal and long lead items not prohibiting occupancy, if any, are identified, with committed to completion date and amount to be withheld until completion.
  2. Owner's maintenance personnel have been instructed on all system operation and maintenance as required by the Contract Documents.
  3. Final cleaning requirements have been completed.
- C. If applicable, once any seasonal and long lead items are completed, Closeout Inspection is held where Owner and Architect verify that The Work has been satisfactorily completed, and Owner, Architect and Contractor execute Closeout portion of the Project Closeout - Final Acceptance form.
- D. When Owner and Architect confirm that The Work is satisfactorily completed, Architect will authorize final payment.

## **PART 2 - PRODUCTS Not Used**

## **PART 3 - EXECUTION Not Used**

**END OF SECTION**

## SECTION 01 7800 - CLOSEOUT SUBMITTALS

### PART 1 - GENERAL

#### 1.1 SUMMARY

- A. Section Includes But is Not Limited To:
  - 1. Administrative and procedural requirements for Closeout Submittals.
- B. Related Requirements:
  - 1. Section 01 3300: 'Submittal Procedures' for administrative and procedural requirements for submittal procedures.

#### 1.2 ADMINISTRATIVE REQUIREMENTS

- A. Project Record Documents:
  - 1. Do not use record documents for construction purposes:
    - a. Protect from deterioration and loss in secure, fire-resistive location.
    - b. Provide access to record documents for Architect's reference during normal working hours.
  - 2. Maintain clean, undamaged set of Drawings:
    - a. Mark set to show actual installation where installation varies from the Work as originally shown.
    - b. Give particular attention to concealed elements that would be difficult to measure and record at a later date.
    - c. Mark record sets with red erasable pencil. Use other colors to distinguish between variations in separate categories of the Work.
    - d. Mark new information that is important to Owner, but was not shown on Drawings.
    - e. Note related Change Order numbers where applicable.

#### 1.3 CLOSEOUT SUBMITTALS

- A. Operations And Maintenance Manual:
  - 1. General:
    - a. Include closeout submittal documentation as required by Contract Documentation.
    - b. Include workmanship bonds, final certifications, equipment check-out sheets, and similar documents.
    - c. Releases enabling Owner unrestricted use of The Work and access to services and utilities. Include occupancy permits, operating certificates, and similar releases.
    - d. Include Project photographs, damage or settlement survey, and similar record information required by Contract Documents.
    - e. Submittal Format:
      - 1) Digital copies unless otherwise noted, required for each individual specification section that include 'Closeout Submittals'.
      - 2) Include only closeout submittals as defined in individual specification section as required in Contract Documents.
  - 2. Project Manual:

- a. Copy of complete Project Manual including Addenda, Modifications as defined in General Conditions, and other interpretations issued during construction:
  - 1) Mark these documents to show variations in actual Work performed in comparison with text of specifications and Modifications.
  - 2) Show substitutions, selection of options, and similar information, particularly on elements that are concealed or cannot otherwise be readily discerned later by direct observation.
3. Maintenance Contracts:
  - a. Digital format only.
4. Operations and Maintenance Data:
  - a. Digital format only:
    - 1) Cleaning instructions.
    - 2) Maintenance instructions.
    - 3) Operations instructions.
    - 4) Equipment list.
    - 5) Parts list.
5. Warranty Documentation:
  - a. Digital format of final, executed warranties.
6. Record Documentation:
  - a. Digital format only.
    - 1) Certifications.
    - 2) Color and pattern selections.
    - 3) Design Data.
    - 4) Geotechnical Evaluation Reports (soils reports).
    - 5) Manufacture Reports.
    - 6) Manufacturer's literature or cut sheets.
    - 7) Shop Drawings.
    - 8) Source Quality Control.
    - 9) Special Procedures.
    - 10) Testing and Inspection Agency Reports.
    - 11) Testing and Inspection Reports.
7. Irrigation Plan.
  - a. Laminated and un-laminated reduced sized hard copies.
8. Landscape Management Plan (LMP):
  - a. Irrigation Section:
    - 1) Submittal Format: Digital format and hard copy of each.
    - 2) Documentation required by sections under 32 8000 Heading: 'Irrigation'.
  - b. Landscaping Section:
    - 1) Submittal Format: Digital format and hard copy of each.

- 2) Documentation required by sections under 32 9000 Heading: 'Planting'.

#### **1.4 MAINTENANCE MATERIAL SUBMITTALS**

- A. Submit item(s) required by Section 01 3300 'Submittal Procedures' and as defined in individual specification section if required in Contract Documents. Items may be provided at completion of Work or with Closeout Submittals.

#### **1.5 WARRANTIES**

- A. When written guarantees beyond one (1) year after substantial completion are required by Contract Documents, secure such guarantees and warranties properly addressed and signed in favor of Owner. Include these documents in Operations & Maintenance Manual(s) specified above.
- B. Delivery of guarantees and warranties will not relieve Contractor from obligations assumed under other provisions of Contract Documents.

#### **PART 2 - PRODUCTS Not Used**

#### **PART 3 - EXECUTION Not Used**

**END OF SECTION**



WEST FIELD SR. SEMINARY

**DIVISION 3 - CONCRETE:**

03 1113	Structural Cast-In-Place Concrete Forming
03 1511	Concrete Anchors
03 2100	Reinforcement Bars
03 2116	Epoxy - Coated Reinforcement Bars
03 3111	Cast-In-Place Structural Concrete
03 3300	Architectural Concrete
03 3923	Membrane Concrete Curing

# SECTION 03 1113 - STRUCTURAL CAST-IN-PLACE CONCRETE FORMING

## PART 1 - GENERAL

### 1.1 SUMMARY

- A. Includes But Not Limited To:
  - 1. Design, construction, and safety of formwork.
  - 2. Furnish and install required formwork ready for placing of concrete.
  - 3. Strip and dispose of formwork.
- B. Related Requirements:
  - 1. Section 03 3111: 'Cast-In-Place Structural Concrete' for:
    - a. Tolerances for placing structural concrete.
    - b. Pre-installation conference held jointly with other concrete related sections.
  - 2. Section 03 3300: 'Architectural Concrete'

### 1.2 REFERENCES

- A. Reference Standards:
  - 1. American Concrete Institute:
    - a. ACI 318-14, 'Building Code Requirements for Structural Concrete and Commentary'.

### 1.3 ADMINISTRATIVE REQUIREMENTS

- A. Pre-Installation Conference:
  - 1. Participate in pre-installation conference as specified in Section 03 3111.
    - 1) Review requirements and frequency of testing and inspections.

## PART 2 - PRODUCTS

### 2.1 COMPONENTS

- A. Forms: Wood, metal, or plastic as arranged by Contractor:
  - 1. Forming material shall be compatible with specified form release agents and with finish requirements for concrete to be left exposed or to receive a smooth rubbed finish.

### 2.2 ACCESSORIES

- A. Form Release Agents:

1. Unexposed Surfaces Only: Contractor's option.
- B. Form Release / Finish Agent:
1. Vertical, Exposed Surfaces or Unexposed Surfaces:
    - a. Chemically acting type.
    - b. Type Two Acceptable Products.
      - 1) Crete-Lease 727 or 20-VOC by Cresset Chemical Co, Weston, OH [www.cresset.com](http://www.cresset.com).
      - 2) Clean Strip (J-1 or J-3 VOC) by Dayton Superior Specialty Chemicals, Kansas City, KS [www.daytonsuperiorchemical.com](http://www.daytonsuperiorchemical.com).
      - 3) E-Z Strip or DEBOND Form Coating by L & M Construction Chemicals, Omaha, NE [www.lmcc.com](http://www.lmcc.com).
      - 4) Q-2 by Unitex, Kansas City, MO [www.unitex-chemicals.com](http://www.unitex-chemicals.com).
      - 5) U S Spec SlicKote by U S Mix Products Co [www.usspec.com](http://www.usspec.com).
      - 6) Duogard or Duogard II by W R Meadows, Elgin, IL [www.wrmeadows.com](http://www.wrmeadows.com).
      - 7) Equal as approved by Architect before use. See Section 01 6200.
- C. Expansion / Contraction Joints:
1. 1/2 inch thick.
  2. Manufactured commercial fiber type:
    - a. Meet requirements of ASTM D1751.
    - b. Type Two Acceptable Products:
      - 1) Conflex by Knight-Celotex, Northfield, IL [www.aknightcompany.com](http://www.aknightcompany.com).
      - 2) Sealtight by W R Meadows Inc, Hampshire, IL [www.wrmeadows.com](http://www.wrmeadows.com).
      - 3) Equal as approved by Architect before installation. See Section 01 6200.
  3. Recycled Vinyl:
    - a. Light gray color.
    - b. Type Two Acceptable Products:
      - 1) Proflex by Oscoda Plastics Inc, Oscoda, MI [www.oscodaplastics.com](http://www.oscodaplastics.com).
      - 2) Equal as approved by Architect before Installation. See Section 01 6200.

## **PART 3 - EXECUTION**

### **3.1 INSTALLATION**

- A. Forms:
1. Assemble forms so forms are sufficiently tight to prevent leakage.
  2. Properly brace and tie forms.
  3. Make proper form adjustments before, during, and after concreting.
  4. Use new forms, or used forms that have been cleaned of loose concrete and other debris from previous concreting and repaired to proper condition. Use APA Plyform B-B Class I, or APA HDO Plyform B-B Class I, on exposed to view concrete that do not receive a smooth rubbed finish.
- B. Accessories:
1. General:



- a. Provide for installation of inserts, templates, fastening devices, sleeves, and other accessories to be set in concrete before placing.
  - b. Position anchor bolts for hold-down anchors and columns and securely tie in place before placing concrete.
2. Form Release / Finish Agents:
- a. Film thickness shall be no thicker than as recommended by Manufacturer.
  - b. Allow no release / finish agent on reinforcing steel or footings.
3. Expansion Joints:
- a. Install at joints between floor slab and foundation wall where shown on Drawings.
- C. Form Removal (Slab on Grade):
1. Removal of forms can usually be accomplished in twelve (12) to twenty-four (24) hours.
  2. If temperature is below 50 deg F or if concrete (stairs, beams, etc) depends on forms for structural support, leave forms intact for sufficient period for concrete to reach adequate strength.
  3. For exposed to view surfaces that receive a smooth rubbed finish, remove forms while concrete is still "green".
  4. Metal bars or prys should not be used. Use wood wedges, tapping gradually when necessary.

### **3.2 FIELD QUALITY CONTROL**

- A. Field Tests And Inspections:
1. Concrete Formwork:
    - a. Inspections are not required and will be performed at discretion of Architect.

**END OF SECTION**

## SECTION 03 1511 - CONCRETE ANCHORS

### PART 1 - GENERAL

#### 1.1 SUMMARY

- A. Products Furnished But Not Installed Under This Section:
  - 1. Cast-in place and post-installed concrete anchors including:
    - a. Adhesive anchors for concrete.
    - b. Expansion anchors for concrete.
    - c. Screw anchors for concrete.
    - d. Concrete anchors and inserts not specified elsewhere.
  - 2. Installer responsible when inspection results of concrete anchors require corrective actions.
- B. Related Requirements:
  - 1. Section 01 1200: 'Multiple Contract Summary' for Owner Furnished Testing and Inspecting Services.
  - 2. Section 01 4523: 'Testing and Inspecting Services' for testing and inspection, and testing laboratory services for materials, products, and construction methods.
  - 3. Section 03 3111: 'Cast-In-Place Structural Concrete' for installation and inspection of cast-in-place anchors.
  - 4. Section 06 1100: 'Wood Framing' for installation of drilled in anchors.

#### 1.2 REFERENCES

- A. Reference Standards:
  - 1. American Concrete Institute:
    - a. ACI 355.4-11, 'Qualification of Post-Installed Adhesive Anchors in Concrete and Commentary'.
    - b. ACI 355.4M-11, 'Qualification of Post-Installed Adhesive Anchors in Concrete and Commentary (Metric)'.
    - c. ACI 548.12-12, 'Specification for Bonding Hardened Concrete and Steel to Hardened Concrete with an Epoxy Adhesive'.
  - 2. American National Standards Institute / American Welding Society (Following are specifically referenced for Structural Steel testing):
    - a. ANSI/AWS D1.1/D1.1M:2015, 'Structural Welding Code - Steel'.
  - 3. ASTM International:
    - a. ASTM A307-14, 'Standard Specification for Carbon Steel Bolts and Studs, 60 000 psi Tensile Strength'.
    - b. ASTM A563-15, 'Standard Specification for Carbon and Alloy Steel Nuts'.
    - c. ASTM A706/A706M-16, 'Standard Specification for Low-Alloy Steel Deformed and Plain Bars for Concrete Reinforcement'.
    - d. ASTM F1554-18, 'Standard Specification for Anchor Bolts, Steel, 36, 55, and 105-ksi Yield Strength'.
    - e. ASTM F3125/F3125-15a, 'Standard Specification for High Strength Structural Bolts, Steel and Alloy Steel, Heat Treated, 120 ksi (830 MPa) and 150 ksi (1040 MPa) Minimum Tensile Strength, Inch and Metric Dimensions'.
  - 4. International Code Council (IBC) (2018 or most recent edition adopted by AHJ):
    - a. IBC Chapter 17, 'Structural Tests and Special Inspections'.

### 1.3 ADMINISTRATIVE REQUIREMENTS

#### A. Scheduling:

1. Inspection shall be performed according IBC requirements.
2. Notify Testing Agency and Architect one week before installing anchors so inspection may be scheduled.

### 1.4 SUBMITTALS

#### A. Action Submittals:

1. Product Data:
  - a. Manufacturer's product literature for each item.

#### B. Informational Submittals:

1. Certificates:
  - a. Adhesive Anchors:
    - 1) Installer to provide current ACI/CRSI certification to Architect prior to installation of anchors.
2. Test And Evaluation Reports:
  - a. Provide ESR for products used indicating conformance with current applicable ESR Acceptance Criteria.
3. Manufacturer's Instructions:
  - a. Manufacturer's published installation recommendations for each item.
4. Qualification Statements:
  - a. All concrete anchors except Adhesive Anchors:
    - 1) Installer to provide record of installer installation training showing dates and those trained for all installed products when required when by Architect.

#### C. Closeout Submittals:

1. Include following in Operations And Maintenance Manual specified in Section 01 7800:
  - a. Record Documentation:
    - 1) Testing and Inspection Reports:
      - a) Testing Agency inspection reports of all inspected anchors.

### 1.5 QUALITY ASSURANCE

#### A. Qualifications:

1. Manufacturer:
  - a. Having sufficient capacity to produce and deliver required materials without causing delay in work.

2. Installer:
  - a. Acceptable to Manufacturer, experienced in performing work of this section and has specialized in installation of work similar to that required for this project.
  - b. Adhesive Anchors:
    - 1) Adhesive Anchors installed in horizontal to vertical overhead orientation to support sustained tension loads shall be installed by Certified Adhesive Anchor Installer (AAI) as certified through ACI/CRSI:
      - a) Refer to most current version of ACI 318 for certification requirements.
      - b) Proof of current certification shall be submitted to the Architect for approval prior to commencement of installation.
  - c. All other Concrete Anchors:
    - 1) Arrange for manufacturer's field representative to provide installation training for all products to be used, prior to commencement of work:
      - a) Provide installation training when required by Architect.

B. Field Inspection:

1. Owner is responsible for Quality Assurance. Quality assurance performed by Owner will be used to validate Quality Control performed by Contractor.
2. Owner will provide Inspection for post-installed concrete anchors:
  - a. Owner will employ testing agency to perform inspection for post-installed concrete anchors as specified in Field Quality Control in Part 3 of this specification:
    - 1) Owner's employment of an independent Testing Agency does not relieve Contractor of Contractor's obligation to perform the Work in strict accordance with requirements of Contract Documents and perform contractor testing and inspection.
    - 2) See Section 01 1200: 'Multiple Contract Summary'.

## 1.6 DELIVERY, STORAGE, AND HANDLING

A. Delivery And Acceptance Requirements:

1. Materials shall be delivered in original, unopened packages with labels intact.

B. Storage And Handling Requirements:

1. Store materials protected from exposure to harmful weather conditions and as directed by Manufacturer.

## PART 2 - PRODUCTS

### 2.1 MATERIALS

A. Concrete Anchors:

1. General:
  - a. Use hot-dipped galvanized or stainless steel with matching nuts and washers in exterior and moist interior applications unless indicated otherwise on Contract Drawings.

- b. Install hot-dipped or stainless steel anchor bolts to attach wood sill plates to foundation with 1/4 inch by 3 inch x 3 inch minimum adjustable plate washers and standard cut washers between wood sill plates and nuts.
  - c. Nut: Conform to requirements of ASTM A563, Grade A, Hex.
  - d. Conform to requirements of ASTM F3125/F3125 for chemical, physical and mechanical requirements for quenched and tempered bolts manufactured from steel and alloy steel.
2. Threaded rod for adhesive anchors and cast-in anchors:
- a. Conform to requirements of ASTM A307, Grade A or ASTM F1554 Grade 36 unless indicated otherwise on Contract Drawings.
3. Cast-In-Place Anchor Bolts:
- a. J-Bolts:
    - 1) Non-headed type threaded 2 inches minimum conforming to requirements of ASTM F1554, Grade A.
    - 2) Anchor hook to project 2 inches minimum including bolt diameter.
  - b. Headed Bolts:
    - 1) Headed type threaded 2 inches minimum conforming to requirements of ASTM F1554, Grade A.
4. Reinforcing Bars:
- a. Composed of deformed carbon steel meeting requirements of ASTM A615/A615M, Grade 60.
5. Adhesive Anchors:
- a. Products shall have current ESR conforming to current ICC Acceptance Criteria AC308 for concrete.
  - b. Rod diameter and embedment length as indicated on Contract Drawings.
  - c. Type Two Acceptable Products:
    - 1) HIT-RE 500V3 with SafeSet Epoxy Adhesive by Hilti Fastening Systems, Tulsa, OK [www.us.hilti.com](http://www.us.hilti.com).
    - 2) Pure 110+ by Powers Fasteners Inc., Brewster NY [www.powers.com](http://www.powers.com).
    - 3) SET-XP Epoxy by Simpson Strong-Tie Co., Pleasanton, CA [www.simpsonanchors.com](http://www.simpsonanchors.com).
    - 4) Equal as approved by Architect before installation. See Section 01 6200.
6. Expansion Anchors:
- a. Products shall have current ESR conforming to current ICC Acceptance Criteria AC193 for concrete.
  - b. Type Two Acceptable Products:
    - 1) KWIK Bolt TZ Expansion Anchor by Hilti Fastening Systems, Tulsa, OK [www.us.hilti.com](http://www.us.hilti.com).
    - 2) Power-Stud +SD2 by Powers Fasteners Inc., Brewster NY [www.powers.com](http://www.powers.com).
    - 3) Strong-Bolt by Simpson Strong-Tie Co., Pleasanton, CA [www.simpsonanchors.com](http://www.simpsonanchors.com).
    - 4) Equal as approved by Architect before installation. See Section 01 6200.
7. Screw Anchors:
- a. Provide anchors with length identification markings conforming to ICC Acceptance Criteria AC 193 for concrete.
  - b. Type Two Acceptable Products:
    - 1) KWIK HUS-EZ by Hilti Fastening Systems, Tulsa, OK [www.us.hilti.com](http://www.us.hilti.com).
    - 2) Wedge-Bolt+ by Powers Fasteners Inc., Brewster NY [www.powers.com](http://www.powers.com).
    - 3) Titen HD by Simpson Strong Tie Co, Pleasanton, CA [www.simpsonanchors.com](http://www.simpsonanchors.com).
    - 4) Equals as approved by Architect through shop drawing submittal before installation. See Section 01 6200.

## **PART 3 - EXECUTION**

### **3.1 EXAMINATION**

#### **A. Verification Of Conditions:**

1. Embedded Items:
  - a. Identify position of reinforcing steel and other embedded items before drilling holes for anchors:
    - 1) Exercise care in coring or drilling to avoid damaging existing reinforcing or embedded items.
    - 2) Take precautions as necessary to avoid damaging pre-stressing tendons, electrical and telecommunications conduit, and gas lines.
  - b. Notify Engineer if reinforcing steel or other embedded items are encountered during drilling.
2. Base Material Strength:
  - a. Unless otherwise specified, do not drill holes in concrete until:
    - 1) Concrete has minimum age of 21 days at time of anchor installation.
    - 2) Concrete has achieved full design strength for load achievement.

### **3.2 PREPARATION**

#### **A. Surface Preparation:**

1. Clean surfaces prior to installation.
2. Prepare surface in accordance with Manufacturer's written recommendations.

### **3.3 INSTALLATION**

#### **A. Post-Installed Anchors:**

1. General:
  - a. Drill holes with rotary impact hammer drills using carbide-tipped bits.
  - b. Unless otherwise shown on Drawings, drill holes perpendicular to concrete surface.
  - c. Perform anchor installation in accordance with Manufacturer's published instructions.
2. Adhesive Anchors:
  - a. Clean holes in accordance with Manufacturer's published instructions before installation of adhesive:
    - 1) Follow Manufacturer's recommendations to ensure proper mixing of adhesive components.
  - b. Adhesive:
    - 1) Inject adhesive into holes proceeding from bottom of hole and progressing toward surface so as to avoid introduction of air pockets into adhesive.
    - 2) Inject sufficient adhesive into hole to ensure that annular gap is filled to surface.
    - 3) Remove excess adhesive from surface and threads of anchor as necessary.

- c. Shim anchors with suitable device to center anchor in hole. Do not disturb or load anchors before Manufacturer's specified cure time has elapsed.
  - d. Temperature:
    - 1) Observe Manufacturer's recommendations with respect to installation temperatures for adhesive anchors.
    - 2) Base material temperatures must be maintained above minimum temperatures allowed by Manufacturer for full required epoxy cure time.
3. Expansion Anchors:
- a. Protect threads from damage during anchor installation and prior to use.
  - b. Set anchors to Manufacturer's recommended torque, using a torque wrench. Following attainment of ten (10) percent of specified torque, one hundred (100) percent of specified torque shall be reached within 7 or fewer complete turns of nut. If specified torque is not achieved within required number of turns, remove and replace anchor, unless otherwise directed by Architect.
4. Screw Anchors:
- a. Protect threads from damage during anchor installation and prior to use.
  - b. Set anchor flush, collared.
  - c. Do not exceed Manufacturer's maximum allowed torque when seating anchor.

### 3.4 FIELD QUALITY CONTROL

#### A. Field And Inspections:

- 1. Civil and structural field inspections are provided by Owner's independent Testing Agency as specified in Section 01 4523 'Testing And Inspection Services':
  - a. Quality Control is sole responsibility of Contractor.
    - 1) Owner's employment of an independent Testing Agency does not relieve Contractor of Contractor's obligation to perform testing and inspection as part of his Quality Control:
      - a) Testing and inspections, if performed by Contractor, will be responsibility of Contractor to be performed by an independent entity.
- 2. Expansion Anchors / Adhesive Anchors / Screw Anchors:
  - a. Certified Inspector from Testing Agency shall verify procedures used for installation of all concrete anchors and monitor their installation for compliance with Manufacturer's requirements.
  - b. Inspections:
    - 1) Inspections shall include required verification and inspection of anchors as referenced in IBC Table 1704.4 and in accordance with most current version of ACI 318 or ACI 318M and applicable ASTM material standards that:
      - a) The correct rod/anchor is used; size and type.
      - b) The correct hole size is used and prepared per Manufacturer's instructions.
      - c) That climactic conditions, and concrete temperature, allow for the anchors' installation and use.
      - d) Proper hole cleaning equipment, per Manufacturer's instructions, is used.
      - e) Torque applied to anchors does not exceed Manufacturer's allowable limits.
      - f) Torque applied to anchors is per Manufacturer's instructions.

#### B. Non-Conforming Work:

1. Contractor is to immediately notify Architect of incorrectly placed, misplaced or malfunctioning anchors and request instructions for corrective actions.

### **3.5 CLEANING**

#### A. Waste Management:

1. Disposal of rubbish, debris, and packaging materials.

### **3.6 PROTECTION**

#### A. General:

1. Protect installed products from damage during construction.

**END OF SECTION**



## SECTION 03 2100 - REINFORCEMENT BARS

### PART 1 - GENERAL

#### 1.1 SUMMARY

A. Includes But Not Limited To:

1. Furnish and install concrete reinforcement bars as described in Contract Documents.

B. Related Requirements:

1. Section 01 1200: 'Multiple Contract Summary' for Owner Furnished Testing and Inspecting Services.
2. Section 01 4523: 'Testing and Inspecting Services' for testing and inspection, and testing laboratory services for materials, products, and construction methods.
3. Section 03 1113: 'Structural Cast-In-Place Concrete Forming'.
4. Section 03 2116: 'Epoxy-Coated Reinforcement Bars'.
5. Section 03 3111: 'Cast-In-Place Structural Concrete' for:
  - a. Reinforcement installed in concrete.
  - b. Pre-installation conference held jointly with other concrete related sections.

#### 1.2 REFERENCES

A. Association Publications:

1. American Concrete Institute:
  - a. ACI 'Detailing Manual' (2004 Edition).
2. Concrete Reinforcing Steel Institute (CRSI):
  - a. CRSI, 'Manual of Standard Practice' (2009 28th Edition).

B. Reference Standards:

1. American Concrete Institute:
  - a. ACI 117-10: 'Specifications for Tolerances for Concrete Construction and Materials and Commentary' (Reapproved 2015).
  - b. ACI 318-14, 'Building Code Requirements for Structural Concrete and Commentary'.
2. ASTM International (Following are specifically referenced for reinforcement bars testing):
  - a. ASTM A615/A615M-18, 'Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement'.

#### 1.3 ADMINISTRATIVE REQUIREMENTS

A. Pre-Installation Conferences:

1. Participate in pre-installation conference as specified in Section 03 3111.

2. In addition to agenda items specified in Section 01 3100, and Section 03 3111, review following:
  - a. Installation scheduling and reinforcing placement.
  - b. Review Section 01 4523 for Testing and Inspection administrative requirements and responsibilities and Field Quality Control tests and inspections required of this section.
    - 1) Review requirements and frequency of testing and inspections.

B. Scheduling:

1. Notify Testing Agency and Architect as directed in Section 03 3053 and Section 03 3111.

#### 1.4 SUBMITTALS

A. Action Submittals:

1. Shop Drawings:
  - a. Reinforcing placement drawings.

B. Informational Submittals:

1. Certificates:
  - a. Mill certificates for mill tests for reinforcing in accordance with ASTM A615/A615M.

C. Closeout Submittals:

1. Include following in Operations And Maintenance Manual specified in Section 01 7800:
  - a. Record Documentation:
    - 1) Testing and Inspection Reports:
      - a) Testing Agency Inspection Reports of reinforcement bars.

#### 1.5 QUALITY ASSURANCE

A. Regulatory Agency Sustainability Approvals:

1. Comply with provisions of following codes and standards except where more stringent requirements are shown or specified:
  - a. American Concrete Institute:
    - 1) ACI 318, 'Building Code Requirements for Structural Concrete and Commentary'.
  - b. Concrete Reinforcing Steel Institute:
    - 1) CRSI, 'Manual of Standard Practice'.

B. Qualifications:

1. Throughout progress of the work of this section, provide at least one (1) person who shall be thoroughly familiar with Construction Documents and other applicable specified requirements, completely trained and experienced in necessary skills, and who shall be present at site and shall direct all work performed under this Section:
  - a. In actual installation of the work of this Section, use adequate numbers of skilled workmen to ensure installation in strict accordance with approved design.
  - b. In acceptance or rejection of work performed under this Section, no allowance will be made for lack of skill on part of workmen.

C. Testing And Inspection:

1. Owner is responsible for Quality Assurance. Quality assurance performed by Owner will be used to validate Quality Control performed by Contractor.
2. Owner will provide Testing and Inspection for inspection of reinforcement bars:
  - a. Owner will employ testing agencies to perform testing and inspection for inspection of reinforcement bars as specified in Field Quality Control in Part 3 of this specification:
    - 1) Owner's employment of an independent Testing Agency does not relieve Contractor of Contractor's obligation to perform the Work in strict accordance with requirements of Contract Documents and perform contractor testing and inspection.
    - 2) See Section 01 1200: 'Multiple Contract Summary'.

## 1.6 DELIVERY, STORAGE, AND HANDLING

A. Delivery And Acceptance Requirements:

1. Deliver bars separated by size and tagged with manufacturer's heat or test identification number.
2. Reinforcement bars shall be free of heavy rust scales and flakes, or other coating at time of delivery and placing.

B. Storage And Handling Requirements:

1. Properly protect rebar on site after delivery.

## PART 2 - PRODUCTS

### 2.1 MATERIAL

A. Reinforcement Bars:

1. Bars shall have grade identification marks and conform to ASTM A615/A615M:
  - a. Grade 60 minimum, except dowels that are to be field bent, Grade 40 minimum.
2. Bars shall be deformed type.
3. Bars shall be free of heavy rust scales and flakes, or other bond-reducing coatings.

### 2.2 ACCESSORIES

A. Bar Supports:

1. Concrete masonry units or bricks are not acceptable.

2. For exposed-to-view concrete surfaces, where legs of supports are in contact with forms, provide supports with legs which are plastic protected (CRSI, Class 1) or stainless steel protected (CRSI, Class 2).
3. Type Two Acceptable Products:
  - a. Concrete 'dobies' or blocks wired to reinforcing.
  - b. Manufactured chairs with 4 sq inch bearing surface on sub-grade, or other feature to prevent chair from being pushed into sub-grade or damaging vapor retarder under slabs on grade.
  - c. Equals as approved by Architect before installation. See Section 01 6200.

## 2.3 FABRICATION

- A. Fabricate reinforcement bars according to the Concrete Reinforcing Steel Institute (CRSI) 'Manual of Standard Practice' and details on Contract Documents.

## PART 3 - EXECUTION

### 3.1 INSTALLATION

- A. General:
  1. Avoid cutting or puncturing vapor retarder during reinforcement placement and concrete operations.
  2. Clean reinforcement of loose rust and mill scale, earth, ice, and other materials which reduce or destroy bond with concrete.
  3. Blowtorch shall not be used to facilitate field cutting or bending or any other reinforcing work.
  4. Reinforcement shall not be bent after partially embedded in hardened concrete.
- B. Placing Reinforcement:
  1. Comply with Concrete Reinforcing Steel Institute CRSI 'Manual of Standard Practice' recommended practice for 'Placing Reinforcing Bars' for details and methods of reinforcement placement and supports. and as herein specified.
  2. Accurately position, support, and secure reinforcement against displacement by formwork, construction, or concrete placement operations:
    - a. Locate and support reinforcing by chairs, runners, bolsters, bar supports, spacers, or hangers, as required as recommended by 'ACI Detailing Manual, except slab on grade work.
    - b. Support bars in slabs on grade and footings with specified bar supports around perimeter and at 4-1/2 feet on center each way maximum to maintain specified concrete cover.
    - c. Install bar supports at bar intersections.
  3. Bend bars cold.
  4. Dowel vertical reinforcement for formed concrete columns or walls out of footing or structure below with rebar of same size and spacing required above.
  5. Securely anchor and tie reinforcement bars and dowels before placing concrete. Set wire ties with ends directed into concrete, not toward exposed concrete surfaces.
- C. Splices:
  1. Non-Concrete Structural System:
    - a. Avoid splices of reinforcement bars at points of maximum stress. Lap bars 60 bar diameters minimum unless dimensioned otherwise on Drawings. Run reinforcement bars continuous through cold joints.
  2. Concrete Structural System:

- a. In beams, slabs, and walls, avoid splices of reinforcement bars at points of maximum stress.
  - b. Lap bars as follows:
    - 1) Compression Splices: 45 bar diameters minimum.
    - 2) Tension Splices: In accordance with ACI 318 Class B requirements.
    - 3) No splice shall be less than 20 inches.
    - 4) For epoxy coated rebar, increase lap-splice lengths by 1.5 times those listed above.
  - c. In columns, splices in vertical bars are permitted only at floor levels or points of lateral support and shall consist of 45 bar diameter laps.
  - d. Run reinforcement bars continuous through cold joints.
- D. Tolerances:
- 1. Provide following minimum concrete cover for reinforcement as per ACI 318 or ACI 318M. Arrange, space and securely tie bars and bar supports to hold reinforcement in position during concrete placement operations:
    - a. Concrete cast against and permanently exposed to earth:
      - 1) Interior Slabs on Grade: 1 inches clear from top of slab at 4 inches slabs, 2 inches clear at 6 inches slabs.
      - 2) Sections other than Slabs: 3 inches.
    - b. Concrete Exposed to Earth or Weather:
      - 1) No. 6 and Larger Bars: 2 inches.
      - 2) No. 5 and Smaller Bars, W31 and D31 Wire: 1-1/2 inches.

### 3.2 FIELD QUALITY CONTROL

- A. Field Tests And Inspections:
- 1. Civil and structural field tests, laboratory testing, and inspections are provided by Owner's independent Testing Agency as specified in Section 01 4523 'Testing And Inspection Services':
    - a. Quality Control is sole responsibility of Contractor.
      - 1) Owner's employment of an independent Testing Agency does not relieve Contractor of Contractor's obligation to perform testing and inspection as part of his Quality Control:
        - a) Testing and inspections, if performed by Contractor, will be responsibility of Contractor to be performed by an independent entity.
  - 2. Reinforcement Bars:
    - a. Testing Agency shall provide inspection for Reinforcement Bars. See Section 03 3111 for Testing and Inspection requirements.

**END OF SECTION**

# SECTION 03 2116 - EPOXY - COATED REINFORCEMENT STEEL BARS

## PART 1 - GENERAL

### 1.1 SUMMARY

A. Includes But Not Limited To:

1. Furnish and install epoxy coated reinforcement steel bars as described in Contract Documents.

B. Related Requirements:

1. Section 01 1200: 'Multiple Contract Summary' for Owner Furnished Testing and Inspecting Services.
2. Section 01 4523: 'Testing and Inspecting Services' for testing and inspection, and testing laboratory services for materials, products, and construction methods.
3. Section 03 1113: 'Structural Cast-In-Place Concrete Forming'.
4. Section 03 2100: 'Reinforcement Bars'.
5. Section 03 3111: 'Cast-In-Place Structural Concrete' for:
  - a. Reinforcement installed in concrete.
  - b. Pre-installation conference held jointly with other concrete related sections.
6. Section 03 3300: 'Architectural Concrete'.

### 1.2 REFERENCES

A. Association Publications:

1. American Concrete Institute:
  - a. ACI 'Detailing Manual' (2004 Edition).
2. Concrete Reinforcing Steel Institute (CRSI):
  - a. CRSI, 'Manual of Standard Practice' (2009 28th Edition).

B. Reference Standards:

1. American Concrete Institute:
  - a. ACI 117-10: 'Specifications for Tolerances for Concrete Construction and Materials and Commentary' (Reapproved 2015).
  - b. ACI 318-14, 'Building Code Requirements for Structural Concrete and Commentary'.
2. ASTM International (Following are specifically referenced for reinforcement bars testing):
  - a. ASTM A615/A615M-18, 'Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement'.
  - b. ASTM A775/A775M-17, 'Standard Specification for Epoxy-Coated Reinforcing Bars'.

### 1.3 ADMINISTRATIVE REQUIREMENTS

#### A. Pre-Installation Conferences:

1. Participate in pre-installation conference as specified in Section 03 3111.
2. In addition to agenda items specified in Section 01 3100, and Section 03 3111, review following:
  - a. Installation scheduling and reinforcing placement.
  - b. Review Section 01 4523 for Testing and Inspection administrative requirements and responsibilities and Field Quality Control tests and inspections required of this section.
    - 1) Review requirements and frequency of testing and inspections.

#### B. Scheduling:

1. Notify Testing Agency and Architect as directed in Section 03 3111.

### 1.4 SUBMITTALS

#### A. Action Submittals:

1. Shop Drawings:
  - a. Reinforcing placement drawings.

#### B. Informational Submittals:

1. Certificates:
  - a. Mill certificates certifying mill tests for reinforcing in accordance with ASTM A775/A775M.
    - 1) Mill test is to be approved before fabrication begins.

#### C. Closeout Submittals:

1. Include following in Operations And Maintenance Manual specified in Section 01 7800:
  - a. Record Documentation:
    - 1) Testing and Inspection Reports:
      - a) Testing Agency Inspection Reports of reinforcement bars.

### 1.5 QUALITY ASSURANCE

#### A. Regulatory Agency Sustainability Approvals:

1. Comply with provisions of following codes and standards except where more stringent requirements are shown or specified:
  - a. American Concrete Institute:
    - 1) ACI 318, 'Building Code Requirements for Structural Concrete and Commentary'.

- b. Concrete Reinforcing Steel Institute:
  - 1) CRSI, 'Manual of Standard Practice'.
- B. Qualifications:
  - 1. Throughout progress of the work of this section, provide at least one (1) person who shall be thoroughly familiar with Construction Documents and other applicable specified requirements, completely trained and experienced in necessary skills, and who shall be present at site and shall direct all work performed under this Section:
    - a. In actual installation of the work of this Section, use adequate numbers of skilled workmen to ensure installation in strict accordance with approved design.
    - b. In acceptance or rejection of work performed under this Section, no allowance will be made for lack of skill on part of workmen.
- C. Testing And Inspection:
  - 1. Owner is responsible for Quality Assurance. Quality assurance performed by Owner will be used to validate Quality Control performed by Contractor.
  - 2. Owner will provide Testing and Inspection for reinforcement bars:
    - a. Owner will employ testing agencies to perform testing and inspection for reinforcement bars as specified in Field Quality Control in Part 3 of this specification:
      - 1) Owner's employment of an independent Testing Agency does not relieve Contractor of Contractor's obligation to perform the Work in strict accordance with requirements of Contract Documents and perform contractor testing and inspection.
      - 2) See Section 01 1200: 'Multiple Contract Summary'.

## 1.6 DELIVERY, STORAGE, AND HANDLING

- A. Delivery And Acceptance Requirements:
  - 1. Deliver bars separated by size and tagged with manufacturer's heat or test identification number.
  - 2. Reinforcement steel bars shall be free of abrasions or other penetrations of epoxy-coating at time of delivery and placing.
- B. Storage And Handling Requirements:
  - 1. Properly protect rebar on site after delivery.

## PART 2 - PRODUCTS

### 2.1 MATERIAL

- A. Epoxy Coated Reinforcement Steel Bars:
  - 1. Bars shall have grade identification marks and conform to ASTM A615/A615M with coating conforming to ASTM A775/A775M and comply with requirements of ACI 318.21.2.5:
    - a. Bar supports shall be completely coated with epoxy or vinyl, compatible with both concrete and epoxy coating on bars. Coating shall be at least 1/8 inch thick at tips.
    - b. Tie wire shall be nylon coated.



2. Actual yield strength based on mill tests does not exceed specified yield strength by more than 18,000 psi and Ratio of actual ultimate stress (at breaking point) to actual tensile yield stress shall not be less than 1.25.
  - a. Grade 60 minimum, except dowels that are to be field bent, Grade 40 minimum.
3. Bars shall be deformed type.
4. Bars shall be free of heavy rust scales and flakes, or other bond-reducing coatings.

## 2.2 FABRICATION

- A. Fabricate reinforcement bars according to the Concrete Reinforcing Steel Institute (CRSI) 'Manual of Standard Practice' and details on Contract Documents.

## PART 3 - EXECUTION

### 3.1 INSTALLATION

- A. General:
  1. Clean reinforcement of loose rust and mill scale, earth, ice, and other materials which reduce or destroy bond with concrete.
  2. Blowtorch shall not be used to facilitate field cutting or bending or any other reinforcing work.
  3. Reinforcement shall not be bent after partially embedded in hardened concrete.
- B. Placing Reinforcement:
  1. Comply with Concrete Reinforcing Steel Institute CRSI 'Manual of Standard Practice' recommended practice for 'Placing Reinforcing Bars' for details and methods of reinforcement placement and supports. and as herein specified.
  2. Accurately position, support, and secure reinforcement against displacement by formwork, construction, or concrete placement operations:
    - a. Locate and support reinforcing by chairs, runners, bolsters, bar supports, spacers, or hangers, as required as recommended by 'ACI Detailing Manual, except slab on grade work.
    - b. Support bars in slabs on grade and footings with specified bar supports around perimeter and at 4-1/2 feet on center each way maximum to maintain specified concrete cover.
    - c. Install bar supports at bar intersections.
  3. Bend bars cold.
  4. Dowel vertical reinforcement for formed concrete columns or walls out of footing or structure below with rebar of same size and spacing required above.
  5. Securely anchor and tie reinforcement bars and dowels before placing concrete. Set wire ties with ends directed into concrete, not toward exposed concrete surfaces.
- C. Splices:
  1. Non-Concrete Structural System:
    - a. Avoid splices of reinforcement bars at points of maximum stress. Lap bars 60 bar diameters minimum unless dimensioned otherwise on Drawings. Run reinforcement bars continuous through cold joints.
- D. Tolerances:

1. Provide following minimum concrete cover for reinforcement as per ACI 318 or ACI 318M. Arrange, space and securely tie bars and bar supports to hold reinforcement in position during concrete placement operations:
  - a. Concrete cast against and permanently exposed to earth:
    - 1) Exterior Slabs on Grade (where shown): 2 inches.
    - 2) Sections other than Slabs: 3 inches.
  - b. Concrete Exposed to Earth or Weather:
    - 1) No. 6 and Larger Bars: 2 inches.
    - 2) No. 5 and Smaller Bars, W31 and D31 Wire: 1-1/2 inches.

### **3.2 FIELD QUALITY CONTROL**

#### **A. Field Tests And Inspections:**

1. Civil and structural field tests, laboratory testing, and inspections are provided by Owner's independent Testing Agency as specified in Section 01 4523 'Testing And Inspection Services':
  - a. Quality Control is sole responsibility of Contractor.
    - 1) Owner's employment of an independent Testing Agency does not relieve Contractor of Contractor's obligation to perform testing and inspection as part of his Quality Control:
      - a) Testing and inspections, if performed by Contractor, will be responsibility of Contractor to be performed by an independent entity.
2. Reinforcement Bars:
  - a. Testing Agency shall provide inspection for Reinforcement Bars. See Section 03 3111 for Testing and Inspection requirements.

**END OF SECTION**

## SECTION 03 3111 - CAST-IN-PLACE STRUCTURAL CONCRETE

### PART 1 - GENERAL

#### 1.1 SUMMARY

##### A. Includes But Not Limited To:

1. Furnish and install concrete work as described in Contract Documents including:
  - a. Quality of concrete used on Project but furnished under other Sections.
  - b. Concrete mix information and use of admixtures.
  - c. Field Quality Control Testing and Inspection requirements for concrete.
  - d. Pre-installation conference held jointly with other concrete related sections.
  - e. Sealants and curing compounds used with concrete.
  - f. Compact aggregate base for miscellaneous cast-in-place concrete.
  - g. Miscellaneous cast-in-place concrete and equipment pads.

##### B. Products Installed But Not Furnished Under This Section:

1. Concrete accessories.
2. Inserts, bolts, boxes, templates, and fastening devices for other work, including those for bases only for Mechanical and Electrical.
3. Light pole and bollard base anchors.
4. Membrane Concrete Curing.

##### C. Related Requirements:

1. Section 01 1200: 'Multiple Contract Summary' for Owner Furnished Testing and Inspecting Services.
2. Section 01 4523: 'Testing and Inspecting Services' for testing and inspection, and testing laboratory services for materials, products, and construction methods.
3. Section 03 1511: 'Concrete Anchors and Inserts'.
4. Section 03 2100: 'Reinforcement Bars'.
5. Section 03 2116: 'Epoxy-Coated Reinforcement Steel Bars'.
6. Section 03 3300: 'Architectural Concrete'.
7. Section 03 3923: 'Membrane Concrete Curing' for quality of curing materials used.
8. Section 07 9213: 'Elastomeric Joint Sealant' for quality of sealants.
9. Section 26 5600: 'Exterior Lighting' for furnishing of light bollard base anchors.
10. Section 31 0501: 'Common Earthwork Requirements' for:
  - a. General procedures and requirements for earthwork.
  - b. Pre-installation conference held jointly with other common earthwork related sections.
11. Section 31 1123: 'Aggregate Base' for aggregate base under miscellaneous cast-in-place concrete and exterior slabs, under interior slabs-on-grade concrete, and asphalt paving.
12. Section 31 2213: 'Rough Grading' for rough grading and preparation of natural soil subgrades below fill and aggregate base materials.
13. Section 31 2216: 'Fine Grading' for grading of subgrade below aggregate base and topsoil.
14. Section 31 2323: 'Fill' for compaction procedures and tolerances.
15. Section 32 8423: 'Underground Sprinklers' for sleeves for underground irrigation system.
16. Section 32 9121: 'Topsoil Grading' for grading of subgrade below topsoil.
17. Divisions 22, 23, And 26: Mechanical and electrical devices including boxes, conduits, pipes, hangers, inserts, and other work to be embedded in concrete work before placing.
18. Furnishing of items to be embedded in concrete specified in Section involved.

19. Owner will provide concrete leveling compounds and patching compounds required for carpet installation.

## 1.2 REFERENCES

### A. Association Publications:

1. American Concrete Institute, Farmington Hills, MI [www.concrete.org](http://www.concrete.org). Abstracts of ACI Periodicals and Publications.
  - a. ACI 117.1R-14: 'Guide for Tolerance Compatibility in Concrete Construction'.
  - b. Certifications:
    - 1) ACI CP-1(16), 'Technical Workbook for ACI Certification of Concrete Field Testing Technician-Grade 1'.
    - 2) ACI CP-10(10), 'Craftsman Workbook for ACI Certification of Concrete Flatwork Technician/Finisher'.
    - 3) ACI CP-19(16), 'Technical Workbook for ACI Certification of Concrete Strength Testing Technician'.

### B. Definitions:

1. Cold Weather, as referred to in this Section, is four (4) hours with ambient temperature below 40 deg F in twenty-four (24) hour period.
2. Floor Flatness ( $F_F$ ): Rate of change in elevation of floor over 12 inches section.
3. Floor Levelness ( $F_L$ ): Measures difference in elevation between two points which are 10 feet apart.
4. Hot Weather, as referred to in this Section, is ambient air temperature above 100 deg F or ambient air temperature above 90 deg F with wind velocity 8 mph or greater.

### C. Reference Standards:

1. American Association of State and Highway Transportation Officials:
  - a. AASHTO M 153-06 (2016), 'Standard Specification for Preformed Sponge Rubber and Cork Expansion Joint Fillers for Concrete Paving and Structural Construction'.
2. American Concrete Institute
  - a. ACI 117-10 (R2015): 'Specifications for Tolerances for Concrete Construction and Materials and Commentary'.
  - b. ACI 305.1-14, 'Specification for Hot Weather Concreting'.
  - c. ACI 306.1-90 (R2002), 'Standard Specification for Cold Weather Concreting'.
  - ACI 318-14, 'Building Code Requirements for Structural Concrete' (ACI 318) and 'Commentary on Building Code Requirements for Structural Concrete' (ACI 318R).
3. ASTM International:
  - a. ASTM C31/C31M-19, 'Standard Practice for Making and Curing Concrete Test Specimens in the Field'.
  - b. ASTM C33/C33M-18, 'Standard Specification for Concrete Aggregates'.
  - c. ASTM C39/C39M-18, 'Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens'.
  - d. ASTM C94/C94M-17a, 'Standard Specification for Ready-Mixed Concrete'.
  - e. ASTM C140/C140M-18a, 'Standard Test Methods for Sampling and Testing Concrete Masonry Units and Related Units'.
  - f. ASTM C143/C143M-15a, 'Standard Test Method for Slump of Hydraulic-Cement Concrete'.
  - g. ASTM C150/C150M-18, 'Standard Specification for Portland Cement'.
  - h. ASTM C172/C172M-17, 'Standard Practice for Sampling Freshly Mixed Concrete'.
  - i. ASTM C173/C173M-16, 'Standard Test Method for Air Content of Freshly Mixed Concrete by the Volumetric Method'.
  - j. ASTM C192/C192M-18, 'Standard Practice for Making and Curing Concrete Test Specimens in the Laboratory'.
  - k. ASTM C231/C231M-17a, 'Standard Test Method for Air Content of Freshly Mixed Concrete by the Pressure Method'.
  - l. ASTM C260/C260M-10a(2016), 'Standard Specification for Air-Entraining Admixtures for Concrete'.
  - m. ASTM C330/C330M-17a, 'Standard Specification for Lightweight Aggregates for Structural Concrete'.

- n. ASTM C494/C494M-17, 'Standard Specification for Chemical Admixtures for Concrete.
  - o. ASTM C496/C496M-17, 'Standard Test Method for Splitting Tensile Strength of Cylindrical Concrete Specimens'.
  - p. ASTM C567/C567M-14, 'Standard Test Method for Determining Density of Structural Lightweight Concrete'.
  - q. ASTM C595/C595M-18, 'Standard Specification for Blended Hydraulic Cements'.
  - r. ASTM C618-19, 'Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use in Concrete'.
  - s. ASTM C1077-17, 'Standard Practice for Agencies Testing Concrete and Concrete Aggregates for Use in Construction and Criteria for Testing Agency Evaluation'.
  - t. ASTM C1157/C1157M-17, 'Standard Performance Specification for Hydraulic Cement'.
  - u. ASTM D1751-18, 'Standard Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Non-extruding and Resilient Bituminous Types)'.
  - v. ASTM E329-18: 'Standard Specification for Agencies Engaged in Construction Inspection and/or Testing'.
  - w. ASTM E1155-14, 'Standard Test Method for Determining  $F_F$  Floor Flatness and  $F_L$  Floor Levelness Numbers'.
4. International Code Council (IBC) (2018 or latest approved edition):
- a. IBC Chapter 17, 'Special Inspections And Tests'.
    - 1) Section 1704, 'Special Inspections And Tests, Contractor Responsibility And Structural Observations'.
    - 2) Section 1705, 'Required Special Inspection And Tests'.
      - a) Section 1705.2, 'Steel Construction'.

### 1.3 ADMINISTRATIVE REQUIREMENTS

#### A. Pre-Installation Conference:

1. Participate in MANDATORY pre-installation conference as specified in Section 01 3100 and held jointly with following sections:
  - a. Section 03 1113: 'Structural Cast-In-Place Concrete Forming'.
  - b. Section 03 2100: 'Reinforcement Bars'.
  - c. Section 03 2116: 'Epoxy-Coated Reinforcement Steel Bars'.
  - d. Section 22 1116: 'Domestic Water Piping'.
  - e. Section 26 0526: 'Grounding And Bonding For Electrical Systems'.
  - f. Section 33 1119: 'Fire Suppression Utility Distribution Piping'.
  - g. Section 33 3313: 'Sanitary Utility Sewerage'.
2. Schedule pre-installation conference prior to placing of footings, installation of foundation forms and reinforcing steel, and installation of anchors, dowels, inserts, and block outs in foundation walls and slabs.
3. In addition to agenda items specified in Section 01 3100, review following:
  - a. Set up concrete placement pour card system and verify that all relevant trades have signed off prior to concrete placement.
  - b. Obtaining trade sign-offs on each pour card will be responsibility of General Contactor's foreman or whoever is in charge of ordering concrete.
  - c. Pour cards will be turned in to Quality Assurance representative after the work has been completed so that they can be reviewed and filed.
  - d. Review installation scheduling, coordination, placement of building concrete, and placement of items installed in and under concrete.
  - e. Review installation scheduling, coordination and placement of site concrete and of items installed in concrete.
  - f. Review 'Verification of Conditions' requirements.
  - g. Review requirements for preparation of subgrade and aggregate base requirements.
  - h. Review formwork requirements.
  - i. Review approved mix design requirements, mix designs and use of admixtures.

- j. Review reinforcing bar submittals.
- k. Review installation schedule and placement of reinforcing bars.
- l. Review placement, finishing, and curing of concrete, including cold and hot weather requirements.
- m. Review joint layout plan for control and expansion joints, fillers for sidewalks, curbs, and gutters:
  - 1) Review jointing requirements.
- n. Review smooth rubbed concrete finish procedures and requirements (applied immediately after removing concrete formwork while concrete is 'green').
- o. Review concrete slab tolerances and corrective measures if tolerances not met.
- p. Review safety issues.
- q. Review Section 01 4523 for Testing and Inspection administrative requirements and responsibilities and Field Quality Control tests and inspections required of this section.
  - 1) Review requirements and frequency of testing and inspections.

B. Scheduling:

- 1. Notify Testing Agency and Architect twenty-four (24) hours minimum before placing concrete.

## 1.4 SUBMITTALS

A. Action Submittals:

- 1. Joint layout plan for control and expansion joints for sidewalks, curbs, and gutters for written approval before starting work on this Section.
- 2. Shop Drawings:
  - a. Show dimensioned locations of anchor bolts for hold-down anchors and columns.
  - b. Show reinforcement and all necessary bending diagrams and reinforcing steel list, and construction joint locations.
  - c. Provide bar schedules and bending details.
  - d. Reinforced concrete walls shall be shown in scale elevation (scale at least one quarter inch to one foot). Details shall be in accordance with ACI rules.
  - e. Show all formwork for concrete surfaces which are to remain exposed in the finished work.

B. Informational Submittals:

- 1. Certificates:
  - a. Installers:
    - 1) Certification for National Ready Mixed Concrete Association (NRMCA).
    - 2) Certification for ACI-certified Flatwork Finishers and Technicians.
- 2. Design Data:
  - a. Mix Design:
    - 1) Furnish proposed mix design to Architect for review prior to commencement of Work.
      - a) Include density (unit weight) and void content determined per ASTM C1688/C1688M for fresh mixed properties and per ASTM C140/C140M for hardened concrete properties.
      - b) Mix design shall show proposed admixture, amount, usage instructions, and justification for proposed use.

b. Ready-Mix Supplier:

- 1) Require mix plant to furnish delivery ticket for each batch of concrete. Keep delivery tickets at job-site for use of Owner or his representatives. Tickets shall show following:
  - a) Name of ready-mix batch plant.
  - b) Serial number of ticket.
  - c) Date and truck number.
  - d) Name of Contractor.
  - e) Name and location of Project.
  - f) Specific class or designation of concrete conforming to that used in Contract Documents.
  - g) Amount of concrete.
  - h) Amount and type of cement.
  - i) Total water content allowed by mix design.
  - j) Amount of water added at plant.
  - k) Sizes and weights of sand and aggregate.
  - l) Time loaded.
  - m) Type, name, manufacturer, and amount of admixtures used.
  - n) Design Data.
- 2) Provide certificates with supporting testing reports verifying compliance with Contract Document requirements and that materials provided are from single source for following:
  - a) Cement.
  - b) Aggregate.
  - c) Fly Ash.

3. Source Quality Control Submittals:

a. Concrete mix design: Submit mix designs to meet following requirements:

- 1) Mix Type B:
  - a) Unexposed interior concrete slabs on grade.
  - b) 3500 psi minimum at twenty-eight (28) days.
  - c) Water / Cementitious Material: 0.45 maximum by weight.
- 2) Mix Type E:
  - a) Building footings, foundation, and grade beams. Also exterior concrete exposed to freeze/thaw cycles and deicing salts or where soils are 'corrosive'.
  - b) 4500 psi minimum at twenty-eight (28) days.
  - c) Water / Cementitious Material: 0.40 maximum by weight.
  - d) Use twenty-five (25) percent Class F fly ash as part of cementitious material.
  - e) Mix Type F should be used for all exterior concrete exposed to freeze/thaw cycles and deicing salts, unless dictated otherwise by site conditions.
- 3) Air Entrainment: Six (6) percent, plus or minus 1-1/2 percent for exterior concrete and foundation walls exposed to freeze/thaw cycles.
- 4) Do not add water any time during mixing cycle above amount required to meet specified water / cement ratio. No reduction in amount of cementitious material is allowed.

b. Slump:

- 1) 4 inch slump maximum before addition of high range water reducer.
- 2) 8 inch slump maximum with use of high range water reducer.

3) Slump not required for Mix Type G.

c. Admixtures:

- 1) Mix design shall show proposed admixture, amount, usage instructions, and justification for proposed use. Do not use any admixture without Architect's written approval.
- 2) Chemical:
  - a) Specified accelerator or retarder may be used if necessary, to meet environmental conditions.
  - b) Special additives to promote rapid drying concrete, or moisture vapor reduction (MVRA), may be used in interior concrete slabs on grade and elevated concrete decks that will receive flooring if necessary, to meet construction schedules.

C. Closeout Submittals:

1. Include following in Operations And Maintenance Manual specified in Section 01 7800:

a. Record Documentation:

1) Pour Reports:

- a) Provide report that records following information:
- b) Date and time of start of pour, Date and time of end of pour, and Date and time of end of finishing procedures.
- c) Temperature at start of pour, Temperature at end of Pour, and Maximum temperature during performance of finishing procedures.
- d) Wind speed at start of pour, Wind speed at end of pour, and Maximum wind speed during performance of finishing procedures.
- e) Humidity at start of pour, Humidity at end of pour, and High and low humidity during performance of finishing procedures.
- f) Cloud cover at start of pour, Cloud cover at end of pour, and High and low cloud cover during performance of finishing procedures.
- g) Screeding method and equipment used.
- h) Saw cut method and equipment used.

2) Testing and Inspection Reports:

a) Testing Agency Testing and Inspecting Reports of concrete.

3) Warranty. Submit rapid concrete drying or MVRA manufacturer warranties for concrete moisture vapor emission induced flooring failure and adhesion; ensure both have been completed in project's name and registered with manufacturer.

- a) Provide warranty to cover cost of flooring failures due to moisture migration from slabs for life of concrete. Include cost of repair or removal of failed flooring, placement of topical moisture remediation system, and replacement of flooring with comparable flooring system.
- b) Provide stand-alone adhesion warranty matching duration of flooring adhesive or primer manufacturer's material defect warranty.

## 1.5 QUALITY ASSURANCE

A. Qualifications: Requirements of Section 01 4301 applies, but is not limited to following:

1. Installers and Installation Supervisor:



- a. ACI-certified Flatwork Technician and Finisher and a supervisor who is an ACI-certified Concrete Flatwork Technician.
2. Ready-Mix Supplier:
  - a. Comply with ASTM C94/C94M requirements and be certified according to NRMCA's 'Certification of Ready Mixed Concrete Production Facilities'.
3. Testing Agencies:
  - a. Independent agency qualified according to ASTM C1077 and ASTM E329.
    - 1) Personnel conducting field tests shall be qualified as ACI Concrete Field Testing Technicians, Grade I according to ACI CP-1 or equivalent certification program.
    - 2) Personnel performing laboratory tests shall be ACI-certified Concrete Strength Testing Technician and Concrete Laboratory Testing Technician - Grade I. Testing Agency laboratory supervisor shall be ACI-certified Concrete Laboratory Testing Technician - Grade II.

**B. Testing And Inspection:**

1. Owner is responsible for Quality Assurance. Quality assurance performed by Owner will be used to validate Quality Control performed by Contractor.
2. Owner will provide Testing and Inspection on concrete:
  - a. Owner will employ testing agencies to perform testing and inspection on concrete as specified in Field Quality Control in Part 3 of this specification:
    - 1) Owner's employment of an independent Testing Agency does not relieve Contractor of Contractor's obligation to perform the Work in strict accordance with requirements of Contract Documents and perform contractor testing and inspection.
    - 2) See Section 01 1200: 'Multiple Contract Summary'.

## **1.6 DELIVERY, STORAGE, AND HANDLING**

**A. Delivery And Acceptance Requirements:**

1. Expansion Joint Filler Material:
  - a. Deliver materials to site in manufacturer's original, unopened containers and packaging, with labels clearly identifying product name and manufacturer.

**B. Storage And Handling Requirements:**

1. Expansion Joint Filler Material:
  - a. Store materials in a clean, dry area in accordance with manufacturer's instructions.
  - b. Protect materials during handling and application to prevent damage.

## **PART 2 - PRODUCTS**

### **2.1 SYSTEM**

**A. Manufacturers:**

1. Manufacturer Contact List:

- a. Aridus Admixture by US Concrete, Eules, TX [www.us-concrete.com/aridus/](http://www.us-concrete.com/aridus/).
- b. BASF (Construction Chemicals Division), Cleveland, OH [www.master-builders-solutions.basf.us/en-us](http://www.master-builders-solutions.basf.us/en-us).
- c. Bonsal American, Charlotte, NC [www.bonsal.com](http://www.bonsal.com).
- d. Concure Systems Admixture by Concure Systems, Phoenix, AZ [www.ConcureSystems.com](http://www.ConcureSystems.com).
- e. Dayton Superior Specialty Chemicals, Kansas City, KS [www.daytonsuperiorchemical.com](http://www.daytonsuperiorchemical.com).
- f. Euclid Chemical Company, Cleveland, OH [www.euclidchemical.com](http://www.euclidchemical.com).
- g. Fritz-Pak Concrete Admixtures, Dallas, TX [www.fritzpak.com](http://www.fritzpak.com).
- h. GCP Applied Technologies, Cambridge, MA [www.gcpat.com/construction/en-us](http://www.gcpat.com/construction/en-us).
- i. ISE Logik Industries, Gulfport, MS [www.iselogik.com](http://www.iselogik.com).
- j. Kryton International Inc., Vancouver, British Columbia, Canada [www.kryton.com](http://www.kryton.com).
- k. L & M Construction Chemicals, Omaha, NE [www.lmcc.com](http://www.lmcc.com).
- l. Larsen Weldcrete by Larsen Products Corp, Rockville, MD [www.larsenproducts.com](http://www.larsenproducts.com).
- m. Sika Corporation, Lyndhurst, NJ [www.sikaconstruction.com](http://www.sikaconstruction.com) and Sika Canada, Pointe Claire, QC [www.sika.ca](http://www.sika.ca).
- n. Unitex, Kansas City, MO [www.unitex-chemicals.com](http://www.unitex-chemicals.com).
- o. U S Mix Products Co, Denver, CO [www.usspec.com](http://www.usspec.com).
- p. W R Meadows, Hampshire, IL [www.wrmeadows.com](http://www.wrmeadows.com).

B. Performance:

1. Design Criteria: Conform to requirements of ASTM C94/C94M unless specified otherwise:
2. Capacities:
  - a. For testing purposes, following concrete strengths are required:
    - 1) At 7 days: 70 percent minimum of 28 day strengths.
    - 2) At 28 days: 100 percent minimum of 28 day strengths.

C. Materials:

1. Hydraulic Cement: Meet requirements of ASTM C150/C150M, Type I or IA.
2. Aggregates:
  - a. General:
    - 1) Aggregates for all concrete shall come from a quarry that is DOT approved and meets or exceeds durability Class I aggregate. The quarry shall submit a letter to Engineer that certifies that all aggregate complies with DOT requirements for durability. Aggregate not meeting DOT durability requirements shall not be used.
  - b. Coarse:
    - 1) Meet requirements of ASTM C33/C33M or nonconforming aggregate that by test or actual service produces concrete of required strength and conforms to local governing codes.
    - 2) Aggregate shall be uniformly graded by weight.
  - c. Fine:
    - 1) Meet requirements of ASTM C33/C33M.
    - 2) Aggregate shall be uniformly graded by weight.
3. Water: Clear, apparently clean, and potable.
4. Admixtures And Miscellaneous:
  - a. Fly Ash:
    - 1) Meet requirements of ASTM C618, Class F (or Class C where Class F is not available) and with loss on ignition (LOI) of three (3) percent maximum.

- b. Chemical:
- 1) No admixture shall contain calcium chloride nor shall calcium chloride be used as an admixture. All chemical admixtures used shall be from same manufacturer and compatible with each other.
  - 2) Air Entraining Admixture:
    - a) Meet requirements of ASTM C260/C260M.
    - b) Type Two Acceptable Products:
    - c) Equal as approved by Architect before use. See Section 01 6200.
  - 3) Water Reducing Admixture:
    - a) Meet requirements of ASTM C494/C494M, Type A and containing not more than 0.05 percent chloride ions.
    - b) Type Two Acceptable Products:
    - c) Equal as approved by Architect before use. See Section 01 6200.
  - 4) Water Reducing, Retarding Admixture:
    - a) Meet requirements of ASTM C494/C494M, Type D and contain not more than 0.05 percent chloride ions.
    - b) Type Two Acceptable Products:
    - c) Equal as approved by Architect before use. See Section 01 6200.
  - 5) High Range Water Reducing Admixture (Superplasticizer):
    - a) Meet requirements of ASTM C494/C494M, Type F or G and containing not more than 0.05 percent chloride ions.
    - b) Type Two Acceptable Products:
    - c) Equal as approved by Architect before use. See Section 01 6200.
  - 6) Non-Chloride, Non-Corrosive Accelerating Admixture:
    - a) Meet requirements of ASTM C494/C494M, Type C or E and containing not more than 0.05 percent chloride ions.
    - b) Type Two Acceptable Products:
    - c) Equal as approved by Architect before use. See Section 01 6200.
  - 7) Corrosion Inhibiting Admixture:
    - a) Liquid admixture to inhibit corrosion of steel reinforcement in concrete by introducing proper amount of anodic inhibitor. Admixture shall contain thirty (30) percent calcium nitrite solution and shall be used where called for in specifications or on drawings.
    - b) Type Two Acceptable Products:
      - (1) Eucon CIA by Euclid.
      - (2) DCI or DCI-S by GCP Applied Technologies.
      - (3) Equal as approved by Architect before use. See Section 01 6200.
  - 8) Alkali-Silica Reactivity Inhibiting Admixture:
    - a) Specially formulated lithium nitrate admixture for prevention of alkali-silica reactivity (ASR) in concrete. Admixture must have test data indicating conformance to ASTM C1293.
    - b) Type Two Acceptable Products:
      - (1) Eucon Integral ARC by Euclid.

- (2) RASIR by W R Grace.
  - (3) Equal as approved by Architect before use. See Section 01 6200.
- 9) Viscosity Modifying Admixture (VMA):
- a) Liquid admixture used to optimize viscosity of Self-Consolidating Concrete (SCC). Subject to compliance with requirements, provide following at dosage rates per manufacturer's recommendation.
  - b) Type Two Acceptable Products:
  - c) Equal as approved by Architect before use. See Section 01 6200.
- 10) Shrinkage Reducing Admixture (SRA):
- a) Liquid admixture specifically designed to reduce drying shrinkage and potential for cracking.
  - b) Type Two Acceptable Products:
  - c) Equal as approved by Architect before use. See Section 01 6200.
- 11) Rapid Drying Admixture in Interior Concrete Slabs on Grade:
- a) Admixture specifically designed to promote rapid drying of concrete.
  - b) Type Two Acceptable Products:
  - c) Equal as approved by Architect before use. See Section 01 6200.
- 12) Moisture Vapor Reduction Admixture (MVRA):
- a) Liquid, inorganic, ASTM C494/C494M Type S Admixture free of volatile organic compounds (VOCs); specifically formulated to close capillary systems formed during concrete placement and to reduce moisture vapor emission and transmission with no adverse effect on concrete properties or finish flooring.
  - b) Type Two Acceptable Products:
    - 1) MVRA 900 by ISE Logik Industries: [www.iselogik.com](http://www.iselogik.com).
    - 2) Concure Systems Admixture by Concure Systems, Phoenix, AZ [www.ConcureSystems.com](http://www.ConcureSystems.com).
    - (3) Equal as approved by Architect before use. See Section 01 6200.
- 13) Waterproofing Admixture: Admixture formulated to reduce permeability to liquid water, with no adverse effect on concrete properties:
- a) Functioning by growth of crystals in capillary pores.
  - b) Permeability of Cured Concrete: No measurable leakage when tested in accordance with COE CRD-C 48 at 200 feet of head; provide test reports.
  - c) Type Two Acceptable Products:
    - (1) CWPA 800 by ISE Logik Industries: [www.iselogik.com](http://www.iselogik.com).
    - (2) Krystol Internal Membrane (KIM) by Kryton: [www.kryton.com](http://www.kryton.com).
    - (3) Equal as approved by Architect before use. See Section 01 6200.

## 2.2 ACCESSORIES

### A. Formwork:

- 1. Meet requirements specified in Section 03 1113:

### B. Bonding Agents:

- 1. Type Two Acceptable Products:

- a. Acrylic Additive by Bonsal American.
- b. Day Chem Ad Bond (J-40) by Dayton Superior.
- c. Flex-Con by Euclid Chemical Co.
- d. Larsen Weldcrete by Larsen Products Corp.
- e. Everbond by L & M Construction Chemicals.
- f. MasterEmaco A 660 (formally Acryl 60) by BASF.
- g. U S Spec Multicoat by U S Mix Products.
- h. Intralok by W R Meadows.
- i. Equal as approved by Architect before use. See Section 01 6200.

C. Expansion Joint Filler:

- a. Expansion Joint Filler Material:
  - 1) Design Criteria:
  - 2) Resilient, flexible, non-extruding, expansion-contraction joint filler meeting requirements of ASTM D1751.
  - 3) 1/2 inch thick.
  - 4) Resilience:
    - a) When compressed to half of original thickness, recover to minimum of seventy (70) percent of original thickness.
- b. Type Two Acceptable Products:
  - 1) Fiber Expansion Joint by W R Meadows, Hampshire, IL [www.wrmeadows.com](http://www.wrmeadows.com).
  - 2) Equal as approved by Architect before installation. See Section 01 6200.

D. Finishing Material (Exposed Vertical Faces of Foundation Walls):

- 1. Finishing Material available in multiple concrete shades to closely match concrete surface.
- 2. Type Two Acceptable Products:
  - a. Mixture of 1 part cement (using same cement as used in concrete foundations), 1 part sand with 95 percent passing #50 sieve.
  - b. RapidSet WunderFixx by CTS Cement Manufacturing Corporation, Cypress, CA [www.rapidset.com](http://www.rapidset.com).
  - c. Equal as approved by Architect before installation. See Section 01 6200.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

A. Verification Of Conditions:

- 1. Concrete Forms:
  - a. Verify dimensions and spot elevations for locations of forms for concrete footings, stem walls, building slabs, curbs, gutters, walkways, and drainage systems are correct before concrete is placed.
    - 1) Notify Architect of incorrect dimensions or spot elevations in writing.
    - 2) Do not place concrete until corrections are made and verified.

## 3.2 PREPARATION

### A. Concrete Mixing:

1. General:
  - a. All concrete shall be machine mixed.
  - b. Water gauge shall be provided to deliver exact predetermined amount of water for each batch.
  - c. Reliable system must be employed to insure that no less than predetermined amount of cement goes into each batch.
  - d. Re-tempering partly set concrete will not be permitted.
2. Transit Mix:
  - a. Transit mix concrete may be used provided it conforms to Specifications and tests herein described and ASTM C94/C94M.
  - b. Central plant producing concrete and equipment transporting it are suitable for production and transportation of controlled concrete and plant is currently approved by local state DOT.
  - c. Maximum elapsed time between time of introduction of water and placing shall be one (1) hour.
  - d. Minimum time of mixing shall be one (1) minute per cubic yard after all material, including water, has been placed in drum, and drum shall be reversed for an additional two (2) minutes.
  - e. Mixing water shall be added only in presence of Inspecting Engineer or inspector employed by Testing Agency.
  - f. Trucks shall not be overloaded in excess of rated capacity as recommended by manufacturer.
3. Cold Weather Concreting Procedures:
  - a. General Requirements:
    - 1) Materials and equipment required for heating and protection of concrete shall be approved and available at Project site before beginning cold weather concreting.
    - 2) Forms, reinforcement, metallic embedments, and fillers shall be free from snow, ice, and frost. Surfaces that will be in contact with newly placed concrete, including sub-grade materials, shall be 35 deg F minimum at time of concrete placement.
    - 3) Thaw sub-grade 6 inches deep minimum before beginning concrete placement. If necessary, re-compact thawed material.
    - 4) Use no frozen materials or materials containing ice.
    - 5) See ACI 306.1 'Standard Specification for Cold Weather Concreting' for additional requirements.
4. Hot Weather Concreting Procedures:
  - a. General:
    - 1) Maximum concrete temperature allowed is 90 deg F in hot weather.
    - 2) Cool aggregate and subgrades by sprinkling.
    - 3) Avoid cement over 140 deg F.
    - 4) Use cold mixing water or ice.
    - 5) Use fog spray or evaporation retardant to lessen rapid evaporation from concrete surface.
    - 6) See ACI 305.1 'Specification for Hot Weather Concreting' for additional requirements.

### B. Surface Preparation:

1. Earthwork Preparation:
  - a. Aggregate base and subgrade:
    - 1) Prepare aggregate base as specified in Section 31 1123.

- 2) Prepare natural soil subgrade as specified in Section 31 2213.
  - 3) Prepare fill subgrade as specified in Section 31 2323.
2. Inserts, bolts, boxes, templates, pipes, conduits, and other accessories required by Divisions 22, 23, and 26 shall be installed and inspected before placing concrete.
  3. Install inserts, bolts, boxes, templates, pipes, conduits, and other accessories furnished under other Sections to be installed as part of work of this Section:
    - a. Tie anchor bolts for hold-down anchors and columns securely to reinforcing steel.

C. Removal:

1. Remove water and debris from space to be placed:

### 3.3 INSTALLATION

A. Placing Concrete:

1. General:

- a. Place as soon after mixing as possible.
- b. Deposit as nearly as possible in final position.
- c. No concrete shall be deposited in water.
- d. Placing of concrete shall be continuous until panel or section is complete.
- e. Compact concrete in forms by vibrating and other means where required.
  - 1) Thoroughly consolidate concrete around reinforcing bars.
  - 2) Use and type of vibrators shall conform to ACI 309.
- f. Form vertical surfaces full depth. Do not allow concrete to flow out from under forms in any degree into landscaped areas.
- g. Consolidate concrete thoroughly.
- h. Do not embed aluminum in concrete.
- i. Do not use contaminated, deteriorated, or re-tempered concrete.
- j. Avoid accumulation of hardened concrete.
- k. Dusting with cement not permitted.

2. Footings:

- a. Level top of finish footing and leave rough.
- b. Where joints are required, bulkhead, key horizontally, and dowel with two No. 5 reinforcing bars, 48 inches long.

3. Foundation Walls: Leave steel projecting where required for floor tie.

4. Exterior Slabs:

- a. For continuous placing and where shown on Drawings, saw cut one inch deep control joints before shrinkage occurs (2 inches at 6 inch slabs).

5. Miscellaneous Concrete Elements:

- a. Equipment Bases: Coordinate with appropriate Sections for locations and dimensions.
- b. Light Bollard Bases, Mow Strips, and Aprons:
  - 1) Install bond breaker consisting of three (3) layers of 30 lb roofing felt between pole base and adjoining sidewalk, mow strip and building foundations, and aprons and building foundations.

- c. Mow Strips:
  - 1) Aggregate base not necessary under mow strips.
  - 2) Form and cast mow strips in place.
  - 3) Set top of mow strip above finish grade as follows:
    - a) Sodded Areas: 2 inches below.
    - b) Ground Cover Areas: 2 inches below.
    - c) Trees and Shrub Areas (not individual trees): 4 inches below.
  - 4) Compact topsoil underneath mow strips to density of undisturbed earth.
- d. Sidewalks, Exterior Landings:
  - 1) Slope with cross slope of 1/8 to 1/4 inch per ft (one to two percent) in direction of intended drainage.
  - 2) Slope away from building 1/8 to 1/4 inch per ft (one to two percent) minimum.
  - 3) Concrete walks shall be screeded to bring surface to grades and lines as indicated. Surface shall be floated with wood float with no coarse aggregate showing and then given broom finish before concrete sets.

6. Joints:

a. Control Joints (Contraction Joints):

- 1) Form control joints with early-entry, dry-cut saws as soon as final trowel operations are complete, and joints can be cut without raveling.
- 2) Depth of control joints shall be approximately one quarter of concrete slab thickness, but not less than one inch.
- 3) Control joints to be hand tooled in sidewalks, curbs and gutters, and mow strips.
- 4) Table One:

Concrete Control Joint On-Center Spacing (+/-)	
Sidewalks	4 feet to 6 feet
Curbs and Gutters	10 feet
Mow Strips	3 feet to 5 feet

b. Expansion Joints:

- 1) Install so top of expansion joint material is 1/4 inch below finished surface of concrete.
- 2) No expansion joint required between curbs and sidewalks parallel to curb.
- 3) Provide expansion joints at ends of exterior site concrete elements that are perpendicular to and terminate at curbs, building foundations or other concrete elements (i.e. sidewalks, mow strips, aprons).
- 4) Table Two:

Concrete Expansion Joint (Isolation) On-Center Spacing (+/-)	
Sidewalks, Curbs and Gutters	40 feet to 100 feet
Mow Strips	20 feet to 40 feet

- 5) Seal expansion joints as specified in Section 07 9213 for following areas:
  - a) Between entryway slabs and building foundations.
  - b) Between sidewalks and building foundations.
- 6) Expansion joints are not required to be sealed for following areas:
  - a) Within mow strips and where mow strip abuts building foundation and sidewalks.
  - b) Within sidewalks.

7. Bonding Fresh And Hardened Concrete:

- a. Re-tighten forms.



- b. Roughen surfaces.
  - c. Clean off foreign matter and laitance.
  - d. Wet but do not saturate.
  - e. Slush with neat cement grout or apply bonding agent.
  - f. Proceed with placing new concrete.
8. Anchor Bolts:
- a. Place anchor bolts not tied to reinforcing steel immediately following leveling of concrete. Reconsolidate concrete around bolt immediately after placing bolt.
  - b. Do not disturb bolts during finishing process.
- B. Finishing:
1. Interior Concrete Flatwork:
- a. Screed Concrete.
  - b. Float Finish:
    - 1) Float as soon after screeding as possible.
    - 2) Consolidate surface with power-driven floats with exception of areas inaccessible to power-driven floats, which may be hand-floated.
    - 3) Re-straighten, cutting down high spots and filling low spots.
    - 4) Repeat float passes and re-straightening until surface has uniform, smooth, granular texture.
  - c. Rough:
    - 1) Top of building slab to receive setting bed for ceramic or paver tile.
  - d. Trowel Finish:
    - 1) Steel trowel slab after concrete has set enough to avoid bringing water and fines to surface.
    - 2) Perform troweling with power-driven trowels with exception of areas inaccessible to power-driven trowels, which may be hand-troweled.
    - 3) Continue troweling passes and re-straightening with 10 foot highway straightedge until surface is free of trowel marks and uniform in texture and appearance.
    - 4) Apply burnished, burned-out trowel finish.
2. Exterior Concrete Flatwork:
- a. Curb, Gutter, Sidewalks, Mow Strips, Flat Drainage Structures, And Miscellaneous:
    - 1) After completion of final floating, performed immediately after screeding and when excess moisture or surface sheen has disappeared, complete surface finishing, as follows:
      - a) Provide fine hair finish where grades are less than 6 percent 1-1/4 inch.
      - b) Provide rough hair finish where grades exceed 6 percent 1-1/4 inch.
      - c) Broom finish, by drawing broom across concrete surface, perpendicular to line of traffic. Repeat operation if required to provide fine line texture acceptable to Architect. At curb and gutter, apply broom finish longitudinal to curb and gutter flowline.
      - d) On inclined slab surfaces, provide coarse, non-slip finish by scoring surface with stiff-bristled broom, perpendicular to line of traffic. At curb and gutter, apply broom finish longitudinal to curb and gutter flowline.
      - e) Do not remove forms for twenty-four (24) hours after concrete has been placed. After form removal, clean ends of joints and point-up any minor honeycombed areas. Remove and replace areas or sections with major defects, as directed by Architect.

- f) Round edges exposed to public view to 1/2 inch radius, including edges formed by expansion joints.
- g) Remove edger marks.

3. Vertical Surfaces (Exposed To View Vertical Surfaces, Exposed Foundation Walls, Concrete Piers, and etc.):

a. General:

- 1) Finishing Material to fill and smooth interior and exterior concrete surface defects such as spalls, gouges, cracks, dents, chips, bug holes, stone pockets, honeycombs, voids and other defective areas.
- 2) Chamfer lines shall be finished.

b. Surface Preparation:

- 1) Formwork shall be stripped from concrete while concrete is still 'green'.
- 2) Concrete surface to be finished immediately after formwork has been removed.
  - a) Immediately after removing forms, remove joints, marks, bellies, projections, loose materials and other irregularities, and cut back metal ties from surfaces to be exposed.
  - b) Repair defective areas and voids or stone pockets with Finishing Material and smooth to even surface matching surrounding undamaged area.

c. Smooth Rubbed Finish:

- 1) Thoroughly wet with water, apply Finishing Material in thin layer, rub in circular motion to smooth uniform finish.
- 2) Entire surface shall be protected from rapid drying for not less than three (3) days.
- 3) Surfaces shall be cleaned of drip marks and discolorations.
- 4) Concrete surface shall be left with clean, neat, uniform finish, free from form markings and shall be uniform in color and texture.

C. Curing:

1. Membrane Concrete Curing:

- a. As specified in Section 09 3923 'Membrane Concrete Curing'.
- b. Follow Manufacturer's written instructions for preparation, application rates, placement, and cleanup:
  - 1) Apply as soon as troweling on interior concrete is complete.
  - 2) Apply as soon as brooming or finishing of exterior concrete is complete.
  - 3) Spraying application is required.
  - 4) Do not dilute or thin product.
  - 5) Do not apply when temperature of concrete is less than 40 deg F
  - 6) Apply uniformly without puddles or ponding.
  - 7) Do not apply before bleed water has dissipated.
  - 8) Do not apply over standing water.

D. Tolerances:

1. General:

- a. Tolerances shall conform to requirements of ACI 117 or CSA A23.1/A23.2, except where specified differently:
  - 1) Floor test surfaces shall be measured and reported within seventy two (72) hours after completion of slab concrete finishing operations and before removal of any supporting shores to eliminate any curling effect F-numbers.

b. Maximum Variation Tolerances:

1) Table Three:

Maximum Variation Tolerances	
Thickness, standard	plus 3/8 inch, minus 1/4 inch
Thickness, footings	minus 0 inch
Plan, 0 - 20 feet	1/2 inch
Plan, 40 feet or greater	3/4 inch
Plan, footings	plus 1/2 inch
Eccentricity, footings	2 inch maximum standard, 1/2 inch at masonry
Openings, size	minus 1/4 inch, plus one inch
Openings, location	plus / minus 1/2 inch at center
Plumb	1/2 inch maximum

2. Local Flatness / Levelness of Interior Slabs:

a. Carpet and Tile Areas:

- 1) Specified Overall Value of  $F_F25 / F_L20$  and Minimum Local Value of  $F_F15 / F_L13$  when tested in accordance with ASTM E1155.
- 2) Specified Overall Value of  $F_F30 / F_L20$  and Minimum Local Value of  $F_F18 / F_L13$  when tested in accordance with ASTM E1155 in ceramic, resilient or vinyl tiled areas.
- 3) Used on building slabs to be covered by carpet and tile as shown on Contract Drawings. Verify and coordinate with Finish Schedule.
- 4) Remedy For Out-of-Tolerance Building Slabs:
  - a) Sections of building slabs which do not meet specified tolerances but are within ten (10) percent of specified tolerances, may be corrected by grinding or filling, at Owner's option.
  - b) Remove and replace sections of slabs measuring outside specified correctable tolerances.
  - c) Carpet areas: If floor leveling compounds or concrete patching compounds are required to bring floor into specified tolerances, they will be provided by Owner in conjunction with carpet installation and back-charged to Contractor.

### 3.4 FIELD QUALITY CONTROL

A. Field Tests And Inspections:

1. Civil and structural field tests, laboratory testing, and inspections are provided by Owner's independent Testing Agency as specified in Section 01 4523 'Testing And Inspection Services':
  - a. Quality Control is sole responsibility of Contractor:
    - 1) Owner's employment of an independent Testing Agency does not relieve Contractor of Contractor's obligation to perform testing and inspection as part of his Quality Control:
      - a) Testing and inspections, if performed by Contractor, will be responsibility of Contractor to be performed by an independent entity.
2. Reinforcement Bars and Bolts:
  - a. Testing Agency shall provide inspections will include following:
    - 1) Bolts:

- a) Inspection of bolts to be installed in concrete prior to and during placement of concrete.
  - b) Periodic inspection of anchors installed in hardened concrete.
- 2) Reinforcement Bars:
- a) Periodic inspection of reinforcement bars and placement prior to concrete placement to verify grade, size, cover, spacing, and position of reinforcing.
  - b) Inspect that all reinforcement bars are positively identified as to heat number and mill analysis.
  - c) Confirm surface of reinforcing bars is free of form release oil or other deleterious substances.
3. Concrete:
- a. Testing Agency shall provide testing and inspection for concrete as per ASTM C1077.
  - b. Testing and inspections, if performed, will include following:
    - 1) Periodic inspection verifying use of required design mix.
    - 2) Inspection of reinforcing bars and anchor bolts before placement of concrete for proper installation.
    - 3) Inspection at time fresh concrete is sampled to fabricate specimens for strength tests, perform slump and air content tests, and determine temperature of concrete.
    - 4) Inspection of concrete placement for proper application techniques.
      - a) Steel tools are not to be used on exterior concrete.
    - 5) Periodic inspection for maintenance of specified curing temperature and techniques:
      - a) Steel tools are not to be used on exterior concrete. Bull floating and finish floating is to be performed with magnesium or wood floats.
    - 6) Periodic inspect of formwork for shape, location and dimensions of concrete member being formed:
      - a) Certified Inspector shall inspect forms for general location, configuration, camber, shoring, sealing of form joints, correct forming material, concrete accessories, and form tie locations.
    - 7) Periodic inspection of concrete finishing operations for proper finishing techniques.
    - 8) Periodic inspection for placement of specified curing compounds.
  - c. Testing Agency will sample and test during placement of concrete as directed by Architect and may include following:
    - 1) Sampling Fresh Concrete: ASTM C172/C172M, except modified for slump to comply with ASTM C94/C94M:
      - a) Slump: ASTM C143/C143M, test each time set of compressive specimens are made.
      - b) Air Content: ASTM C173/C173M, volumetric method for lightweight or normal weight concrete: ASTM C231/C231M, pressure method for normal weight concrete each time set of compression test specimens are made.
      - c) Concrete Temperature: Test each time set of compressive specimens are made.
      - d) Unit Weight: ASTM C567/C567M, test each time set of compressive specimens are made.
    - 2) Concrete floor flatness and floor levelness of interior slabs as per ASTM E1155.
    - 3) Concrete moisture and alkalinity testing. See Section 09 0503 Flooring Substrate Preparation.
  - d. Compression Test Specimen: ASTM C31/C31M, one (1) set of four (4) standard cylinders for each compressive strength test, unless otherwise directed. Mold and store cylinders for laboratory cured test specimens except when field-cure test specimens are required.
  - e. Compressive Strength Tests: ASTM C39/C39M:

- 1) Obtain one (1) composite sample for each day's pour of each concrete mixture exceeding 5 cu. yd, but less than 50 cu. yd plus one (1) set for each additional 50 cu. yd or fraction thereof.
- 2) One (1) specimen tested at seven (7) days, two (2) specimens tested at twenty-eight (28) days, and one (1) specimen retained in reserve for later testing if required.
- 3) If strength of field-cured cylinders is less than eighty-five (85) percent of companion laboratory-cured cylinders, evaluate current operations and provide corrective procedures for protecting and curing in-place concrete.
- 4) Strength level of concrete will be considered satisfactory if averages of sets of three (3) consecutive strength test results equal or exceed specified compressive strength, and no individual strength test result falls below specified compressive strength by more than 500 psi.

f. Samples:

- 1) Fresh Concrete: ASTM C172/C172M except modified for slump to comply with ASTM C94/C94M.
  - a) Slump: ASTM C143/C43M, test each time set of compressive specimens are made.
  - b) Air Content: ASTM C173/C173M, volumetric method for lightweight or normal weight concrete: ASTM C231/C231M, pressure method for normal weight.
  - c) Concrete Temperature: Test each time set of compressive specimens are made.
  - d) Unit Weight: ASTM C567/C567M, test each time set of compressive specimens are made.

B. Non-Conforming Work: Non-conforming work as covered in the General Conditions applies, but is not limited to the following:

1. Correct any work found defective or not complying with contract document requirements at no additional cost to the Owner.

### 3.5 CLEANING

A. General:

1. Curing:
  - a. Clean tools, equipment as directed by Manufacturer's instructions.

### 3.6 PROTECTION

A. Concrete:

1. Protect concrete that has not received its initial set from precipitation to avoid excess water in mix and unsatisfactory surface finish.
2. Do not allow materials resulting from construction activities, which will affect concrete or application of finish floor systems adversely, to come in contact with interior concrete slabs.
3. Protect interior concrete floors from stains, paint, mortar and other construction activities.

B. Curing:

1. Restrict foot or vehicle traffic as curing membrane dries as recommended by Manufacturer.

**END OF SECTION**

## SECTION 03 3300 - ARCHITECTURAL CONCRETE

### PART 1 - GENERAL

#### 1.1 SUMMARY

- A. Section Includes:
  - 1. Cast-in-place architectural concrete, including form facings, reinforcement accessories, concrete materials, concrete mixtures, concrete placement, and concrete finishes.
  - 2. Requirements in Section 03 3111 "Cast-in-Place Concrete" apply to this Section.

#### 1.2 DEFINITIONS

- A. Cast-in-Place Architectural Concrete: Concrete that is exposed to view, is designated as architectural concrete, and that requires special concrete materials, formwork, placement, or finishes to obtain specified architectural appearance.
- B. Cementitious Materials: Portland cement alone or in combination with one or more of the following: blended hydraulic cement, fly ash, slag cement, other pozzolans, and silica fume; materials subject to compliance with requirements.
- C. Design Reference Sample: Sample designated by Architect in the Contract Documents that reflects acceptable surface quality and appearance of cast-in-place architectural concrete.
- D. Water/Cement Ratio (w/cm): The ratio by weight of water to cementitious materials.

#### 1.3 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.

#### 1.4 ACTION SUBMITTALS

- A. Product Data: For each of the following:
  - 1. Form-facing panels.
  - 2. Form joint tape.
  - 3. Form joint sealant.
  - 4. Form-release agent.
  - 5. Surface retarder.
  - 6. Form ties.
  - 7. Bar supports.
  - 8. Portland cement.
  - 9. Fly ash.
  - 10. Aggregates.
  - 11. Admixtures:
    - a. Include limitations of use, including restrictions on cementitious materials, supplementary cementitious materials, air entrainment, aggregates, temperature at time of concrete placement, relative humidity at time of concrete placement, curing conditions, and use of other admixtures.
- B. Design Mixtures: For each concrete mixture, include the following:
  - 1. Mixture identification.
  - 2. Minimum 28-day compressive strength.

3. Durability exposure class.
4. Maximum w/cm.
5. Calculated equilibrium unit weight, for lightweight concrete.
6. Slump limit.
7. Air content.
8. Nominal maximum aggregate size.
9. Amounts of mixing water to be withheld for later addition at Project site if permitted.
10. Intended placement method.
11. Alternative design mixtures when characteristics of materials, Project conditions, weather, test results, or other circumstances warrant adjustments.

## **1.5 INFORMATIONAL SUBMITTALS**

- A. Material Certificates: For each of the following:
  1. Cementitious materials.
  2. Admixtures.
  3. Form materials and form-release agents.
  
- B. Material Test Reports: For the following, by a qualified testing agency:
  1. Portland cement.
  2. Fly ash.
  3. Aggregates.

## **1.6 QUALITY ASSURANCE**

- A. Ready-Mixed Concrete Manufacturer Qualifications: A firm experienced in manufacturing ready-mixed concrete products and that complies with ASTM C94/C94M requirements for production facilities and equipment.
  1. Manufacturer certified in accordance with NRMCA's "Certification of Ready Mixed Concrete Production Facilities."
  
- B. Installer Qualifications: An experienced cast-in-place architectural concrete installer, as evidenced by not less than five consecutive years' experience, specializing in installing cast-in-place architectural concrete similar in material, design, and extent to that indicated for this Project and whose work has resulted in construction with a record of successful in-service performance.
  1. Provide written evidence of qualifications and experience.
  2. Include locations, descriptions, and photographs of completed projects, including name of architect, substantiating the quality of the installer's experience.

## **PART 2 - PRODUCTS**

### **2.1 CONCRETE, GENERAL**

- A. ACI Publications: Comply with ACI 301 unless modified by requirements in the Contract Documents.

### **2.2 FORM-FACING MATERIALS**

- A. Comply with Section 03 1113 "Structural Cast-In-Place Concrete Forming" for formwork and other form-facing material requirements, and as specified in this Section.

- B. Form-Facing Panels for As-Cast Finishes:
  - 1. Steel- and glass-fiber-reinforced plastic, or other approved nonabsorptive panel materials that provide continuous, true, and smooth architectural concrete surfaces. Furnish in largest practicable sizes to minimize number of joints.
- C. Chamfer Strips: Metal, rigid plastic, elastomeric rubber, or dressed wood; nonstaining; in longest practicable lengths.
- D. Form Joint Tape: Compressible foam tape; pressure sensitive; AAMA 800; minimum 1/4 inch thick.
- E. Form Joint Sealant: Elastomeric sealant complying with ASTM C920, Type M or Type S, Grade NS, that adheres to form joint substrates, does not stain, does not adversely affect concrete surfaces, and does not impair subsequent treatments and finishes of concrete surfaces.
- F. Form-Release Agent: Commercially formulated, colorless form-release agent that does not bond with, stain, or adversely affect architectural concrete surfaces and will not impair subsequent treatments and finishes of architectural concrete surfaces.
  - 1. Formulate form-release agent with rust inhibitor for steel form-facing materials.
- G. Surface Retarder: Water-soluble chemical liquid set retarder, for application on form-facing materials, capable of temporarily delaying final hardening of newly placed architectural concrete surface to depth of aggregate exposure specified.
- H. Form Ties: Factory-fabricated, glass-fiber-reinforced plastic or removable ties designed to resist lateral pressure of fresh concrete on forms and to prevent spalling of concrete on removal.
  - 1. Furnish ties with tapered tie cone spreaders that, when removed, will leave holes no larger than 3/4 inch in diameter on architectural concrete surface.

## 2.3 REINFORCEMENT ACCESSORIES

- A. Bar Supports: Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars in place.
  - 1. Manufacture bar supports in accordance with CRSI's "Manual of Standard Practice."
  - 2. Where legs of wire bar supports contact forms, use gray, all-plastic or CRSI Class 2, stainless steel bar supports.

## 2.4 CONCRETE MATERIALS

- A. Cementitious Materials:
  - 1. Portland Cement: ASTM C150/C150M, Type I or 1A, gray.
  - 2. Fly Ash: ASTM C618, Class C or Class F.
- B. Normal-Weight Aggregates: ASTM C33/C33M, Class 3M coarse aggregate or better, graded. Provide aggregates from single source from single manufacturer.
  - 1. Maximum Coarse-Aggregate Size: 1/2 inch.
  - 2. Gradation: Uniformly graded.
- C. Air-Entraining Admixture: As specified in Section 03 3111 "Cast-in-Place Concrete."
- D. Chemical Admixtures: As specified in Section 03 3111 "Cast-in-Place Concrete," and certified by manufacturer to be compatible with other admixtures and that do not contribute water-soluble chloride ions exceeding those permitted in hardened concrete. Do not use calcium chloride or admixtures containing calcium chloride.



- E. Water and Water Used to Make Ice: ASTM C94/C94M, potable or complying with ASTM C1602/C1602M, including all limits listed in Table 2 and requirements of paragraph 5.4.

## **2.5 CURING MATERIALS**

- A. Comply with Section 03 3111 "Cast-in-Place Concrete."

## **2.6 CONCRETE MIXTURES, GENERAL**

- A. Obtain each color, size, type, and variety of concrete mixture from single manufacturer with resources to provide cast-in-place architectural concrete of consistent quality in appearance and physical properties.
- B. Prepare design mixtures for each type and strength of cast-in-place architectural concrete proportioned on basis of laboratory trial mixture or field test data, or both, in accordance with ACI 301.
  - 1. Use a qualified independent testing agency for preparing and reporting proposed concrete mixture designs, based on laboratory trial mixtures.
- C. Cementitious Materials: Limit percentage, by weight, of cementitious materials other than portland cement in concrete as follows:
  - 1. Fly Ash or Other Pozzolans: 25 percent by mass.
- D. Admixtures: Use admixtures in accordance with manufacturer's written instructions.

## **2.7 CONCRETE MIXTURES**

- A. See Section 03 3111.

## **2.8 CONCRETE MIXING**

- A. Ready-Mixed Architectural Concrete: Measure, batch, mix, and deliver concrete in accordance with ASTM C94/C94M, and furnish batch ticket information.
  - 1. Clean equipment used to mix and deliver cast-in-place architectural concrete to prevent contamination from other concrete.
  - 2. For mixer capacity of 1 cu. yd. or smaller, continue mixing at least 1-1/2 minutes, but not more than five minutes after ingredients are in mixer, before any part of batch is released.
  - 3. For mixer capacity larger than 1 cu. yd., increase mixing time by 15 seconds for each additional 1 cu. yd..
  - 4. Provide batch ticket for each batch discharged and used in the Work, indicating Project identification name and number, date, mixture type, mixture time, quantity, and amount of water added. Record approximate location of final deposit in structure.

## **PART 3 - EXECUTION**

### **3.1 INSTALLATION OF FORMWORK**

- A. Comply with Section 03 1113 " Structural Cast-In-Place Concrete Forming " for formwork, embedded items, and shoring and reshoring, and as specified in this Section.
- B. Limit deflection of form-facing panels to not exceed ACI 301 requirements.
- C. Limit cast-in-place architectural concrete surface irregularities, as follows:

1. Surface Finish-2.0: ACI 117 Class B, 1/4 inch.
- D. Construct forms to result in cast-in-place architectural concrete that complies with ACI 117.
- E. Seal form joints, chamfers and penetrations at form ties with form joint tape or form joint sealant to prevent cement paste leakage.
1. Provide closure backing materials if indented rustication is used over a ribbed form line, and seal joint between rustication strip and form with joint sealant.
- F. Chamfer exterior corners and edges of cast-in-place architectural concrete where so indicated on drawings.
- G. Coat contact surfaces of wood chamfer strips with wood sealer before placing reinforcement, anchoring devices, and embedded items.
- H. Coat contact surfaces of forms with form-release agent, in accordance with manufacturer's written instructions, before placing reinforcement, anchoring devices, and embedded items.
- I. Coat contact surfaces of forms with surface retarder, in accordance with manufacturer's written instructions, before placing reinforcement, anchoring devices, and embedded items.

### **3.2 INSTALLATION OF REINFORCEMENT AND ACCESSORIES**

- A. Comply with Section 03 2116 "Epoxy-Coated Reinforcement Steel Bars" for fabricating and installing steel reinforcement and accessories.

### **3.3 JOINTS**

- A. Construction Joints: Install construction joints true to line, with faces perpendicular to surface plane of cast-in-place architectural concrete, so strength and appearance of concrete are not impaired, at locations indicated or as approved by Architect.
1. Place joints perpendicular to main reinforcement. Continue reinforcement across construction joints unless otherwise indicated.
  2. Space vertical joints in walls as indicated on Drawings. Unless otherwise indicated on Drawings, locate joints beside piers integral with walls, near corners, and in concealed locations where possible. Coordinate with Architect.
- B. Contraction Joints: Form weakened-plane contraction joints true to line, with faces perpendicular to surface plane of cast-in-place architectural concrete, so strength and appearance of concrete are not impaired, at locations indicated on Drawings or as approved by Architect.

### **3.4 CONCRETE PLACEMENT**

- A. Comply with Section 03 3111 "Cast-in-Place Concrete."

### **3.5 FINISHING FORMED SURFACES**

- A. Comply with Section 03 3111 "Cast-in-Place Concrete."
- B. Architectural Concrete Finish: Match Architect's design reference sample, identified and described as indicated, to satisfaction of Architect.

### **3.6 CONCRETE CURING**

- A. Comply with Section 03 111 "Cast-in-Place Concrete" using identical curing procedures to that used for field sample panels.

### **3.7 REPAIR**

- A. Comply with ACI 301.
- B. Repair damaged finished surfaces of cast-in-place architectural concrete when repairing is approved by Architect.
- C. Match repairs to color, texture, and uniformity of surrounding surfaces and to repairs on approved field sample panels.
- D. Remove and replace cast-in-place architectural concrete that cannot be repaired to Architect's approval.

### **3.8 FIELD QUALITY CONTROL**

- A. Comply with Section 03 3111 "Cast-in-Place Concrete."

### **3.9 CLEANING**

- A. Clean cast-in-place architectural concrete surfaces after finish treatment to remove stains, markings, dust, and debris.
- B. Wash and rinse surfaces in accordance with concrete finish applicator's written instructions.
  - 1. Protect other Work from staining or damage due to cleaning operations.
  - 2. Do not use cleaning materials or processes that could change the appearance of cast-in-place architectural concrete finishes.

### **3.10 PROTECTION**

- A. Protect corners, edges, and surfaces of cast-in-place architectural concrete from damage; use guards and barricades.
- B. Protect cast-in-place architectural concrete from staining, laitance, and contamination during remainder of construction period.

### **3.11 FINAL ACCEPTANCE**

- A. Final acceptance of completed architectural concrete Work will be determined by Architect by comparing approved field sample panels with installed Work, when viewed at a distance of 20 feet.

**END OF SECTION 03 3300**



1. American Association of State and Highway Transportation Officials:
  - a. AASHTO M 148-05, 'Standard Specification for Liquid Membrane-Forming Compounds for Curing'.
2. ASTM International:
  - a. ASTM C309-11, 'Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete'.

### **1.3 SUBMITTALS**

- A. Action Submittals:
  1. Product Data:
    - a. Manufacturer's product data.
    - b. Material Safety Data Sheets (MSDS).
- B. Informational Submittals:
  1. Manufacturer Instructions:
    - a. Printed installation instructions.

### **1.4 QUALITY ASSURANCE**

- A. Regulatory Agency Sustainability Approvals:
  1. Comply with applicable VOC standards and other local requirements.

### **1.5 DELIVERY, STORAGE, AND HANDLING**

- A. Delivery And Acceptance Requirements:
  1. Materials shall be delivered in original, unopened packages with labels intact.
- B. Storage And Handling Requirements:
  1. Follow Manufacturer's written instructions for handling and storage of product:
    - a. Store in unopened containers in clean, dry area between 35 deg F and 110 deg F (Keep from freezing) or as directed by Manufacturer's instruction.
  2. Shelf Life: Do not use curing compound that is over one (1) year from manufacturer date.

### **1.6 FIELD CONDITIONS**

- A. Ambient Conditions:
  1. Do not apply curing compound when temperature of concrete is less than 40 deg F

## PART 2 - PRODUCTS

### 2.1 MATERIALS

#### A. Membrane Concrete Curing:

1. Description:
  - a. Clear water-based, ready-to use membrane curing agent that cures freshly placed concrete, forming effective barrier against moisture loss from concrete surface.
2. Design Criteria:
  - a. Exterior Concrete:
    - 1) Dissipating or non-dissipating membrane curing agent.
  - b. Interior Concrete:
    - 1) Dissipating membrane curing agent only.
  - c. VOC-compliant compound.
  - d. Meet requirements of ASTM C309 and AASHTO M 148, Type 1 or 1-D, Class B.
  - e. Interior concrete: containing no mineral spirits, naphtha, or other components detrimental to finish flooring installation.
  - f. Maintain ninety-five (95) percent of mix water present in concrete mass after application.
  - g. Gradually dissipate after twenty-eight (28) days without leaving stain or discoloring concrete surface.
3. Horizontal and Vertical Cast-In-Place Structural Concrete:
  - a. Type One Acceptable Products.
    - 1) Exterior Concrete:
      - a) Clear Cure J7WB by Dayton Superior Corporation, Miamisburg, OH [www.daytonsuperior.com](http://www.daytonsuperior.com).
      - b) Clear Water Resin by Right Point, Dekalb, IL [www.rightpointe.com](http://www.rightpointe.com).
      - c) L&M Cure R by L&M Construction Chemicals, Inc. Omaha, NE [www.lmcc.com](http://www.lmcc.com).
      - d) VOCOMP 20 (do not use when concrete sealer will be applied in areas of freeze/thaw and deicer salts) by W.R. Meadows, Inc. Hampshire, IL [www.wrmeadows.com](http://www.wrmeadows.com).
      - e) 1100-Clear by W. R. Meadows, Inc. Hampshire, IL [www.wrmeadows.com](http://www.wrmeadows.com).
    - 2) Interior Concrete:
      - a) Clear Cure J7WB by Dayton Superior Corporation, Miamisburg, OH [www.daytonsuperior.com](http://www.daytonsuperior.com).
      - b) Clear Water Resin by Right Point, Dekalb, IL [www.rightpointe.com](http://www.rightpointe.com).
      - c) L&M Cure R by L&M Construction Chemicals, Inc. Omaha, NE [www.lmcc.com](http://www.lmcc.com).
      - d) 1100-Clear by W. R. Meadows, Inc. Hampshire, IL [www.wrmeadows.com](http://www.wrmeadows.com).
  - b. Equal product meeting design criteria requirements as approved by Architect/Owner's Representative before BID. See Section 01 6200.

PART 3 - EXECUTION: Not Used

END OF SECTION



WEST FIELD SR. SEMINARY

**DIVISION 4 - MASONRY:**

- 04 0501 Common Masonry Requirements
- 04 0513 Cement and Lime Masonry Mortaring
- 04 0520 Masonry Reinforcing
- 04 0521 Masonry Veneer Ties
- 04 0523 Masonry Accessories
- 04 2223 Architectural Concrete Unit Masonry Veneer



# SECTION 04 0501 - COMMON MASONRY REQUIREMENTS

## PART 1 - GENERAL

### 1.1 SUMMARY

#### A. Includes But Not Limited To:

1. Common requirements and procedures for Masonry including:
  - a. References.
  - b. Definitions.
  - c. Pre-Installation Conferences held jointly with masonry sections.
  - d. Joint backing for masonry control joints and masonry expansion joints.
  - e. Testing and Inspection for providing specific testing and inspections and Field Tests and Inspections administrative requirements for masonry.

#### B. Related Requirements:

1. Section 01 1200: 'Multiple Contract Summary' for Owner Furnished Testing and Inspecting Services.
2. Section 01 4523: 'Testing And Inspection Services' for testing, inspections, special testing, special inspections, and testing laboratory services for materials, products, and construction methods.
3. Section 07 9213: 'Elastomeric Joint Sealants' used with masonry joints.
4. Sections Under 04 0000 Heading: 'Masonry':
  - a. Pre-installation conference held jointly with other masonry related sections including:
    - 1) Section 04 0513: 'Cement and Lime Masonry Mortaring'.
    - 2) Section 04 2223: 'Architectural Concrete Unit Masonry' Veneer.

### 1.2 REFERENCES

#### A. Definitions:

1. Concrete Masonry Units:
  - a. Running Bond: Same as common bond, with continuous horizontal joints, but vertical joints are offset or in line. Masonry units of each course are offset from the previous instead of being right on top of each other. If running bond is being used, end of unit will be at mid-point of unit on course below. Running bond only requires minimal cutting at each end and will easily follow a gentle curve. Running bond method most used.
  - b. Wythe: Continuous vertical section of masonry one (1) unit in thickness.
2. Cold Weather: as referred to in this Section, is four (4) hours with ambient temperature below 40 deg F in twenty-four (24) hour period.
3. Efflorescence: Deposit or encrustation of soluble salts, generally white and most commonly consisting of calcium sulfate that may form on surface of stone, brick, concrete, or mortar when moisture moves through and evaporates on masonry. Often caused by free alkalis leached from mortar, grout, adjacent concrete, or in clays. Test for efflorescence is described in ASTM C67 and CAN/CSA A82.
4. Flashing:
  - a. Cavity Wall Flashing: Same as flexible flashing.

- b. Flashing: Thin impervious material placed in mortar joints and through air spaces in masonry to prevent water penetration and/or provide water drainage.
  - c. Flexible Flashing: Water-proof material typically used in cavity wall construction to contain and assist in proper water drainage that may penetrate wall system veneer. Other materials may be required to constitute the system.
  - d. Foundation Flashing: Same as flexible flashing.
  - e. Head And Sill Flashing: Same as flexible flashing.
  - f. Through-Wall Flashing: Generally considered same as flexible flashing.
5. Hot Weather: as referred to in this Section, is ambient air temperature above 100 deg F or ambient air temperature above 90 deg F with wind velocity 8 mph or greater.
6. Vents:
- a. Weep Hole: Opening placed in mortar joints of facing material at level of flashing, to permit escape of moisture.
  - b. Weep Vent: Inserts placed in Weep Hole to screen insects from entering but allowing escape of moisture.
  - c. Vents (Open Head Joints): Placed at top of drainage air space to help reduce moisture buildup in air space by promoting ventilation. Weep vents may be placed vents to screen insects from entering but allowing movement of air through weep holes.

B. Reference Standards:

- 1. ASTM International:
  - a. ASTM D2000-18, 'Standard Classification for Rubber Products in Automotive Applications'.
  - b. ASTM D2240-15, 'Standard Test Method for Rubber Property-Durometer Hardness'.
  - c. ASTM D2287-12, 'Standard Specification for Nonrigid Vinyl Chloride Polymer and Copolymer Molding and Extrusion Compounds'.
- 2. International Building Code (IBC) (2018 or latest approved edition):
  - a. Chapter 17, 'Special Inspections And Tests':
    - 1) Section 1704, 'Special Inspections And Tests, Contractor Responsibility And Structural Observations'.
    - 2) Section 1705, 'Required Special Inspection And Tests':
      - a) Section 1705.2, 'Steel Construction'.
  - b. Chapter 21, 'Masonry' for materials, design, construction and quality of masonry.
- 3. The Masonry Society (TMS):
  - a. TMS 402/602-16, 'Building Code Requirements and Specification for Masonry Structures'.

### 1.3 ADMINISTRATIVE REQUIREMENTS

A. Coordination:

- 1. Coordinate work with other trades with items to be built into masonry such as electrical switches and plumbing faucets.

B. Pre-Installation Conference:

- 1. Participate in MANDATORY pre-installation conference as specified in Section 01 3100 held jointly with other Division 04 'Masonry' specifications in this Project that require pre-installation conferences:
  - a. Conduct conference at Project site.
  - b. Schedule pre-installation conference during construction of mockup panel.

2. In addition to agenda items specified in Section 01 3100, review following:
  - a. Review storage and handling requirements.
  - b. Review cold and hot weather procedure requirements.

#### 1.4 SUBMITTALS

- A. Action Submittals:
  1. Product Data: As specified in each masonry section.
  2. Samples: As specified in each masonry section.

#### 1.5 QUALITY ASSURANCE

- A. Mockups:
  1. Masonry Sample Panel:
    - a. Sample panel 4 feet long by 3 feet high of proposed color range, texture, bond, mortar, and workmanship. Include mock-up framing and sheathing to show wall construction to be used on Project, including:
      - 1) Anchor and tie systems.
      - 2) Any specialty details, such as reveals, soldier courses, window details.
      - 3) Flexible flashing and required components at foundation.
      - 4) Seismic reinforcing.
    - b. Sample panel(s) shall be constructed using 'production run' material to be used on Project unless otherwise approved in writing by Architect and/or Owner.
    - c. Sample panel(s) to be used as standard of comparison for masonry work built of same material.
    - d. Sample panel(s) shall remain at jobsite until all masonry is completed.
    - e. Do not start work until Architect has accepted sample panel(s).
    - f. At Architect's direction, demolish mock-ups and remove debris.

#### 1.6 DELIVERY, HANDLING, AND STORAGE

- A. Delivery And Acceptance Requirements:
  1. Check, carefully unload, and deliver material to site in such manner as to avoid soiling, damaging, or chipping.
  2. Do not use damaged masonry units, damaged components of structure, or damaged packaged materials.
  3. Masonry Accessories: Materials shall be delivered in original, unopened packages with labels intact.
- B. Storage And Handling Requirements:
  1. Aggregate:
    - a. Store different aggregates separately.
    - b. Store on high ground, or ideally, off ground to prevent contamination from dirt, organic materials and ground water, any of which may contribute to efflorescence and may be deleterious to mortar performance.
    - c. Store under protective cover to avoid saturation and freezing in cold weather.
  2. Cementitious material:
    - a. Store in such manner as to prevent deterioration or intrusion of foreign material or moisture.

- b. Do not use cementitious materials that have become contaminated.
  - c. Protect from precipitation and groundwater.
    - 1) Store materials on elevated platforms, under cover, and in dry location.
    - 2) Do not use cementitious materials that have become damp or has become unsuitable for good construction.
3. Masonry accessories:
- a. Store masonry accessories clear of ground, including metal items, to prevent corrosion and contamination by dirt and ground water which may contain soluble salts and other matter which may contribute to efflorescence and staining.
  - b. Plastic and asphalt coated flashing material should not be stored in areas exposed to sunlight. During installation, flashing must be pliable so that no cracks occur at corners or bends.
  - c. Protect from damage until installation.
4. Masonry units:
- a. Store materials protected from exposure to harmful weather conditions as directed by manufacturer.
  - b. Store material on planks clear of ground which may contain soluble salts and protect from damage, dirt, or disfigurement.
  - c. If units are not stored in an enclosed location, cover tops and sides of stacks with waterproof membrane, securely tied. If units become wet, do not install until they are dry.
5. Masonry Reinforcement:
- a. Protect reinforcement, ties, and metal accessories from permanent distortions, elements and store off ground.

## 1.7 FIELD CONDITIONS

### A. Ambient Conditions:

- 1. Mortar:
  - a. Ideal mortar temperature is 70 deg F  $\pm$  10 deg F. Mixing temperature should be maintained within 10 deg F.
- 2. Cold Weather Requirements. Implement approved cold weather procedures and comply with requirements contained in TMS 402/602 including but not limited to following:
  - a. Preparation requirements (prior to conducting masonry work):
    - 1) Do not lay masonry units having either temperature below 20 deg F or containing frozen moisture, visible ice, or snow on their surface.
    - 2) Do not use frozen materials or materials mixed or coated with ice or frost. Keep materials free of ice and snow. Do not lay masonry on frozen material. Remove and replace unit masonry damaged by frost or by freezing conditions.
    - 3) Remove visible ice and snow from top surface of existing foundations and masonry to receive new construction. Heat these surfaces above freezing, using methods that do not result in damage.
    - 4) Preparation of mortar.
  - b. Construction requirements (work in progress and based on ambient air temperature):
    - 1) Do not heat water or aggregates used in mortar or grout above 140 deg F. Comply with cold weather requirements for ambient air temperatures prior to conducting masonry work in accordance with TMS 402/602.
- 3. Hot Weather Requirements. Implement approved hot weather procedures and comply with requirements contained in TMS 402/602 including but limited to following:

- a. Preparation (prior to conducting masonry work). Comply hot weather procedures when:
  - 1) Ambient air temperature exceeds 100 deg F, or exceeds 90 deg F with wind velocity greater than 8 mph.
  - 2) Ambient temperature exceeds 115 deg F, or exceeds 105 deg F with wind velocity greater than 8 mph.
- b. Construction requirements (work in progress). Comply hot weather procedures when prior to conducting masonry work in accordance with TMS 402/602.

**END OF SECTION**

# SECTION 04 0513 - CEMENT AND LIME MASONRY MORTARING

## PART 1 - GENERAL

### 1.1 SUMMARY

- A. Includes But Not Limited To:
  - 1. Quality of masonry mortar used on Project.
- B. Related Requirements:
  - 1. Section 04 0501: 'Common Masonry Requirements'.
  - 2. Sections Under 04 2000 Heading: Furnish and install mortar.

### 1.2 REFERENCES

- A. Definitions:
  - 1. See Section 04 0501: 'Common Masonry Requirements' for common masonry definitions.
- B. Reference Standards:
  - 1. ASTM International:
    - a. ASTM C144-18, 'Standard Specification for Aggregate for Masonry Mortar'.
    - b. ASTM C150/C150M-18, 'Standard Specification for Portland Cement'.
    - c. ASTM C207-18, 'Standard Specification for Hydrated Lime for Masonry Purposes'.
    - d. ASTM C270-14a, 'Standard Specification for Mortar for Unit Masonry'.

### 1.3 ADMINISTRATIVE REQUIREMENTS

- A. Pre-Installation Conference:
  - 1. Participate in MANDATORY pre-installation conference as specified in Section 01 3100 held jointly with other Division 04 'Masonry' specifications in this Project that require pre-installation conference as specified in Section 04 0501: 'Common Masonry Requirements'.

### 1.4 SUBMITTALS

- A. Informational Submittals:
  - 1. Source Quality Control Submittals:
    - a. If pre-mixed wet mortar or pre-blended dry mortar mix are to be used, provide certification from Manufacturer or Supplier verifying that mixes meet specification requirements.
    - b. If site mixed / blended mortar is to be used, provide written description of proposed method of measuring and mixing of materials.

## 1.5 DELIVERY, HANDLING, AND STORAGE

- A. Delivery And Acceptance Requirements:
  - 1. As specified in Section 04 0501: 'Common Masonry Requirements'.
- B. Storage And Handling Requirements:
  - 1. Cementitious material:
    - a. As specified in Section 04 0501: 'Common Masonry Requirements'.

## PART 2 - PRODUCTS

### 2.1 SYSTEM

- A. Design Criteria:
  - 1. Mixing:
    - a. Meet either proportion or property specifications of ASTM C270 for masonry mortar as per Table 3 'Proportion Specifications' and Table 4 'Physical Requirements for Masonry Cement Mortars'.
    - b. Conform with requirements of ASTM C780 and ASTM C1586.
    - c. Machine mixing should be used whenever possible.
  - 2. Mortar Minimum Compressive Strength at twenty-eight (28) days:
    - a. Type N: 750 psi.
      - 1) Veneer Unit Masonry.
- B. Materials:
  - 1. Portland Cement:
    - a. Meet requirements of ASTM C150/C150M and ASTM C270.
  - 2. Hydrated Lime:
    - a. Meet requirements of ASTM C207 for hydrated lime.
  - 3. Aggregate:
    - a. Meet requirements of ASTM C144 and ASTM C270.
  - 4. Water:
    - a. Clean and free of acids, alkalis, and organic materials.
  - 5. Admixtures:
    - a. Use no admixtures, except for color pigments specified below, without Architect's written permission. Use of any admixture to meet cold weather requirements and admixtures that increase air entrainment are expressly forbidden under all circumstances.

6. Mortar Color Pigment:
  - a. High purity, chemically inert, unfading, alkali-fast mineral oxides, finely ground and especially prepared for mortar.
  - b. Color Standard: As selected by Architect.
  - c. Type One Acceptable Products:
    - 1) True Tone Mortar Colors by Davis Colors, Los Angeles, CA [www.daviscolors.com](http://www.daviscolors.com).
    - 2) SGS Mortar Colors by Solomon Colors, Springfield, IL [www.solomoncolors.com](http://www.solomoncolors.com).
    - 3) Equal as approved by Architect before bidding. See Section 01 6200.
- C. Mixes:
  1. General:
    - a. Heat water and sand to 140 deg F maximum if temperature is below 40 deg F.
  2. Unit Masonry for mortar as specified in each Masonry specification section:
    - a. Proportions of ingredients in compliance with proportion specification of ASTM 270 using Portland cement.

**END OF SECTION**



## SECTION 04 0520 - MASONRY REINFORCING

### PART 1 - GENERAL

#### 1.1 SUMMARY

- A. Products Furnished But Not Installed Under This Section:
  - 1. Masonry horizontal joint reinforcing.
- B. Related Requirements:
  - 1. Sections under 04 2000 Heading: 'Unit Masonry' for masonry units using masonry reinforcing.

#### 1.2 REFERENCES

- A. Reference Standards:
  - 1. ACI 117.1R-14, 'Guide for Tolerance Compatibility in Concrete Construction'.
  - 2. ACI 117-10, 'Specifications for Tolerances for Concrete Construction and Materials and Commentary' - Reapproved 2015).
- B. Definitions:
  - 1. See Section 04 0501 for common masonry definitions.
- C. Reference Standards:
  - 1. ASTM International:
    - a. ASTM A153/A153M-16a, 'Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware'.
    - b. ASTM A615/A615M-18, 'Standard Specification for Deformed and Plain Carbon Steel Bars for Concrete Reinforcement'.
    - c. ASTM A951/A951M-16, 'Standard Specification for Steel Wire for Masonry Joint Reinforcement'.
    - d. ASTM A1064/A1064M-18a, 'Standard Specification for Carbon-Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete'.

#### 1.3 SUBMITTALS

- A. Informational Submittals:
  - 1. Certificates:
    - a. Mill certificate.
  - 2. Fabricator Instructions:
    - a. Reinforcing bar placement drawings.

#### 1.4 DELIVERY, HANDLING, AND STORAGE

- A. Delivery And Acceptance Requirements:

1. Steel reinforcing bars shall be free of heavy rust scales and flakes, and other bond-reducing coatings at time of delivery and placing.
2. Separate steel reinforcing bars by size and tag with manufacturer's heat or test identification number.
3. Tag continuous joint reinforcing with Manufacturer's name, wire size, and ASTM / CSA specification.

B. Storage And Handling Requirements:

1. Properly protect reinforcing on site after delivery.

## **PART 2 - PRODUCTS**

### **2.1 SYSTEMS**

A. Manufacturers:

1. Manufacturers Contact List:

- a. Heckman Building Products Inc, Chicago, IL [www.heckmannbuildingprods.com](http://www.heckmannbuildingprods.com).
- b. Hohmann & Barnard, Hauppauge, NY [www.h-b.com](http://www.h-b.com).
- c. Masonry Reinforcing Corporation of America, Charlotte, NC [www.wirebond.com](http://www.wirebond.com).

B. Materials:

1. Design Criteria:

- a. Cold-drawn steel conforming to ASTM A1064/A1064M.
- b. Continuous Joint Reinforcing:
  - 1) Conform to ASTM A1064/A1064M. Exterior wall reinforcing shall be galvanized to meet requirements of ASTM A153/A153M, Class B-2.
  - 2) Rod Size:
    - a) Side rods: 9 gauge or 3/16 inch diameter.
- c. Finish: Hot-dipped galvanized as per ASTM A153/A153M (1.5 oz/ft<sup>2</sup> after fabrication).

## **PART 3 - EXECUTION**

### **3.1 INSTALLATION**

A. Reinforcement

1. Basic requirements:

- a. Place reinforcement in accordance with the sizes, types, and locations indicated on Contract Drawings and as specified.
- b. Do not place dissimilar metals in contact with each other.
- c. Reinforcing shall be free of material that may destroy bond.
- d. Veneer Unit Masonry:
  - 1) Attach joint reinforcing to veneer ties in accordance with Manufacturer's instructions.

## **3.2 CLEANING**

### **A. Waste Management:**

1. Disposal of rubbish, debris, and packaging materials.

**END OF SECTION**



**SECTION 04 0521 - MASONRY VENEER TIES**

**PART 1 - GENERAL**

**1.1 SUMMARY**

- A. Products Furnished But Not Installed Under This Section:
  - 1. Ties for attaching masonry veneer to framed walls.
- B. Related Requirements:
  - 1. Section 04 0501: 'Common Masonry Requirements' for installation of anchor and tie system.
  - 2. Section 04 0520: 'Masonry Reinforcing' for quality of seismic masonry reinforcing.
  - 3. Sections Under 04 2000 Heading: 'Unit Masonry' for installation of masonry units using anchor and tie system.

**1.2 REFERENCES**

- A. Reference Standards:
  - 1. ASTM International:
    - a. ASTM A153/A153M-16a, 'Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware'.
    - b. ASTM A1008/A1008M-18, 'Standard Specification for Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, Solution Hardened, and Bake Hardenable'.

### 1.3 SUBMITTALS

- A. Action Submittals:
  - 1. Product Data:
    - a. Manufacturer's product literature or cut sheet for each item showing compliance with design criteria requirements as specified.
- B. Informational Submittals:
  - 1. Test And Evaluation Reports:
    - a. Manufacturer's published test results showing performance characteristics.
  - 2. Manufacturer's Instructions:
    - a. Manufacturer's published installation instructions for each item.

## PART 2 - PRODUCTS

### 2.1 MANUFACTURED UNITS

- A. Manufacturers:
  - 1. Manufacturer Contact Information:
    - a. Heckman Building Products Inc, Melrose Park, IL [www.heckmannbuildingprods.com](http://www.heckmannbuildingprods.com).
    - b. Hohmann & Barnard, Hauppauge, NY [www.h-b.com](http://www.h-b.com).
    - c. Wire-Bond by Masonry Reinforcing Corporation of America, Charlotte, NC [www.wirebond.com](http://www.wirebond.com).
- B. Design Criteria:
  - 1. Seismic Anchors:
    - a. Seismic anchors for Seismic Design Categories A, B, C, D, E, and F.
    - b. Comply with seismic requirements for continuous wire in veneer to be integral component of anchor system.
  - 2. Wire (Carbon Steel):
    - a. As specified in Section 04 0520.
- C. Veneer Unit Masonry With Exterior Rigid Insulation Attached to Framing:
  - 1. Masonry Ties:
    - a. Design Criteria:
      - 1) Finish: Hot dipped galvanized (ASTM A153/A153M, Class B-2).
      - 2) Length: Total length includes cavity air space, exterior rigid insulation and 1-1/2 inches masonry overlap as per code.
    - b. Type Two Acceptable Products:

- 1) HB-213-2X w/300-C Seismic Clip by Hohmann & Barnard.
  - 2) 2-Seal Tie Veneer Anchor by Hohmann & Barnard.
  - 3) Thermal 2-Seal Tie Veneer Anchor by Hohmann & Barnard.
  - 4) Equals meeting Design Criteria as approved by Architect before installation. See Section 01 6200.
2. Fasteners:
- a. Class Two Quality Standards. See Section 01 6200:
    - 1) Wood Framing: Non-corrosive wood screws of length, type, and quantity recommended by Manufacturer.

**PART 3 - EXECUTION: Not Used**

**END OF SECTION**



**SECTION 04 0523 - MASONRY ACCESSORIES**

**PART 1 - GENERAL**

**1.1 SUMMARY**

A. Products Furnished But Not Installed Under This Section:

1. Drip edge/plate.
2. Flexible flashing for brick sills.
3. Flexible flashing for bottom of masonry veneer.
4. Mortar guard.
5. Termination bar.
6. Weep vents.
7. Vents (open head joints).

B. Related Requirements:

1. Section 04 0501: 'Common Masonry Requirements' for installation of masonry accessories.
2. Section 04 0519: 'Masonry Anchors And Inserts'.
3. Section 04 0521: 'Masonry Veneer Ties'.
4. Sections Under 04 2000 Heading: 'Unit Masonry' for masonry accessories used in unit masonry.

**1.2 REFERENCES**

A. Definitions:

1. See Section 04 0501 for common masonry definitions.

- B. Reference Standards:
  - 1. ASTM International:
    - a. ASTM A153/A153M-16a, 'Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware'.
    - b. ASTM A240/A240M-18, 'Standard Specification for Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels and for General Applications'.
    - c. ASTM A580/A580M-18, 'Standard Specification for Stainless Steel Wire'.
    - d. ASTM D903-98(2017), 'Standard Test Method for Peel or Stripping Strength of Adhesive Bonds'.
    - e. ASTM D1056-14, 'Standard Specification for Flexible Cellular Materials - Sponge or Expanded Rubber'.

### 1.3 SUBMITTALS

- A. Action Submittals:
  - 1. Product Data:
    - a. Manufacturer's product literature or cut sheet for each item showing compliance with design criteria requirements as specified.
- B. Informational Submittals:
  - 1. Test And Evaluation Reports:
    - a. Manufacturer's published test results showing performance characteristics.
  - 2. Manufacturer's Instructions:
    - a. Manufacturer's published installation instructions for each item.
- C. Closeout Submittals:
  - 1. Include following in Operations And Maintenance Manual specified in Section 01 7800:
    - a. Warranty Documentation:
      - 1) Final, executed copy of Warranty.
    - b. Record Documentation:
      - 1) Manufacturers documentation:
        - a) Manufacturer's product literature for each item.

### 1.4 DELIVERY, STORAGE, AND HANDLING

- A. Delivery And Acceptance Requirements:
  - 1. See submittal requirements as specified in Section 04 0501.
- B. Storage And Handling Requirements:
  - 1. See submittal requirements as specified in Section 04 0501.



## 1.5 WARRANTY

- A. Manufacturer's Standard Warranty for products provided.

## PART 2 - PRODUCTS

### 2.1 ACCESSORIES

- A. Manufacturers:

- 1. Manufacturer Contact List:

- a. Advanced Building Products Inc, Springvale, ME [www.advancedflashing.com](http://www.advancedflashing.com).
- b. Hohmann & Barnard, Hauppauge, NY [www.h-b.com](http://www.h-b.com).
- c. Mortar Net USA Ltd, Burns Harbor, IN [www.mortarnet.com](http://www.mortarnet.com).
- d. Sandell Manufacturing, Schenectady, NY [www.sandellmfg.com](http://www.sandellmfg.com).
- e. Wire-Bond, Charlotte, NC [www.wirebond.com](http://www.wirebond.com).
- f. York Manufacturing Inc, Sanford, ME [www.yorkflashings.com](http://www.yorkflashings.com).

- B. Materials:

- 1. Flexible Flashing:

- a. Design Criteria:

- 1) General:

- a) Compatible with sealants and other building components.
- b) Do not use as an exposed flashing.
- c) Drool: Membrane shall not 'drool' when exposed to UV or heat.

- 2) Required Components:

- a) Drip Edge/Plate: Install with stainless steel drip edge/plate.
- b) Mortar Guard: Install with mortar guard.
- c) Termination Bar: Install termination bar.
- d) Weep Vents: Requires weep vents.

- 3) Self-adhering and self-sealing membranes:

- a) Ambient Conditions: Follow Manufacturer recommendations for storage and application.
- b) Do not apply to moist or damp surfaces.
- c) Meet testing requirements of ASTM D903 for peel or stripping strength of adhesive bonds.

- b. Asphalt-Free Copper Flashing:

- 1) Description:

- a) Non-asphaltic laminated flashing.
- b) Copper bonded laminated with a non-asphaltic adhesive compound.
- c) Size: 5 ounces copper per one sq ft of material.

- 2) Type One Acceptable Products:

- a) Cop-R-Kraft Duplex by Advanced Building Products.
  - b) Copper-Tuff by Hohmann & Barnard.
  - c) Cop-R-TEX Duplex (for coping, door and window heads, roof flashing, curtain wall and flashing between new and old walls) by York.
  - d) Multi-Flash 500 by York.
  - e) Equal meeting Design Criteria as approved by Architect before bidding. See Section 01 6200.
- c. Asphalt-Free Non-Copper Flashing:
- 1) Description:
    - a) Self-adhering and self-sealing composite non-asphaltic waterproof polyethylene membrane.
  - 2) Design Criteria:
    - a) Self-adhering and self-sealing.
    - b) Width: Provide 18 inches minimum width.
  - 3) Type One Acceptable Products:
    - a) Aquaflash Premium by Wire-Bond.
    - b) Flex-Flash Flashing by Hohmann & Barnard.
    - c) Textroflash Flashing by Hohmann & Barnard.
    - d) Equal meeting Design Criteria as approved by Architect before bidding. See Section 01 6200.
- d. Preassembled Systems:
- 1) Description:
    - a) Pre-assembled panels consist of flashing membrane, drainage mat with integrated weep tabs, termination bar, drip edge, inside/outside corner boots, and end dams for a complete system.
  - 2) Type One Acceptable Product:
    - a) Total Flash by Mortar Net.
    - b) Flash-Vent by York.
    - c) Equal meeting Design Criteria as approved by Architect before bidding. See Section 01 6200.
2. Components:
- a. Drip Edge/Plate:
    - 1) Design Criteria:
      - a) 26 ga (0.019) stainless steel AISI Type 304 drip edge/plate flashing with drip edge hemmed back.
    - 2) Type One Acceptable Products:
      - a) No. 1007 Hemmed Drip-Edge Flashing by Heckmann.
      - b) Drip Plate by Hohmann & Barnard.
      - c) Sandell's Drip Edge by Sandell Construction Solutions.
      - d) No. 4156 Drip Edge Flashing by Wire-Bond.
      - e) Equal meeting Design Criteria as approved by Architect before bidding. See Section 01 6200.
  - b. Mortar Guard:

- 1) Description:
    - a) Allows passage of moisture from cavity to building exterior while restricting ingress of insects and other debris.
  - 2) Design Criteria:
    - a) Allows moisture to quickly and easily exit the cavity.
    - b) Allows for proper air movement in and out of the cavity.
    - c) Will not oxidize, rot, promote mold or fungus growth, or react with common building materials.
  - 3) Dimensions:
    - a) Thickness as recommended by Manufacturer for air space.
  - 4) Category Four Approved Products. See Section 01 6200 for definition of Categories.
    - a) Mortar Trap by Hohmann & Barnard.
    - b) Mortar Net by Mortar Net.
- c. Termination Bar:
- 1) Design Criteria:
    - a) Rigid PVC or stainless steel bar with sealant catch lip.
  - 2) Class Two Quality Standard:
    - a) Equal meeting Design Criteria as approved by Architect before installation. See Section 01 6200.
- d. Weep Vents:
- 1) Description:
    - a) Allows passage of moisture from cavity to building exterior while restricting ingress of insects and other debris.
    - b) Dimensions:
      - (1) 3/8 inch wide x 2-1/2 inch deep x 3-3/8 inch long.
  - 2) Design Criteria:
    - a) Polypropylene tested to conform to ASTM standards.
    - b) Suitable for top of wall venting.
  - 3) Type One Acceptable Products:
    - a) Cell Vent:
      - (1) QV - Quadro-Vent by Hohmann & Barnard.
      - (2) No. 3601 Cell Vent by Wire-Bond.
    - b) Equal meeting Design Criteria as approved by Architect before bidding. See Section 01 6200.
- e. Vents (Open Head Joints):
- 1) Description:

- a) Vent inserted in weep hole at top of drainage air space in full height masonry veneer walls (not required in veneer wainscot walls or if air space vents into structure/roof above wall).
  - b) Vent allows passage of moisture from cavity to building exterior while restricting ingress of insects and other debris.
  - c) Dimensions:
    - (1) 3/8 inch wide x 2-1/2 inch deep x 3-3/8 inch long.
- 2) Design Criteria:
- a) Polypropylene tested to conform to ASTM standards.
  - b) Suitable for top of wall venting.
- 3) Type One Acceptable Products:
- a) Cell Vent:
    - (1) QV - Quadro-Vent by Hohmann & Barnard.
    - (2) No. 3601 Cell Vent by Wire-Bond.
  - b) Equal meeting Design Criteria as approved by Architect before bidding. See Section 01 6200.

**PART 3 - EXECUTION: Not Used**

**END OF SECTION**

## SECTION 04 2223 - ARCHITECTURAL CONCRETE UNIT MASONRY VENEER

### PART 1 - GENERAL

#### 1.1 SUMMARY

- A. Includes But Not Limited To:
  - 1. Furnish and install architectural concrete unit masonry veneer as described in Contract Documents.
- B. Products Installed But Not Furnished Under This Section:
  - 1. Engraved Stone Panel Signage.
  - 2. Masonry Accessories:
    - a. Drip edge/plate.
    - b. Flexible flashing for masonry sills.
    - c. Flexible flashing for bottom of masonry veneer.
    - d. Mortar guard.
    - e. Termination bar.
    - f. Weep vents.
  - 3. Masonry Veneer Ties.
- C. Related Requirements:
  - 1. Section 04 0501: 'Common Masonry Requirements' for:
    - a. Common masonry requirements and procedures.
    - b. Pre-installation conference held jointly with other masonry related sections.
  - 2. Section 04 0513: 'Cement and Lime Masonry Mortaring' for quality of mortar.
  - 3. Section 04 0521: 'Masonry Veneer Ties' for quality of masonry veneer ties.
  - 4. Section 04 0523: 'Masonry Accessories' for furnishing drip edge/plate, flexible flashing, mortar guard, termination bars, and weep vents.
  - 5. Section 05 1223: 'Structural Steel For Buildings' for metal Lintels.
  - 6. Section 07 9213: 'Elastomeric Joint Sealants'.
  - 7. Section 10 1424: 'Engraved Stone Panel Signage'.

#### 1.2 REFERENCES

- A. Definitions:
  - 1. Section 04 0501: 'Common Masonry Requirements' for:
    - a. Common Masonry Terms.
- B. Reference Standards:
  - 1. ASTM International:
    - a. ASTM C90-16a, 'Standard Specification for Loadbearing Concrete Masonry Units'.
    - b. ASTM C331/C331M-17, 'Standard Specification for Lightweight Aggregates for Concrete Masonry Units'.

2. The Masonry Society (TMS):
  - a. TMS 402/602-16, 'Building Code Requirements and Specification for Masonry Structures'.

### **1.3 ADMINISTRATIVE REQUIREMENTS**

#### **A. Pre-Installation Conference:**

1. Participate in MANDATORY pre-installation conference as specified in Section 01 3100 held jointly with other Division 04 'Masonry' specifications in this Project that require pre-installation conference as specified in Section 04 0501.

### **1.4 SUBMITTALS**

#### **1. Source Quality Control Submittals:**

- a. Manufacturer's certification that units meet compressive strength specified requirements.

### **1.5 QUALITY ASSURANCE**

#### **A. Qualifications:**

1. Installer: Requirements of Section 01 4301 applies, but not limited to following:
  - a. Minimum of five (5) years' experience on successfully completed projects of similar nature.

### **1.6 DELIVERY, HANDLING, AND STORAGE**

#### **A. Delivery And Acceptance Requirements:**

1. As specified in Section 04 0501: 'Common Masonry Requirements'.

#### **B. Storage And Handling Requirements:**

1. Aggregate, Cementitious Material, Masonry Accessories, Masonry Units, and Reinforcement:
  - a. As specified in Section 04 0501: 'Common Masonry Requirements'.

### **1.7 FIELD CONDITIONS**

#### **A. Ambient Conditions:**

1. Cold Weather and Hot Weather Limitations:
  - a. As specified in Section 04 0501: 'Common Masonry Requirements'.

## PART 2 - PRODUCTS

### 2.1 SYSTEM

A. Design Criteria:

1. Minimum Compressive Strength of 2000 psi.

B. Materials:

1. Mortar: Type 'N' mortar as specified in Section 04 0513: 'Cement and Lime Masonry Mortaring'.
2. Concrete Masonry Units:

a. General Design Criteria:

- 1) Meet requirements of ASTM C90, lightweight classification:
  - a) 85 lbs per cu ft minimum weight classification.
  - b) Lightweight aggregates conforming to ASTM C331/C331M.
  - c) Do not use re-crushed masonry units as aggregate.
- 2) Outside Corners: Square-edged.
- 3) Uniform color and textures with unbroken edges.
- 4) 8"x16"x4" nominal size.

C. Decorative CMUs: ASTM C90.

1. Unit Compressive Strength: Provide units with minimum average net-area compressive strength of 2150 psi.
2. Density Classification: Normal weight.
3. Pattern and Texture:
  - a. Colored, ground-face honed finish. Match Architect's samples.
  - b. Colored, split-face finish. Match Architect's samples.

D. Mortar Pigments: Natural and synthetic iron oxides and chromium oxides, compounded for use in mortar mixes and complying with ASTM C979/C979M. Use only pigments with a record of satisfactory performance in masonry mortar.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - a. Davis Colors.
  - b. Euclid Chemical Company (The); an RPM company.
  - c. Lanxess Corporation.
  - d. Solomon Colors, Inc.

E. Colored Cement Products: Packaged blend made from portland cement and hydrated lime or masonry cement and mortar pigments, all complying with specified requirements, and containing no other ingredients.

1. Colored Portland Cement-Lime Mix:
  - a. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - 1) Holcim (US) Inc.
    - 2) Lafarge North America Inc.
    - 3) Lehigh Hanson; HeidelbergCement Group.

## 2.2 ACCESSORIES

- A. Construction Cleaning Compounds:
  - 1. Type Two Acceptable Products:
    - a. 202 or 202V by Diedrich Technologies, Oak Creek, WI [www.diedrichtechnologies.com](http://www.diedrichtechnologies.com).
    - b. Surekleen No. 600 or Vana-Trol by ProSoCo Inc, Kansas City, KS [www.prosoco.com](http://www.prosoco.com).
    - c. Equal as approved by Architect before use. See Section 01 6200.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Verification Of Conditions:
  - 1. Verify substrates have been properly prepared.
  - 2. Verify built-in items are in proper location, and ready for roughing into masonry.
  - 3. Notify Architect of any unsatisfactory preparation before proceeding.
    - a. Do not install masonry over unsuitable conditions.
    - b. Commencement of Work by installer is considered acceptance of substrate.

### 3.2 PREPARATION

- A. Coordinate placement of reinforcement, anchors and accessories, flashings and weep holes and other moisture control products specified in other sections.
- B. Prior to placing masonry:
  - 1. Clean reinforcement by removing mud, oil, or other materials that will adversely affect or reduce bond at time mortar or grout is placed.
  - 2. Remove laitance, loose aggregate, and anything else that would prevent mortar from bonding to foundation.
- C. Wetting Masonry Units:
  - 1. Concrete masonry:
    - a. Do not wet concrete masonry units before laying. Wet cutting is permitted.

### 3.3 INSTALLATION

- A. Interface With Other Work:
  - 1. Masonry Cutting:
    - a. Make cuts proper size to accommodate work of other trades.
    - b. Cut openings for electrical devices using cover plates no larger than can be covered by standard size plate.
    - c. Replace unit masonry in which larger than necessary openings are cut.
    - d. Do not patch openings with mortar or other material.
- B. General:



1. Cold Weather and Hot Weather Limitations:
    - a. Place mortar as specified in Section 04 0501: 'Common Masonry Requirements'.
  2. Maintain masonry courses to uniform dimension. Form vertical and horizontal joints of uniform thickness.
  3. Step back unfinished work for joining with new work. Use toothing only with Architect's approval.
  4. Built-In Work:
    - a. As work progresses, install masonry flashings and weep holes and other built-in work specified in other sections.
- C. Tolerances:
1. Masonry work shall be true to vertical and horizontal planes within 1/8 inch in 10 feet, non-cumulative.
  2. Maintain 3/8 inch mortar joints throughout.
- D. Mortar:
1. Use mortar within two (2) hours of initial mixing. Discard mortar that has begun to set. Set masonry units within one (1) minute of spreading mortar.
  2. Do not allow mortar build-up in cavity between masonry veneer and wall framing.
- E. Laying:
1. Layout:
    - a. Stack bond except where indicated otherwise.
  2. Joints:
    - a. Tool concave. Fill completely except where indicated differently.
    - b. Do not tool until mortar has taken initial set.
    - c. Point holes in joints. Fill and tool properly.
  3. Concrete Masonry Units:
    - a. Lay masonry units dry. Do not lay masonry on frozen material.
    - b. Place units so:
      - 1) Bed joints are fully mortared.
      - 2) Head joints are fully mortared.
- F. Reinforcing:
1. Reinforcing shall be free of material that may destroy bond.
  2. Continuous Joint Reinforcing:
    - a. Beginning approximately 8 inches from base of masonry, provide joint reinforcing 16 inches on center vertically, except 8 inches on center if drip crimped.
    - b. Lap splices and intersections minimum of 6 inches.
- G. Embedded items and accessories:
1. Install embedded items and accessories as follows:
    - a. Install and secure connectors, flashing, weep holes, weep vents, nailing blocks, and other accessories.
    - b. Aluminum:

- 1) Do not embed aluminum conduits, pipes, and accessories in masonry, grout, or mortar, unless they are effectively coated or isolated to prevent chemical reaction between aluminum and cement or electrolytic action between aluminum and steel.

### **3.4 CLEANING**

#### **A. General:**

1. Clean exposed masonry surfaces of stains, efflorescence, mortar and grout droppings, and debris using methods that do not damage masonry.
2. After mortar has hardened, wet masonry and clean with specified cleaning compound. Use stiff fibered brush for application. Rinse masonry surfaces with water immediately after cleaning. Leave masonry clean, free of mortar daubs, and with tight mortar joints.
3. Wash adjacent non-masonry surfaces. Use detergent and soft brushes or cloth.
4. Sweep and rake adjacent pavement and grounds to remove mortar and debris. Where necessary, pressure wash pavement surfaces to remove mortar, dust, dirt, and stains.

#### **B. Waste Management:**

1. Unit Masonry:
  - a. Clean up masonry debris and remove from site.

### **3.5 PROTECTION**

#### **A. General:**

1. Protect masonry with covering during rainy weather.

#### **B. Cold Weather Requirements:**

1. In cold weather, all materials and walls should be properly protected against freezing including storing of materials, preparation of mortar, heating of masonry units, laying precautions, and protection of Work.
2. Remove all masonry deemed frozen or damaged.

**END OF SECTION**



WEST FIELD SR. SEMINARY

**DIVISION 5 - METALS:**

05 0503	Shop-Applied Metal Coatings
05 0523	Metal Fastenings
05 1223	Structural Steel For Buildings
05 5133	Wall-Mounted Ladders
05 5214	Steel Pipe and Tube Railings
05 5871	Metal Brackets



### 1.3 ADMINISTRATIVE REQUIREMENTS

#### A. Pre-Installation Conference:

1. Participate in pre-installation conference.
2. In addition to requirements of Section 01 3100, review following:
  - a. Meet with Architect before commencing repair of galvanized surfaces to establish extent of repairs required and, if applicable, choice of methods to be used.

### 1.4 SUBMITTALS

#### A. Action Submittals:

1. Product Data:
  - a. Product data and samples, if requested by Architect.

## PART 2 - PRODUCTS

### 2.1 FINISHES

#### A. Factory And Shop-Applied Primer:

1. Compatible with and of equal or better quality than finish paint system to be applied by Sections under 09 9000 heading.
2. Primer on unexposed, unfinished surfaces may be fabricator's standard shop coat.

#### B. Repairs To Primed Surface:

- C. Unless otherwise specified, use primer which matches characteristics of original primer and is compatible with and of equal or better quality than finish paint system to be applied by Sections under 09 9000 heading.

#### D. Material For Repairs Of Galvanized Surfaces:

1. Non-Structural, Non-Load-Bearing Items Not Exposed To Weather:
  - a. Zinc-Rich Paints:
    - 1) Zinc-Dust Content: Dried film shall contain 94 percent minimum of zinc-dust by weight.
    - 2) Type One Acceptable Manufacturers:
      - a) Galvax by Alvin Products Inc, Everett, MA [www.alvinproducts.com](http://www.alvinproducts.com).
      - b) ZRC Galvilite by ZRC Worldwide, Marshfield, MA [www.zrcworldwide.com](http://www.zrcworldwide.com).
      - c) Equal as approved by Architect before bidding. See Section 01 6200.
2. Structural, Load-Bearing Items And Items Exposed To Weather:
  - a. Zinc-Based Solders, Powder, Or Rod:
    - 1) Zinc-Cadmium solder with liquidus temperature range from 518 to 527 deg F, or
    - 2) Zinc-Tin-Lead alloy with liquidus temperature range from 446 to 500 deg F.
  - b. Sprayed Zinc: Wire, ribbon, or powdered zinc suitable for process.

## PART 3 - EXECUTION

### 3.1 PREPARATION

#### A. Surface Preparation:

1. General:
  - a. Clean, grind, or otherwise prepare welds in steel that is to be coated within limits acceptable to welder responsible for structural integrity.
  - b. Surfaces to be coated shall be clean, dry and free of oil, grease, and corrosion products.
2. Preparation Of Primed, Ungalvanized Surfaces:
  - a. Clean welds and grind serious abrasions.
3. Preparation Of Galvanized Surfaces:
  - a. Follow requirements of ASTM A780/A780M and following:
  - b. For Repair Using Zinc-Rich Paints:
    - 1) Blast clean surfaces to near-white metal, in accordance with SSPC-SP10 (1 to 2 mil anchor pattern), as minimum.
    - 2) Where circumstances do not allow blast cleaning, power disk sand to bright metal finish.
    - 3) Extend surface preparation into undamaged galvanized area.
    - 4) Remove flux residue and weld spatter from welded areas.
  - c. For Repair Using Zinc-Based Alloys:
    - 1) Clean surface to be reconditioned using wire brush, light grinding action, or mild blasting.
    - 2) Extend surface preparation into surrounding, undamaged galvanized areas.
    - 3) Remove flux residue and weld spatter from welded areas.
    - 4) Preheat cleaned area to at least 600 deg F.
      - a) Do not overheat surface beyond 750 deg F or allow surrounding galvanized coatings to be burned.
      - b) Wire brush surface during preheating.
  - d. For Repair Using Sprayed Zinc (Metallizing):
    - 1) Blast clean surfaces to near-white metal, in accordance with SSPC-SP5 as minimum.
    - 2) Extend surface preparation into undamaged galvanized area.
    - 3) Remove flux residue and weld spatter from welded areas.

### 3.2 REPAIR / RESTORATION

#### A. Repairs To Primed, Ungalvanized Surfaces:

1. Thoroughly clean metal and give one (1) prime coat of specified material, well-worked into metal joints and open spaces. Match existing primed finish as required.
  - a. Do not apply primer at temperatures below 45 deg F.
  - b. Protect un-primed machine-finished surfaces against corrosion by priming.

#### B. Repairs To Galvanized Surfaces:

1. Non-Structural, Non-Load-Bearing Items Not Exposed To Weather:
  - a. Repair Using Zinc-Rich Paints: Spray- or brush-apply zinc-rich paint to prepared area. Apply paint in single application employing multiple spray passes to achieve dry film thickness of 2 mils.
2. Structural, Load-Bearing Items And Items Exposed To Weather:
  - a. Repair Using Zinc-Based Alloys:
    - 1) Rub cleaned, pre-heated areas with repair stick to deposit evenly distributed layer of zinc alloy. If powdered zinc alloys are used, sprinkle powder on surface and spread out with spatula or similar tool.
    - 2) Remove flux residue by rinsing with water or wiping with damp cloth.
  - b. Repair Using Sprayed Zinc (Metallizing): Apply 2 mil minimum coating by means of metal-spraying pistols fed with either zinc wire or zinc powder in accordance with requirements of ASTM B695, Type I.
3. All Items:
  - a. Apply repair materials immediately after surface preparation is complete.
  - b. Take thickness measurements, with either magnetic or electromagnetic gauge, to ensure applied coating is as specified or agreed to.

**END OF SECTION**





- a. ANSI/AWS D1.1/D1.1M:2015, 'Structural Welding Code - Steel'.
  - b. ANSI/AWS D1.3/D1.3M:2018, 'Structural Welding Code - Sheet Steel'.
2. ASTM International:
- a. ASTM A307-14, 'Standard Specification for Carbon Steel Bolts and Studs, 60,000 psi Tensile Strength'.

### **1.3 QUALITY ASSURANCE**

- A. Qualifications: Requirements of Section 01 4301 applies, but not limited to the following:
- 1. Welders shall be certified 30 days minimum before beginning work on Project. If there is doubt as to proficiency of welder, Architect may require welder to take another test, at no expense to Owner. Certification shall be by Pittsburgh Laboratories or other authority approved by Architect.
- B. Certifications:
- 1. Maintain welder's certifications on job-site.

## **PART 2 - PRODUCTS**

### **2.1 MANUFACTURED UNITS**

- A. Materials:
- 1. Bolts And Threaded Fasteners:
    - a. Bolts: Conform to requirements of ASTM A307, Grade A.

### **2.2 ACCESSORIES**

- A. Arc-Welding Electrodes: Type E70XX AWS Iron and Steel Arc-welding electrodes and meeting current AISC Specifications.

## **PART 3 - EXECUTION**

### **3.1 PERFORMANCE**

- A. Welding shall meet requirements of ANSI / AWS D1.1 and D1.3.
- B. Welding requirements shown on drawings.

**END OF SECTION**



## 1.2 REFERENCES

### A. Reference Standards:

1. American Society For Testing And Materials:
  - a. ASTM A36/A36M-14, 'Standard Specification for Carbon Structural Steel'.
  - b. ASTM A53/A53M-18, 'Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless'.
  - c. ASTM A500/A500M-18, 'Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes'.

## PART 2 - PRODUCTS

### 2.1 COMPONENTS

#### A. Materials:

1. Structural Tubing: Meet requirements of ASTM A500/A500M, Grade B.
2. Miscellaneous Steel:
  - a. Meet requirements of ASTM A36/A36M for the following:
    - 1) Miscellaneous structural steel.

#### B. Fabrication:

1. Shop prime steel provided under this Section.

## PART 3 - EXECUTION: Not Used

**END OF SECTION**



- a. ANSI/ALI A14.3-2018, 'American National Standard for Ladders - Fixed - Safety Requirements'.
2. ASTM International:
  - a. ASTM A36/A36M-14, 'Standard Specification for Carbon Structural Steel'.

## **PART 2 - PRODUCTS**

### **2.1 ASSEMBLIES**

#### **A. Materials:**

1. Steel For Interior Ladders: Meet requirements of ASTM A36/A36M.
2. Steel For Exterior Ladders: Meet requirements of ASTM A36/A36M. Prime and painted.
3. Stringers: 3/8 by 2-1/2 inch flat bar stock.
4. Treads: One inch round rungs.
5. Mounting Brackets: Drilled angles.

#### **B. Fabrication:**

1. Fabricate ladders to comply with requirements of ANSI/ALI A14.3 including but not limited to :
  - a. Minimum requirements for design, construction, and use of fixed ladders.
  - b. Requirements for cages, wells, and ladder safety systems used with fixed ladders, in order to minimize personal injuries.
  - c. All parts and appurtenances necessary for safe and efficient ladder shall be considered integral parts of design.
2. Weld joints. Grind joints to be smooth to the touch and finished to match adjoining surfaces.
3. Space treads 12 inches on centers.
4. Fabricate mounting brackets of drilled angles.
5. Prime interior ladders.

## **PART 3 - EXECUTION**

### **3.1 INSTALLATION**

- A. Support ladder with welded steel brackets located at top and bottom, and equally spaced but no more than 60 inches on center between top and bottom where ladder is installed against a wall. Size brackets to support design loads specified in ANSI/ALI A14.3.

**END OF SECTION**



### 1.3 SUBMITTALS

- A. Action Submittals:
  - 1. Shop Drawings: Show fabrication and installation of handrails including floor plans, elevations, sections, details of components, and attachments to other elements of The Work.

### 1.4 DELIVERY, STORAGE, AND HANDLING

- A. Storage And Handling Requirements:
  - 1. Store handrails and railing systems in clean, dry location, away from uncured concrete and masonry, and protected against damage.
  - 2. Cover with waterproof paper, tarpaulin, or polyethylene sheeting. Allow for air circulation inside covering.

## PART 2 - PRODUCTS

### 2.1 ASSEMBLIES

- A. Materials:
  - 1. Handrails:
    - a. Steel pipe meeting requirements of ASTM A53/A53M or steel tubing meeting requirements of ASTM A501/A501M.
    - b. 1-1/2 inch outside diameter.
  - 2. Brackets, Flanges, Fittings, And Anchors:
    - a. Provide standard wall brackets, flanges, miscellaneous fittings, and anchors for connection of handrails and railings to other construction.
- B. Fabrication:
  - 1. Preassemble railing systems in shop to greatest extent possible to minimize field splicing and assembly.
  - 2. Disassemble units only as necessary for shipping and handling limitations. Clearly mark units for reassembly and coordinated installation. Use connections that maintain structural value of joined pieces.
  - 3. Grind smooth welded joints and buff welds to same appearance as remainder of railing. Cut pipe ends as specified in Section 05 0503.
  - 4. Form curves by bending pipe in jigs to produce uniform curvature for each configuration required. Maintain cylindrical cross-section of pipe throughout entire bend without buckling, twisting, cracking, or otherwise deforming exposed surfaces of pipe.
  - 5. Welded Connections:
    - a. Fabricate railing system and handrail connections by welding.
    - b. Weld corners and seams continuously to comply with following:
      - 1) Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
      - 2) At tee and cross intersections, notch ends of intersecting members to fit contour of pipe to which end is joined and weld all around.
      - 3) At exposed connections, finish exposed welds and surfaces smooth and blended so no roughness shows after finishing and so contours of welded surfaces match adjacent surfaces.
  - 6. Return pipe ends of wall mounted handrails into wall.
  - 7. After fabrication, shop prime metal to be painted.

## PART 3 - EXECUTION

### 3.1 INSTALLATION

- A. Touch up field welds to match pre-finished material.

**END OF SECTION**





## **PART 2 - PRODUCTS**

### **2.1 FABRICATED UNITS**

#### **A. Materials:**

##### **1. Metal Brackets:**

##### **a. Fabrication:**

- 1) Fabricate as detailed.
- 2) Grind exposed welds smooth and polish to match non-welded metal finish.
- 3) After fabrication and drilling of mounting holes, shop prime.

## **PART 3 - EXECUTION: Not Used**

**END OF SECTION**



WEST FIELD SR. SEMINARY

**DIVISION 6 - WOOD AND PLASTICS:**

06 0573	Preservative Wood Treatment
06 0574	Fire-Retardant Wood Treatment
06 1011	Wood Fastenings
06 1100	Wood Framing
06 1636	Wood Panel Product Sheathing
06 1712	Structural Composite Lumber
06 1733	Wood 'I' Joists
06 1735	Shop-Fabricated Wood Trusses
06 2001	Common Finish Carpentry Requirements
06 2024	Door, Frame, and Finish Hardware Installation
06 2710	Shelving
06 4001	Common Architectural Woodwork Requirements
06 4114	Wood-Veneer-Faced Architectural Cabinets
06 4216	Flush Wood Paneling
06 4313	Wood Stairs
06 4512	Architectural Woodwork Wood Trim
06 6001	Miscellaneous Plastic Fabrications

## SECTION 06 0573 - PRESERVATIVE WOOD TREATMENT

### PART 1 - GENERAL

#### 1.1 SUMMARY

- A. Includes But Not Limited To:
  - 1. Quality of wood preservative treatment where specified.
- B. Related Requirements:
  - 1. Section 06 1100:
    - a. Characteristics of wood to be pressure-treated.
    - b. Furnishing and installing of pressure-treated wood.

#### 1.2 REFERENCES

- A. Definitions:
  - 1. Preservative-Treated Wood: Wood exposed to high levels of moisture or heat susceptible to decay by fungus and other organisms, and to insect attack. The damage caused by decay or insects can jeopardize the performance of the wood members so as to reduce the performance below that required. Preservative treatment requires pressure-treatment process to achieve depth of penetration of preservative into wood to verify that the wood will be resistant to decay and insects over time.
  - 2. Treated Wood: Wood impregnated under pressure with compounds that reduce its susceptibility to flame spread or to deterioration caused by fungi, insects, or marine bores.
- B. Reference Standards:
  - 1. American Wood Protection Association:
    - a. AWPA N1-06, 'All Millwork Products - Preservative Treatment by Nonpressure Process'.
    - b. AWPA P5-10, 'Standard For Waterborne Preservatives'.
    - c. AWPA P22-10, 'Standard For Ammoniacal Copper Zinc Arsenate (ACZA)'.
    - d. AWPA P51-10, 'Standard for Zinc Borate (ZB)'.
    - e. AWPA T1-12, 'Use Category System: Processing and Treatment Standard For Treated Wood'.
    - f. AWPA U1-12, 'Use Category System: User Specification For Treated Wood'.
  - 2. International Building Code (IBC) (2018 or most recent edition adopted by AHJ):
    - a. Chapter 23, 'Wood':
      - 1) Section 2300, 'Minimum Standards and Quality':
        - a) 2303.1, 'General':
          - (1) 2303.1.8, 'Preservative-Treated Wood'.
      - 2) Section 2400, 'General Construction Requirements':
        - a) 2304.11, 'Protection Against Decay and Termites':
          - (1) 2311.2, 'Wood Used Above Ground'.

(2) 2311.4, 'Wood In Contact With The Ground'.

### 1.3 SUBMITTALS

#### A. Informational Submittals:

1. Certificate: Certificate of pressure treatment showing compliance with specification requirements and including information required under IBC Section 2303.1.8.1, 'Identification'.

## PART 2 - PRODUCTS

### 2.1 SYSTEMS

#### A. Manufacturers:

1. Type One Acceptable Manufacturers:
  - a. Arch Wood Protection Inc, Atlanta, GA [www.wolmanizedwood.com](http://www.wolmanizedwood.com).
  - b. Hoover Treated Wood Products, Thomson, GA [www.frtw.com](http://www.frtw.com).
  - c. Osmose Inc, Griffin, GA [www.osmose.com](http://www.osmose.com).
  - d. U S Borax Inc, Valencia, CA [www.borax.com/wood](http://www.borax.com/wood).
  - e. Viance LLC, Charlotte, NC [www.treatedwood.com](http://www.treatedwood.com).
  - f. Equal as approved by Architect before bidding. See Section 01 6200.

#### B. Performance:

1. Framing lumber grade and species shall be as specified in Section 06 1100 for particular use.
2. Interior Wood In Contact With Concrete or Masonry:
  - a. Preservatives:
    - 1) Disodium octoborate tetrahydrate (DOT / SBX) meeting requirements of AWPA U1 and with retention of 0.25 lbs per cu ft.
    - 2) Zinc borate meeting requirements of AWPA U1 and with retention of 0.17 lbs per cu ft.
    - 3) CCA-C (47.5 percent chromium trioxide, 18.5 percent copper oxide and 34 percent arsenic pentoxide) by Koppers Performance Chemicals, Griffin, Georgia, <http://www.koppersperformancechemicals.com/> (0.25 lb/cu ft minimum retention).
    - 4) DURA-GUARD by Hoover Treated Wood Products, Thomson, GA [www.frtw.com](http://www.frtw.com) (.40 lb/cu ft minimum retention).
  - b. Lumber: Treat in accordance with AWPA U1.

## PART 3 - EXECUTION: Not Used

**END OF SECTION**

# SECTION 06 0574 - FIRE RETARDENT WOOD TREATMENT

## PART 1 - GENERAL

### 1.1 SUMMARY

- A. Includes But Not Limited To:
  - 1. Quality of fire-treated wood panel product sheathing provided under Division 06.
- B. Related Requirements:
  - 1. Section 01 4523: 'Testing and Inspection Services'.
  - 2. Section 06 1636: 'Wood Panel Product Sheathing'.

### 1.2 REFERENCES

- A. Reference Standards:
  - 1. American Wood-Preserver's Association:
    - a. AWPA C9-96. 'Plywood, Pressure Treatment.'

## PART 2 - PRODUCTS

### 2.1 SYSTEMS

- A. Sheathing:
  - 1. Manufacturers:
    - a. Quality Standard: FLAME PROOF LHC method by Osmose or equal method meeting UL FR-S classification.
    - b. Type One Acceptable Manufacturers:
      - 1) Osmose Inc, Griffin, GA [www.osmose.com](http://www.osmose.com).
      - 2) Equal as approved by Architect before bidding. See Section 01 6200.
  - 2. Performance:
    - a. Treat sheathing for exterior entry canopy roofs in accordance with AWPA Standards and dried after treatment.
    - b. Comply with IBC code requirements.
    - c. Fire-retardant wood treatment shall not reduce the structural characteristics of the wood panel product sheathing.
  - 3. Materials:
    - a. Identify treated lumber as to name of treater, preservative used, and retention in lbs/cu ft.
    - b. Season after treatment to moisture content required for non-treated material.
    - c. Kiln dry wood after treatment.

PART 3 - EXECUTION - NOT USED

END OF SECTION





- c. ASTM F1667-18a, 'Standard Specification for Driven Fasteners: Nails, Spikes, and Staples'.

### 1.3 SUBMITTALS

#### A. Action Submittals:

1. Product Data:
  - a. Manufacturer's literature on framing anchors and powder actuated fasteners.
2. Shop Drawings:
  - a. Submit diameter and lengths of fasteners proposed for use on Project. If length or diameter of proposed fasteners differ from specified fasteners, also include technical and engineering data for proposed fasteners including, but not limited to:
    - 1) Adjusted fastener spacing where using proposed fasteners and,
    - 2) Adjusted number of fasteners necessary to provide connection capacity equivalent to specified fasteners.
  - b. Submit on powder-actuated fasteners other than those specified in Contract Documents showing design criteria equivalents at each application.
  - c. Show type, quantity, and installation location of framing anchors. Where necessary, reference Drawing details, etc, for installation locations.

## PART 2 - PRODUCTS

### 2.1 MANUFACTURED UNITS

#### A. Description:

1. Nail Terminology:
  - a. When following nail terms are used in relation to this Project, following lengths and diameters will be understood. Refer to nails of other dimensions by actual length and diameter, not by one of listed terms:

Nail Term	Length	Diameter
8d Box	2-1/2 inches	0.113 inch
8d Common	2-1/2 inches	0.131 inch
10d Box	3 inches	0.128 inch
10d Common	3 inches	0.148 inch
16d Box	3-1/2 inches	0.135 inch
16d Sinker	3-1/4 inches	0.148 inch
16d Common	3-1/2 inches	0.162 inch

#### B. Materials:

1. Wood fastener list:
  - a. Provide VMR Suppliers with wood fastener list.
2. Fasteners:
  - a. General:

- 1) Fasteners for preservative treated wood shall be of hot dipped zinc-coated galvanized steel, stainless steel, silicon bronzed, or copper. Coating weights for zinc-coated fasteners shall be in accordance with ASTM A153/A153M.
- b. Nails:
    - 1) Meet requirements of ASTM F1667.
    - 2) Unless noted otherwise, nails listed on Drawings or in Specifications shall be common nail diameter, except 16d nails, which shall be box diameter.
  - c. Wood Screws:
    - 1) SDS Screws:
      - a) Category Four Approved Products. See Section 01 6200 for definitions of categories.
        - (1) SDS Screws by Simpson Strong Tie Co, Dublin, CA [www.strongtie.com](http://www.strongtie.com).
      - 2) All Other: Standard type and make for job requirements.
  - d. Powder-Actuated Fasteners:
    - 1) Type One Quality Standard: Hilti X-DNI 62P8.
    - 2) Manufacturers:
      - a) Hilti, Tulsa, OK [www.us.hilti.com](http://www.us.hilti.com).
      - b) Redhead Division of ITW, Wood Dale, IL [www.itw-redhead.com](http://www.itw-redhead.com) and Markham, ON [www.itwconstruction.ca](http://www.itwconstruction.ca).
      - c) Equals as approved by Architect through shop drawing submittal before installation. See Section 01 6200.
3. Adhesives:
    - a. Construction Mastics:
      - 1) Meet requirements of 'APA-The Engineered Wood Association' Specification AFG-01 or ASTM D3498.
      - 2) Use phenol-resorcinol type for use on pressure treated wood products.
  4. Framing Anchors:
    - a. Framing anchors and associated fasteners in contact with preservative hot dipped zinc-coated galvanized steel or stainless steel. Do not use stainless steel items with galvanized items.
    - b. Type Two Acceptable Products:
      - 1) KC Metals Inc, San Jose, CA [www.kcmetals.com](http://www.kcmetals.com).
      - 2) Simpson Strong Tie Co, Dublin, CA [www.strongtie.com](http://www.strongtie.com).
      - 3) United Steel Products Co Inc (USP), Montgomery, MN [www.uspconnectors.com](http://www.uspconnectors.com).
      - 4) Equals as approved by Architect through shop drawing submittal before installation. See Section 01 6200.

## PART 3 - EXECUTION

### 3.1 ERECTION

- A. Secure one Manufacturer approved fastener in each hole of framing anchor that bears on framing member unless approved otherwise in writing by Architect.

B. Provide washers with bolt heads and with nuts bearing on wood.

**END OF SECTION**

## SECTION 06 1100 - WOOD FRAMING

### PART 1 - GENERAL

#### 1.1 SUMMARY

- A. Includes But Not Limited To:
  - 1. Furnish and install wood framing and blocking as described in Contract Documents.
- B. Products Installed But Not Furnished Under This Section:
  - 1. Miscellaneous structural steel elements.
  - 2. Roof related blocking, wood nailers, and curbs.
  - 3. Stair stringers.
  - 4. Structural composite lumber.
  - 5. Wood 'I' joists.
  - 6. Wood panel product sheathing.
  - 7. Wood trusses.
- C. Related Requirements:
  - 1. Section 05 1223: 'Structural Steel For Buildings' for furnishing of miscellaneous structural steel.
  - 2. Section 06 0573: 'Preservative Wood Treatment' for quality of preservative wood treatment.
  - 3. Section 06 1636: 'Wood Panel Product Sheathing' for:
    - a. Pre-installation conference held jointly with Section 06 1100.
  - 4. Section 06 1712: 'Structural Composite Lumber - SCL'.
  - 5. Section 06 1733: 'Wood I Joists'.
  - 6. Section 06 1753: 'Shop Fabricated Wood Trusses'.
  - 7. Sections under 06 4000 Heading: 'Architectural Woodwork' for wall blocking requirements.
  - 8. Sections in Division 07: Roofing membranes for related blocking, wood nailers, and curbs.
  - 9. Section 08 4113: 'Aluminum-Framed Entrances And Storefronts':
    - a. Pre-installation conference held jointly with Section 06 1100.

#### 1.2 REFERENCES

- A. Association Publications:
  - 1. American Lumber Standard Committee (ALSC) (Maintains NIST standard):
    - a. Voluntary Product Standard:
      - 1) PS 20-15, 'American Softwood Lumber Standard'.
  - 2. National Institute of Standards and Technology (NIST), U. S. Department of Commerce:
    - a. Voluntary Product Standard DOC PS 20-15, 'American Softwood Lumber Standard'.
- B. Reference Standards:

1. Truss Plate Institute / Structural Building Components Association:
  - a. TPI / SBCA. 'Building Component Safety Information BCSI 2013, 'Guide to Good Practice for Handling, Installing, Restraining & Bracing of Metal Plate Connected Wood Trusses'.

### 1.3 ADMINISTRATIVE REQUIREMENTS

#### A. Pre-Installation Conference:

1. Participate in MANDATORY pre-installation conference held jointly with Section 06 1636.
  - a. Schedule pre-installation conference immediately before beginning framing work.
  - b. In addition to agenda items specified in Section 01 3100, review following:
    - 1) Equipment and gypsum board blocking in wood framed walls.
    - 2) Rough opening.
    - 3) Shear walls and struts.
    - 4) Nails and nailing requirements.
    - 5) Truss installation.
    - 6) Connections.
2. Participate in pre-installation conference held jointly with Section 08 4113.
  - a. Schedule pre-installation conference for one (1) week before scheduled installation of storefront system.
  - b. In addition to agenda items specified in Section 01 3100, review following:
    - 1) Rough opening requirements.

### 1.4 SUBMITTALS

#### A. Informational Submittals:

1. Test And Evaluation Reports:
  - a. Technical and engineering data on nails to be set by nailing guns for Architect's approval of types proposed to be used as equivalents to specified hand set nails and adjusted number and spacing of pneumatically-driven nails to provide equivalent connection capacity.
2. Manufacturer Instructions:
  - a. Copies of pamphlets specified in REFERENCE Article. After Architect's examination, keep pamphlets on Project site with approved shop drawings. Pamphlets may be obtained from Truss Plate Institute, Wood Truss Council of America, or from Truss Fabricator.
3. Qualification Statements:
  - a. Alternate Supplier(s):
    - 1) Provide name and contact information.
    - 2) Provide Qualification documentation as requested.

## 1.5 QUALITY ASSURANCE

### A. Qualifications:

#### 1. Suppliers:

- a. Licensed by American or Canadian Institute of Timber Construction, or American Wood Systems.
- b. Category Three Approved Suppliers Approved Supplier(s):
  - 1) Approval subject to agreement process approval.
- c. Alternate Supplier(s):
  - 1) Fabricator Firm specializing in performing work of this section:
    - a) Firm experience in supplying products indicated for this Project.
    - b) Financial stability.
    - c) Sufficient production capacity to produce required units.
    - d) Comply with specifications and Contract Documents.
    - e) Agree to complete reporting documents, including: Agree to provide total costs to the Church.
  - 2) Submit documentation to Architect or Owner.

## 1.6 DELIVERY, STORAGE, AND HANDLING

### A. Delivery And Acceptance Requirements:

1. Protect lumber and sheathing and keep under cover in transit and at job site.
2. Do not deliver material unduly long before it is required.

### B. Storage And Handling Requirements:

1. Store lumber and sheathing on level racks and keep free of ground to avoid warping.
2. Stack to insure proper ventilation and drainage.
3. Handle and store wood trusses in accordance with ANSI / WTCA Booklet BSCI except trusses may be unloaded by dumping if trusses are shipped horizontally, are rolled off low profile roller bed trailer, and no part of any truss is required to drop more than 18 inches.

## PART 2 - PRODUCTS

### 2.1 SUPPLIERS

#### A. Suppliers:

1. Category Three Approved Suppliers. See Section 01 6200 for definitions of Categories and Section 01 4301 for Qualification Requirements:
  - a. BMC, West Jordan, UT. [www.BuildWithBMC.com](http://www.BuildWithBMC.com). Contact Par Palmer:
    - 1) Office: (801) 224-0541.
    - 2) Mobile: (801) 376-9853.
    - 3) E-Mail: [Par.Palmer@BuildWithBMC.com](mailto:Par.Palmer@BuildWithBMC.com) or [www.BuildWithBMC.com](http://www.BuildWithBMC.com).

- b. J. M. Thomas Forest Products, Ogden, UT. [www.thomasforest.com](http://www.thomasforest.com). Contact Tom Karren:
  - 1) Office: (800) 962-8780.
  - 2) FAX: 801-782-9652.
  - 3) E-Mail: [tom@thomasforest.com](mailto:tom@thomasforest.com).
  
- c. Shelter Products, Inc., Portland, OR [www.shelter-products.com](http://www.shelter-products.com). Contact Mike Running:
  - 1) Office: (800) 662-3612.
  - 2) Cell: NA.
  - 3) FAX: (503) 238-2663.
  - 4) E-Mail: [mrunning@shelter-products.com](mailto:mrunning@shelter-products.com).

## 2.2 MATERIALS

### A. Wood Framing List:

- 1. Provide Category Three Approved Suppliers with wood framing list.

### B. Dimension Lumber:

- 1. Design Criteria:
  - a. Meet requirements of PS 20 and National Grading Rules for softwood dimension lumber.
  - b. Bear grade stamp of WWPFA, SPIB, or other association recognized by American Lumber Standards Committee identifying species of lumber by grade mark or by Certificate of Inspection.
  - c. Lumber 2 inches or less in nominal thickness shall not exceed 19 percent in moisture content at time of fabrication and installation and be stamped 'S-DRY', 'K-D', or 'MC15'.
  - d. Preservative Treated Plates / Sills:
    - 1) 2x4: Standard and better Douglas Fir, Southern Pine, or HemFir, or StrandGuard by iLevel by Weyerhaeuser Boise, ID [www.ilevel.com](http://www.ilevel.com). (LSL 1.3 E)
    - 2) 2x6 And Wider: No. 2 or or MSR 1650f - 1.5e Douglas Fir, Southern Pine, HemFir, or StrandGuard by iLevel by Weyerhaeuser, Boise, ID [www.ilevel.com](http://www.ilevel.com). (LSL 1.3 E).

### C. Posts, Beams, And Timbers 5 Inches by 5 Inches And Larger:

- 1. Design Criteria:
  - a. No. 1 or better Douglas Fir or Southern Pine.

### D. Lumber Ledgers:

- 1. Design Criteria:
  - a. No. 2 Douglas Fir-Larch, or Southern Pine.

### E. See Contract Drawings for additional requirements.

## 2.3 ACCESSORIES

### A. Blocking:

- 1. Sound lumber without splits, warps, wane, loose knots, or knots larger than 1/2 inch.

- B. Furring Strips:
  - 1. Utility or better.
- C. Sill Sealer:
  - 1. Closed-cell polyethylene foam, 1/4 inch thick by width of plate.

## **PART 3 - EXECUTION**

### **3.1 INSTALLATION**

- A. General:
  - 1. Use preservative treated wood for wood members in contact with concrete or masonry, including wall, sill, and ledger plates, door and window subframes and bucks, etc.
- B. Interface With Other Work:
  - 1. Coordinate with other Sections for location of blocking required for installation of equipment and building specialties. Do not allow installation of gypsum board until required blocking is in place.
  - 2. Where manufactured items are to be installed in framing, provide rough openings of dimensions within tolerances required by manufacturers of such items. Confirm dimensions where not shown on Contract Drawings.
- C. Tolerances:
  - 1. Walls:
    - a. 1/4 inch in 20 feet, non-cumulative in length of wall.
    - b. 1/8 inch in 10 feet with 1/4 inch maximum in height of wall.
    - c. Distances between parallel walls shall be 1/4 inch maximum along length and height of wall.
- D. Floors:
  - 1. Place with crown side up.
  - 2. Provide accurately fitted header and trimmer joists of same size as regular joists around floor openings, unless detailed otherwise, and support by steel joist hangers.
  - 3. Double joists under partitions that parallel run of joists.
- E. Walls:
  - 1. Openings: Single, bearing stud supporting header and one adjacent (king) stud continuous between top and bottom plates, unless shown otherwise.
  - 2. Corners And Partition Intersections: Triple studs.
  - 3. Top Plates In Bearing Partitions: Doubled or tripled and lapped. Stagger joints at least 48 inches.
  - 4. Firestops:
    - a. Horizontal or vertical concealed spaces in walls, light coves, soffits, drop ceilings, and other features over 10 feet in length or height, and at stairs, ceiling levels, floor levels, and other junctures of horizontal to vertical concealed spaces.
    - b. Within concealed spaces of exterior wall finishes and exterior architectural elements, such as trims, cornices or projections, at maximum intervals of 20 feet, length or height.
  - 5. Sill Plates:



- a. Shear Walls And Bearing Walls:
    - 1) Provide specified anchor 12 inches maximum and 4 inches minimum from each end of each plate.
    - 2) Shear Walls: Fasten with anchor bolts embedded in concrete or with screw anchors.
    - 3) Bearing Walls: Fasten with anchor bolts embedded in concrete, or with screw anchors or expansion bolts in drilled holes.
  - b. Non-Structural Walls: Fasten with powder actuated fasteners.
  - c. In addition to requirements of paragraphs 'a' and 'b' above, set sill plates of interior walls measuring less than 36 inches in length in solid bed of specified construction adhesive, except where sill sealer is used.
  - d. Install specified seal sealer under sill plates of exterior walls of main building and of acoustically insulated interior walls.
6. Beams And Girders:
- a. Built-Up Members:
    - 1) Stagger individual members of multiple span beams and girders so, over any one support, no more than half the members will have a joint. In all cases, however, joints shall occur over supports.
    - 2) Unless shown otherwise on Drawings, nail two-ply built-up members with 10d nails 12 inches on center top and bottom, staggered on opposite sides. Nail three-ply built-up members with 16d nails at 12 inches on center, top and bottom, staggered, on opposite sides. Set with crown edge up with full bearing at ends and intermediate supports.
  - b. Pre-Fabricated Members:
    - 1) Solid glu-lam, LVL, LSL, or PSL members may be used in place of built-up 2x framing members. Size shall be same as built-up member.
    - 2) Solid LVL or PSL members may be used in place of built-up LVL members. Size shall be same as sum of built-up members.
  - c. Wood shims are not acceptable under ends.
  - d. Do not notch framing members unless specifically shown in Drawing detail.
7. Nailing:
- a. Stud to plate (coordinate with Contract Drawings):
 

2 by 4 inch nominal	End nail, two 16d OR toe nail, four 8d
2 by 6 inch nominal	End nail, three 16d OR toe nail, four 8d
2 by 8 inch nominal	End nail, four 16d OR toe nail, six 8d
2 by 10 inch nominal	End nail, five 16d OR toe nail, six 8d
1-3/4 by 5-1/2 inch LVL	End nail, three 16d OR toe nail, four 8d
1-3/4 by 7-1/4 inch LVL	End nail, four 16d OR toe nail, six 8d
1-3/4 by 9-1/4 inch LVL	End nail, five 16d OR toe nail, six 8d
1-3/4 by 11-1/4 inch LVL	End nail, six 16d OR toe nail eight 8d
  - b. Top plates: Spiked together, 16d, 16 inches on center.
  - c. Top plates: Laps, lap members 48 inches minimum and nail with 16d nails 4 inches on center
  - d. Top plates: Intersections, three 16d.
  - e. Backing And Blocking: Three 8d, each end.
  - f. Corner studs and angles: 16d, 16 inches on center.
- F. Roof And Ceiling Framing:
- 1. Place with crown side up at 16 inches on center unless noted otherwise.
  - 2. Install structural blocking and bridging as necessary and as described in Contract Documents.

3. Special Requirements:
  - a. Roof And Ceiling Joists: Lap joists 4 inches minimum and secure with code approved framing anchors.
  - b. Roof Rafters;
    - 1) Cut level at wall plate and provide at least 2-1/2 inches bearing where applicable. Spike securely to plate with three 10d nails.
    - 2) Attach to trusses or other end supports with framing anchors described in Contract Documents.
    - 3) Provide for bracing at bearing partitions.
4. Installation of Wood Trusses:
  - a. Handle, erect, and brace wood trusses in accordance with TPI / WTCA Booklet BCSI.
  - b. Do not install damaged or broken wood trusses. Replace wood trusses that are broken, damaged, or have had members cut out during course of construction.
  - c. Provide construction bracing for trusses in accordance with TPI DSB-89.
  - d. Provide continuous 2x4 horizontal web bracing as shown on truss shop drawings.
    - 1) Secure bracing to each truss with two 10d or 16d nails.
    - 2) Lap splice bracing by placing bracing members side by side on common web member. Butt splices are not acceptable.
  - e. Unless directed or shown otherwise, provide diagonal 2x4 bracing between trusses at each line of horizontal web bracing.
    - 1) This diagonal bracing shall be continuous and extend from junction of web and top chord of one truss to junction of web and bottom chord of different truss.
    - 2) Install bracing at approximately 45 degree angle. Bracing will extend over three trusses minimum or more as determined by height of trusses and 45 degree installation angle.
    - 3) Install brace on side of web opposite horizontal web bracing and nail to each web with two 10d or 16d nails.
    - 4) Install one brace every 20 feet as measured from top of brace to top of next brace.
5. Installation of Structural Composite Lumber:
  - a. Install temporary horizontal and cross bracing to hold members plumb and in safe condition until permanent bracing is installed.
  - b. Install permanent bracing and related components before application of loads to members.
6. Installation of wood Web Joists:
  - a. Handle, erect, and brace sheathing wood web joists in accordance with Manufacturer's instructions.
  - b. Do not install damaged or broken wood web joists.
  - c. Install temporary horizontal and cross bracing to hold members plumb and in safe condition until permanent bracing is installed.
  - d. Cut holes through webs at locations or of sizes shown on Drawings and as recommended by Manufacturer.
7. Secure headers and header backing to structure as described in Contract Documents.
- G. Accessory / Equipment Mounting And Gypsum Board Back Blocking (nailers) for Wood Framing):
  1. Furnish and install blocking in wood framing required for hardware, specialties, equipment, accessories, and mechanical and electrical items, etc.
  2. Furnish and install back blocking in wood framing required for joints in gypsum wallboard.
    - a. Install back blocking between I-joist framing members with equivalent of Simpson Z2 clips attached with four 10d x 1-1/2 inches nails at each end, two into 'I' joist and two into blocking.

- b. Attach back blocking at trusses, stick framing, or walls with two 10d nails in each end of each piece of blocking.

**END OF SECTION**

## SECTION 06 1636 - WOOD PANEL PRODUCT SHEATHING

### PART 1 - GENERAL

#### 1.1 SUMMARY

A. Includes But Not Limited To:

1. Furnish and install wood panel product sheathing required for walls, roofs, and floors as described in Contract Documents.
2. Furnish and install fire-treated wood panel product sheathing for exterior entry canopy roofs as described in contract documents.

B. Related Requirements:

1. Section 01 1200: 'Multiple Contracts Summary'.
2. Section 01 4523: 'Testing and Inspecting Services' for testing and inspection, and testing laboratory services for materials, products, and construction methods.
3. Section 06 0574: 'Fire-Retardant Wood Treatment'.
4. Section 06 1100: 'Wood Framing' for:
  - a. Pre-installation conference held jointly with Section 06 1636.

#### 1.2 REFERENCES

A. Association Publications:

1. National Institute of Standards and Technology (NIST), U. S. Department of Commerce:
  - a. Voluntary Product Standard DOC PS 1-09. 'Structural Plywood'.
  - b. Voluntary Product Standard DOC PS 2-04. 'Performance Standard for Wood-Based Structural-Use Panels'.
2. The Engineered Wood Association (APA), Tacoma, WA [www.apawood.org](http://www.apawood.org).
  - a. Performance Rated Panels, 'Product Guide' (for products bearing the APA trademark) December 2011.
  - b. Voluntary Product Standard:
    - 1) PS 1-09. 'Structural Plywood'.
    - 2) PS 2-04. 'Performance Standard for Wood-Based Structural-Use Panels'.
  - c. PRP-108 'Performance Standards and Policies for Structural-Use Panels'.
3. TECO, Cottage Grove, WI [www.tecotested.com](http://www.tecotested.com).
  - a. TECO PRP-133: ('Fire Rated Assemblies - OSB substitution for plywood in UL fire-rated assemblies that specify plywood).

B. Reference Standards:

1. International Code Council (IBC) (2018 or latest AHJ approved edition):
  - a. IBC Chapter 17, 'Special Inspections And Tests'.

### 1.3 ADMINISTRATIVE REQUIREMENTS

- A. Pre-Installation Conference:
  - 1. Participate in pre-installation conference as specified in Section 06 1100.
  - 2. In addition to agenda items specified in Section 01 3100 and Section 06 1100, review following:
    - a. Review Section 01 4523 for Testing and Inspection administrative requirements and responsibilities and Field Quality Control inspection required of this section.
- B. Scheduling:
  - 1. Notify Testing Agency and Architect twenty-four (24) hours minimum before placing sheathing.

### 1.4 SUBMITTALS

- A. Informational Submittals:
  - 1. Qualification Statements:
    - a. Alternate Supplier(s):
      - 1) Provide name and contact information.
      - 2) Provide Qualification documentation as requested.
- B. Closeout Submittals:
  - 1. Include following in Operations And Maintenance Manual specified in Section 01 7800:
    - a. Record Documentation:
      - 1) Testing and Inspection Reports:
        - a) Testing Agency Inspection Reports of sheathing.

### 1.5 QUALITY ASSURANCE

- A. Qualifications:
  - 1. Suppliers:
    - a. Licensed by American or Canadian Institute of Timber Construction, or American Wood Systems.
    - b. Category Three Approved Supplier(s):
      - 1) Approval subject to agreement process approval.
    - c. Alternate Supplier(s):
      - 1) Fabricator Firm specializing in performing work of this section:
        - a) Firm experience in supplying products indicated for this Project.
        - b) Financial stability.
        - c) Sufficient production capacity to produce required units.
        - d) Comply with specifications and Contract Documents.

e) Agree to complete reporting documents, including: Agree to provide total costs to the Church including breakdown costs of millwork.

2) Submit documentation to Architect or Owner.

B. Testing and Inspection:

1. Owner will provide Testing and Inspection for inspection of sheathing:

a. Owner will employ testing agencies to perform inspection for sheathing as specified in Field Quality Control in Part 3 of this specification.

1) Owner's employment of an independent Testing Agency does not relieve Contractor of Contractor's obligation to perform the Work in strict accordance with requirements of Contract Documents and perform contractor testing and inspection.

2) See Section 01 1200: 'Multiple Contract Summary'.

b. Owner's employment of an independent Testing Agency does not relieve Contractor of Contractor's obligation to perform testing and inspection as part of his Quality Control.

1) Testing and inspections, if performed by Contractor, will be responsibility of Contractor to be performed by an independent entity.

## 1.6 DELIVERY, STORAGE, AND HANDLING

A. Delivery And Acceptance Requirements:

1. Do not deliver material unduly long before it is required.
2. Protect sheathing and keep under cover in transit and at job site.

B. Storage And Handling Requirements:

1. Store sheathing on level racks and keep free of ground.
2. Stack to insure proper ventilation and drainage.

## PART 2 - PRODUCTS

### 2.1 MANUFACTURED UNITS

A. Suppliers:

1. Category Three Approved Suppliers. See Section 01 6200 for definitions of Categories and Section 01 4301 for Qualification Requirements:

a. BMC, West Jordan, UT. [www.BuildWithBMC.com](http://www.BuildWithBMC.com). Contact Par Palmer:

1) Office: (801) 224-0541.

2) Mobile: (801) 376-9853.

3) E-Mail: [Par.Palmer@BuildWithBMC.com](mailto:Par.Palmer@BuildWithBMC.com) or [www.BuildWithBMC.com](http://www.BuildWithBMC.com).

b. J. M. Thomas Forest Products, Ogden, UT. [www.thomasforest.com](http://www.thomasforest.com). Contact Tom Karren:

1) Office: (800) 962-8780.

- 2) FAX: 801-782-9652.
  - 3) E-Mail: tom@thomasforest.com.
- c. Shelter Products, Inc., Portland, OR www.shelter-products.com. Contact Mike Running:
- 1) Office: (800) 662-3612.
  - 2) Cell: NA.
  - 3) FAX: (503) 238-2663.
  - 4) E-Mail: mrunning@shelter-products.com.

**2.2 MATERIALS**

A. Performance:

- 1. Design Criteria:
  - a. Meet requirements of PS 1, PS 2, or PRP-133 (TECO). Except where plywood is specifically indicated on Contract Drawings, oriented strand board (OSB) is acceptable.

B. Sheathing:

- 1. Wood framing list:
  - a. Provide Category Three Approved Suppliers with wood framing list.
- 2. Sheathing:
  - a. Sheathing shall bear grade stamp from American Plywood Association (APA) or equal grading organization.
  - b. Sheathing shall not exceed 18 percent moisture content when fabricated or more than 19 percent when installed in Project.
  - c. Sheathing 23/32 inch thick and thicker used for single-layer subflooring shall be tongue and groove.
  - d. Sheathing used for same purpose shall be of same thickness. In all cases, thickness specified is minimum required regardless of span rating.
  - e. Minimum span ratings for given thicknesses shall be as follows:

Thickness	Span Rating
15/32 inch actual	32 / 16
1/2 inch nominal	32 / 16
19/32 inch actual	40 / 20
5/8 inch nominal	40 / 20
23/32 inch actual	48 / 24
3/4 inch nominal	48 / 24

**2.3 ACCESSORIES**

A. Nails:

- 1. As indicated on Contract Drawings.

## PART 3 - EXECUTION

### 3.1 INSTALLATION

#### A. General:

1. Top of nail heads shall be flush with sheathing surface.
2. Use of edge clips to provide spacing between sheathing panels is acceptable.

#### B. Wall Sheathing:

1. Spacing:
  - a. Provide 1/8 inch space between sheets at end and edge joints.
2. Edge Bearing And Blocking:
  - a. Panel edges shall bear on framing members and butt along their center lines.
  - b. Back block panel edges, which do not bear on framing members, with 2 inch nominal framing.
3. Nail Spacing:
  - a. As indicated on Contract Drawings.
  - b. Place nails not less than 3/8 inch in from edge.
4. Thickness:
  - a. As indicated on Contract Drawings.
5. Do not install any piece of wall sheathing with shortest dimension of less than 12 inches.

#### C. Roof Sheathing:

1. Placing:
  - a. Lay face grain at right angles to supports. Provide blocking for support if framing turns at roof overhang.
  - b. Provide 1/8 inch space between sheets at end and side joints.
  - c. Stagger panel end joints.
  - d. Sheathing shall be continuous of two spans minimum.
2. Edge Bearing and Blocking:
  - a. As indicated on Contract Drawings.
3. Nail Spacing:
  - a. As indicated on Contract Drawings.
  - b. Place nails at least 3/8 inch in from edge.
4. Thickness:
  - a. As indicated on Contract Drawings.
5. Do not install any piece of roof sheathing with shortest dimension of less than 24 inches unless support is provided under all edges.



D. Floor Sheathing:

1. Floor Sheathing: 1 Layer Subflooring.

- a. Apply bead of glue to structural supports. Lay face grain / strength axis across supports and with panel continuous over two supports minimum.
- b. Allow expansion gap of at least 1/2 inch at walls.
- c. Tongue and Groove.
- d. Nail Spacing.
  - 1) As indicated on Contract Drawings.
- e. Thickness:
  - 1) As indicated on Contract Drawings.
- f. Do not install any piece of floor sheathing with shortest dimension less than 24 inches.

### 3.2 FIELD QUALITY CONTROL

A. Field Inspections:

1. Sheathing:

- a. General:
  - 1) Owner is responsible for Quality Assurance. Quality assurance performed by Owner will be used to validate Quality Control performed by Contractor.
  - 2) Quality Control is sole responsibility of Contractor as specified in Section 01 4523 'Testing And Inspection Services'.
- b. For walls and roof areas where nail spacing is 4 inches and less on center, Inspector shall verify wood panel sheathing, grade, thickness and nominal size of framing members, adjoining panel edges, nail size and spacing, bolting and other fastening of other components.

### 3.3 PROTECTION

- A. Protect roof sheathing from moisture until roofing is installed.

**END OF SECTION**

## SECTION 06 1712 - STRUCTURAL COMPOSITE LUMBER: SCL

### PART 1 - GENERAL

#### 1.1 SUMMARY

- A. Products Furnished But Not Installed Under This Section:
  - 1. Laminated Veneer Lumber (LVL).
  - 2. Parallel Strand Lumber (PSL).
- B. Related Requirements:
  - 1. Section 06 1100: 'Wood Framing' for installation, securing, bracing, etc.

#### 1.2 REFERENCES

- A. Reference Standards:
  - 1. ASTM International:
    - a. ASTM D2559-12a(2018), 'Standard Specification for Adhesives for Structural Laminated Wood Products for Use Under Exterior Exposure Conditions'.
    - b. ASTM D5456-18, 'Standard Specification for Evaluation of Structural Composite Lumber Products'.

#### 1.3 SUBMITTALS

- A. Informational Submittals:
  - 1. Certificates: Provide certification confirming that material structural design properties and design stresses have met or exceed requirements shown on Drawings.
  - 2. Test And Evaluation Reports: Copies of ICC or CCMC reports showing approval materials.
  - 3. Qualification Statements:
    - a. Alternate Supplier(s):
      - 1) Provide name and contact information.
      - 2) Provide Qualification documentation as requested.

#### 1.4 QUALITY ASSURANCE

- A. Qualifications:
  - 1. Suppliers:
    - a. Category Three Approved Supplier(s):
      - 1) Approval subject to agreement process approval.
    - b. Alternate Supplier(s):

- 1) Fabricator Firm specializing in performing work of this section.
- 2) Provide documentation of the following:
  - a) Firm experience in supplying products indicated for this Project.
  - b) Financial stability.
  - c) Sufficient production capacity to produce required units.
  - d) Comply with specifications and Contract Documents.
  - e) Agree to complete reporting documents, including: Agree to provide total costs to the Church including breakdown costs of millwork.
- 3) Submit documentation to Architect or Owner.

## 1.5 DELIVERY, STORAGE, AND HANDLING

### A. Storage And Handling Requirements:

1. Store members on job site in accordance with Manufacturer's instructions.
2. Keep dry and provide supports to keep members off floor or ground.
3. Split plastic wrappers of members stored encased in plastic on bottom side to allow for air circulation.

## PART 2 - PRODUCTS

### 2.1 MANUFACTURED UNITS

#### A. Suppliers:

1. Category Three Approved Suppliers. See Section 01 6200 for definitions of Categories and Section 01 4301 for Qualification Requirements:
  - a. BMC, West Jordan, UT. [www.BuildWithBMC.com](http://www.BuildWithBMC.com). Contact Par Palmer:
    - 1) Office: (801) 224-0541.
    - 2) Mobile: (801) 376-9853.
    - 3) E-Mail: [Par.Palmer@BuildWithBMC.com](mailto:Par.Palmer@BuildWithBMC.com) or [www.BuildWithBMC.com](http://www.BuildWithBMC.com).
  - b. J. M. Thomas Forest Products, Ogden, UT. [www.thomasforest.com](http://www.thomasforest.com). Contact Tom Karren:
    - 1) Office: (800) 962-8780.
    - 2) FAX: 801-782-9652.
    - 3) E-Mail: [tom@thomasforest.com](mailto:tom@thomasforest.com).
  - c. Shelter Products, Inc., Portland, OR [www.shelter-products.com](http://www.shelter-products.com). Contact Mike Running:
    - 1) Office: (800) 662-3612.
    - 2) Cell: NA.
    - 3) FAX: (503) 238-2663.
    - 4) E-Mail: [mrunning@shelter-products.com](mailto:mrunning@shelter-products.com).

#### B. Acceptable Manufacturers:

1. Boise Cascade Corp, Boise, ID [www.bc.com](http://www.bc.com).
2. Georgia-Pacific Corp, Atlanta, GA [www.gp.com](http://www.gp.com).
3. Jager Industries Inc, Calgary, AB [www.jagerbuildingsystems.com](http://www.jagerbuildingsystems.com).

4. Louisiana Pacific Corp, Portland, OR [www.lpcorp.com](http://www.lpcorp.com).
5. Roseburg Forest Products, Roseburg, OR [www.roseburg.com](http://www.roseburg.com).
6. Trus Joist Corp, Div Weyerhaeuser, Boise, ID [www.tjm.com](http://www.tjm.com) or Surrey, BC (604) 588-7878.
7. Web Joist, Chehalis, WA [www.webjoist.com](http://www.webjoist.com).
8. Weyerhaeuser, Engineered Lumber Products, Boise, ID [www.woodbywy.com](http://www.woodbywy.com).
9. Equal as approved by Architect before bidding. See Section 01 6200.

C. Design Criteria:

1. Materials shall be tested and evaluated in accordance with ASTM D5456.
2. Materials shall have current ICC-ES Evaluation Report, report approved by International Codes Council, or report issued by Architect approved model code evaluation service and shall comply with requirements of report.

D. Materials:

1. Wood framing list:
  - a. Provide Category Three Approved Suppliers with wood framing list.
2. Members:
  - a. Identify materials by stamp or stamps indicating manufacturer's name, product trade name, grade, species (if applicable), evaluation report number, plant number, and name or logo of independent inspection agency.
3. Adhesive: Meet requirements of ASTM D2559.

- E. Fabrication: Materials shall be manufactured in a plant evaluated for fabrication by governing code evaluation service and under supervision of third party inspection agency listed by governing code evaluation service.

**PART 3 - EXECUTION: Not Used**

**END OF SECTION**

## SECTION 06 1733 - WOOD 'I' JOISTS

### PART 1 - GENERAL

#### 1.1 SUMMARY

- A. Products Furnished But Not Installed Under This Section:
  - 1. Plywood web 'I' joists, web stiffeners, and components.
- B. Related Requirements:
  - 1. Section 06 1100: 'Wood Framing' for installation, securing, bracing, etc.

#### 1.2 REFERENCES

- A. Association Publications:
  - 1. International Code Council (ICC):
    - a. ICC, 500 New Jersey Avenue, NW, 6th Floor, Washington, DC 20001, Phone (888) ICC-SAFE (422-7233) [www.iccsafe.org](http://www.iccsafe.org).
    - b. ICC-ES Evaluation Reports, [www.icc-es.org](http://www.icc-es.org).

#### 1.3 SUBMITTALS

- A. Action Submittals:
  - 1. Shop Drawings:
    - a. Include following information on submitted shop drawings:
      - 1) Show critical dimensions for determining fit and placement in building as well as loads joists are designed to support.
      - 2) Flange material and sizes.
      - 3) Size, thickness, and dimension of web.
      - 4) Lumber species and grades used.
      - 5) Web stiffener locations, make-up, and installation.
      - 6) Name and trademark of Manufacturer.
- B. Informational Submittals:
  - 1. Test And Evaluation Reports: Copies of ICC reports showing approval of connections and webs.
  - 2. Test And Evaluation Reports: Copies of ICC or CCMC reports showing approval of connections and webs.
  - 3. Qualification Statements:
    - a. Alternate Supplier(s):
      - 1) Provide name and contact information.
      - 2) Provide Qualification documentation as requested.

## 1.4 QUALITY ASSURANCE

### A. Qualifications:

#### 1. Suppliers:

##### a. VMR Approved Supplier(s):

- 1) Approval subject to VMR agreement process approval.

##### b. Alternate Supplier(s):

- 1) Fabricator Firm specializing in performing work of this section.
- 2) Provide documentation of the following:
  - a) Firm experience in supplying products indicated for this Project.
  - b) Financial stability.
  - c) Sufficient production capacity to produce required units.
  - d) Comply with specifications and Contract Documents.
  - e) Agree to complete reporting documents, including: Agree to provide total costs to the Church including breakdown costs of millwork.
- 3) Submit documentation to Architect or Owner.

## 1.5 DELIVERY, STORAGE, AND HANDLING

### A. Storage And Handling Requirements:

1. Store joists in vertical position protected from weather.
2. Handle with care to prevent damage.

## PART 2 - PRODUCTS

### 2.1 MANUFACTURED UNITS

#### A. Suppliers:

1. Category Three Approved Suppliers. See Section 01 6200 for definitions of Categories and Section 01 4301 for Qualification Requirements:
  - a. BMC, West Jordan, UT. [www.BuildWithBMC.com](http://www.BuildWithBMC.com). Contact Par Palmer:
    - 1) Office: (801) 224-0541.
    - 2) Mobile: (801) 376-9853.
    - 3) E-Mail: [Par.Palmer@BuildWithBMC.com](mailto:Par.Palmer@BuildWithBMC.com) or [www.BuildWithBMC.com](http://www.BuildWithBMC.com).
  - b. J. M. Thomas Forest Products, Ogden, UT. [www.thomasforest.com](http://www.thomasforest.com). Contact Tom Karren:
    - 1) Office: (800) 962-8780.
    - 2) FAX: 801-782-9652.
    - 3) E-Mail: [tom@thomasforest.com](mailto:tom@thomasforest.com).
  - c. Shelter Products, Inc., Portland, OR [www.shelter-products.com](http://www.shelter-products.com). Contact Mike Running:

- 1) Office: (800) 662-3612.
- 2) Cell: NA.
- 3) FAX: (503) 238-2663.
- 4) E-Mail: mrunning@shelter-products.com.

B. Acceptable Manufacturers:

1. Boise Cascade Corp, Boise, ID www.bc.com.
2. Georgia-Pacific Corp, Atlanta, GA www.gp.com.
3. Jager Industries Inc, Calgary, AB www.jagerbuildingsystems.com.
4. Louisiana Pacific Corp, Portland, OR www.lpcorp.com.
5. Roseburg Forest Products, Roseburg, OR www.roseburg.com.
6. Trus Joist Corp, Div Weyerhaeuser, Boise, ID www.tjm.com or Surrey, BC (604) 588-7878.
7. Web Joist, Chehalis, WA www.webjoist.com.
8. Weyerhaeuser, Engineered Lumber Products, Boise, ID www.woodbywy.com.
9. Equal as approved by Architect before bidding. See Section 01 6200.

C. Performance:

1. Design Criteria:
  - a. Provide joists that meet the load capacity and stiffness requirements shown on Drawings.
  - b. Provide joists that meet shear, moment, and stiffness properties shown on Drawings.
  - c. Custom design joists under supervision of registered professional engineer. Designs shall be in accordance with allowable values assigned by building code approval.
  - d. Only connections and webs currently approved by Research Committee of ICC or by Canadian Construction Materials Centre (CCMC) are acceptable for use.
  - e. Materials shall have current ICC-ES Evaluation Report, report approved by International Codes Council, or report issued by Architect approved model code evaluation service and shall comply with requirements of report.

D. Materials:

1. Wood framing list:
  - a. Provide Category Three Suppliers with wood framing list.

## 2.2 FABRICATION

- A. Fabrication of joists shall be as approved by ICC, except where requirements of Contract Documents exceed ICC requirements.

### PART 3 - EXECUTION: Not Used

**END OF SECTION**





- a. DSB-89, 'Recommended Design Specification for Temporary Bracing of Metal Plate Connected Wood Trusses'.
- 3. Truss Plate Institute (TPI) / Structural Building Components Association (SBCA):
  - a. TPI/SBCA Structural Building Components Association Components Safety Information BCSI 'Guide to Good Practice for Handling, Installing, Restraining & Bracing of Metal Plate Connected Wood Trusses' (2013 Edition with 2015 Update).

B. Definitions:

- 1. Metal-Plate-Connected Wood Trusses: Planar structural units consisting of metal-plate-connected members fabricated from dimension lumber and cut and assembled before delivery to Project site.

C. Reference Standards:

- 1. American National Standards Institute (ANSI) / Truss Plate Institute (TPI):
  - a. ANSI/TPI 1-2014, 'National Design Standard for Metal Plate Connected Wood Truss Construction.
- 2. ASTM International:
  - a. ASTM A641M-09a (2014), 'Standard Specification for Zinc-Coated (Galvanized) Carbon Steel Wire'.
  - b. Drawings.

### 1.3 ADMINISTRATIVE REQUIREMENTS

A. Sequencing:

- 1. Time delivery and erection of trusses to avoid extended on-site storage and to avoid delaying progress of other trades whose work follow erection of trusses.

### 1.4 SUBMITTALS

A. Action Submittals:

- 1. Shop Drawings:
  - a. Truss design drawings:
    - 1) Base truss design drawings on truss configurations and truss loads and requirements of Contract Documents. Joint configurations may be modified to allow double cut webs. Determine member forces from exact analysis method as defined by TPI.
    - 2) Include following information:
      - a) Allowable loads in lbs per effective nail or lbs per sq inch for lumber and plates used as allowed by ICBO and current ICBO report number.
      - b) Stress reduction factors used for plates and lumber.
      - c) Top and bottom chord design loads in psf.
      - d) Size, thickness, and exact location by dimension of plates.
      - e) Lumber species and grades used.
      - f) Combine stress index for each member.
      - g) Stamp and signature of Engineer responsible for preparation of drawings.
      - h) Name and trademark of Plate Manufacturer if metal plates are used.
      - i) Name and address of Truss Fabricator and Project name and address.

## B. Informational Submittals:

1. Certificates:
  - a. Complete and provide copy of certification "Truss Plant Certification Requirements Form" to Architect before bid.
  - b. Provide attachment copy of truss plant certification with completed "Truss Plant Certification Requirements Form" to Architect and Testing Agency before commencing fabrication of Wood Trusses.
2. Test And Evaluation Reports:
  - a. Copies of previous four quarterly inspection reports verifying compliance with TPI regulations unless the Truss Fabricator provides proof that they are certified and in good standing with the In-Plant WTCA QC program certification.

## 1.5 QUALITY ASSURANCE

### A. Qualifications. Requirements of Section 01 4301 applies, but is not limited to the following:

1. Metal Connector-Plate Manufacturer Qualifications:
  - a. Member of TPI and complies with quality-control procedures in TPI 1 for manufacturer of connector plates.
    - 1) Fabricator's responsibility includes providing professional engineering services needed to assume engineering responsibility.
    - 2) Engineering responsibility: Preparation of shop drawings and comprehensive engineering analysis by qualified professional engineer registered in location of jurisdiction.
2. Fabricator Qualifications:
  - a. Fabricator must have a letter providing evidence that they are certified and in good standing with their third party accredited Quality Assurance business.
  - b. Fabricator shall have in place a program requiring fabrication plant to be inspected four times each year by an independent testing laboratory in accordance with TPI regulations.

## 1.6 DELIVERY, HANDLING, AND STORAGE

### A. Delivery And Acceptance Requirements:

1. Notify Architect two (2) days minimum before arrival of trusses to allow for scheduling of truss inspection on site before unloading and for monitoring of unloading procedure.
2. Unload trusses by one of following methods.
  - a. As outlined in TPI / SBCA Booklet BCSI, 'Guide to Good Practice For Handling, Installing & Bracing of Metal Plate Connected Wood Trusses'.
  - b. Trusses may be unloaded by dumping if trusses are shipped horizontally, are rolled off low profile roller bed trailer, and if no part of any truss is required to drop more than 18 inches.
3. After delivery of trusses:
  - a. Inspect for damage before installing trusses.
  - b. Inspect for "gaps" between framing members.
  - c. Discard and replace trusses that are damaged or defective.

## PART 2 - PRODUCTS

### 2.1 MANUFACTURERS

#### A. Wood Truss Fabricators:

1. Type Two Acceptable Fabricator:
  - a. Meet following requirements:
    - 1) Wood Truss fabricator whose products meet quality requirements of this Section.
    - 2) Wood Truss fabricator shall be certified and submit copy of the truss plant certification with 'Truss Plant Certification Requirements Form' the Architect and Testing Agency before commencing fabrication of Wood Trusses.

### 2.2 MANUFACTURED UNITS

#### A. Performance:

1. Design Criteria:
  - a. Top and Bottom Chords and Web Members:
    - 1) 2 inch by 4 inch nominal minimum size unless noted otherwise by Contract Documents.
    - 2) Sizes, species, and grades of members shall be as required to provide combined stress indexes of less than one.
    - 3) Designed in accordance with ANSI/TPI 1 for given design loads.
    - 4) Of quality to meet or exceed stress grade requirements given in table below for each lumber classification and to meet requirements for dimension lumber in Section 06 1100. Truss members not called out on Drawings shall meet or exceed stresses of classification C.

- a) Of quality to meet minimum stress grade requirements given below:

	Class A, 2x6	Class B, 2x6	Class C, 2x4	Class C, 2x6
Fb Bending	1720	1495	1510	1310
Ft Tension	1010	880	825	725
Fv Shear	75	75	75	75
Fc Perpendicular	405	405	405	405
Fc Parallel	1650	1485	1495	1430
E	1.6x10 <sup>6</sup>	1.5x10 <sup>6</sup>	1.5x10 <sup>6</sup>	1.5x10 <sup>6</sup>

- b) Allowable stresses shown are for normal duration of load and repetitive member use.
- c) Following machine stress rated lumbers may be substituted for the above lumbers provided the combined stress ratio for each member is less than 1.0 by National Design Specification for Wood formulas, 2001. Total load deflection is less than L/240 and live load deflection is less than L/360.

A	B	C
2100f - 1.8E	1800f - 1.6E	1650f - 1.5E

- b. Metal Gusset Plates:
  - 1) Plate design and manufacture shall be as approved by 'The Research Committee for the ICC'.

- 2) Truss plates for symmetrical trusses shall be same size on both sides of truss. Determine size to be used by highest loading value on either side of truss.

B. Materials:

1. Wood framing list:
  - a. Provide VMR Suppliers with wood framing list.
2. Top And Bottom Chords And Web Members:
  - a. Douglas Fir-Larch #2 or better, Hem Fir #1 or better, MSR 1650F-1.5E or better, Southern Pine #2 or better, or Spruce Pine Fir #2 or better.
3. Metal Gusset Plates:
  - a. Connector plates to comply with TPI 1 from hot-dip galvanized steel sheet complying with ASTM A 653/A 653M; Structural Steel (SS), high-strength low-alloy steel Type A (HSLAS Type A), or high-strength low-alloy steel Type B (HSLAS Type B); G60 coating designation; and not less than 0.036 inch thick.
    - 1) Use for interior locations.
  - b. Manufacturer's name or trademark shall be visible on plates.
  - c. Category Four Approved Manufacturers. See Section 01 6200 for definitions of Categories:
    - 1) Eagle Metal Products, Dallas, TX [www.eaglemetal.com](http://www.eaglemetal.com).
    - 2) ITW Building Components Group, Glenview, IL [www.itwbcg.com](http://www.itwbcg.com).
    - 3) MiTek Industries, Inc.; a subsidiary of Berkshire Hathaway Inc. Chesterfield, MO [www.mii.com](http://www.mii.com) or MiTek Canada, Bradford ON [www.mii.com/canada](http://www.mii.com/canada).
    - 4) Simpson AS Truss Connector Plates; Simpson Strong-Tie Company Inc. Pleasanton, CA [www.strongtie.com](http://www.strongtie.com).

C. Fabrication:

1. General:
  - a. Fabrication of trusses shall be as approved by ICC except that this Specification shall govern when it exceeds ICC requirements.
  - b. Fabricate trusses from approved shop drawings.
  - c. Fabricate trusses in jigs with members accurately cut to provide good bearing at joints. Joints shall be acceptable if the average opening between ends of members immediately after fabrication is less than 1/16 inch.
  - d. Each chord section shall be involved in two (2) panel points before being spliced.
2. Metal Gusset Plates:
  - a. No panel point shall have more than one (1) plate per truss side.
  - b. Plates shall have minimum bite of 2-1/2 inches on members. Measure bite along center line of webs and perpendicular to chord axes. Orient plate axis parallel with truss chord axis except where chords change pitch or terminate. Plates may be placed parallel with webs at single web joints.
    - 1) Minimum bite requirements are waived for non-structural webs parallel to top chords added for insulation backing and for other non-structural members.
    - 2) Minimum bite requirements are waived for truss blocking.
  - c. Plate Sizes:
    - 1) Minimum width of plates shall be 3 inches.

- a) Minimum bite requirements are waived for non-structural webs parallel to top chords added for insulation backing.
- b) Minimum width requirements are waived for truss blocking.
- 2) For flat bottom chord trusses, size plates for 110 percent of member forces. For scissor trusses, size plates for 150 percent of member forces. If webs are double cut, plates are to be sized for additional 10 percent of the member forces.
- 3) Size plates, nail and steel section for 110 percent of member forces.
- 4) No increase in plate values will be allowed for duration of loading or other factors.
- d. Press plates into members to obtain full penetration without crushing outer surface of wood. Plate embedment is acceptable if opening between plate and wood surface is less than 1/32 inch.
- e. Lumber defects and plate misplacement, in combination, shall not reduce plate area or number of effective teeth, prongs, or nails by more than ten percent.
- f. Do not apply metal gusset plates after shop fabrication.

### **PART 3 - EXECUTION**

#### **3.1 FIELD QUALITY CONTROL**

##### **A. Field Tests And Inspections:**

- 1. Prefabricated Metal Plate Connected Wood Trusses:
  - a. Testing Agency will obtain "Truss Plant Certification Requirements Form" attachment copy from Architect as per requirements of Section 06 1753 Shop-Fabricated Wood Trusses: Trusses Rafters.
  - b. Where truss clear span is 60 feet or greater, Inspector shall verify that temporary installation restraint/bracing and permanent individual truss member restraint/bracing are installed in accordance with approved truss submittal package.

**END OF SECTION**

**ATTACHMENTS**

# Truss Plant Certification Requirements Form

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Metal Plate Connected Wood Truss suppliers shall be certified as evidenced by submittal of a copy of the truss plant certification with this completed form to the Architect and Testing Agency before commencing fabrication of Wood Trusses.

Metal Plate Connected (MPC) wood truss operations must design, manufacture and provide quality control and quality audits that comply with the latest edition of ANSI/TPI-1 promulgated by the Truss Plate Institute.

The truss plant must be certified by an independent third party accredited Quality Assurance business such as, but not limited to, the Truss Plate Institute (TPI); the Southern Pine Inspection Bureau, the Timber Products Inspection Bureau or the PFS Corp. The third party accredited Quality Assurance business must be under the auspices of the International Accreditation Services (IAS) or the American National Standards Institute (ANSI) and be ISO/IES Standard 17020 compliant. The inspection/audit process is to be completely independent of the truss manufacturer.

Truss plant shall fulfill the following requirements (see [www.sbcindustry.com](http://www.sbcindustry.com) and [www.tpinst.org](http://www.tpinst.org) or [www.tpic.ca](http://www.tpic.ca)):

- \_\_\_\_\_ Shall have an independent and accredited third party inspection agency (Quality Assurance business) staff member visit the truss plant for the certification, and shall have at least one inspection done quarterly by an independent third party inspection agency that is itself certified.
- \_\_\_\_\_ Shall meet all necessary in-plant requirements including: The Acceptance Criteria for Quality Documentation (ICC AC-10) by the ICC Evaluation Service, Inc. which shall include the quality control requirements of the Product Standard of ANSI / TPI. Meeting the ANSI / TPI standard includes having an in-plant quality control manual, quality control procedures in place, and meeting the weekly inspection frequency.
- \_\_\_\_\_ Do inspections at the required frequency and of the type established by the certification program. Specifically as a minimum, three trusses per set up location per shift per week.
- \_\_\_\_\_ Not manufacture trusses or use components that do not comply with the requirements of this form and of the Contract Documents.
- \_\_\_\_\_ Provide proof of compliance to the requirements of this form and provide the proof to the General Contractor who will forward it to the Architect prior to the truss plant providing a bid.

OR

Truss plant shall be certified and be in good standing with the In-Plant WTCA QC program. This includes the following requirements (see [www.sbcindustry.com](http://www.sbcindustry.com) and [www.tpinst.org](http://www.tpinst.org) or [www.tpic.ca](http://www.tpic.ca)):

- \_\_\_\_\_ Truss plant has been trained by SBCA on the ANSI/TPI 1 QC standard.
- \_\_\_\_\_ Truss plant has quarterly third party inspections, and that the third party has been trained by SBCA.
- \_\_\_\_\_ Truss plant has quality control manual that meets the AC-10 requirements.
- \_\_\_\_\_ Truss plant has quality control procedures in place including: meeting the weekly inspection frequency, performing detailed inspections, and documenting any inspection problems and how they were resolved.
- \_\_\_\_\_ Truss plant is sending their data quarterly to SBCA for review.
- \_\_\_\_\_ Truss plant shall not manufacture trusses or use components that do not comply with the requirements of this form and of the Contract Documents.

In-Plant WTCA QC certified plants are listed at [www.sbcindustry.com/wtcaqccertco.php](http://www.sbcindustry.com/wtcaqccertco.php).

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## SECTION 06 2001 - COMMON FINISH CARPENTRY REQUIREMENTS

### PART 1 - GENERAL

#### 1.1 SUMMARY

A. Includes But Not Limited To:

1. Furnish and install sealants required for items installed under this Section, as described in Contract Documents.

B. Products Installed But Not Furnished Under This Section:

1. Architectural Woodwork.
2. Factory Manufactured Access Doors.
3. Selected Building Specialties.
4. Selected Equipment.
5. Window Stools.
6. Wood-Veneer-Faced Architectural Cabinets.
7. Miscellaneous as specified elsewhere.

C. Related Requirements:

1. Section 06 1100: 'Wood Framing' for furring and blocking.
2. Section 06 1636: 'Wood Panel Product Sheathing'.
3. Sections under 06 4000 Heading: Furnishing of Architectural Woodwork.
  - a. Section 06 4001: 'Common Architectural Woodwork Requirements':
    - 1) Approved Fabricators.
    - 2) Quality of wood materials to be used in Finish Carpentry.
  - b. Section 06 4114: 'Wood-Veneer-Faced Architectural Cabinets'.
  - c. Section 06 4313: 'Wood Stairs'.
  - d. Section 06 4512: 'Architectural Woodwork Wood Trim'.
4. Section 06 6001: 'Miscellaneous Plastic Fabrications' for quality of Window Stools.
5. Section 07 9213: 'Elastomeric Joint Sealants' for quality of sealants, submittal and installation requirements.
6. Section 08 3110: 'Access Doors And Panels' for furnishing of Factory Manufactured Access Doors.
7. Sections under 09 9000 heading: Back priming of work to be installed against concrete or masonry or subjected to moisture, and finishing of finish carpentry and architectural woodwork.
8. Sections in Division 10: Furnishing of Specialties.
9. Sections in Division 11: Furnishing of Equipment.

#### 1.2 REFERENCES

A. Association Publications:

1. Architectural Woodwork Institute / Architectural Woodwork Manufacturers Association of Canada / Woodwork Institute, 46179 Westlake Drive, Suite 120, Potomac Falls, VA [www.awinet.org](http://www.awinet.org).
  - a. Architectural Woodwork Standards (AWS), 2nd Edition, 2014.

B. Definitions:

1. Grade: Unless otherwise noted, this term means Grade rules for Economy, Custom, and/or Premium Grade:
  - a. Economy Grade: The lowest acceptable grade in both material and workmanship requirements, and is for work where price outweighs quality considerations.
  - b. Custom Grade: Typically specified for and adequately covers most high-quality architectural woodwork, providing a well-defined degree of control over a project's quality of materials, workmanship, or installation.
  - c. Premium Grade: The highest Grade available in both material and workmanship where the highest level of quality, materials, workmanship, and installation is required.

## **PART 2 - PRODUCTS**

### **2.1 MATERIALS**

- A. Glue: Waterproof and of best quality.

## **PART 3 - EXECUTION**

### **3.1 EXAMINATION**

- A. Verification Of Conditions:
1. Verify walls, ceilings, floors, and openings are plumb, straight, in-line, and square before installing Architectural Woodwork.
  2. Report conditions that are not in compliance to Architect before starting installation.

### **3.2 PREPARATION**

- A. Surface Preparation:
1. Install Architectural Woodwork after wall and ceiling painting is completed in areas where Architectural Woodwork is to be installed.

### **3.3 INSTALLATION**

- A. Special Techniques:
1. AWS Custom Grade is minimum acceptable standard, except where explicitly specified otherwise, for installation of architectural woodwork.
- B. General Architectural Woodwork Installation:
1. Fabricate work in accordance with measurements taken on Project site.
  2. Scribe, miter, and join accurately and neatly to conform to details.
  3. Exposed surfaces shall be machine sanded, ready for finishing.
  4. Allow for free movement of panels.
  5. Countersink nails. Countersink screws and plug those exposed to view.
- C. Items Installed But Not Furnished Under This Section: Install in accordance with requirements specified in Section furnishing item.



1. Window Stool:
  - a. Install window stool to structure with silicone sealant as specified in Section 07 9213 'Elastomeric Joint Sealant'.

**END OF SECTION**

# SECTION 06 2024 - DOOR, FRAME, AND FINISH HARDWARE INSTALLATION

## PART 1 - GENERAL

### 1.1 SUMMARY

- A. Includes But Not Limited To:
  - 1. Furnish and install sealants for caulking door frames as described in Contract Documents.
  - 2. Furnish and install insulation in door frames as described in Contract Documents.
- B. Products Installed But Not Furnished Under This Section:
  - 1. Flush wood doors.
  - 2. Finish hardware.
- C. Related Requirements:
  - 1. Section 07 2116: 'Blanket Insulation' for quality of fiberglass insulation.
  - 2. Section 07 9213: 'Elastomeric Joint Sealants' for quality of sealants.
  - 3. Sections under 08 1000 heading: Furnishing of doors and metal frames.
  - 4. Sections under 08 7000 heading: Furnishing of finish hardware.

### 1.2 ADMINISTRATIVE REQUIREMENTS

- A. Pre-Installation Conference.
  - 1. Participate in pre-installation conference.
  - 2. In addition to agenda items specified in Section 01 3100, review following:
    - a. Schedule conference after hardware has been delivered to site and organized into hardware groups by door, but before installation of hardware.
    - b. Check for appropriate blocking and for correct hardware models and fasteners for substrates.
    - c. Review submittals and set of Manufacturer's installation, adjustment, and maintenance instructions submitted under Section 08 7101.
    - d. Review use of crowbar or other prying devices are not permitted to be used to set door frame into wall opening.

### 1.3 SUBMITTALS

- A. Informational Submittals:
  - 1. Installer Report:
    - a. Report verifying correct operation and adjustment of installed hardware.
  - 2. Special Procedure Submittals:
    - a. Copy of 'Installation Guide for Doors & Hardware' by Door & Hardware Institute. Guide may be obtained from Door and Hardware Institute (DHI).

## 1.4 QUALITY ASSURANCE

- A. Regulatory Agency Sustainability Approvals:
  - 1. Fire door installations shall meet code requirements.

## 1.5 DELIVERY, STORAGE, AND HANDLING

- A. Delivery And Acceptance Requirements:
  - 1. Wood Doors:
    - a. Do not have doors delivered to building site until after plaster, cement, and taping compound are dry.
    - b. If doors are to be stored at job-site for more than one week, seal top and bottom edges if not factory sealed.
  - 2. Metal Frames:
    - a. Examine door frames and note damage upon acceptance.
- B. Storage And Handling Requirements:
  - 1. Wood Doors:
    - a. Store flat on a level surface in a dry, well ventilated building.
      - 1) Cover to keep clean but allow air circulation
    - b. Handle with clean gloves and do not drag doors across one another or across other surfaces.
    - c. Do not subject doors to abnormal heat, dryness, or humidity or sudden changes therein
      - 1) Condition doors to average prevailing humidity of locality before hanging.
  - 2. Metal Frames:
    - a. Protect metal frames from damage before and during installation.

## PART 2 - PRODUCTS: Not Used

## PART 3 - EXECUTION

### 3.1 INSTALLATION

- A. Hollow Metal Frames:
  - 1. Site Tolerances:
    - a. Squareness: 1/16 inch from top edge to opposite top edge.
    - b. Plumbness: 1/16 inch from top of jamb to bottom of jamb.
    - c. Alignment: 1/16 inch from plane of left side face of jamb to right side face of jamb.
    - d. Twist: 1/16 inch across throat of jamb plane measured across each face to plane of opposite jamb throat.
    - e. Finished Clearance Between Door And Frame:

- 1) 1/16 inch at head and hinge jamb plus 1/16 inch maximum
  - 2) 1/8 inch at strike jamb plus or minus 1/16 inch maximum.
  - 3) 1/2 inch to top of finished floor surface or 1/4 inch to top of threshold, plus or minus 1/16 inch maximum.
2. Set frame in location and level head.
    - a. Use of crowbar or other prying device to set door frame into wall opening will damage door frames and are not permitted to be used.
  3. Equalize with adjustable floor anchor.
  4. Set spreaders and fasten jambs to floor and wall.
    - a. Wood spreaders shall be square, fabricated from lumber one inch minimum thick, be same length as door opening at header, and same depth as frame.
    - b. Cut notches for frame stops.
    - c. Do not remove spreaders until frames are permanently anchored in wall.
    - d. Use one spreader at base of frame and another at strike level.
    - e. Do not use temporary spreaders welded to base of jambs during installation of frame.
  5. Fill gap between frame and framing with urethane foam or tightly-packed fiberglass insulation. If urethane foam is used, foam interior of frames before installing frame. Trim excess before installation of frame.
  6. Caulking:
    - a. Caulk around both sides of frames of doors receiving acoustical seals with specified sealant.

B. Doors:

1. When Project is completed, doors shall not bind, stick, or be mounted so as to cause future hardware difficulties.
2. Do not impair utility or structural strength of door in fitting of door, applying hardware, or cutting and altering door louvers, panels, or other special details.

C. Hardware:

1. General:
  - a. Install using set of Manufacturer's installation, adjustment, and maintenance instructions submitted with hardware under Section 08 7101. Follow as closely as possible.
  - b. Mount closers on jamb stop side of door in parallel arm configuration where it is physically possible to do so and not damage or hinder operation of door or closer.
2. Hardware for Wood Doors:
  - a. If doors are not factory-machined, use hardware templates furnished by Hardware Manufacturer when mounting hardware.
  - b. Set hinges flush with edge surface. Be sure that hinges are set in a straight line to prevent distortion.
  - c. Mount door latches high in strike plate opening so when door later settles, latch will not bind.

### 3.2 FIELD QUALITY CONTROL

A. Field Tests:

1. Arrange to have keys brought to Project site and, in meeting attended by local representatives and Architect, test every new key and locking mechanism.

B. Non-Conforming Work: Non-conforming work as covered in the General Conditions applies, but is not limited to the following:

1. Correct any work found defective or not complying with contract document requirements at no additional cost to the Owner.
2. Door frames:
  - a. Door frames damaged by use of crowbar or other prying devices to set door frames shall be repaired or replaced at no additional cost to Owner.

### **3.3 CLOSEOUT ACTIVITIES**

#### **A. Instruction of Owner:**

1. Using Owner's Operations And Maintenance Manual, explain keying systems at same time keys and locking mechanisms are tested.

#### **B. Key Delivery:**

1. Immediately before Final Acceptance Meeting, turn change keys over to Owner properly organized, tagged, and placed in new key cabinet.

**END OF SECTION**



## PART 2 - PRODUCTS

### 2.1 MATERIALS

#### A. Shelves:

1. Design Criteria:
  - a. Conform to applicable requirements of Sections 06 4001.
  - b. Fabricate the work of this section to AWS 'Custom Grade'.
  - c. Species as acceptable for AWS 'Custom Grade'.
2. Material:
  - a. Panel Product:
    - 1) Glues (adhesives) used in manufacture and fabrication of panel products shall be Type I or II.
    - 2) Moisture content shall be same as specified for lumber.
    - 3) Cores:
      - a) All Other: Industrial grade particle board with minimum density of 45 lbs per cu ft.
    - 4) Facings:
      - a) All facings shall be Melamine or Kortron.
    - 5) Thickness:
      - a) 30 Inch Span And Less: 3/4 inch thick.
      - b) Spans Over 30 Inches To 42 Inches: One inch thick.
      - c) Spans Over 42 inches: One inch thick and provide equal center supports.
  - b. Edgings:
    - 1) Use 3/4 inch Kortron or Melamine faced Panel Product with hot glued 3 mm thick PVC with eased edges. Apply banding on all four edges of adjustable shelving and on exposed edges of fixed shelving, with one-inch return onto unexposed edges. Edge banding color to match Panel Product.

### 2.2 ACCESSORIES

#### A. Manufacturer:

1. Manufacturer Contact Information:
  - a. Knapé & Vogt, Grand Rapids, MI [www.knapandvogt.com](http://www.knapandvogt.com) or Knapé & Vogt Canada Inc, Mississauga, ON (905) 676-8166.

#### B. Shelf Brackets And Standards:

1. Brackets:
  - a. Size according to shelf width, end of bracket to be within 2 inches (50 mm) of front edge of shelf.
  - b. Category Four Approved Product. See Section 01 6200 for definitions of Categories.

- 1) 187WH extra heavy duty brackets by Knape & Vogt.
2. Standards:
  - a. Category Four Approved Product. See Section 01 6200 for definitions of Categories.
    - 1) 87WH extra heavy duty standard by Knape & Vogt.

### **PART 3 - EXECUTION**

#### **3.1 INSTALLATION**

- A. Attach metal standards by screws into framing members or special blocking. Utilize all available pre-drilled screw holes in standards.

**END OF SECTION**



# SECTION 06 4001 - COMMON ARCHITECTURAL WOODWORK REQUIREMENTS

## PART 1 - GENERAL

### 1.1 SUMMARY

- A. Includes But Not Limited To:
  - 1. General standards for materials and fabrication of Architectural Woodwork and for hardware associated with Architectural Woodwork.
- B. Related Requirements:
  - 1. Section 06 1100: 'Wood Framing' for furring and blocking.
  - 2. Section 06 2001: 'Common Finish Carpentry Requirements' for Installation.
  - 3. Section 06 4114: 'Wood-Veneer-Faced Architectural Cabinets'.
  - 4. Section 06 6001: 'Miscellaneous Plastic Fabrications'.
  - 5. Section 09 9324: 'Interior Clear-Finished Hardwood' for filling of nail holes and finishing.
  - 6. Section 12 3661: 'Quartz Agglomerate Countertops'.

### 1.2 REFERENCES

- A. Association Publications:
  - 1. Architectural Woodwork Institute / Architectural Woodwork Manufacturers Association of Canada / Woodwork Institute, 46179 Westlake Drive, Suite 120, Potomac Falls, VA [www.awinet.org](http://www.awinet.org).
    - a. Architectural Woodwork Standards (AWS), 2nd Edition, 2014.
- B. Definitions:
  - 1. Grade: Unless otherwise noted, this term means Grade rules for Economy, Custom, and/or Premium Grade:
    - a. Custom Grade: Typically specified for and adequately covers most high-quality architectural woodwork, providing a well-defined degree of control over a project's quality of materials, workmanship, or installation.

### 1.3 SUBMITTALS

- A. Action Submittals:
  - 1. Product Data:
    - a. Manufacturer's literature for specialty items and hardware not manufactured by Architectural Woodwork fabricator.
  - 2. Shop Drawings:
    - a. Category Three Approved Fabricator:
      - 1) Fabricator First Submittal:

- a) Provide 1/4 inch (or larger) scale building layout and/or description of required room walls required for field dimension for Field Quality Control Submittal. Provide submittal before rough framing is completed.
  - 2) Fabricator Second Submittal:
    - a) Provide shop drawings for cabinet and casework that are included for project showing details, casework locations and layout and required dimensions based on Field Quality Control Submittals for compliance to Contract Drawings for approval to Project Architect.
- B. Informational Submittals:
  - 1. Field Quality Control Submittals:
    - a. Contractor First Submittal:
      - 1) Provide verification field dimensions and updated Contract Drawings of all areas requested from Fabricator First Submittal from Category Three Approved Fabricator including but limited to the following:
        - a) Field dimensions (finish wall dimensions) of all walls with casework.
      - 2) Submit First Submittal to Category Three Approved Fabricator within three (3) days of completion of gypsum board installation but before gypsum board finishing to allow Category Three Approved Fabricator necessary time to complete casework.
    - b. Second Submittal:
      - 1) Provide verification field dimensions and updated Contract Drawings after Rostrum floor framing and gypsum board is installed in Rostrum area as requested from First Submittal from Category Three Approved Fabricator including the following:
        - a) Field dimensions (finish wall dimensions) of all walls in rostrum area if included on project.
        - b) Field dimensions of rostrum floor framing.

#### 1.4 SUBMITTALS

- A. Action Submittals:
  - 1. Product Data:
    - a. Manufacturer's literature for specialty items and hardware not manufactured by Architectural Woodwork fabricator.
  - 2. Shop Drawings:
    - a. Fabricator:
      - 1) Provide shop drawings for cabinet and casework that are included for project showing details, casework locations and layout in compliance with Contract Drawings.
- B. Informational Submittals:
  - 1. Qualification Statement:
    - a. Fabricator:

- 1) Provide Qualification documentations as requested.

## 1.5 QUALITY ASSURANCE

A. Qualifications: Requirements of Section 01 4301 applies, but not limited to following:

1. Fabricator:
  - a. Category Three Approved Fabricators:
    - 1) Approval subject to agreement process approval.

## 1.6 DELIVERY, HANDLING, AND STORAGE

A. Delivery And Acceptance Requirements:

1. Fabricator Responsibility:
  - a. Assemble architectural woodwork at Architectural Woodwork Fabricator's plant and deliver ready for erection insofar as possible.
  - b. Protect architectural woodwork from moisture and damage while in transit to job site.
2. General Contractor Responsibility:
  - a. Report damaged materials received within two (2) days from delivery at project site.

B. Storage And Handling Requirements:

1. General Contractor Responsibility:
  - a. Unload and store in place where it will be protected from moisture and damage and convenient to use.

## 1.7 WARRANTY

A. Manufacturer Extended Warranty:

1. Approved Fabricator's written guarantee that all Goods and Services will be free from defects in materials and workmanship for a period of five (5) years from date of substantial completion.

## PART 2 - PRODUCTS

### 2.1 FABRICATORS

A. Approved Fabricators. See Section 01 4301 for Qualification Requirements.

1. Category Three Approved Fabricators. See Section 01 6200 for definitions of Categories and Section 01 4301 for Qualification Requirements:
  - a. Anderson Cabinet and Millwork, 198 North 4700 East, Rigby, ID 83442.

- 1) Contact Information: Matt Miller phone (208) 538-7415 cell (208) 317-7412 e-mail matt@andersoncabinet.com.
  - b. Michael Seiter & Co., Inc., P.O. Box 315 Heber City, UT 84032.
    - 1) Contact Information: Mark Seiter phone (435) 654-0601 fax (435) 654-0613 e-mail mark@msandcoinc.com.
  - c. Thompson and Sons Cabinets, 11834 N. 3400 West, Deweyville, UT 84309.
    - 1) Contact Information: David Thompson cell (435) 230-0876 office (435) 257-7152 e-mail zcabinets@comcast.net.
2. Same Approved Fabricator shall furnish following Specification Sections:
- a. Section 06 4114: 'Wood-Veneer-Faced Architectural Cabinets'.
  - b. Section 06 6001: 'Miscellaneous Plastic Fabrications'.

## 2.2 ASSEMBLIES

### A. Design Criteria:

1. General:
  - a. AWS Custom Grade is minimum acceptable standard, except where explicitly specified otherwise, for materials, construction, and installation of architectural woodwork.
2. Materials:
  - a. Lumber:
    - 1) Grade:
      - a) No defects in boards smaller than 600 sq in.
      - b) One defect per additional 150 sq inches in larger boards.
      - c) Select pieces for uniformity of grain and color on exposed faces and edges.
      - d) No mineral grains accepted.
    - 2) Allowable Defects:
      - a) Tight knots not exceeding 1/8 inch in diameter. No loose knots permitted.
      - b) Patches (dutchmen) not apparent after finishing when viewed beyond 18 inches.
      - c) Checks or splits not exceeding 1/32 inch by 3 inches and not visible after finishing when viewed beyond 18 inches.
      - d) Stains, pitch pockets, streaks, worm holes, and other defects not mentioned are not permitted.
      - e) Normal grain variations, such as cats eye, bird's eye, burl, curl, and cross grain are not considered defects.
    - 3) Use maximum lengths possible, but not required to exceed 10 feet without joints. No joints shall occur closer than 72 inches in straight runs exceeding 18 feet. Runs between 18 feet and 10 feet may have no more than one joint. No joints shall occur within 72 inches of outside corners nor within 18 inches of inside corners.
    - 4) Moisture content shall be six (6) percent maximum at fabrication. No opening of joints due to shrinkage is acceptable.

### B. Fabrication:

1. Follow Architectural Woodwork Standards (AWS) for fabrication of Architectural Woodwork.

2. Tolerances:
  - a. No planer marks (KCPI) allowed. Sand wood members and surfaces with 100 grit or finer.
  - b. Maximum Gap: None allowed.
  - c. Flushness Variation: 0.015 inch maximum.
  - d. Sanding Cross Scratches: 1/4 inch maximum.
  - e. Plug screw holes. Screw locations not to be visible beyond 18 inches.
3. Fabricate work in accordance with measurements taken on job site.
4. 'Ease' sharp corners and edges of exposed members to promote finishing and protect users from splinters. Radius of 'easing' shall be uniform throughout Project and between 1/32 and 1/16 of an inch.
5. Fabricate so veneer grain is vertical.
6. Joints:
  - a. Use lumber pieces with similar grain pattern when joining end to end.
  - b. Compatibility of grain and color from lumber to panel products is required.
7. Install hardware in accordance with Manufacturer's directions. Leave operating hardware operating smoothly and quietly.
8. Remove or repair damaged surface or defects in exposed finished surfaces of architectural woodwork to match adjacent similar undamaged surface.

**PART 3 - EXECUTION: Not Used**

**END OF SECTION**

# SECTION 06 4114 - WOOD-VENEER-FACED ARCHITECTURAL CABINETS

## PART 1 - GENERAL

### 1.1 SUMMARY

- A. Products Furnished But Not Installed Under This Section:
  - 1. Custom casework.
- B. Related Requirements:
  - 1. Section 06 1100: 'Wood Framing' for wall blocking required for Custom Casework.
  - 2. Section 06 2001: 'Common Finish Carpentry Requirements' for installation of Custom casework.
  - 3. Section 06 4001: 'Common Architectural Woodwork Requirements' for:
    - a. Approved Fabricators.
    - b. General standards for materials and fabrication of Architectural Woodwork and for hardware associated with Architectural Woodwork.
  - 4. Section 09 9324: 'Interior Clear-Finished Hardwood' for wood finishes.
  - 5. Sections Under 22 4200 Heading: Plumbing Fixtures.

### 1.2 REFERENCES

- A. Association Publications:
  - 1. Architectural Woodwork Institute / Architectural Woodwork Manufacturers Association of Canada / Woodwork Institute, 46179 Westlake Drive, Suite 120, Potomac Falls, VA [www.awinet.org](http://www.awinet.org).
    - a. Architectural Woodwork Standards (AWS), 2nd Edition, 2014.
    - b. HPVA, NWWDA, or APA.
  - 2. Hardwood Plywood & Veneer Association (HPVA), Reston, VA [www.hpva@hpva.org](http://www.hpva@hpva.org).
  - 3. The Engineered Wood Association (APA), Tacoma, WA [www.apawood.org](http://www.apawood.org).
  - 4. Window & Door Manufacturers Association (WDMA) Chicago, IL [www.wdma@wdma.com](http://www.wdma@wdma.com).
- B. Definitions:
  - 1. Book-Match: Matching between adjacent veneer leaves on one panel face. Every other piece of veneer is turned over so that the adjacent leaves are "opened" as two pages in a book. The fibers of the wood, slanting in opposite directions in the adjacent leaves, create a characteristic light and dark effect when the surface is seen from an angle.
  - 2. Face Veneer: The outermost exposed wood veneer surface of a veneered wood door, panel, or other component exposed to view when the project is completed.
  - 3. Grade: Unless otherwise noted, this term means Grade rules for Economy, Custom, and/or Premium Grade:
    - a. Custom Grade: Typically specified for and adequately covers most high-quality architectural woodwork, providing a well-defined degree of control over a project's quality of materials, workmanship, or installation.
  - 4. High-Pressure Decorative Laminate (HPDL): Laminated thermosetting decorative sheets intended for decorative purposes. Also known as Plastic Laminate.

5. Medium Density Fiberboard (MDF): Generic name for a panel or core manufactured from lignocellulosic fibers combined with synthetic resin or other suitable binder and bonded together under heat and pressure in hot press by process in which added binder creates entire bond.
6. Panel Product: Panels manufactured with differences in core materials, adhesives or binders which affect characteristics of the panels. These include wood veneers and many prefinished wood panels and decorative overlays with aesthetic and performance characteristics.
7. Running Match: Each panel face is assembled from as many veneer leaves as necessary. Any portion left over from one panel may be used to start the next.
8. Veneer: A thin sheet or layer of wood, usually rotary cut, sliced or sawn from a log or flitch. Thickness may vary from 1/100 inch (0.3 mm) to 1/4 inch (6.4 mm).

C. Reference Standards:

1. American National Standards Institute / Builders Hardware Manufacturers Association:
  - a. ANSI/BHMA A156.11-2014, 'Cabinet Locks'.
2. American National Standards Institute / Hardwood Plywood & Veneer Association:
  - a. ANSI/HPVA HP-1-2009, 'Standard for Hardwood and Decorative Plywood'.
3. American National Standards Institute / Window & Door Manufacturers Association (WDMA):
  - a. ANSI/WDMA I.S. 6A-13, 'Industry Standard for Architectural Stile and Rails Doors'.

### 1.3 ADMINISTRATIVE REQUIREMENTS

A. Coordination:

1. Coordinate the efforts of the various trades affected by the Work of this Section.
2. Coordinate completion of 2x6 wall blocking for custom casework.
3. Coordinate completion of custom casework.

### 1.4 SUBMITTALS

A. Action Submittals:

1. Product Data:
  - a. Manufacturer's literature or cut sheets for hardware.
2. Shop Drawings:
  - a. Confirm compliance with Contract Document requirements as to configuration and dimensions of custom casework.
  - b. Include plan and elevation views, materials used, standing and running trim profiles, assembly methods, joint details, fastening methods, accessories, and hardware.
3. Samples:
  - a. Interior Hardwood for Transparent Finish:
    - 1) Before performing work of this Section, prepare Control Sample, to match sample available from Owner, to be used as finishing standard for interior clear finished hardwood as specified in Section 09 9324.
    - 2) Design Criteria:

- a) Provide 8 inch by 10 inch sample(s) of rift cut Maple to match Architect provided stain color selected for Project.
- b) Control Sample will be used as performance standard for evaluating finish provided.

B. Informational Submittals:

1. Source Quality Control Submittals:

a. Samples:

1) Interior Hardwood for Transparent Finish:

- a) Architect will provide Control Sample for finish.

## PART 2 - PRODUCTS

### 2.1 ASSEMBLIES

A. Components:

1. Design Criteria:

a. General:

1) Except as noted otherwise, fabricate the work of this section according to AWS 'Custom Grade'.

- a) Cabinet door wood grain direction shall run vertically and all doors shall be set matched.

2) Casework Construction Type:

- a) Type B: Face-frame construction where front edge of cabinet body components are overlaid with frame.

3) Door interface style:

- a) Type B Construction: Flush Overlay.

b. Solid Stock:

1) Exposed: Rift Cut Maple.

2) Semi-exposed And Concealed: Species as acceptable for AWS 'Custom Grade'.

c. Panel Product:

1) Glues (adhesives) used in manufacture and fabrication of panel products shall be Type I or II.

2) Moisture content shall be same as specified for lumber.

3) Cores:

- a) Cabinet Doors: Medium density fiberboard (MDF) with minimum density of 48 lbs per cu ft.

- b) All Other: Industrial grade particle board with minimum density of 45 lbs per cu ft.

4) Facings:

- a) Hardwood veneer facings shall be rift cut Maple AWS Grade A, or equal by HPVA, WDMA, or APA.

- b) All other facings shall be Melamine or Kortron.



- 5) Edgings:
  - a) Cabinet Doors And Drawer Fronts Higher Than 8 Inches:
    - (1) 3/4 inch by 1/8 to 1/4 inch edge-band of wood species matching hardwood face veneer.
  - b) Melamine / Kortron Faced Shelves And Exposed Panel Product Edges:
    - (1) Hot-glued, 3 mm thick, PVC edge-banding.
    - (2) Wood-grain, except color matching Melamine or Kortron surface at shelf edges.
  - c) Wood Veneer Faced Shelves:
    - (1) 3/4 inch by 1/4 inch edge-band of wood species matching hardwood face veneer on front edge with hot-glued, 2 mm thick minimum, wood-grained PVC edge-banding on other three sides.
  - d) Semi-Exposed Panel Product Edges:
    - (1) Hot-glued, 3 mm thick, wood grained PVC edge-banding.
  - e) All Other: 3/4 inch by 1/4 inch edge-band of wood species matching hardwood face veneer.
- d. Casework Doors:
  - 1) Face Veneer:
    - a) Design Criteria:
      - (1) Rift cut Maple meeting requirements of AWS Grade A, 1/50 inch thick minimum immediately before finishing.
      - (2) Face veneers shall be running book matched.

B. Fabrication:

1. Fabricators:
  - a. Approved Fabricators. See Section 06 4001 for Category Three Approved Fabricators.
2. Cabinet Body:
  - a. Use AWS Flush Overlay construction on cabinet bodies.
  - b. If used, install Rail System adjustable shelf supports recessed.
3. Drawers:
  - a. Fabricate with separate, screw-attached drawer front.
  - b. Joints shall be dowel and pressure-glued, or lock shoulder, glued, and pin nailed.
  - c. Set bottoms into sides, backs, and subfront with 1/4 inch deep groove with 3/8 inch minimum standing shoulder.
  - d. Every drawer shall have specified drawer guides and pull installed. Install drawer guides with 'Euroscresws', and pulls with through-bolts passing through both front and sub-front.
4. Cabinet Doors:
  - a. Hinges: Install hinges using plastic insertion dowels for hinges and 'Euroscresws' for baseplates.
  - b. Every cabinet door shall have specified pull installed.

5. Cabinet Component Thickness And Material:

- a. Use hardwood veneer facing on panel product, except on following surfaces:
  - 1) Where Kortron or Melamine shall be used.
  - 2) Cabinet exposed interiors surfaces (not including cabinet doors) and shelving faces behind cabinet doors in all rooms.
  - 3) Cabinet semi-exposed surfaces.
  - 4) Cabinet concealed surfaces.
  - 5) Cabinet exposed exteriors permanently concealed (not exposed to view).
  - 6) Drawer sides, backs, bottoms, and subfronts.
- b. Ends, Divisions, Bottoms, Tops: 3/4 inch thick panel product.
- c. Rails: 3/4 inch thick panel product.
- d. Shelves:
  - 1) Panel product.
  - 2) Thickness:
    - a) 30 InchSpan And Less: 3/4 inch thick.
    - b) Spans Over 30 Inches To 42 Inches: One inch thick.
    - c) Spans Over 42 inches: One inch thick and provide Hafele or equal center supports.
- e. Backs: 1/4 inch thick panel product.
- f. Doors: 3/4 inch thick panel product.
- g. Drawer Sides, Backs, And Subfronts: 1/2 inch thick minimum panel product.
- h. Drawer Bottoms: 1/4 inch thick panel product.
- i. Separate Drawer Front:
  - 1) 8 Inches High And Less: 3/4 inch thick solid hardwood.
  - 2) More Than 8 Inches High: 3/4 inch panel product.

6. Cabinet and Drawer Locks:

- a. Install only on cabinets and drawers as shown on Contract Documents.

7. Install plastic grommets in cable access holes in countertops located as located on Contract Documents.

C. Finishes:

1. Factory Finishing:

- a. Design Criteria:
  - 1) Applied before leaving factory.
  - 2) Factory-finish to match Owner selected sample as specified in Section 09 9324.
- b. Color: Shall be selected by Architect.

## 2.2 ACCESSORIES

A. Cabinet Hardware:

1. Cabinet And Drawer Pulls:

- a. As specified on millwork drawings.
2. Cabinet And Drawer Locks:
    - a. General:
      - 1) Pin tumbler type suitable for location.
      - 2) Keying: Key each cabinet and drawer individually.
      - 3) Stamp keys with Room number and cabinet designation.
      - 4) Provide six (6) keys per cabinet.
    - b. Design Criteria:
      - 1) Barrel diameter: 7/8 inch
      - 2) Cylinder length: 7/8 inch
      - 3) Key removable in locked or unlocked position.
      - 4) Meet ANSI/BHMA A156.11 Grade 2 requirements.
    - c. Type Two Acceptable Manufacturers:
      - 1) Advantage Plus cam lock by CompX National Lock.
      - 2) 100DR/200DW N Series door and drawer lock by Olympus Lock Inc.
      - 3) Equal as approved by Architect before installation. See Section 01 6200.
  3. Cabinet Adjustable Shelf Supports:
    - a. 32mm System: Casework Fabricator's standard.
  4. Cabinet Hinges:
    - a. Description:
      - 1) Cup Hinge (Concealed Hinge or European style).
      - 2) Steel, nickel-plated, full overlay, self closing with dowel, Mod 17.
    - b. Design Criteria:
      - 1) Doors 48 inches High or Less:
        - a) Two (2) hinges.
        - b) Hinge Opening: 165 degree minimum.
      - 2) Doors over 48 inches High:
        - a) Four (4) hinges.
        - b) Hinge Opening: 165 degree minimum.
    - c. Basis of Design: Model 329.03.558 with Model 329.73.510 mounting plate by Hafele.
      - 1) Category Four Approved Manufacturers. See Section 01 6200 for definitions of Categories:
        - a) Blum.
        - b) Grass America.
        - c) Hafele.

- d) Knape & Vogt.
- e) Salice.

5. Drawer Guides:

- a. As specified on millwork drawings.

B. Cabinet Door Bumpers:

1. Description:

- a. Polyurethane bumper to protect gypsum board from cabinet handle damage where cabinet handles hit gypsum wallboard surface.

2. Design Criteria:

- a. Clear.
- b. Peel adhesion.
- c. Size: 3/8 inch diameter x 1/8 inch thick.

3. Type Two Acceptable Products:

- a. WS-34 Cylindrical Soft Durometer Cabinet Bumper by Anybumper.
- b. Equal as approved by Architect before installation. See Section 01 6200.

## 2.3 SOURCE QUALITY CONTROL

A. Inspections:

1. Clear Finished Hardwood:

- a. Color matches Owner provided sample specified in Section 09 9324.

## PART 3 - EXECUTION: Not Used

**END OF SECTION**

# SECTION 06 4216 - FLUSH WOOD PANELING

## PART 1 - GENERAL

### 1.1 SUMMARY

- A. Includes But Not Limited To:
  - 1. Quality requirements for AWS premium grade hardwood veneer paneling.
- B. Related Requirements:
  - 1. Section 06 4001: Common Architectural Woodwork Requirements.

### 1.2 REFERENCES

- A. Association Publications:
  - 1. Architectural Woodwork Institute, 46179 Westlake Drive, Suite 120, Potomac Falls, VA [www.awinet.org](http://www.awinet.org).
    - a. Architectural Woodwork Standards (AWS), 2nd Edition, 2014.
- B. Definitions:
  - 1. Face Veneer: The outermost exposed wood veneer surface of a veneered wood door, panel, or other component exposed to view when the project is completed.
  - 2. Grade: Unless otherwise noted, this term means Grade rules for Economy, Custom, and/or Premium Grade:
  - 3. Plain-Sawn: A hardwood figure developed by sawing a log lengthwise at a tangent to the annual growth rings. It appears as U-shaped or straight markings in the board's face.

## PART 2 - PRODUCTS

### 2.1 MATERIALS

- A. AWS Premium Grade Hardwood Panels:
  - 1. Panel Product 3/4 inch thick.
  - 2. For Transparent Finishes:
    - a. Face Veneer: Rift cut white Maple meeting requirements of AWS Grade A, 1/50 inch thick minimum immediately before finishing.
    - b. Balancing Backer Veneer: Any compatible veneer.
    - c. Matching of veneer leaves: Slip match.
    - d. Veneer matching within panel face: Center and balanced matched.
    - e. Veneer matching from panel to panel: Slip match.

### 2.2 HANGER SYSTEM

- A. Manufacturers and Systems:
  - 1. Monarch Metals Aluminum Z Clip System MF375.

2. Equal from other manufacturers as approved by Architect.

### **2.3 DECORATIVE REVEALS**

- A. Aluminum reveal accessories as detailed on drawings.
- B. Decorative Reveals:
  1. Monarch Metals Decorative Reveals.
  2. Equal from other manufacturers as approved by Architect.

### **PART 3 - EXECUTION: Not Used**

**END OF SECTION**

## SECTION 06 4313 - WOOD STAIRS

### PART 1 - GENERAL

#### 1.1 SUMMARY

- A. Products Furnished But Not Installed Under This Section:
  - 1. Stair treads and risers to:
    - a. Mechanical Mezzanine.
- B. Related Requirements:
  - 1. Section 05 5214: 'Steel Pipe and Tube Railings' for custom metal handrails.
  - 2. Section 06 1100: 'Wood Framing' for stair stringers.
  - 3. Section 06 1636: 'Wood Panel Product Sheathing'.
  - 4. Section 06 2001: 'Common Finish Carpentry Requirements' for Installation.
  - 5. Section 06 4001: 'Common Architectural Woodwork Requirements'.

### PART 2 - PRODUCTS

#### 2.1 ASSEMBLIES

- A. Materials:
  - 1. Treads:
    - a. **5/4 inch** clear Douglas Fir or Southern Pine, or **1-1/8 inch** thick high density particle board preformed stair tread.
    - b. Treads to have **1/2 inch** radius at top outside edge.
  - 2. Risers: **4/4 inch** clear Douglas Fir or Southern Pine, or **3/4 inch** plywood meeting requirements specified in Section 06 1636.

### PART 3 - EXECUTION: Not Used

END OF SECTION





- a. Architectural Woodwork Standards (AWS), 2nd Edition, 2014.
- B. Definitions:
  - 1. Grade: Unless otherwise noted, this term means Grade rules for Economy, Custom, and/or Premium Grade.
    - a. Custom Grade: Typically specified for and adequately covers most high-quality architectural woodwork, providing a well-defined degree of control over a project's quality of materials, workmanship, or installation.
  - 2. Running Trim: Generally combined in the term "standing and running trim" and refers to random, longer length trims delivered to the jobsite (e.g., baseboard, chair rail, crown molding).

### 1.3 SUBMITTALS

- A. Action Submittals:
  - 1. Shop Drawings:
    - a. Include materials used, standing and running trim profiles, joint details, and hardware.
  - 2. Samples:
    - a. Interior Hardwood for Transparent Finish:
      - 1) Before performing work of this Section, prepare Control Sample, to match sample available from Owner, to be used as finishing standard for interior clear finished hardwood as specified in Section 09 9324.
      - 2) Design Criteria:
        - a) Provide 8 inch by 10 inch sample of rift cut maple to match Owner provided stain color selected for Project.
        - b) Control Sample will be used as performance standard for evaluating finish provided.
- B. Informational Submittals:
  - 1. Source Quality Control Submittals:
    - a. Samples:
      - 1) Interior Hardwood for Transparent Finish:
        - a) Architect will provide Control Sample for finish.

## PART 2 - PRODUCTS

### 2.1 MATERIALS

- A. Manufacturers:
  - 1. Approved Fabricators. See Section 06 4001 for Approved Fabricators.
- B. Performance / Design Criteria: Conform to requirements of Section 06 4001 'Common Architectural Woodwork Requirements'.
  - 1. Glue: Waterproof and of best quality.

2. Factory-finish to match Owner approved sample as specified in Section 09 9324.

C. Architectural Woodwork Wood Trim:

1. Interior Hardwood For Transparent Finish:

a. Design Criteria:

1) Solid wood shall be rift cut maple.

2) Finish to match Owner selected sample as specified in Section 09 9324.

## 2.2 SOURCE QUALITY CONTROL

A. Inspections:

1. Clear Finished Hardwood:

a. Color matches Owner approved sample specified in Section 09 9324.

**PART 3 - EXECUTION Not Used**

**END OF SECTION**

## SECTION 06 6001 - MISCELLANEOUS PLASTIC FABRICATIONS

### PART 1 - GENERAL

#### 1.1 SUMMARY

- A. Products Furnished But Not Installed Under This Section:
  - 1. Furnish window stools as described in Contract Documents.
- B. Related Requirements:
  - 1. Section 06 2001: 'Common Finish Carpentry Requirements' for:
    - a. Installation of Window Stools.
  - 2. Section 06 4001: 'Common Architectural Woodwork Requirements' for Approved Fabricators.

#### 1.2 REFERENCES

- A. Definitions:
  - 1. Solid Surface: Solid surface materials are manufactured from polymeric materials. Granules may also be added to enhance the color effects. Solid surface materials are non-porous and homogeneous, with the same composition throughout the thickness of the solid surface material. They are capable of being repaired, renewed to the original finish and fabricated into continuous surfaces with inconspicuous seams.
- B. Reference Standards:
  - 1. American National Standards Institute/International Cast Polymer Alliance:
    - a. ANSI/ICPA SS-1-2001, 'Performance Standard for Solid Surface Materials'.

#### 1.3 SUBMITTALS

- A. Action Submittals:
  - 1. Product Data:
    - a. Manufacturer's literature.
    - b. Color selections.

### PART 2 - PRODUCTS

#### 2.1 ASSEMBLIES

- A. Manufacturers:
  - 1. Acrylic Solid Surface:

- a. Category Four Approved Manufacturers. See Section 01 6200 for definitions of Categories.
  - 1) Everform solid surface by formica corporation, Cincinnati, OH. [www.formica.com](http://www.formica.com)
- B. Materials:
  - 1. Acrylic Solid Surface Window Stools:
    - a. Design Criteria:
      - 1) Meet requirements of ANSI/ICPS SS-1.
    - b. General:
      - 1) 1/2 inch thick 100 percent acrylic polymer.
    - c. Colors: See Finish Schedule on Drawings.

**EXECUTION: Not Used**

**END OF SECTION**

**DIVISION 7 - THERMAL AND MOISTURE PROTECTION:**

07 2113	Board Insulation
07 2116	Blanket Insulation
07 2613	Above-Grade Vapor Retarders
07 2616	Below-Grade Vapor Retarders
07 2719	Plastic Sheet Air Barriers
07 4619	Steel Siding
07 5419	Poly-Chloride Roofing: PVC
07 6210	Galvanized Steel Flashing and Trim
07 6311	Metal Soffit Panels
07 7233	Roof Hatches
07 9213	Elastomeric Joint Sealants
07 9219	Acoustical Joint Sealants

## SECTION 07 2113 - BOARD INSULATION

### PART 1 - GENERAL

#### 1.1 SUMMARY

- A. Includes But Not Limited To:
  - 1. Furnish and install board insulation on interior side of perimeter foundation walls and under floor slabs as described in Contract Documents.
  - 2. Furnish and install board insulation on exterior perimeter of above grade framing walls as described in Contract Documents.

#### 1.2 REFERENCES

- A. Definitions:
  - 1. Flame Spread: The propagation of flame over a surface.
  - 2. Flame Spread Index: The numerical value assigned to a material tested in accordance with ASTM E84.
  - 3. Smoke-Developed Index: The numerical value assigned to a material tested in accordance with ASTM E84.
- B. Reference Standards:
  - 1. ASTM International:
    - a. ASTM C518-17, 'Standard Test Method for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus'.
    - b. ASTM C578-18, 'Standard Specification for Rigid, Cellular Polystyrene Thermal Insulation'.
    - c. ASTM C1289-18a, 'Standard Specification for Faced Rigid Cellular Polyisocyanurate Thermal Insulation Board'.
    - d. ASTM E84-18b, 'Standard Test Method for Surface Burning Characteristics of Building Materials'.
    - e. ASTM E96/E96M-16, 'Standard Test Methods for Water Vapor Transmission of Materials'.
  - 2. Underwriters Laboratories, Inc.:
    - a. UL 723: 'Standard for Safety Test for Surface Burning Characteristics of Building Materials'; (11th Edition - 2018).

#### 1.3 ADMINISTRATIVE REQUIREMENTS

- A. Coordination:
  - 1. Installation of Polyethylene Film Vapor Retarder as specified in Section 07 2616 with Type 1 Insulation (Below Grade).
- B. Pre-Installation Conferences:
  - 1. Participate in pre-installation conference as specified in Section 01 3100:
    - a. Schedule pre-installation conference prior to commencement of installing insulation with Installer and Manufacturer's Representative if available.
    - b. In addition to agenda items specified in Section 01 3100, review following:
      - 1) Review installation procedures.
      - 2) Review coordination of work with related and adjacent work.
      - 3) Review special details and flashing.

## 1.4 QUALITY ASSURANCE

### A. Regulatory Agency Sustainability Approvals:

1. Insulation shall be manufactured to be in compliance with International Code Council (IBC) or other applicable building codes.
2. Fire-Test-Response Characteristics: As determined by test method indicated below by qualified testing agency. Identify products with appropriate markings of applicable testing agency.
  - a. Surface-Burning Characteristics:
    - 1) Insulation shall have Class A flame spread rating in accordance with ASTM E84 or UL 723.
      - a) Class A (Flame spread index 0-25; Smoke-developed index 0-450).
      - b) Flash point: None.
3. Qualifications:
  - a. Installer: Firm which has at least three (3) years' experience in work of type required by this specification.

## 1.5 DELIVERY, STORAGE, AND HANDLING

### A. Delivery And Acceptance Requirements:

1. Materials shall be delivered in original, unopened packages with labels intact. Exercise care to avoid damage during unloading.
2. Deliver materials in sufficient quantities to allow continuity of work.

### B. Storage And Handling Requirements:

1. Store, protect and handle materials in accordance with Manufacturer's recommendations to prevent damage, contamination and deterioration. Keep material free of dirt and other foreign matter.
2. Store in cool, dry area away from sources of heat, flame, ignition and strong oxidizing agents.
3. Following Manufacturer's instructions for protection when handling and cutting insulation.

## 1.6 WARRANTY

### A. Manufacturer Warranty:

1. Manufacturer's Insulation Warranty.

## PART 2 - PRODUCTS

### 2.1 MANUFACTURERES

#### A. Manufacturer Contact List:

1. Owens Corning, Toledo, OH [www.owens-corning.com](http://www.owens-corning.com).
2. Dow Chemical, Midland, MI [www.dow.com](http://www.dow.com) or Dow Canada, Sarnia, ON [www.dow.com](http://www.dow.com).

## 2.2 MATERIALS

### A. Board Insulation:

1. Description:
  - a. Extruded polystyrene foam insulation for use above and below grade.
2. Design Criteria:
  - a. Meet requirements of ASTM C578, Type IV.
  - b. Close-cell foam insulation.
  - c. Meet requirements of ASTM E84 or UL 723 for 'surface burning characteristics of building materials'.
  - d. Perimeter Insulation:
    - 1) Butt type, minimum RSI 1.7 (R-10), (2 inches thick by (24 inches by standard length.
3. Type One Acceptable Products:
  - a. Foamular 250 by Owens Corning.
  - b. Styrofoam Scoreboard Extruded Polystyrene Foam Insulation by Dow Chemical.
  - c. Equal as approved by Architect before bidding. See Section 01 6200.

## 2.3 ACCESSORIES

### A. Fasteners:

1. Tapping screws with washers.
  - a. As recommended by Manufacturer.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

#### A. Verification Of Conditions:

1. Prior to all work of this section, carefully inspect installed work of all other trades and verify that all such work is complete to point where installation may properly commence.
2. Verify insulation may be installed in accordance with original design and manufacturer's recommendations
3. Discrepancies:
  - a. In event of discrepancy, immediately notify Architect.
  - b. Do not proceed with installation in areas of discrepancy until all such discrepancies have been fully resolved.

### 3.2 INSTALLATION

- #### A. General:
- Install insulation in compliance with International Code Council (IBC) or other applicable building codes and in accordance with Manufacturer's current recommendations.



B. Type 1 Insulation (Below Grade):

1. Remove ties and concrete protrusions that would keep insulation from fully contacting foundation wall face.
2. Install against interior side of perimeter foundation walls extending downward from top of slab 48 inches or to top of footing, whichever is less. Install using 3/8 inch beads of adhesive at 12 inches on center vertically and at each vertical and horizontal joint to completely seal insulation.
3. Install horizontally for 24 inches under building slab continuously around building perimeter and between slab and foundation wall for full depth of slab.

C. Continuous Insulation On Above-Grade Exterior Walls:

1. Thickness as noted on drawings.

### 3.3 FIELD QUALITY CONTROL

A. Field Tests And Inspections:

1. Upon completion of installation, visually inspect each insulated area and verify that all insulation is complete and properly installed.

B. Non-Conforming Work: Non-conforming work as covered in the General Conditions applies, but is not limited to the following:

1. Correct any work found not complying with contract document requirements at no additional cost to the Owner.

### 3.4 CLEANING

A. Waste Management:

1. Remove from site debris resulting from work of this Section.

**END OF SECTION**

## SECTION 07 2116 - BLANKET INSULATION

### PART 1 - GENERAL

#### 1.1 SUMMARY

- A. Includes But Not Limited To:
  - 1. Furnish and install faced thermal and acoustic batt insulation as described in Contract Documents.
- B. Related Requirements:
  - 1. Section 06 2024: 'Door, Frame, And Finish Hardware Installation' for furnishing and installing of insulation in hollow metal door frames.

#### 1.2 REFERENCES

- A. Reference Standards:
  - 1. ASTM International:
    - a. ASTM C665-17, 'Standard Specification for Mineral-Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing'.

#### 1.3 QUALITY ASSURANCE

- A. Regulatory Agency Sustainability Approvals:
  - 1. Insulation shall be manufactured and installed in compliance with International Building Code (IBC) or other applicable building codes.

### PART 2 - PRODUCTS

#### 2.1 SYSTEMS

- A. Manufacturers:
  - 1. Insulation:
    - a. Type One Acceptable Manufacturers:
      - 1) Certaineed Corp, Valley Forge, PA [www.certainteed.com](http://www.certainteed.com).
      - 2) FiberTEK, Salt Lake City, UT [www.fibertekinsulation.com](http://www.fibertekinsulation.com).
      - 3) Guardian Fiberglass, Greer, SC [www.guardianbp.com](http://www.guardianbp.com).
      - 4) Johns Manville, Denver, CO [www.jm.com](http://www.jm.com).
      - 5) Knauf Fiber Glass, Shelbyville, IN [www.knaufusa.com](http://www.knaufusa.com).
      - 6) Owens-Corning Fiberglass Corporation, Toledo, OH [www.owens-corning.com](http://www.owens-corning.com).
      - 7) Thermafiber, Wabash, IL [www.thermafiber.com](http://www.thermafiber.com).
    - b. Equal as approved by Architect before bidding. See Section 01 6200.

B. Materials:

1. Thermal And Acoustic Insulation:

- a. Order insulation by 'R' value rather than 'U' value, rating, or thickness, either 16 or 24 inches (400 or 600 mm) wide according to framing spacing.
- b. Unfaced Insulation: Meet requirements of ASTM C665, Type I.
- c. 'R' Value Required:

1) Acoustically Insulated Ceilings:

- a) Enclosed Spaces: Fill framed cavity with batt of appropriate thickness.
- b) Unenclosed Spaces: R-19.
- c) Unenclosed Spaces above Offices and Restrooms: R-30.

2) Wood Wall Stud Framing:

R-11	3-1/2 inches deep
R-19	5-1/2 inches deep

3) Structural Composite Lumber (SCL) Wall Framing:

R-19	5-1/2 inches deep
R-25	7-1/4 inches deep
R-30	9-1/2 inches deep

**PART 3 - EXECUTION**

**3.1 INSTALLATION**

A. General:

- 1. Leave no gaps in insulation envelope.
- 2. If two layers of insulation are used to attain required 'R' value, only layer towards interior of building shall have facing.
- 3. Provide minimum clearance around recessed lighting fixtures as approved by local code.

B. In Framing:

- 1. Install insulation behind plumbing and wiring, around duct and vent line penetrations, and in similar places.
- 2. Fit ends of batts snug against top and bottom plates.
- 3. Fit batts snug against stud framing at each side.
- 4. Where insulation is not enclosed by structure or drywall, support in place with wire or other suitable material as approved by Architect before bid.

**END OF SECTION**

# SECTION 07 2613 - ABOVE-GRADE VAPOR RETARDERS: POLYETHYLENE

## PART 1 - GENERAL

### 1.1 SUMMARY

A. Includes But Not Limited To:

1. Furnish and install polyethylene film vapor retarders on framed walls as described in Contract Documents.

### 1.2 REFERENCES

A. Reference Standards:

1. ASTM International:
  - a. ASTM D4397-16, 'Standard Specification for Polyethylene Sheeting for Construction, Industrial, and Agricultural Applications'.

## PART 2 - PRODUCTS

### 2.1 MATERIALS

A. Vapor Retarder:

1. 6 mil minimum clear polyethylene sheets meeting requirements of ASTM D4397.

### 2.2 ACCESSORIES

A. Lap Sealant:

1. Type Two Acceptable Products:
  - a. Narrow Joint Sealer by Schnee-Morehead Inc, Irving, TX [www.trustsm.com](http://www.trustsm.com).
  - b. Equal as approved by Architect before use. See Section 01 6200.

## PART 3 - EXECUTION

### 3.1 INSTALLATION

- A. Install using 1/2 inch long minimum staples through thin cardboard disc or strip reinforcement. Staple every 6 inches along structural members and blocking and 3 inches in from sheet edge. Run long edge of sheet along structural members.
- B. Bed joints in specified sealant or seal with vapor resistant tape of type recommended by Manufacturer for vapor retarder installation.
- C. Seal penetrations through vapor retarder immediately before installation of gypsum board.

### **3.2 FIELD QUALITY CONTROL**

#### **A. Field Inspection:**

1. Vapor retarder is to be air tight and free from holes, tears, and punctures.
  - a. Immediately before installation of gypsum board, inspect vapor retarder for holes, tears, and punctures and repair damaged areas.
  - b. Immediately before completion of Project, inspect exposed vapor retarder for holes, tears, and punctures and repair damaged areas.

**END OF SECTION**

# SECTION 07 2616 - BELOW-GRADE VAPOR RETARDER

## PART 1 - GENERAL

### 1.1 SUMMARY

- A. Products Furnished But Not Installed Under This Section:
  - 1. Vapor retarder, seam tape, and penetration accessories for installation under interior slabs-on-grade.
- B. Related Requirements:
  - 1. Section 31 1123: 'Aggregate Base' for installation of vapor retarder under aggregate base and concrete slab.

### 1.2 REFERENCE

- A. Association Publications:
  - 1. American Concrete Institute:
    - a. ACI 302.1R-04, 'Guide for Concrete Floor and Slab Construction'.
      - 1) Section 3.2.3, 'Vapor Retarder'.
    - b. ACI 302.2R-06, 'Guide for Concrete Slabs that Receive Moisture-Sensitive Flooring Materials'.
- B. Definitions:
  - 1. Vapor Barrier: Material that has permeance of 0.1 perm or less. Vapor barrier is a material that is essentially vapor impermeable. Vapor barrier is a Class I vapor control layer. Test procedure for classifying vapor retarders is ASTM E-96 Test Method A—the desiccant or dry cup method.
  - 2. Vapor Retarder: Vapor retarder is a material that has permeance of 1.0 perm or less and greater than 0.1 perm. Vapor retarder is a material that is vapor semi-impermeable. Vapor retarder is a Class II vapor control layer. The test procedure for classifying vapor retarders is ASTM E-96 Test Method A—the desiccant or dry cup method.
  - 3. Vapor Retarder Classes and Permeance Descriptions:
    - a. Classes of Vapor Retarders:
      - 1) Class I Vapor Retarder: 0.1 perm or less.
      - 2) Class II Vapor Retarder: 1.0 perm or less and greater than 0.1 perm.
      - 3) Class III Vapor Retarder: 10 perm or less and greater than 1.0 perm.
    - b. Four general classes based on permeance):
      - 1) Vapor Impermeable: 0.1 perm or less.
      - 2) Vapor semi-impermeable: 1.0 perm or less and greater than 0.1 perm.
      - 3) Vapor semi-permeable: 10 perm or less and greater than 1.0 perm.
      - 4) Vapor permeable: greater than 10 perms.
- C. Reference Standards:
  - 1. ASTM International:

- a. ASTM D1709-16a, 'Standard Test Methods for Impact Resistance of Plastic Film by the Free-Falling Dart Method'.
- b. ASTM E96/E96M-16, 'Standard Test Methods for Water Vapor Transmission of Materials'.
- c. ASTM E1745-11, 'Standard Specification for Water Vapor Retarders Used in Contact with Soil or Granular Fill under Concrete Slabs'.

### 1.3 SUBMITTALS

#### A. Action Submittals:

1. Product Data:
  - a. Manufacturer's literature or cut-sheets.
2. Samples:
  - a. Vapor Retarder:
    - 1) Submit sample of specified vapor retarder.

#### B. Informational Submittals:

1. Test And Evaluation Reports:
  - a. Independent laboratory test results showing compliance with ASTM C1745 Standard.
2. Source Quality Control Submittals:
  - a. Vapor Retarder:
    - 1) Installation, seaming, and penetration boot instructions.

#### C. Closeout Submittals:

1. Include following in Operations And Maintenance Manual specified in Section 01 7800:
  - a. Warranty Documentation:
    - 1) Final, executed copy of Warranty:
  - b. Record Documentation:
    - 1) Manufacturers documentation:
      - a) Manufacturer's documentation showing compliance to Contract Documents.

### 1.4 WARRANTY

#### A. Manufacturer Warranty:

1. Site review by manufacturers representative prior to concrete placement.
2. Manufacturer standard warranty to be free of defects and installed without damage and life of the building limited warranty for vapor retarder.

## PART 2 - PRODUCTS

### 2.1 ASSEMBLIES

#### A. Manufacturers:

1. Manufacturer Contact List:
  - a. Fortifiber, Reno, NV [www.fortifiber.com](http://www.fortifiber.com).
  - b. Insulation Solutions, East Peoria, IL [www.insulationsolutions.com](http://www.insulationsolutions.com).
  - c. Raven Industries, Sioux Falls, SD [www.ravenind.com](http://www.ravenind.com).
  - d. Reef Industries, Houston, TX [www.reefindustries.com](http://www.reefindustries.com).
  - e. Stego Industries, San Juan Capistrano, CA [www.stegoindustries.com](http://www.stegoindustries.com).
  - f. W R Meadows, Hampshire, IL [www.wrmeadows.com](http://www.wrmeadows.com).

#### B. Materials:

1. Vapor Retarder:
  - a. Design Criteria:
    - 1) Meet requirements of ASTM E1745, Class A rating.
    - 2) Thickness: **15 mil** minimum.
    - 3) Physical Properties:
      - a) Water Vapor Pemeance           ASTM E96, Method A           Perm 0.01
      - b) Puncture Resistance            ASTM D1709.
  - b. Category Four Approved Products. See Section 01 6200 for definition of Categories.
    - 1) Griffolyn 15 by Reef Industries.
    - 2) Moistop Ultra 15 Underslab Vapor Retarder by Fortifiber.
    - 3) Perminator (15 mil) by W R Meadows.
    - 4) Stego Wrap by Stego.
    - 5) Vapor Block 15 by Raven Industries.
    - 6) Viper Vaporcheck II (**15 mil**) by Insulation Solutions.

### 2.2 ACCESSORIES

#### A. Vapor Barrier:

1. Seam Tape: As recommended by Membrane Manufacturer for continuous taping of seams and sealing of penetration boots.
2. Penetration Boots at Utility Penetrations:
  - a. Quality Standard: Factory fabricated pipeboots:
    - 1) Moistop: The Boot.
    - 2) Raven: VaporBoot.
    - 3) Reef Industries: VaporBoot.
    - 4) All Others:
      - a) Other Manufacturer's boot system.  
or



- b) Field fabricated from same material as vapor retarder membrane.

**PART 3 - EXECUTION Not Used**

**END OF SECTION**

## SECTION 07 2719 - PLASTIC SHEET AIR BARRIERS

### PART 1 - GENERAL

#### 1.1 SUMMARY

A. Includes But Not Limited To:

1. Furnish and install air infiltration barriers on exterior side of exterior wall sheathing as described in Contract Documents.

#### 1.2 REFERENCES

A. Reference Standards:

1. ASTM International:
  - a. ASTM E1677-11, 'Standard Specification for an Air Barrier (AB) Material or System for Low-Rise Framed Building Walls'.

#### 1.3 SUBMITTALS

A. Informational Submittals:

1. Test And Evaluation Reports: Copy of test results showing performance characteristics.

B. Closeout Submittals:

1. Include following in Operations And Maintenance Manual specified in Section 01 7800:
  - a. Warranty Documentation:
    - 1) Final, executed copy of Warranty (if available from Manufacturer).

#### 1.4 QUALITY ASSURANCE

A. Qualifications: Requirements of Section 01 4301 applies, but is not limited to following:

1. Manufacturer Qualifications:
  - a. Provide single source for all products of system.

#### 1.5 WARRANTY

A. Manufacturer Warranty:

1. Manufacturer's limited warranty (if available on product).

## PART 2 - PRODUCTS

### 2.1 ASSEMBLIES

#### A. Manufacturers:

1. Category Four Approved Products. See Section 01 6200 for definitions of Categories:
  - a. Styrofoam Weathermate Plus by Dow, Chemical Co, Midland, MI [www.dow.com](http://www.dow.com)
  - b. Tyvek HomeWrap by Du Pont Company, Wilmington, DE [www.dupont.com](http://www.dupont.com)
  - c. DriShield Housewrap by Protecto Wrap, Denver, CO [www.protectowrap.com](http://www.protectowrap.com)
  - d. Fortress Pro by Raven Industries, Sioux Falls, SD [www.ravenind.com](http://www.ravenind.com)
  - e. Typar Housewrap by Fiberweb, Old Hickory, TN [www.typar.com](http://www.typar.com).

#### B. Materials:

1. Air Retarder:
  - a. Non-woven.
  - b. Meet requirements of ASTM E1677, Type I.
2. Sealing Tape:
  - a. Type Two Acceptable Products:
    - 1) DuPont Contractor Tape.
    - 2) Fortress Pro Seaming Tape.
    - 3) Typar Construction Tape.
    - 4) 3M Contractor Sheathing Tape.
    - 5) Protecto Wrap BT25 XL Window Sealing Tape.
    - 6) As recommended in writing by Air Retarder Manufacturer.
3. Fasteners:
  - a. Category Four Approved Products. See Section 01 6200 for definitions of Categories:
    - 1) Wood Framing: Corrosion resistant roofing nails with **3/4 inch** long shank minimum and **one inch** diameter plastic head or Tyvek Wrap Caps. Staples are only allowed to aid in installation with permanent fasteners installed immediately thereafter.

## PART 3 - EXECUTION

### 3.1 INSTALLATION

#### A. Install over exterior wall sheathing.

1. Apply specified fasteners along stud lines at **18 inches** maximum on center. Lap horizontal joints **6 inches** minimum, with upper layer placed over lower layer. Lap vertical seams **16 or 24 inches** as necessary to match framing spacing. Do not fasten at bottom where necessary to allow for installation of flashing behind air infiltration barrier at base of masonry veneer.

2. Seal joints and penetrations through air infiltration barrier with specified tape before installation of finish material. Air infiltration barrier shall be air tight and free from holes, tears, and punctures.

**END OF SECTION**

## SECTION 07 4619 - STEEL SIDING

### PART 1 - GENERAL

#### 1.1 SUMMARY

A. Includes But Not Limited To:

1. Furnish and install steel siding system as described in Contract Documents.

#### 1.2 REFERENCES

A. Reference Standards:

1. ASTM International:
  - a. ASTM A653/A653M-18, 'Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.'
  - b. AAMA 621 – Voluntary Specifications for High Performance Organic Coatings on Coil Coated Architectural Hot Dipped Galvanized (HDG) & Zinc-Aluminum Coated Steel Substrates.
  - c. AAMA 809.2 Voluntary Specification Non-Drying Sealants.

#### 1.3 SUBMITTALS

A. Informational Submittals:

1. Manufacturer Instructions:
  - a. Manufacturer's published installation instructions.

B. Action Submittals:

1. Product Data: Manufacturer's data sheets for specified products. Include data indicating compliance with performance requirements.
2. Shop Drawings: Show layouts of metal panels. Include details of each condition of installation, panel profiles, and attachment to building. Provide details at a minimum scale 1-1/2-inch per foot of edge conditions, joints, fastener and sealant placement, flashings, openings, penetrations, and special details. Make distinctions between factory and field assembled work.
  - a. Indicate points of supporting structure that must coordinate with metal panel system installation.
  - b. Include structural data indicating compliance with performance requirements and requirements of local authorities having jurisdiction.
3. Samples for Initial Selection: For each exposed product specified including sealants. Provide representative color charts of manufacturer's full range of colors.
4. Samples for Verification: Provide 12-inch long section of each metal panel profile. Provide color chip verifying color selection.

C. Closeout Submittals:

1. Include following in Operations And Maintenance Manual specified in Section 01 7800:

- a. Warranty Documentation:
  - 1) Final, executed copy of Warranty.
- b. Record Documentation:
  - 1) Manufacturers documentation:
    - a) Manufacturer's literature.
    - b) Color selection.

#### **1.4 QUALITY ASSURANCE**

- A. Manufacturer/Source: Provide metal panel assemblies and accessories from a single manufacturer accredited under IAS AC472, Part B.
- B. Manufacturer Qualifications: Approved manufacturer listed in this Section with minimum five years experience in manufacture of similar products in successful use in similar applications.
  - 1. Approval of Comparable Products: Submit the following in accordance with project substitution requirements, within time allowed for substitution review prior to bid:
    - a. Product data, indicating compliance with requirements.
    - b. Samples of each component.
    - c. Sample shop drawings from similar project.
    - d. Project References: Minimum of five installations not less than three years old, with Owner and Architect contact information.
    - e. Sample warranty.
    - f. Certificate of accreditation under IAS AC472 Part B.
  - 2. Substitutions following award of contract are not allowed except as stipulated in Division 01 General Requirements.
  - 3. Approved manufacturers must meet separate requirements of Submittals Article.
- C. Installer Qualifications: Experienced Installer with minimum of five years experience with successfully completed projects of a similar nature and scope.
  - 1. Installer's Field Supervisor: Experienced mechanic supervising work on site whenever work is underway.

#### **1.5 WARRANTY**

- A. Manufacturer Warranty:
  - 1. Manufacturer's written 20-year guarantee for Polyvinylidene Fluoride finishes.

## PART 2 - PRODUCTS

### 2.1 SYSTEMS

#### A. Manufacturers:

1. Basis of Design Manufacturer: MBCI Metal Roof and Wall Systems, Division of NCI Group, Inc.; Houston TX. Tel: (877) 713-6224; Email: info@mbsci.com; Web: www.mbsci.com
  - a. Provide basis of design product, or comparable product approved by Architect prior to bid.

#### B. Materials:

1. Ribbed-Profile, Concealed Fastener Metal Walls Panels: Structural metal panels consisting of formed metal sheet with fastener leg for concealed attachment to wall framing.
  - a. Basis of Design: MBCI, MasterLine 16 Panel.
  - b. Aluminum-Zinc Alloy-Coated Steel Sheet: ASTM A792/A792M, structural quality, Grade 50, Coating Class AZ50 (Grade 340, Coating Class AZM150), prepainted by the coil-coating process per ASTM A755/A755M.
    - 1) Nominal Thickness: 24 gauge coated thickness, with smooth surface.
      - a) Exterior Finish: Fluoropolymer two-coat system (MBCI signature 300 series).
      - b) Color: As indicated.
  - c. Panel Width: 16 inches.
  - d. Panel Thickness: 7/8 inch.

### 2.2 MISCELLANEOUS MATERIALS

- A. General: Provide complete metal panel assemblies incorporating trim, copings, and miscellaneous flashings. Provide required fasteners, closure strips, and sealants as indicated in manufacturer's written instructions.
- B. Flashing and Trim: Match material, thickness, and finish of metal panels.
- C. Panel Fasteners: Self-tapping screws and other acceptable fasteners recommended by metal panel manufacturer. Where exposed fasteners cannot be avoided, supply corrosion-resistant fasteners with heads matching color of metal panels by means of factory-applied coating, with weathertight resilient washers.
- D. Panel Sealants:
  1. VOC Content of Interior Sealants: Sealants used inside the weatherproofing system shall comply with the following limits for VOC content when calculated according to 40 CFR 59, Subpart D (EPA Method 24):
    - a. Architectural Sealants: 250 g/L.
  2. Concealed Joint Sealant: Non-curing butyl, AAMA 809.2.
  3. Elastomeric Joint Sealant: Urethane sealant, single-component, ASTM C920 Type S, Grade NS, Class 25, Use NT, A, M, G, O.
  4. Tape Mastic: Manufacturer's standard butyl type.

## 2.3 FABRICATION

- A. General: Provide factory fabricated and finished metal panels, trim, and accessories meeting performance requirements, indicated profiles, and structural requirements.
- B. Sheet Metal Flashing and Trim: Fabricate flashing and trim to comply with manufacturer's written instructions, approved shop drawings, and project drawings.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine metal panel system substrate with Installer present. Inspect for erection tolerances and other conditions that would adversely affect installation of metal panels.
  - 1. Inspect framing that will support metal panels to determine if support components are installed as indicated on approved shop drawings and are within tolerances acceptable to metal panel manufacturer and installer. Confirm presence of acceptable framing members at recommended spacing to match installation requirements of metal panels.
- B. Correct out-of-tolerance work and other deficient conditions prior to proceeding with metal panel installation.

### 3.2 METAL PANEL INSTALLATION

- A. Concealed-Fastener Formed Metal Panels: Install metal panel system in accordance with manufacturer's written instructions, approved shop drawings, project drawings and referenced publications. Install metal panels in orientation, sizes, and locations indicated. Anchor panels and other components securely in place. Provide for thermal and structural movement.
- B. Fasten metal panels to supports with fasteners at each location indicated on approved shop drawings, at spacing and with fasteners recommended by manufacturer. Fasten panel to support structure through leading flange. Snap-fit back flange of subsequent panel into secured flange of previous panel.
  - 1. Cut panels in field where required using manufacturer's recommended methods.
  - 2. Dissimilar Materials: Where elements of metal panel system will come into contact with dissimilar materials, treat faces and edges in contact with dissimilar materials as recommended by metal panel manufacturer.
- C. Attach panel flashing trim pieces to supports using recommended fasteners and joint sealers.
- D. Joint Sealers: Install liquid sealants where indicated and where required for weatherproof performance of metal panel assemblies.
  - 1. Seal panel base assembly, openings, panel head joints, and perimeter joints using joint sealers indicated in manufacturer's instructions.
  - 2. Seal perimeter joints between window and door openings and adjacent panels using elastomeric joint sealer.
  - 3. Prepare joints and apply sealants per requirements of Division 07 Section "Joint Sealants."

### 3.3 ACCESSORY INSTALLATION

- A. General: Install metal panel accessories with positive anchorage to building and weather tight mounting; provide for thermal expansion. Coordinate installation with flashings and other components.
  - 1. Install components required for a complete metal panel assembly, including trim, copings, flashings, sealants, closure strips, and similar items.



2. Comply with details of assemblies utilized to establish compliance with performance requirements and manufacturer's written installation instructions.
3. Set units true to line and level as indicated. Install work with laps, joints, and seams that will be permanently weather resistant.

#### **3.4 CLEANING AND PROTECTION**

- A. Clean finished surfaces as recommended by metal panel manufacturer.
- B. Replace damaged panels and accessories that cannot be repaired to the satisfaction of the Architect.

**END OF SECTION**

## SECTION 07 5419 - POLYVINYL-CHLORIDE ROOFING: PVC

### PART 1 - GENERAL

#### 1.1 SUMMARY

- A. Includes But Not Limited To:
1. Furnish and install roofing membrane with flashings and other components to comprise total roofing system as described in Contract Documents including:
    - a. Single-ply membrane.
- B. Related Requirements:
1. Section 06 0573: 'Preservative Wood Treatment' for roof related blocking and roof nailers.
  2. Section 06 0574: 'Fire-Retardant Wood Treatment' for roof sheathing at entry canopies.
  3. Section 06 1100: 'Wood Framing' for roof related blocking, nailing and sheathing.
  4. Section 06 2001: 'Common Finish Carpentry Requirements' for wood nailers, curbs and blocking.
  5. Section 07 6210: 'Galvanized Steel Flashing And Trim' for metal work installation and requirements.
- C. Products Installed But Not Furnished Under This Section:
1. Sheet metal work including caps, sleeves, umbrella hoods, pipe enclosures boxes, strapping, and scuppers.
- D. Related Requirements:
1. Division 07 for sheet metal work specialties and accessories.

#### 1.2 REFERENCES

- A. Association Publications:
1. American National Standards Institute / Single Ply Roofing Industry:
    - a. ANSI/SPRI/FM 4435/ES-1 2003, 'Wind Design Standard for Edge Systems Used with Low Slope Roofing Systems'.
    - b. ANSI/SPRI WD-1 'Wind Design Standard for Roofing Assemblies'.
  2. FM Global Resource Catalogue by FM Global, Norwood, MA [www.fmglobal.com](http://www.fmglobal.com).
    - a. Approval Guide:
      - 1) Factory Mutual Standard 4470 - Approval Standard for Class 1 Roof Covers.
    - b. Property Loss Prevention Data Sheet 1-28, 'Wind Design' (latest edition).
    - c. Property Loss Prevention Data Sheet 1-29, 'Roof Deck Securement and Above-Deck Components' (latest edition).
    - d. Property Loss Prevention Data Sheet 1-49, 'Perimeter Flashing' (latest edition).
- B. Definitions:
1. Flame Spread Classification: Categories as per ASTM E84/UL 723 or ULC 102:

- a. Class A: Highest fire-resistance rating for roofing as per ASTM E108. Indicated roofing is able to withstand severe exposure to fire exposure to fire originating from sources outside building.
  - b. Class B: Fire-resistance rating indicating roofing materials are able to withstand moderate exposure to fire originating from sources outside of building.
  - c. Class C: Fire-resistance rating indicating roofing materials are able to withstand light exposure to fire originating from sources outside of building.
- C. Reference Standards:
- 1. ASTM International:
    - a. ASTM C1289-18a, 'Standard Specification for Faced Rigid Cellular Polyisocyanurate Thermal Insulation Board'.
    - b. ASTM C1303/C1303M-15, 'Standard Test Method for Predicting Long-Term Thermal Resistance of Closed-Cell Foam Insulation'.
    - c. ASTM D4434/D4434M-15, 'Standard Specification for Polyvinyl Chloride Sheet Roofing'.
    - d. ASTM E84-18b, 'Standard Test Method for Surface Burning Characteristics of Building Materials'.
    - e. ASTM E108-17, 'Standard Test Methods for Fire Tests of Roof Coverings'.
  - 2. International Building Code (IBC) (2018 edition or latest edition adopted by AHJ):
    - a. Chapter 15, 'Roof Assemblies And Rooftop Structures':
      - 1) Section 1507, 'Requirements for Roof Coverings':
        - a) 1507.13, 'Thermoplastic single-ply Roofing'.
  - 3. National Fire Protection Association:
    - a. NFPA 101: 'Life Safety Code' (2018 or most recent edition adopted by AHJ).
  - 4. Underwriters Laboratories (UL):
    - a. UL 580: 'Tests for Uplift Resistance of Roof Assemblies' (5th Edition).
    - b. UL 723, 'Tests for Safety Test for Surface Burning Characteristics of Building Materials' (11th Edition).
    - c. UL 790, 'Standard Test Methods for Fire Tests of Roof Coverings' (8th Edition).
    - d. UL 1897-04, 'Uplift Tests for Roof Covering Systems' (7th Edition).
    - e. UL 2218, 'Standard for Impact Resistance of Prepared Roof Coverings Materials' (2nd Edition).

### 1.3 ADMINISTRATIVE REQUIREMENTS

- A. Pre-Installation Conferences:
- 1. Participate in MANDATORY pre-installation conference.
    - a. Roofing Installer's Foreman and those responsible for installation of roofing to be in attendance. Include Roofing Manufacturer's Representative if available.
  - 2. Schedule pre-installation conference at project site after installation of roof deck including pipe and flue penetrations, but before application of any roofing system component.
  - 3. In addition to agenda items specified in Section 01 3100, review following:
    - a. Review Manufacturer's written instructions.
    - b. Review if Project is in high wind area.
    - c. Review delivery, storage, and handling requirements.
    - d. Review ambient conditions requirements.

- e. Review roofing installation requirements including flashing and penetrations.
- f. Review roofing drainage requirements.
- g. Review temporary protections for roofing system.
- h. Review cleaning and disposal requirements.
- i. Review Special Procedure Submittal for Warranty Information to be given to Manufacturer before Manufacture will issue Roof Warranty by Installer.
- j. Review safety issues.
- k. Review field inspections and non-conforming work requirements.
- l. Review protection of membrane by other trades after installation of membrane.

## 1.4 SUBMITTALS

### A. Action Submittals:

#### 1. Product Data:

- a. Manufacturer's literature or cut sheet for each element of system.
- b. Manufacturer's preparation and installation instructions and recommendations.

#### 2. Shop Drawings:

- a. Prepared by Roofing Installer and approved by Roofing Membrane Manufacturer and include following:

- 1) Base flashings.
- 2) Location and type of penetrations.
- 3) Membrane terminations.
- 4) Outline of roof and roof size.
- 5) Perimeter and penetration details.
- 6) Roof insulation:
  - a) Insulation fastening patterns for corner, perimeter, and field-of-roof locations.
  - b) Taper insulation, including slopes.
- 7) Special details and materials.

- b. Confirm that specified FM Class and UL Class assembly is appropriate for Project location.
- c. Include approved copy of Manufacturer's Notice of Award or Assembly Letter.

#### 3. Samples:

- a. Manufacturer's 4 inch square minimum sample representing actual color, membrane and thickness.

### B. Informational Submittals:

#### 1. Certificates:

- a. Installer's signed certificate stating roofing system complies with Contract Documents performance requirements and work only performed by trained and authorized personnel in those procedures.
- b. Manufacturer's signed certificate that roof system has been inspected by Technical Service Representative and stating no deviation from system specified or approved shop drawings without written approval by Owner Representative and Manufacturer.

- 2. Test And Evaluation Reports: Submit evidence that roof system has been tested and approved or listed as follows:

- a. Submit evidence that roof system has been tested and approved or listed to meet Factory Mutual Research Corporation (FM) Classification required for this Project.
  - b. Submit evidence that roof system has been tested to meet UL Class requirement required for fire-resistance rating for this Project.
3. Manufacturer Instructions:
- a. Two (2) copies of Roofing Manufacturer's published instructions for Architect and maintain one (1) at job-site.
4. Special Procedure Submittals:
- a. Installer to fill out 'Roof Manufacturer' Installer Workmanship Warranty' and 'Manufacturer System Warranty' from information provided in the Attachment 'Roofing Manufacturer's Information For Architect' from Manufacturer and from Architect. Warranties are to be included in Closeout Submittals.
5. Qualification Statement:
- a. Roofing Manufacturer's certification of Installer.
- C. Closeout Submittals:
1. Include following in Operations And Maintenance Manual specified in Section 01 7800:
- a. Warranty Documentation:
    - 1) Final, executed copy of 'Roofing Manufacturer System Warranty' including wind speed coverage and required Owner mandatory information.
    - 2) Final, executed copy of 'Roof Installer Workmanship Warranty' including required Owner mandatory information.
    - 3) Verify mandatory information as specified in Special Procedure Submittal has been included in Final Warranty.
  - b. Record Documentation:
    - 1) Manufacturers Documentation:
      - a) Record Shop Drawings if requested. Record shop drawings shall be given shop drawing number by Roofing Manufacturer.
      - b) Certificate: Manufacturer Inspection report by Technical Service Representative.
      - c) Certificate: Installer statement of compliance for performance requirements.
      - d) Test And Evaluation Report: UL fire-resistance rating test report.
      - e) Test And Evaluation Report: Factory Mutual Research Classification approval.

## 1.5 QUALITY ASSURANCE

- A. Regulatory Agency Sustainability Requirements:
- 1. Roof system will meet requirements of all federal, state, and local codes having jurisdiction (AHJ).
  - 2. Fire Characteristics Performance Requirement:
    - a. Roof system will achieve UL Class A rating when tested in accordance with ASTM E108 or UL-790:
      - 1) Materials shall be identified with appropriate markings of applicable testing agency.
  - 3. Thermal Performance Requirement:

- a. Roof system will achieve minimum R value not less than 30.
- 4. Wind Criteria as per ASCE 7-10:
  - a. Basic wind speed (V): 109
  - b. Wind exposure and importance factor (Iw): C

B. Qualifications:

- 1. Requirements of Section 01 4301 applies but not limited to the following:
  - a. Installers Qualifications:
    - 1) Provide documentation if requested by Architect:
      - a) Roofing Installer shall be approved and authorized by Roofing System Manufacturer to install Manufacturer's product and eligible to receive Manufacturer's special warranty before bid.
      - b) Roofing Installer shall be able to document roofing membrane installation for five (5) year minimum.
      - c) Roofing Installer must have current license for the city, county, and state where project is located.
      - d) Roofing Installer must have license for specific type of roofing work to be performed.
      - e) Roofing Installer's foreman shall be skilled in his trade and qualified to lay out and supervise the Work.
      - f) Membrane and flashing installation shall be performed by personnel trained and authorized by Roofing Manufacturer.
      - g) Welding equipment shall be provided by or approved by Roofing Manufacturer. Mechanics intending to use equipment shall have successfully completed training course provided by Manufacturer's Technical Representative before welding.
  - b. Manufacturer Qualifications:
    - 1) Manufacturer shall manufacture membrane material for five (5) consecutive years.
      - a) No product with documented failure will be allowed.
    - 2) Manufacturer that is UL listed for membrane roofing system used for this Project.
    - 3) Source Limitations:
      - a) Provide roof components including roof insulation and fasteners for roofing system from same Manufacturer as membrane roofing or approved by Roofing Membrane Manufacturer.

## 1.6 DELIVERY, STORAGE, AND HANDLING

A. Delivery And Acceptance Requirements:

- 1. Make no deliveries to Project until installation is about to commence, or until approved storage area is provided.
- 2. Deliver products job site in original unopened containers or wrappings bearing all seals and approvals.
- 3. Deliver materials in sufficient quantities to allow continuity of work.
- 4. Remove any material not approved from job site.

B. Storage And Handling Requirements:

- 1. General:
  - a. Follow Manufacturer's instructions and precautions for storage of materials.
  - b. Handle and store roofing materials and place equipment in manner to avoid permanent deflection of roof decking.

- c. Material Safety Data Sheets (MSDS) must be on location always during transportation, storage and application of materials.
2. Storage Requirements:
- a. Protection:
    - 1) Protect roof materials from physical damage, moisture, soiling, and other sources in a clean, dry, protected location and with temperature range required by Manufacturer. Protect from direct sunlight.
    - 2) Provide continuous protection of materials against moisture absorption (Manufacturer's/Supplier's shrink wrap is not accepted waterproofing).
    - 3) Store membrane rolls lying down on pallets fully protected from weather with clean canvas tarpaulins.
  - b. Roof Insulation:
    - 1) Comply with insulation Manufacturer's written instructions for handling, storing, and protection during installation.
  - c. Safety:
    - 1) Store flammable materials in cool, dry area away from sparks, open flames, or excessive heat. Follow precautions outlined on containers or supplied by material manufacturer/supplier.
    - 2) Liquid materials such as solvents and adhesives shall be stored off site and installed away from open flames, sparks, and excessive heat.
    - 3) Site storage is acceptable if liquid materials are placed in a locked, sealed storage container.
    - 4) Situate equipment and materials so as to preclude danger, disturbance, or interference to public safety and traffic, and to not constitute fire hazard.
  - d. Temperature:
    - 1) Store adhesives at temperatures above 40 deg F and below 180 deg F.
  - e. Unacceptable Material:
    - 1) Remove from job site materials that are determined to be damaged by Architect or by Roofing Manufacturer and replace at no additional cost to Owner.
    - 2) Remove all wet and damaged materials from site.
    - 3) Discard and legally dispose of liquid material that cannot be applied within its stated shelf life.
3. Handling Requirements:
- a. Select and Handle operating equipment so as not to damage existing construction or new roofing system, or to overload structural system.
  - b. Handle rolled goods so as to prevent damage to edge or ends.

## 1.7 FIELD CONDITIONS

### A. Ambient Conditions:

- 1. Temperature ranges shall be within tolerances allowed for material being used.
  - a. Roof surface shall be free of ponding water, ice, and snow.
  - b. Cold temperature:

- 1) Follow Manufacturer's written instructions for cold temperature requirements before applying membrane adhesive:
  - a) Follow specified precautions.
  - b) Expose only enough adhesive to be used as directed by membrane manufacturer:
  - c) Low VOC restrictions (if required by local AHJ): Temperatures to be 40 deg F and rising before applying.
- c. Hot temperature:
  - 1) Do not expose membrane and accessories to constant temperature in excess of 180 deg F.
2. Proceed with roofing work when existing and forecasted weather conditions permit.

## 1.8 WARRANTY

### A. Manufacturer Warranty:

1. Roofing Membrane Manufacturer's Special Warranty for:
  - a. Thirty (30) year no dollar limit (NDL) material and labor warranty covering roofing system, including insulation, components of membrane roofing system and flashing degradation and workmanship.
  - b. Accidental Puncture Warranty:
    - 1) Membrane Manufacturer's written Accidental Puncture Warranty for up to sixteen (16) hours of Labor to repair punctures after final inspection.
  - c. Warranty shall include wind speed coverage to 90 mph

### B. Roof Installer Workmanship Warranty:

1. Written five (5) year guarantee covering workmanship and repairs or replacement of work without cost to Owner, counter-signed by Installer and General Contractor from date of installation:
  - a. Roof Installer Workmanship Warranty must include information required in Attachment 'Warranty Information'.

## PART 2 - PRODUCTS

### 2.1 SYSTEM

#### A. Manufacturer:

1. Category Three Approved Manufacturers. See Section 01 6200 for definitions of Categories:
  - a. Carlisle SynTec Incorporated, Carlisle PA [www.carlisle-syntec.com](http://www.carlisle-syntec.com). (717) 245-7000:
    - 1) Contact Information (USA, Canada and Global):
      - a) Primary Contact: Greg Petschke (Manager Strategic Accounts), office (800) 479-6832 cell (717) 215-2681 [greg.petschke@carlisesyntec.com](mailto:greg.petschke@carlisesyntec.com).
      - b) Secondary Contact: Kristen Morrow (Strategic Accounts Coordinator), phone (717) 245-7289 [kristen.morrow@carlisleccm.com](mailto:kristen.morrow@carlisleccm.com).
      - c) Secondary Contact: Horner & Associates (Utah, Idaho, Wyoming, and Montana): Tom (801) 842-8305 [tom@hornerassocd7.com](mailto:tom@hornerassocd7.com) or Gary (801) 712-0326 [gary@hornerassocd7.com](mailto:gary@hornerassocd7.com).



b. Sika Sarnafil, Canton, MA (800) 576-2358 or (781) 828-5400. www.sikacorp.com.

1) Contact Information (USA, Canada and Global):

- a) Primary Contact: Steve Moosman, District Manager, office (801) 575-8648 x7551 cell (801) 201-6269 moosman.steve@us.sika.com.
- b) Secondary Contact: Jim Greenwell, Mountain Region Manager: office (801) 575-8648 x7558 cell (801) 455-3838 greenwell.jim@us.sika.com.

B. Design Criteria:

1. General:

- a. Installed membrane roofing and base flashings shall withstand specified uplift pressures, thermally induced movement, and exposure to weather without failure due to defective manufacture, fabrication, installation, or other defects in construction.
- b. Membrane roofing and base flashings shall remain watertight.

2. Drainage Requirement:

- a. Roof system to provide positive drainage where all standing water dissipates within forty-eight (48) hours after precipitation ends.

3. Material Compatibility:

- a. Provide roofing materials that are compatible with one another under conditions of service and application required, as demonstrated by membrane Roofing Membrane Manufacturer based on testing and field experience.

4. Metal details, fabrication practices, and installation methods shall conform to applicable requirements of following:

- a. Factory Mutual Loss Prevention Data Sheet 1-49, 'Perimeter Flashing' (latest issue).
- b. Sheet Metal and Air Conditioning Contractors National Association Inc, 5th edition.

C. Components:

1. Membrane:

a. Description:

1) Adhered:

- a) Meet requirements of ASTM D4434/D4434M, Type III.
- b) Category Four Approved Products. See Section 01 6200 for definitions of Categories:

(1) Carlisle SynTec:

- (a) Sure-Flex PVC FRS fiberglass reinforced membrane.
- (b) Sure-Flex PVC KEE synthetic fiber reinforced membrane.

(2) Sika Sarnafil:

- (a) G410 fiberglass reinforced membrane with lacquer coating.

b. Thickness:

1) Field membrane: Thickness: 80 mil by optimum width and length determined by job conditions.

- 2) Flashing membrane: Thickness: 0.60 mil by optimum width and length determined by job conditions.
- c. Surface Color:
  - 1) White.
- 2. Insulation:
  - a. FM and UL approved.
  - b. If required by Manufacturer for warranty, provide approved facer.
  - c. Polyisocyanurate Foam Insulation Board:
    - 1) Meet requirements of ASTM C1289.
    - 2) Insulation boards shall be Factory Mutual approved for classification selected for project.
    - 3) Facer:
      - a) Fiber reinforced paper facer or coated-glass fiber mat facer.
    - 4) Insulation panels directly under roofing membrane and roof system cover board shall not exceed 48 inches by 96 inches.
    - 5) Insulation panels to be 2 inches maximum thickness for each layer. Insulation shall be multiple layers and achieve minimum 'R' value of 30. Tapered layer shall slope at 1/4 in per ft.
  - d. Roof System Cover Board (Recovery/Hard Board) Over Insulation:
    - 1) Non-Fire Rated:
    - 2) 'Adhered' application:
      - a) Minimum thickness to be determined by roofing system Manufacturer based upon Warranty term and Wind Warranty requirements.
      - b) Category Four Approved Products. See Section 01 6200 for definitions of Categories:
        - (1) 1/2 inch minimum Dens-Deck Prime Roof Board by G-P Gypsum.
        - (2) 1/2 inch 1/2 inch thick minimum Securock by USG.
- 3. Vapor Retarder / Air Barrier:
  - a. Wood Roof Decks:
    - 1) Self adhered retarder:
      - a) May be used as temporary roof membrane up to ninety (90) day exposure.
      - b) Category Four Approved Products. See Section 01 6200 for definitions of Categories:
        - (1) Carlisle SynTec:
          - (a) Systems 725 TR air and vapor barrier with primers and sealers as required.
        - (2) Sika Sarnafil:
          - (a) Sarnavap air and vapor barrier with primers and sealants as required.

## 2.2 ACCESSORIES

### A. Adhesives, Sealants and Sealer:

1. General:
  - a. Supplied by Roofing Membrane Manufacture Meet uplift and VOC requirements required for Project for specific application method and in compliance with all local codes and restrictions provided by Roofing Membrane Manufacture.
  - b. As accepted by Roofing Manufacturer under specified warranty.
2. Provide sealants for use inside of the weatherproofing system that have a VOC content of 250 g/L or less when required by local codes or AHJ.
3. Pourable Sealer:
  - a. Approved by Roofing Membrane Manufacturer for specified roof system.
4. Membrane:
  - a. Category Four Approved Products. See Section 01 6200 for definitions of Categories:
    - 1) Carlisle SynTec:
      - a) Carlisle Sure Flex PVC: Solvent based membrane adhesive.
    - 2) Sika Sarnafil:
      - a) Sarnacol 2170: Solvent based membrane adhesive.
5. Insulation:
  - a. Category Four Approved Products. See Section 01 6200 for definitions of Categories:
    - 1) Carlisle SynTec:
      - a) Carlisle FAST or Flexible FAST low rise polyurethane foam adhesive.
    - 2) Sika Sarnafil:
      - a) Sarnacol 2163/AD/OM: Low rise polyurethane foam adhesive.

### B. Coated Metal:

1. Colors:
  - a. Not Seen From Ground: Color to match selected roof membrane.
  - b. Seen From Ground: Manufacturer's standard color as selected by Architect to match membrane surface color chosen for project.
2. Category Four Approved Products. See Section 01 6200 for definitions of Categories:
  - a. Carlisle SynTec:
    - 1) Sure Flex coated metal 24 ga G90 galvanized sheet metal laminated with 0.035 inch thick PVC membrane:
    - 2) Membrane cover strips:

- a) 0.060 inch thick.
    - b) Color to match selected Sure Flex.
  - b. Sika Sarnafil:
    - 1) 25 ga G90 galvanized sheet metal laminated with 0.020 inch thick membrane:
    - 2) Sarnclad membrane cover strips:
      - a) 0.060 inch thick.
      - b) Color to match selected Sarnaclad.
- C. Counterflashing:
  - 1. Formed to meet design requirements and match existing metals and aesthetics, furnished by Membrane Manufacturer.
- D. Mechanical Attachment Accessories:
  - 1. Fasteners:
    - a. Category Four Approved Products. See Section 01 6200 for definitions of Categories:
      - 1) Carlisle SynTec:
        - a) Carlisle Fasteners or engineered fasteners designed to anchor membrane and flashing into substrates that include steel, concrete, gypsum, and light weight concrete roof decks.
      - 2) Sika Sarnafil:
        - a) Sarnafasteners or engineered fasteners designed to anchor membrane and flashing into substrates that include steel, concrete, gypsum, and light weight concrete roof decks.
    - 2. Bars And Plates:
      - a. Category Four Approved Products. See Section 01 6200 for definitions of Categories:
        - 1) Carlisle SynTec:
          - a) Bars and plates engineered as companion assembly with Carlisle Fasteners. Used to secure membrane and/or flashing as required by Membrane Manufacturer.
        - 2) Sika Sarnafil:
          - a) Bars and plates engineered as companion assembly with Sarna fasteners. Used to secure membrane and/or flashing as required by Membrane Manufacturer.
- E. Miscellaneous Fasteners and Anchors:
  - 1. Fasteners, anchors, nails, straps, bars, etc. shall be of post-galvanized zinc or cadmium-plated steel, aluminum, or stainless steel. Mixing metal types and methods of contact shall be in such manner as to avoid galvanic corrosion.
  - 2. Compatible with substrates and flashings to be anchored:
    - a. Fasteners for attachment of metal to masonry shall be expansion type fasteners with stainless steel pins.
    - b. Wood fasteners and anchors shall have embedment of one inch minimum and be approved for such use by Fastener Manufacturer.
- F. Prefabricated Flashing Accessories: Membrane corners and pipe stacks as supplied by Membrane manufacturer.

G. Traffic Surface:

1. Standard Walkway:

a. Description:

- 1) Traffic surface used to protect roof membrane with limited slip surface.
- 2) Approved for all wind load areas.
- 3) Heat weldable walk roll.

b. Category Four Approved Products. See Section 01 6200 for definitions of Categories:

- 1) Carlisle SynTec:
  - a) Sure Flex Walkway Roll.
- 2) Sika Sarnafil:
  - a) SarnaTred Walkway Roll.

H. Wood Nailers:

1. Treat wood nailers as per Section 06 0573 for preservative wood treatment and Section 06 0574 for fire-retardant wood treatment. Creosote or asphaltic-treated wood is not acceptable.
2. Wood nailers shall conform to Factory Mutual's Loss Prevention Data Sheet 1-49.
3. Wood shall have maximum moisture content of 19 percent by weight on dry weight basis.

## PART 3 - EXECUTION

### 3.1 INSTALLERS

A. Category Three Approved Manufacturer's Roofing Installers: See Section 01 4301:

1. Carlisle SynTec:
  - a. <Insert Approved Installer>.
  - b. <Insert Approved Installer>.
  - c. <Insert Approved Installer>.
2. Sika Sarnafil:
  - a. <Insert Approved Installer>.
  - b. <Insert Approved Installer>.
  - c. <Insert Approved Installer>.

### 3.2 EXAMINATION

A. Verification Of Conditions:

1. Examine deck to determine if it is satisfactory for installation of roofing system:
  - a. Inspect for defects such as excessive surface roughness, contamination, structural inadequacy, or any other condition that will adversely affect quality of work.

- b. Verify that roof drain lines are functioning correctly before starting work of this Section. Report such blockages in writing to Architect, with copy to Roofing Manufacturer, for corrective action before beginning work of this Section.
  - c. Verify that wood blocking, curbs, and nailers are securely anchored to roof deck at penetrations and terminations and nailers match thicknesses of insulation to be installed.
2. Notify Architect of unsuitable conditions in writing:
    - a. Commencement of Work by installer is considered acceptance of substrate.
    - b. Stop work immediately if any unusual or concealed condition is discovered and immediately notify Architect in writing, with letter copy to Roofing Manufacturer.
    - c. Proceed with installation only after unsatisfactory conditions have been corrected.
- B. Examination And Assessment:
1. Examine decks for adequacy before commencing work. Requirements shall include but not limited to the following:
    - a. Designed slope required for proper drainage.
    - b. Location of roof drains.
    - c. Moisture conditions that will adversely affect quality of work.
    - d. Other condition incompatible with good roofing practice.
  2. Notify Architect in writing of conditions with letter copy to Roofing Membrane Manufacturer that would limit guarantee on part of Manufacturer or applicator.

### 3.3 PREPARATION

A. Surface Preparation:

1. General:
  - a. Substrate shall be clean, smooth, dry, and free of flaws, sharp edges, loose and foreign material, oil and grease. Roofing shall not start until defects have been corrected.
  - b. Provide temporary walkways and work platforms as necessary to complete work under this section with no damage to surfaces exposed during work.
  - c. Coordinate application of membrane to provide protection of underlying materials from wetting or other damage by the elements on a continuous basis.
  - d. Sheet metal sleeves, caps, and enclosures shall be completely installed on daily basis.
  - e. Prevent materials from entering and clogging roof drains and conductors and from spilling or migrating onto surfaces of other construction. Remove roof-drain plugs when no work is taking place or when rain is forecast.
  - f. Complete terminations and base flashings and provide temporary seals to prevent water from entering completed sections of roofing system at the end of the workday or when rain is forecast.
  - g. Remove and discard temporary seals before beginning work on adjoining roofing.

B. Wood Nailers:

1. Install continuous treated wood nailers at perimeter of entire roof and around roof projections and penetrations as described on Contract Drawings by Section 06 1100 'Wood Framing'.

### 3.4 INSTALLATION

A. Interface With Other Work:

1. Coordinate with Installers whose work penetrates roof deck or requires men and equipment to traverse roof deck.

B. General:

1. Installation shall be in conformance with latest edition of manufacturer's specification except where Contract Documents are more restrictive.
2. Roof surfaces shall be free of water, ice and snow. Surfaces to receive insulation, membrane, or flashings shall be dry. Should surface moisture occur, provide equipment necessary to dry surface before application.
3. Secure new and temporary construction, including equipment and accessories, so as to preclude wind blow-off and subsequent roof or equipment damage.
4. Install only as much roofing as can be made weathertight each day, including flashing and detail work. Clean seams and heat-weld before leaving jobsite.
5. Schedule and execute work without exposing interior building areas to effects of inclement weather. Protect existing building and its contents against all risks.
6. Before and during application, remove dirt, debris, and dust from surfaces either by vacuuming, sweeping, blowing with compressed air, or similar methods.
7. Report rooftop contamination that is anticipated or that is occurring to Roofing Manufacturer to determine corrective steps to be taken.

C. Vapor Retarder / Air Barrier Installation:

1. Wood Roof Decks:
  - a. Self adhered retarder: Apply self adhesive retarder directly over deck with overlaps and sheet edges sealed in accordance with Manufacturer's instruction.
2. Conduct moisture and adhesion tests.

D. Insulation:

1. Install insulation as recovery layer over substrate and to obtain desired thermal value. Roof assembly shall be dry.
2. Neatly cut insulation cut to fit around penetrations and projections.
3. Install tapered insulation in accordance with insulation manufacturer's shop drawings.
4. Install tapered insulation around drains creating a drain sump.
5. Do not install more insulation board than can be covered with roofing membrane by end of day's work or onset of inclement weather.
6. 'Adhered' Adhesive Attachment:
  - a. All work surfaces should be clean, dry, free of dirt, dust, debris, oils, loose and/or embedded gravel, un-adhered coatings, and other contaminants.
  - b. Apply adhesive in thickness and pattern in accordance with Insulation Manufacturer, Factory Mutual, and Roofing Manufacturer recommendations for fastening rates and patterns.
  - c. Quantity and location of adhesive beads shall also result in insulation boards resting evenly on roof deck/substrate so there are no cavities between boards and substrate.
  - d. Carlisle FAST or Flexible FAST foam adhesive requirement:
    - 1) Apply adhesive when substrate and ambient temperature are 25 deg F or above.
  - e. Insulation shall be fully bonded to substrate or vapor retarder.

E. Roof System Cover Board:

1. Offset roof system cover board joints 24 inches minimum from joints in underlying substrate or insulation.
2. Wood Roof Decks:
  - a. Non-visible installation:

- 1) Secure roof system cover board using insulation plates and fasteners spaced as required by Membrane Manufacturer's warranty requirements.
  - b. Visible (from ground/surrounding buildings) installation.
    - 1) Secure roof system cover board using low profile attachment plates and fasteners spaced as required by Membrane Manufacturer's warranty requirements.
- F. Membrane:
1. Inspection:
    - a. Inspect surface of insulation or substrate before installation of roof membrane.
    - b. Substrate shall be clean, dry and smooth with no excessive surface roughness, contaminated surfaces or unsound surfaces such as broken, delaminated, or damaged insulation boards.
    - c. All sharp projections shall be removed by sweeping, blowing or vacuum cleaning.
  2. Adhesive:
    - a. Follow ambient conditions as specified in Part 1 of this specification.
    - b. Follow Manufacturer's written application instructions including adhesive coverage rate requirements. Apply no adhesive in seam areas.
      - 1) Installer Option A):
        - a) Apply adhesive using solvent-resistant nap paint rollers.
      - 2) Installer Option B):
        - a) Apply adhesive using wet lay-in adhesive application.
  3. Hot-Air Welding Of Lap Areas:
    - a. General:
      - 1) Seams shall be hot air welded. Seam overlaps shall be 3 inches wide minimum when automatic machine welding, and 4 inches wide when hand welding.
      - 2) Membrane to be welded shall be clean and dry. No adhesive shall be in seam.
      - 3) Hand Welding:
        - a) Hand welded seams shall be completed in three stages. Allow hot-air welding equipment to warm up for one (1) minute minimum before welding.
      - 4) Seam shall be tack-welded every 36 inches to hold membrane in place.
      - 5) Weld back edge of seam with narrow but continuous weld to prevent loss of hot air during final welding.
      - 6) Insert nozzle into seam at 45 degree angle. Once proper welding temperature has been reached and membrane begins to 'flow', position hand roller perpendicular to nozzle and press lightly. For straight seams, use 1-1/2 inch wide nozzle. Use 3/4 inch wide nozzle for corners and compound connections.
    - b. Machine Welding: Follow Roofing Manufacturer's instructions and use recommended equipment.
    - c. Quality Control of Welded Seams:
      - 1) Check welded seams for continuity using rounded screwdriver. Make on-site evaluation of welded seams daily at locations directed by Owner's Representative or representative of Roofing Manufacturer.



- 2) Take one inch wide cross-section samples of welded seams at least three times a day. Patch each test cut at no additional cost to Owner.

G. Flashings:

1. General:

- a. Install flashings concurrently with roof membrane. No temporary flashings will be allowed without prior written approval of Owner's Representative and Roofing Manufacturer. Approval shall only be for specific locations on specific dates.
- b. If water is allowed to enter under newly completed roofing, remove and replace affected area no additional cost to Owner.
- c. Adhere flashings to compatible, dry, smooth, and solvent-resistant surfaces.

2. Membrane Flashings:

a. Adhesive Application for Flashings:

- 1) Adhere flashing membranes to solvent resistant substrates. Cut interior and exterior corners and miters and hot-air weld into place. No bitumen shall be in contact with membrane.
- 2) Apply adhesive using solvent-resistant 3/4 inch nap paint rollers. Apply adhesive in smooth, even coatings with no holidays, globs, or similar irregularities. Coat only area that can be completely covered in same day's operations. Allow surface with adhesive coating to dry completely prior to installing flashing membrane.
- 3) When surface is dry, cut flashing membrane to workable length and evenly coat underside with adhesive apply at Manufacturer's adhesive coverage rate requirements.
- 4) When adhesive has dried sufficiently to produce strings when touched with a dry finger, roll coated membrane onto previously coated substrate being careful to avoid wrinkles. Do not allow adhesive on underside of membrane to completely dry. Overlap adjacent sheets 3 inches. Flashings shall extend 4 inches onto roofing membrane. Press bonded sheet firmly in place with hand roller.
- 5) Apply no adhesive in seam areas that are to be welded.

- b. Install fasteners and membrane fastenings plates at 12 inches on center with acceptable fasteners into structural deck at the base of parapets, walls, and curbs. Also install Sarnastop at the base of tapered edge strips and at transitions, peaks, and valleys according to Roofing Manufacturer's details:

1) Hurricane Bar:

- a) Provide inside 4 ft perimeter peel stop (Hurricane Bar) required by Owner for all projects in all wind speed coverage areas.
- c. Extend flashings 8 inches minimum above roofing level except otherwise where detailed.
- d. Terminate flashings according to Roofing Manufacturer's recommended details.
- e. Adhere flashing membranes to solvent resistant substrates. Cut interior and exterior corners and miters and hot-air weld into place. No bitumen shall be in contact with membrane.

3. Metal Flashings:

- a. Complete metal work in conjunction with roofing and flashings so that watertight condition exists daily.
- b. Install metal to provide adequate resistance to bending and allow for normal thermal expansion and contraction.
- c. Metal joints shall be watertight.
- d. Securely fasten metal flashings into solid wood blocking. Fasteners shall penetrate wood nailer one inch (25 mm) minimum.
- e. Airtight and continuous metal hook strips are required behind metal fascias. Fasten hook strips 12 inches on center into wood nailer or masonry wall.

- f. Counterflashings shall overlap base flashings 4 inches minimum.
  - g. Metal Base Flashings:
    - 1) Space adjacent sheets 1/4 inch apart.
    - 2) Fasten ends of metal 6 inches on center.
    - 3) Cover joint with 2 inch wide aluminum tape.
    - 4) Hot-air weld 4 inch wide strip of flashing membrane over joint.
  - h. Metal Edge Flashing:
    - 1) Install as per requirements of ANSI/SPRI/FM 4435/ES-1, 'Wind Design Standard for Edge Systems Used with Low Slope Roofing Systems'.
    - 2) Fasten metal edge flashings with two rows of post-galvanized flat head annular ring nails, 4 inches on center staggered.
    - 3) Space adjacent sheets of metal 1/4 inch apart.
    - 4) Cover joint with 2 inch wide aluminum tape.
    - 5) Carlisle Sure Flex PVC coated metal:
      - a) Hot air weld 6 inchwide strip of non - reinforced PVC flashing over coated metal joint.
    - 6) Sika Sarnafil Sarnaclad:
      - a) Hot-air weld 4 inch wide strip of flashing membrane over joint.
- H. Temporary Cut-Off:
- 1. Construct temporary waterstops to provide one hundred (100) percent watertight seal:
    - a. Make stagger of insulation joints even by installing partial panels of insulation.
    - b. Carry new membrane into waterstop.
    - c. Seal waterstop to deck or substrate so water will not travel under new or existing roofing.
    - d. Seal edge of membrane in continuous heavy application of sealant as described above.
    - e. When work resumes, cut-out contaminated membrane and dispose of off-site.
  - 2. If inclement weather occurs while temporary waterstop is in place, provide labor necessary to monitor situation to maintain watertight condition.
  - 3. If water is allowed to enter under newly completed roofing, remove affected area and replace at no additional cost to Owner.
- I. Walkway Rolls:
- 1. Mark lines on membrane to determine location and direction(s) of walkway network. Membrane surface shall be clean.
  - 2. Follow Manufacturer's written application instructions including adhesive coverage rate requirements.

### 3.5 FIELD QUALITY CONTROL

- A. Field Inspection:
- 1. Before Manufacturer's inspection for warranty, Installer must perform pre-inspection to review work and to verify flashing has been completed as well as application of caulking.
  - 2. Final Roof Inspection:
    - a. Arrange for Roofing Membrane Manufacturer's technical personnel to inspect roofing installation on completion.
  - 3. Upon completion of roof inspection, provide certification that installation has been performed in accordance with Contract Document and Roofing Manufacturer requirements.

B. Non-Conforming Work:

1. Correct all work not in compliance to Contract Documents at no additional cost to Owner.
  - a. Repair or remove and replace components of membrane roofing system where inspections indicate that they do not comply with specified requirements.
  - b. Replace contaminated membrane.
2. Additional inspections will be performed to determine compliance of replaced or additional work with specified requirements at no additional cost to Owner.
3. Repair landscaped areas damaged by construction activities at no additional cost to Owner.

### 3.6 CLEANING

A. Waste Management:

1. Perform daily clean-up to collect wrappings, empty container, paper, and other roofing waste debris from project site.
2. Upon completion, roofing waste materials must be disposed from site to dumping area legally authorized to receive such materials.
3. Complete site cleanup, including both interior and exterior building areas that have been affected by construction, to Owner's satisfaction.

### 3.7 PROTECTION

A. General Contractor Responsibility:

1. Protection of roofing membrane from damage and wear from other trades from damage after completion of roof membrane.
2. Clean overspray and spillage from adjacent construction using cleaning agents and procedures recommended by Manufacturer of affected construction.

**END OF SECTION**

**ATTACHMENTS**

# ARCHITECT'S INFORMATION FOR ROOFING MANUFACTURERS

## PROJECT INFORMATION GIVEN TO ROOFING MANUFACTURER BY ARCHITECT

Project Architect to provide following information to each Approved Roofing Manufacturer **THREE WEEKS** minimum before BID.  
 Project Information will be used by Roofing Manufacture for 'Roofing Manufacture Project Information' to be given to Architect to assist in the roof design and incorporated in the specifications for the Project

Project Name: West Field Sr. Seminary  
 Project Site Address: 2200 S 4300 W, Ogden, Utah  
 Building Type (Meetinghouse, CES, O&M/R&I, Temple, Other) Custom Seminary  
 Roof Deck (Wood, Concrete, Steel) Wood

Architect to provide Digital Information to assist Roof Manufacture:	Preliminary Specification Section 07 5423 Roof Plan	Architectural Floor Plan(s) Exterior Building Elevations
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## ROOFING MANUFACTURER CONTACT INFORMATION

### Carlisle SynTec

Primary Contact:	Greg Petschke Cell (717) 215-2681, Office (717) 245-7000 Greg.Petschke@CarlisleSynTec.com	Strategic Account Manager
Secondary Contact:	Kristen Morrow phone (717) 245-7289 kristen.morrow@carlisleccm.com	Strategic Accounts Coordinator
Secondary Contact:	Horner & Associates: (Utah, Idaho, Wyoming, and Montana)	
	Tom Horner Gary Horner	Phone (801) 842-8305 tom@hornerassocd7.com Phone (801) 712-0326 gary@hornerassocd7.com

### Sika Sarnafil

Primary Contact:	Steve Moosman Office (801) 575-8648 x7551 Cell (801) 201-6269 moosman.steve@us.sika.com	District Manager
Secondary Contact:	Jim Greenwell Office (801) 575-8648 x7558 Cell (801) 455-3838 greenwell.jim@us.sika.com	Mountain Region Manager

**PROJECT INFORMATION for ROOF WARRANTY**

Architect to provide following information to Roof Installer after BID to be included in 'Roof Installer Workmanship Warranty' and 'Manufacturer System Warranty' as part of the Closeout Submittal.

Name of Owner (FM Group):	<u>Farr West Utah FM Group</u>
Mailing Address (FM Office Address)	<u>1448 W 1800 N, Clinton, UT 84015</u>
Property ID (Property No.)	<u>501-9820</u>
Site Address (Project Site Address)	<u>2200 S. 4300 W., Ogden, Utah</u>
Roof Completion Date (Substantial Completion date available after BID to be included in Roof Warranty)	

# ROOFING MANUFACTURER'S INFORMATION FOR ARCHITECT

## ROOFING INFORMATION TO BE INCLUDED BY ARCHITECT IN 'PROJECT SPECIFICATIONS'

Submit this Information to Architect in writing or e-mail **THREE DAYS** minimum before BID

### PROJECT ROOF DESIGN INFORMATION

ROOF MANUFACTURER: \_\_\_\_\_

Wind Speed Coverage: (Add to Warranty Part 1 of specifications) \_\_\_\_\_

(Architect - Do not correlate wind design to wind warranty. ASCE 7 maps changed to reflect new building codes. Use wind speed map to design for local code compliance for project).

### APPROVED INSTALLERS

List of Approved Installers to be used on this Project to be added by Architect into Project Specifications before bid as specified in Part 3 of Project Specifications. Include Firm Name, Address, and Contact Information.

Only Roof Installers named by Approved Roofing Manufacturers and included in Contract Documents for this Project are approved. List minimum of two (2) installers from each Roofing Manufacturer. More than two (2) installers are not required from each Manufacturer. Do not use Installer lists from other Projects without first contacting Roofing Manufacturer.

- 1). \_\_\_\_\_
- 2). \_\_\_\_\_
- 3). \_\_\_\_\_
- 4). \_\_\_\_\_
- 5). \_\_\_\_\_
- 6). \_\_\_\_\_

### COMMENTS

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# SECTION 07 6210 - GALVANIZED STEEL FLASHING AND TRIM

## PART 1 - GENERAL

### 1.1 SUMMARY

- A. Includes But Not Limited To:
  - 1. Furnish and install miscellaneous flashing, counterflashing, and hold-down clips as described in Contract Documents and not specified to be of other material.
- B. Products Furnished But Not Installed Under This Section:
  - 1. Copings, scuppers, and miscellaneous sheet metal specialties not specified to be of other materials.
- C. Related Requirements:
  - 1. Section 06 1100: 'Wood Framing' for wood base.
  - 2. Sections under 07 5000 heading: 'Membrane Roofing' for installation of gravel stops, copings, scuppers, and miscellaneous roofing related flashing.
  - 3. Section 07 9213: 'Elastomeric Joint Sealant'.

### 1.2 REFERENCES

- A. Reference Standards:
  - 1. ASTM International:
    - a. ASTM A653/A653M-18, 'Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process'.
    - b. ASTM A792/A792M-10(2015), 'Standard Specification for Steel Sheet, 55 % Aluminum-Zinc Alloy-Coated by the Hot-Dip Process'.
  - 2. Federal Specifications:
    - a. TT-S-00230C(2) Sealing Compound, Elastomeric Type, Single Component, (For Caulking, Sealing, and Glazing in Buildings and Other Structures).

## PART 2 - PRODUCTS

### 2.1 SYSTEM

- A. Manufacturers:
  - 1. Type Two Acceptable Manufacturers Of Metal:
    - a. CMG - Coated Metals Group, Denver, CO [www.cmgmetals.com](http://www.cmgmetals.com).
    - b. Drexel Metals, LLC, Ivyland, PA [www.drexmet.com](http://www.drexmet.com).
    - c. Fabral, Lancaster, PA [www.fabral.com](http://www.fabral.com).
    - d. Firestone Metal Products, Anoka, MN [www.unaclad.com](http://www.unaclad.com).
    - e. MBCI, Houston, TX [www.mbc.com](http://www.mbc.com).

- f. Metal Sales Manufacturing Corp, Sellersburg, IN [www.mtlsales.com](http://www.mtlsales.com).
- g. O'Neal Flat Rolled Metals (member of O'Neal Industries), Brighton, CO [www.ofrmetals.com](http://www.ofrmetals.com).
- h. Petersen Aluminum Corp, Elk Grove, IL [www.pac-clad.com](http://www.pac-clad.com).
- i. Ryerson, Chicago, IL [www.ryerson.com](http://www.ryerson.com).
- j. Equal as approved by Architect before installation. See Section 01 6200.

B. Materials:

1. Sheet Metal:

- a. Galvanized iron or steel meeting requirements of ASTM A653/A653M, G 90 or Galvalume steel meeting requirements of ASTM A792/A792M AZ50, 50 ksi.
  - 1) 22 ga for hold-down clips.
  - 2) 24 ga for all other.

C. Fabrication:

- 1. Form accurately to details.
- 2. Profiles, bends, and intersections shall be even and true to line.
- 3. Fold exposed edges 1/2 inch to provide stiffness.

D. Finish:

- 1. Exposed to view:
  - a. Provide face coating of polyvinylidene Fluoride (PVF<sub>2</sub>) Resin-base finish (Kynar 500 or Hylar 5000) containing seventy (70) percent minimum PVF<sub>2</sub> in resin portion of formula. Thermo-cured two coat system consisting of corrosion inhibiting epoxy primer and top coat factory applied over properly pre-treated metal.
  - b. Reverse side coating shall be thermo-cured system consisting of corrosion inhibiting epoxy primer applied over properly pre-treated metal.
- 2. Color as selected by Architect from Manufacturer's standard colors.

## 2.2 ACCESSORIES

A. Sealants: Rubber base type conforming to Fed Spec TT-S-00230C.

B. Fasteners:

- 1. Of strength and type consistent with function.
- 2. Nails: Hot-dipped galvanized.
- 3. Screws, Bolts, And Accessory Fasteners: Galvanized or other acceptable corrosion resistant treatment.

## PART 3 - EXECUTION

### 3.1 INSTALLATION

- A. Install with small, watertight seams.
- B. Slope to provide positive drainage.
- C. Provide sufficient hold down clips to insure true alignment and security against wind.



- D. Provide 4 inch minimum overlap.
- E. Allow sufficient tolerance for expansion and contraction.
- F. Insulate work to prevent electrolytic action.

### **3.2 CLEANING**

- A. Leave metals clean and free of defects, stains, and damaged finish.

**END OF SECTION**

## SECTION 07 6311 - METAL SOFFIT PANELS

### PART 1 - GENERAL

#### 1.1 SUMMARY

A. Includes But Not Limited To:

1. Furnish and install metal soffit panel system as described in Contract Documents.

#### 1.2 REFERENCES

A. Reference Standards:

1. ASTM International:
  - a. ASTM A653/A653M-18, 'Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process'.
  - b. ASTM A792/A792M-10(2015), 'Standard Specification for Steel Sheet, 55 % Aluminum-Zinc Alloy-Coated by the Hot-Dip Process'.
  - c. ASTM B209-14, 'Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate'.
  - d. ASTM E84-18b, 'Standard Test Method for Surface Burning Characteristics of Building Materials'.

#### 1.3 SUBMITTALS

A. Action Submittals:

1. Product Data:
  - a. Manufacturer's literature or cut sheet for products furnished.

B. Closeout Submittals:

1. Include following in Operations And Maintenance Manual specified in Section 01 7800:
  - a. Warranty Documentation:
    - 1) Final, executed copy of Warranty.

#### 1.4 QUALITY ASSURANCE

A. Regulatory Agency Sustainability Approvals:

1. Fire Characteristics Performance Requirement:
  - a. Meet requirements of ASTM E84 Class A fire rating.

B. Qualifications:

1. Installer:

- a. Minimum three (3) years experience with installations of comparable quality, scope, similar size, and complexity before bidding.

## 1.5 DELIVERY, STORAGE, AND HANDLING

### A. Delivery And Acceptance Requirements:

1. Materials shall be delivered in original, unopened packages with labels intact.
2. Inspect delivered material for damage.

### B. Storage And Handling Requirements:

1. Stack panels on pallets or above ground, covered with weathertight and ventilated covering. Prevent condensation build-up or moisture entrapment in materials.
2. Store panels not in contact with other materials that might cause staining, denting or other surface damage.

## 1.6 WARRANTY

### A. Manufacturer Warranty:

1. Manufacturer's standard warranty against manufacturer defects.
2. Manufacturer's written thirty five (35) year warranty on paint finish against cracking, peeling, blistering, chalk, and color change.

## PART 2 - PRODUCTS

### 2.1 SYSTEMS

#### A. Manufacturers:

1. Type One Acceptable Manufacturers Of Metal:
  - a. AEP / Span, Dallas, TX [www.aep-span.com](http://www.aep-span.com).
  - b. ATAS Aluminum Products, Allentown, PA [www.atas.com](http://www.atas.com).
  - c. Fabral, Lancaster, PA [www.fabral.com](http://www.fabral.com).
  - d. Fashion Inc, Ottawa, KS [www.fashioninc.com](http://www.fashioninc.com).
  - e. Firestone Metal Products, Anoka, MN [www.unaclad.com](http://www.unaclad.com).
  - f. MBCI, Houston, TX [www.mbc.com](http://www.mbc.com).
  - g. O'Neal Flat Rolled Metals (member of O'Neal Industries), Brighton, CO [www.ofrmetals.com](http://www.ofrmetals.com).
  - h. Petersen Aluminum Corp, Elk Grove, IL [www.pac-clad.com](http://www.pac-clad.com).
  - i. Ryerson, Chicago, IL [www.ryerson.com](http://www.ryerson.com).
  - j. Equal as approved by Architect before bidding. See Section 01 6200.

#### B. Performance:

1. Design Criteria:
  - a. Flush panel design.
    - 1) Panels shall be interlocked full length of panel.
    - 2) Panel widths shall be Manufacturer's standard.
  - b. Performance Standard: ATAS Wind-LOK Soffit MPS120.

C. Materials:

1. 24 ga (0.0276 in) galvanized iron or steel meeting requirements of A653/A653M, G 90.
2. 24 ga (0.0276 in) minimum 50 ksi galvalume steel meeting requirements of ASTM A792/A792M AZ-55.

D. Fabrication:

1. Panels shall be uniformly dimensioned, roll formed to lengths to avoid trimming.
2. Panel system shall be anchored as recommended by Manufacturer.
3. Panels shall be continuous.

E. Finish:

1. Polyvinylidene Fluoride (PVF<sub>2</sub>) Resin-base (Kynar 500 or Hylar 5000) finish for coil coating components containing 70 percent minimum PVF<sub>2</sub> in resin portion of formula. Thermo-cured two coat system consisting of corrosion inhibiting epoxy primer and top coat factory applied over properly pre-treated metal.
2. Color as selected by Architect from Manufacturer's standard colors.

## 2.2 ACCESSORIES

- A. Fastening Devices: 1-1/2 inch cadmium or zinc plated ring shanked nails.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

A. Verification Of Conditions:

1. Examine substrate and verify framing is suitable for installation of soffit system.
2. Notify Architect of unsuitable conditions in writing.
  - a. Do not install soffit over unsuitable conditions.
  - b. Commencement of Work by installer is considered acceptance of substrate.

### 3.2 INSTALLATION

- A. Conceal fasteners where possible. Paint heads of exposed fasteners to match background.
- B. Isolate from dissimilar metals to prevent electrolytic action.

### 3.3 FIELD QUALITY CONTROL

- A. Non-Conforming Work: Non-conforming work as covered in the General Conditions applies, but is not limited to the following:
1. Correct any work found defective or not complying with contract document requirements including buckling or bowing due to improper installation and touch up of minor scratches and spots at no additional cost to the Owner.

### **3.4 CLEANING**

A. General:

1. Clean exposed panel surfaces promptly after installation in accordance with manufacturer's instructions.

B. Waste Management:

1. Dispose of waste in provided waste receptacles (dumpsters) as specified in Section 01 7400.

**END OF SECTION**

## SECTION 07 7233 - ROOF HATCHES

### PART 1 - GENERAL

#### 1.1 SUMMARY

A. Products Supplied But Not Installed Under This Section:

1. Roof hatches and scuttles indicated on Contract Drawings including:
  - a. Related hardware and attachments.
  - b. Safety post for fixed ladders in roof hatches.

B. Related Requirements:

1. Section 06 2001: 'Common Finish Carpentry Requirements' for installation of roof hatches and safety post in roof hatches.
2. Sections Under 07 5000 Heading: Membrane Roofing.
3. Sections Under 07 6000 Heading: Flashing and Sheet Metal.
4. Section 07 9219: 'Elastomeric Joint Sealants' for sealant.

#### 1.2 REFERENCES

A. Association Publications:

1. U.S. Department of Labor, Occupational Safety and Health Administration (OSHA):
  - a. 29 CFR 1910 Subpart D: Walking-Working Surfaces:
    - 1) 1910.23 (e) - Guarding floor and wall openings and holes.
    - 2) 1910.27 (c) - Hatch Covers.

#### 1.3 SUBMITTALS

A. Action Submittals:

1. Product Data:
  - a. Roof Hatch:
    - 1) Manufacturer's technical data for each type of hatch assembly, including setting drawings, templates, finish requirements, and details of anchorage devices.
      - a) Include locations, construction details, finishes, latching or locking provisions, and other pertinent data.
2. Shop Drawings:
  - a. Roof Hatch:
    - 1) Indicate configuration and dimension of components, adjacent construction, required clearances and tolerances, and other affected Work.
      - a) Hatch Units: Show types, elevations, thickness of metals, and full size profiles.

- b) Hardware: Show materials, finishes, locations of fasteners, types of fasteners, locations and types of operating hardware, and details of installation.

B. Informational Submittals:

1. Manufacturers' Instructions:

a. Roof Hatch:

- 1) Indicate installation requirements and rough-in dimensions.

C. Closeout Submittals:

1. Include following in Operations And Maintenance Manual specified in Section 01 7800:

a. Warranty Documentation:

1) Roof Hatch:

- a) Final, executed copy of Warranty.

2) Roof Hatch Safety Railing:

- a) Final, executed copy of Warranty.

#### 1.4 QUALITY ASSURANCE

A. Regulatory Agency Sustainability Approvals:

1. OSHA Compliance:

- a. Provide safety post for fixed ladders as required by OSHA Standard 1910.27 and as specified in this Section.

- 1) Meet minimum concentrated load of 200 lbs load.

B. Qualifications:

1. Manufacturer:

- a. Company specializing in manufacturing and installation of components specified in this Section with minimum of five (5) years documented experience.

#### 1.5 DELIVERY, STORAGE, AND HANDLING

A. Delivery And Acceptance Requirements:

- 1. Make no deliveries to Project until installation is about to commence, or until approved storage area is provided.

B. Storage And Handling Requirements:

- 1. Store materials under cover in dry and clean location off ground. Remove materials that are damaged or otherwise not suitable for installation from Project site and replace with acceptable materials at no additional cost to Owner.
- 2. Exercise proper care in handling of Work so as not to injure finished surfaces. Protect Work from damage after it is in place.

## 1.6 WARRANTY

- A. Roof Hatch:
  - 1. Provide Manufacturer's standard written warranty for materials and workmanship against defects.
- B. Roof Hatch Safety Railing:
  - 1. Provide Manufacturer's five (5) year minimum warranty.

## PART 2 - PRODUCTS

### 2.1 MANUFACTURERS

- A. Type One Acceptable Manufacturers:
  - 1. Babcock-Davis Hatchways Inc, Arlington, MA [www.babcock-davis.com](http://www.babcock-davis.com).
  - 2. The Bilco Company, New Haven, CT [www.bilco.com](http://www.bilco.com).
  - 3. Dur-Red Products, Cudahy, CA [www.dur-red.com](http://www.dur-red.com).
  - 4. Milcor, Bensenville, IL [www.milcorinc.com](http://www.milcorinc.com).
  - 5. Equal as approved by Architect before bidding. See Section 01 6200.

### 2.2 MANUFACTURED UNITS

- A. Roof Hatch:
  - 1. Design Criteria:
    - a. Provide 36 inch x 30 inch for ladder access.
    - b. Provide corrosion resistance finish.
  - 2. Cover And Curb:
    - a. Cover: 11 ga mill finish aluminum.
    - b. Cover Lining: 18 ga mill finish aluminum cover liner.
    - c. Curb Height: 12 inches with 3-1/2 inch flange for mounting, with integral cap flashing.
    - d. Insulate curb and cover with one inch rigid fiberglass.
  - 3. Performance Standard: Bilco S-50.

### 2.3 ACCESSORIES

- A. Roof Hatch Safety Railing:
  - 1. Description:
    - a. OSHA compliant Safety Railing for new and retrofit applications.
    - b. Safety railing mounts to new or existing roof hatch curb counterflashing without penetrating membrane.
  - 2. Design Criteria:
    - a. Compliance: OSHA 29 CFR1910.23 for guarding floor and wall openings and holes.



- b. Self-Closing Gate.
- 3. Basis of Design: Babcock-Davis model BSRCA 36x30 FG
- B. Safety Post For Fixed Ladders:
  - 1. Description:
    - a. Safety post for fixed vertical ladders used with roof hatches.
    - b. Telescoping post permanently mounts to top two (2) rungs of fixed ladder providing positive hand-hold and enabling user to enter or exit roof hatch in upright and balanced position.
    - c. Post locks automatically when fully extended.
  - 2. Comply with requirements of Regulatory Agency Sustainability Approvals as specified in Quality Assurance in Part 1 of this specification.
  - 3. Finish: Hot dip galvanized or mill finish aluminum.
  - 4. Type One Acceptable Manufacturers:
    - a. Safety Post by Babcock-Davis Hatchways Inc, Arlington, MA [www.babcock-davis.com](http://www.babcock-davis.com).
    - b. LadderUP Safety Post (Model LU-4) by The Bilco Company, New Haven, CT [www.bilco.com](http://www.bilco.com).
    - c. Extend-A-Rail (Model ER-1) by Precision Ladders, LLC, Morristown, TN [www.precisionladders.com](http://www.precisionladders.com).
    - d. Equal as approved by Architect before bidding. See Section 01 6200.

## **PART 3 - EXECUTION**

### **3.1 EXAMINATION**

- A. Verification of Conditions:
  - 1. Verify areas and conditions under which roof hatches is to be located and identify conditions detrimental to proper or timely completion.
  - 2. Verify deck, cubs, roof membrane, base flashing and other items affecting Work of this section are in place and positioned correctly.
  - 3. Verify dimensions and tolerances.
    - a. Report unsatisfactory conditions in writing to Architect.
    - b. Commencement of Work by installer is considered acceptance of substrate.

### **3.2 INSTALLATION**

- A. Follow Manufacturer's instructions for installing Roof Hatch, Safety Railing, Safety Post, and related accessories and attachments.

### **3.3 ADJUSTING**

- A. Test-operate roof hatch with operable components. Clean and lubricate joints and hardware. Adjust for proper operation.

### **3.4 CLEANING**

- A. General:
  - 1. Clean exposed surfaces per manufacture's written instructions. Touch up damaged metal coatings.

B. Waste Management:

1. Disposal:

- a. Remove debris resulting from work of this Section from roof and site in approved waste receptacle.

**END OF SECTION**

## SECTION 07 9213 - ELASTOMERIC JOINT SEALANTS

### PART 1 - GENERAL

#### 1.1 SUMMARY

- A. Includes But Not Limited To:
  - 1. Furnish and install sealants not specified to be furnished and installed under other Sections.
  - 2. Quality of sealants to be used on Project not specified elsewhere, including submittal, material, and installation requirements.
- B. Related Requirements:
  - 1. Furnishing and installing of sealants is specified in Sections specifying work to receive new sealants.
- C. Products Furnished But not Installed Under This Section:
  - 1. Interior Ceramic Tile Joint Sealants:
- D. Related Requirements:
  - 1. Section 09 3013: 'Ceramic Tiling'.

#### 1.2 REFERENCES

- A. Definitions:
  - 1. Sealant Types and Classifications:
    - a. ASTM Specifications:
      - 1) Type:
        - a) Type S: Single-component sealant.
        - b) Type M: Multi-component sealant.
      - 2) Grade:
        - a) Grade P: Pourable or self-leveling sealant used for horizontal traffic joints.
        - b) Grade NS: Non-sag or gunnable sealant used for vertical and non-traffic joints.
      - 3) Classes: Represent movement capability in percent of joint width.
        - a) Class 100/50: Sealant that, when tested for adhesion or cohesion under cyclic movement shall withstand of at least 100 percent increase and decrease of at least 50 percent of joint width as measured at time of application.
        - b) Class 50: Sealant that, when tested for adhesion or cohesion under cyclic movement shall withstand increase and decrease of at least 50 percent of joint width as measured at time of application.
        - c) Class 25: Sealant that, when tested for adhesion or cohesion under cyclic movement shall withstand increase and decrease of at least 25 percent of joint width as measured at time of application.
        - d) Class 12: Sealant that, when tested for adhesion and cohesion under cyclic movement shall withstand increase and decrease of at least 12 percent of joint width as measured at time of application.

- 4) Use:
  - a) T (Traffic): Sealant designed for use in joints in pedestrian and vehicular traffic areas such as walkways, plazas, decks and parking garages.
  - b) NT (Non-Traffic): Sealant designed for use in joints in non-traffic areas.
  - c) I (Immersion): Sealant that meets bond requirements when tested by immersion (Immersion rated sealant applications require primer).
  - d) M (Mortar): Sealant that meets bond requirements when tested on mortar specimens.
  - e) G (Glass): Sealant that meets bond requirements when tested on glass specimens.
  - f) A (Aluminum): Sealant that meets bond requirements when tested on aluminum specimens.
  - g) O (Other): Sealant that meets bond requirements when tested on substrates other than standard substrates, being glass, aluminum, mortar.

2. Silicone: Any member of family of polymeric products whose molecular backbone is made up of alternating silicon and oxygen atoms and which has pendant hydrocarbon groups attached to silicon atoms. Used primarily as a sealant. Offers excellent resistance to water and large variations in temperature (minus 100 deg F to + 600 deg F).

B. Reference Standards:

1. ASTM International:
  - a. ASTM C920-18, 'Standard Specification for Elastomeric Joint Sealants'.
  - b. ASTM C1193-16, 'Standard Guide for Use of Joint Sealants'.
  - c. ASTM C1330-18, 'Standard Specification for Cylindrical Sealant Backing for Use with Cold Liquid Applied Sealants'.
  - d. ASTM C1481-12(2017) 'Standard Guide for Use of Joint Sealants with Exterior Insulation & Finish Systems (EIFS)'.
  - e. ASTM D5893/D5893M-16, 'Standard Specification for Cold Applied, Single Component, Chemically Curing Silicone Joint Sealant for Portland Cement Concrete Pavements'.

### 1.3 ADMINISTRATIVE REQUIREMENTS

A. Scheduling:

1. Schedule work so waterproofing, water repellents and preservative finishes are installed after sealants, unless sealant manufacturer approves otherwise in writing.
2. Ensure sealants are cured before covering with other materials.

### 1.4 SUBMITTALS

A. Action Submittals:

1. Product Data:
  - a. Manufacturer's specifications and other data needed to prove compliance with the specified requirements.
  - b. Manufacturer's literature for each Product.
  - c. Schedule showing joints requiring sealants. Show also backing and primer to be used.

B. Informational Submittals:

1. Certificates:
  - a. Manufacturer's Certificate:
    - 1) Certify products are suitable for intended use and products meet or exceed specified requirements.
    - 2) Certificate from Manufacturer indicating date of manufacture.

2. Manufacturers' Instructions:
  - a. Manufacturer's installation recommendations for each Product.
  - b. Manufacturer's installation for completing sealant intersections when different materials are joined.

## 1.5 QUALITY ASSURANCE

### A. Qualifications:

1. Manufacturer: Company specializing in manufacturing products specified in this section with minimum ten (10) years documented experience.
2. Applicator Qualifications:
  - a. Company specializing in performing work of this section.
  - b. Provide if requested, reference of projects with minimum three (3) years documented experience, minimum three (3) successfully completed projects of similar scope and complexity, and approved by manufacturer.
  - c. Designate one (1) individual as project foreman who shall be on site at all times during installation.

### B. Preconstruction Testing:

1. Pre-construction testing is not required when sealant manufacturer can furnish data acceptable to Architect based on previous testing for materials matching those of the Work.

### C. Mockups:

1. Provide mockups including sealant and joint accessories to illustrate installation quality and color if requested by Architect or Project Manager.
  - a. Incorporate accepted mockup as part of Work.

## 1.6 DELIVERY, STORAGE, AND HANDLING

### A. Delivery and Acceptance Requirements:

1. Deliver and keep in original containers until ready for use.
2. Inspect for damage or deteriorated materials.

### B. Storage and Handling Requirements:

1. Handle, store, and apply materials in compliance with applicable regulations and material safety data sheets (MSDS).
2. Handle to prevent inclusion of foreign matter, damage by water, or breakage.
3. Store in a cool dry location, but never under 40 deg F or subjected to sustained temperatures exceeding 90 deg F or as per Manufacturer's written recommendations.
4. Do not use sealants that have exceeded shelf life of product.

## 1.7 FIELD CONDITIONS

### A. Ambient Conditions:

1. Do not install sealant during inclement weather or when such conditions are expected. Allow wet surfaces to dry.
2. Follow Manufacturer's temperature recommendations for installing sealants.

## 1.8 WARRANTY

### A. Manufacturer Warranty:

1. Signed warranties against adhesive and cohesive failure of sealant and against infiltration of water and air through sealed joint for period of three (3) years from date of Substantial Completion.
  - a. Manufacturer's standard warranty covering sealant materials.
  - b. Applicator's standard warranty covering workmanship.

## PART 2 - PRODUCTS

### 2.1 SYSTEMS

#### A. Manufacturers:

##### 1. Manufacturer Contact List:

- a. Dow Corning Corp., Midland, MI [www.dowcorning.com](http://www.dowcorning.com).
- b. Franklin International, Inc. Columbus, OH [www.titebond.com](http://www.titebond.com).
- c. GE Sealants & Adhesives (see Momentive Performance Materials Inc.).
- d. Laticrete International Inc., Bethany, CT [www.laticrete.com](http://www.laticrete.com).
- e. Momentive Performance Materials Inc. (formally GE Sealants & Adhesives), Huntersville, NC [www.ge.com/silicones](http://www.ge.com/silicones).
- f. Sherwin-Williams, Cleveland, OH [www.sherwin-williams.com](http://www.sherwin-williams.com).
- g. Sika Corporation, Lyndhurst, NJ [www.sikaconstruction.com](http://www.sikaconstruction.com) or Sika Canada Inc, Pointe Claire, QC [www.sika.ca](http://www.sika.ca).
- h. Tremco, Beachwood, OH [www.tremcosealants.com](http://www.tremcosealants.com) or Tremco Ltd, Toronto, ON (800) 363-3213.

#### B. Materials:

##### 1. Design Criteria:

- a. Compliance: Meet or exceed requirements of these standards:
  - 1) ASTM C920: Elastomeric joint sealant performance standard.
  - 2) ASTM D5893/D5893M: Silicone Joint Sealant for Concrete Pavements.
- b. Comply with Manufacturer's ambient condition requirements.
- c. Sealants must meet Manufacturer's shelf-life requirements.
- d. Sealants must adhere to and be compatible with specified substrates.
- e. Sealants shall be stable when exposed to UV, joint movements, and environment prevailing at project location.
- f. Primers (Concrete, stone, masonry, and other nonporous surfaces typically do not require a primer. Aluminum and other nonporous surfaces except glass require use of a primer. Installer Option to use Adhesion Test to determine if primer is required or use primer called out in related sections):
  - 1) Adhesion Test:
    - a) Apply silicone sealant to small area and perform adhesion test to determine if primer is required to achieve adequate adhesion. If necessary, apply primer at rate and in accordance with Manufacturer's instructions. See 'Field Quality Control' in Part 3 of this specification for Adhesive Test.
  - 2) If Primer required, shall not stain and shall be compatible with substrates.
  - 3) Allow primer to dry before applying sealant.

2. Sealants At Exterior Building Elements:

a. Description:

- 1) Weathersealing expansion, contraction, perimeter, and other movement joints which may include all or part of the following for project:
  - a) Aluminum entrance perimeters and thresholds.
  - b) Connections.
  - c) Door frames.
  - d) Joints and cracks around windows.
  - e) Masonry.
  - f) Parapet caps.
  - g) Wall penetrations.
  - h) Other joints necessary to seal off building from outside air and moisture.

b. Design Criteria:

- 1) Meet following standards for Sealant:
  - a) ASTM C920: Type S, Grade NS, Class 50 Use NT, M, G, A.
- 2) Limitations:
  - a) Do not use below-grade applications.
  - b) Do not use on surfaces that are continuously immersed or in contact with water.
  - c) Do not use on wet, damp, frozen or contaminated surfaces.
  - d) Do not use on building materials that bleed oils, plasticizers or solvents, green or partially vulcanized rubber gaskets or tapes.
- 3) Color:
  - a) Architect to select from Manufacturer's standard colors.
  - b) Match building elements instead of window (do not use white that shows dirt easily).

c. Category Four Approved Products. See Section 01 6200 for definitions of Categories:

- 1) Dow Corning:
  - a) Primer: 1200 Prime Coat.
  - b) Sealant: 791 Silicone Weatherproofing Sealant.
- 2) Momentive Performance Materials (formerly, GE Sealants & Adhesives):
  - a) Primer: SS4044 Primer.
  - b) Sealant: GE SCS2000 SilPruf Silicone Sealant & Adhesive.
- 3) Tremco:
  - a) Primer:
    - (1) Metal surface: No. 20 primer.
    - (2) Porous surfaces: No. 23 primer.
  - b) Sealant: Spectrum 1 Silicone Sealant.

3. Sealants At Exterior Sheet Metal And Miscellaneous:
  - a. Description:
    - 1) Weathersealing expansion, contraction, perimeter, and other movement joints which may include all or part of the following for project:
      - a) Flashings.
      - b) Roof vents and flues.
  - b. Design Criteria:
    - 1) Meet following standards for Sealant:
      - a) ASTM C920: Type S Grade NS, Class 25 (min) Use NT, M, G, A and O.
    - 2) Limitations:
      - a) Do not use below-grade applications.
      - b) Do not use on surfaces that are continuously immersed or in contact with water.
      - c) Do not use on wet, damp, frozen or contaminated surfaces.
      - d) Do not use on building materials that bleed oils, plasticizers or solvents, green or partially vulcanized rubber gaskets or tapes.
  - c. Category Four Approved Products. See Section 01 6200 for definitions of Categories:
    - 1) Dow Corning: 790 Silicone Building Sealant.
    - 2) Momentive Performance Materials (formerly, GE Sealants & Adhesives): GE SCS2350 Silicone Elastomeric Sealant.
    - 3) Tremco: Tremsil 600 Silicone Sealant.
4. Sealants At Expansion Joints in Exterior Concrete (Entryway Slabs, Mowstrips, Sidewalks):
  - a. Expansion Joints:
    - 1) Design Criteria:
      - a) Meet following standards for Sealant:
        - (1) ASTM C920: Type S, Grade NS, Class 100/50 Use T, NT, M, G, A, and O.
    - 2) Sealant required at expansion for following areas:
      - a) Between entryway slabs and building foundations.
      - b) Between sidewalks and building foundations.
      - c) Miscellaneous vertical applications.
    - 3) Sealant NOT required at expansion joints for following areas:
      - a) Within mowstrips and where mowstrips abut building foundations and sidewalks.
      - b) Within sidewalks.
    - 4) Category Four Approved Products. See Section 01 6200 for definitions of Categories:
      - a) Dow Corning:
        - (1) Primer: 1200 Prime Coat.
        - (2) Sealant: 790 Silicone Building Sealant.



- b) Sika:
          - (1) Primer: Sikasil Primer-2100.
          - (2) Sealant: Sikasil-728 NS Non-Sag Silicone Sealant.
  - b. Penetrations thru Concrete Walls:
    - 1) Design Criteria:
      - a) Meet following standards for Sealant:
        - (1) ASTM C920: Type S, Grade NS, Class 100/50 Use T, NT, M, G, A, and O.
    - 2) Category Four Approved Products. See Section 01 6200 for definitions of Categories:
      - a) Dow Corning:
        - (1) Primer: 1200 Prime Coat.
        - (2) Sealant: 790 Silicone Building Sealant.
      - b) Sika:
        - (1) Primer: Sikasil Primer-2100.
        - (2) Sealant: Sikasil-728 NS Non-Sag Silicone Sealant.
5. Sealants At Control Joints in Exterior Concrete (Entryway Slabs, Mowstrips, Sidewalks):
  - a. Control Joints:
    - 1) Design Criteria:
      - a) Meet following standards for Sealant:
        - (1) ASTM C920, Type S, Grade P, Class 100/50; Use T, M, G, A, O.
    - 2) Sealant required at control joints in following areas:
      - a) Miscellaneous vertical applications.
    - 3) Sealant is NOT required at control joints, unless needed to protect moisture sensitive soils or by Contract Drawings, in following areas:
      - a) Within mowstrips.
      - b) Within sidewalks.
      - c) Within entryway slabs.
    - 4) Category Four Approved Products. See Section 01 6200 for definitions of Categories:
      - a) Dow Corning:
        - (1) Primer: 1200 Prime Coat.
        - (2) Sealant: 890-SL Silicone Building Sealant.
      - b) Sika:
        - (1) Primer: Primer: Sikasil Primer-2100.
        - (2) Sealant: Sikasil-728 SL Self-leveling Silicone Sealant.
6. Sealants At Curbs And Gutters:
  - a. Expansion Joints and Control Joints:
    - 1) Description:

- a) Effective for sealing transverse contraction and expansion joints, longitudinal, center line and shoulder joints in Portland cement concrete.
    - b) One component (part) non-sag silicone material that cures to low modulus, silicone rubber upon exposure to atmospheric moisture. May be applied over wide temperature range.
  - 2) Design Criteria:
    - a) Expansion joint sealant is required in following areas:
      - (1) Within curbs and gutters at approved layout locations.
    - b) Meet following standards for Sealant: Non-sag: ASTM C920: Type S, Grade NS, Class 100/50, Use T, NT.
  - 3) Category Four Approved Products. See Section 01 6200 for definitions of Categories:
    - a) Dow Corning:
      - (1) Primer: 1200 Prime Coat.
      - (2) Sealant: 888 Silicone Joint Sealant.
    - b) Sika:
      - (1) Primer: Primer: Sikasil Primer-2100.
      - (2) Sikasil-728 NS Non-Sag Silicone Sealant.
7. General Interior Sealants:
- a. General:
    - 1) Inside jambs and heads of exterior door frames.
    - 2) Both sides of interior door frames.
    - 3) Inside perimeters of windows.
    - 4) Miscellaneous gaps between substrates.
  - b. Design Criteria:
    - 1) Meet ASTM C920, Type S, Grade NS, NT, and Class 25 test requirements.
    - 2) 100 percent silicone sealant.
  - c. Non-Paintable Sealant (Installer Option A):
    - 1) Category Four Approved Product. See Section 01 6200 for definitions of Categories:
      - a) Dow Corning: Tub, Tile, And Ceramic Silicone Sealant.
      - b) Laticrete: Latasil Silicone Sealant.
      - c) Momentive Performance Materials (formerly, GE Sealants & Adhesives): GE SCS2800 SilGlaze II Silicone Sealant.
      - d) Sherwin Williams: White Lightning Silicone Ultra Low Odor Window and Door Sealant.
      - e) Tremco: Tremsil 200 Silicone Sealant.
      - f) Franklin International: Titebond 2601 (White) 2611 (Clear) 100% Silicone Sealant.
  - d. Paintable Sealant (Installer Option B):
    - 1) Category Four Approved Product. See Section 01 6200 for definitions of Categories:
      - a) Momentive Performance Materials (formerly, GE Sealants & Adhesives): GE SCS7000 Paintable Silicone Sealant.

8. Sealants For Interior Joints:
  - a. General:
    - 1) Countertops and backsplash to wall.
    - 2) Sinks and lavatories to countertops.
    - 3) Joints between plumbing fixtures and other substrates.
  - b. Interior Ceramic Tile Joints are furnished in Section 07 9213 and installed in Section 09 3013 'Ceramic Tiling' including the following:
    - 1) Ceramic tile inside corners.
    - 2) Ceramic tile and paver tile joints.
  - c. Description:
    - 1) One-part acetoxy cure silicone sealant with fungicides to resist mold and mildew.
  - d. Design Criteria:
    - 1) Meet ASTM C920, Type S, Grade NS, NT, and Class 25 test requirements.
    - 2) 100 percent silicone sealant.
  - e. Color: As selected by Architect from Manufacturer's standard colors.
  - f. Category Four Approved Products. See Section 01 6200 for definitions of Categories:
    - 1) Dow Corning: Tub, Tile, And Ceramic Silicone Sealant.
    - 2) Laticrete: Latacil Tile and Stone Silicone Sealant.
    - 3) Momentive Performance Materials (formerly, GE Sealants & Adhesives): GE SCS1700 Sanitary Silicone Sealant.
    - 4) Tremco: Tremsil 200 Silicone Sealant.

## 2.2 ACCESSORIES

- A. Bond Breaker Tape:
  1. Pressure sensitive tape as by Sealant Manufacturer to suit application.
  2. Provide tape to prevent adhesion to joint fillers or joint surfaces at back of joint and allow sealant movement.
- B. Joint Backing:
  1. Comply with ASTM C1330.
  2. Flexible closed cell, non-gassing polyurethane or polyolefin rod or bond breaker tape as recommended by Sealant Manufacturer for joints being sealed.
  3. Oversized 25 to 50 percent larger than joint width.
- C. Joint Cleaner:
  1. Non-corrosive and non-staining type as recommended by Sealant Manufacturer, compatible with joint forming materials.
- D. Masking Tape:
  1. Non-staining, non-absorbent tape product compatible with joint sealants and adjacent joint surfaces.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

#### A. Verification Of Conditions:

1. Examine substrate surfaces and joint openings are ready to receive Work.
  - a. Verify each sealant is compatible for use with joint substrates.
  - b. Verify joint surfaces are clean and dry.
  - c. Ensure concrete surfaces are fully cured.
2. Sealants provided shall meet Manufacturer's shelf-life requirements.
3. Notify Architect of unsuitable conditions in writing.
  - a. Do not proceed until unsatisfactory conditions are corrected.
4. Commencement of Work by installer is considered acceptance of substrate.

### 3.2 PREPARATION

#### A. Surface Preparation:

1. Surfaces shall be clean, dry, free of dust, oil, grease, dew, frost or incompatible sealers, paints or coatings that may interfere with adhesion. Prepare substrates in accordance with Manufacturer's instructions:
  - a. Porous surfaces: Clean by mechanical methods to expose sound surface free of contamination and laitance followed by blasting with oil-free compressed air.
  - b. Nonporous surfaces: Use two-cloth solvent wipe in accordance with ASTM C1193. Allow solvent to evaporate prior to sealant application.
  - c. High-pressure water cleaning: Exercise care that water does not enter through failed joints.
  - d. Primers:
    - 1) Primers enhance adhesion ability.
    - 2) Use of primers is not a substitution for poor joint preparation.
    - 3) Primers should be used always in horizontal application where there is ponding water.
2. Field test joints in inconspicuous location.
  - a. Verify joint preparation and primer required to obtain optimum adhesion of sealants to joint substrate.
  - b. When test indicates sealant adhesion failure, modify joint preparation primer, or both and retest until joint passes sealant adhesion test.
3. Masking: Apply masking tape as required to protect adjacent surfaces and to ensure straight bead line and facilitate cleaning.

#### B. Joints:

1. Prepare joints in accordance with ASTM C1193.
  - a. Clean joint surfaces of contaminants capable of affecting sealant bond to joint surface using Manufacturer's recommended instructions for joint preparation methods.
  - b. Remove dirt, dust, oils, wax, paints, and contamination capable of affecting primer and sealant bond.
  - c. Clean concrete joint surfaces to remove curing agents and form release agents.

- C. Protection:
  - 1. Protect elements surrounding the Work of this section from damage or disfiguration.

### 3.3 APPLICATION

- A. General:
  - 1. Apply silicone sealant in accordance with Manufacturer's instructions.
  - 2. Do not use damaged or deteriorated materials.
  - 3. Install primer and sealants in accordance with ASTM C1193 and Manufacturer's instructions.
  - 4. Apply primer where required for sealant adhesion.
  - 5. Install sealants immediately after joint preparation.
  - 6. Do not use silicone sealant as per the following:
    - a. Apply caulking/sealant at temperatures below 40 deg F.
    - b. Below-grade applications.
    - c. Brass and copper surfaces.
    - d. Materials bleeding oils, plasticizers, and solvents.
    - e. Structural glazing and adhesive.
    - f. Surfaces to be immersed in water for prolonged time.
- B. Joint Backing:
  - 1. Install joint backing to maintain sealant joint ratios recommended by Manufacturer.
  - 2. Install without gaps, twisting, stretching, or puncturing backing material. Use gage to ensure uniform depth to achieve correct profile, coverage, and performance.
  - 3. Rod for open joints shall be at least 1-1/2 times width of open joint and of thickness to give solid backing. Backing shall fill up joint so depth of sealant bite is no more than 3/8 inch deep.
- C. Bond Breaker:
  - 1. Install bond breaker where joint backing is not used or where backing is not feasible.
    - a. Apply bond-breaker tape in shallow joints as recommended by Sealant Manufacturer.
- D. Sealant:
  - 1. Apply sealant with hand-caulking gun with nozzle of proper size to fit joints. Use sufficient pressure to insure full contact to both sides of joint to full depth of joint. Apply sealants in vertical joints from bottom to top.
  - 2. Fill joint opening to full and proper configuration.
  - 3. Apply in continuous operation.
  - 4. Tool joints immediately after application of sealant if required to achieve full bedding to substrate or to achieve smooth sealant surface. Tool joints in opposite direction from application direction, i.e., in vertical joints, from the top down. Do not 'wet tool' sealants.
  - 5. Depth of sealant bite shall be 1/4 inch minimum and 1/2 inch maximum, but never more than one half or less than one fourth joint width.
- E. Caulk gaps between painted or coated substrates and unfinished or pre-finished substrates. Caulk gaps larger than 3/16 inch between painted or coated substrates.

### 3.4 TOLERANCES

- A. Provide joint tolerances in accordance with Manufacturer's printed instructions.

### 3.5 FIELD QUALITY CONTROL

- A. Adhesion Test (Installer Option to use adhesion test to determine if primer is required).
  - 1. Perform adhesion tests in accordance with Manufacturer's instructions and ASTM C1193, Method A, Field-Applied Sealant joint Hand-Pull Tab:
    - a. Perform five (5) tests for first 1,000 linear feet of applied silicone sealant and one (1) test for each 1,000 linear feet seal thereafter or perform one (1) test per floor per building elevation minimum.
    - b. For sealants applied between dissimilar materials, test both sides of joints.
  - 2. Sealants failing adhesion test shall be removed, substrates cleaned, sealants re-installed, and re-testing performed.
  - 3. Maintain test log and submit report to Architect indicating tests, locations, dates, results, and remedial actions.

### 3.6 CLEANING

- A. Remove masking tape and excess sealant.
- B. Clean adjacent materials, which have been soiled, immediately (before setting) as recommended by Manufacturer.
- C. Waste Management: Dispose of products in accordance with manufacturer's recommendation.

**END OF SECTION**

## SECTION 07 9219 - ACOUSTICAL JOINT SEALANTS

### PART 1 - GENERAL

#### 1.1 SUMMARY

A. Includes But Not Limited To:

1. Quality of sealants to be used at perimeters of and penetrations through acoustically insulated walls and associated ceilings.

B. Related Requirements:

1. Section 09 2900: Furnishing and installing of acoustical sealants.

#### 1.2 REFERENCES

A. Definitions:

1. Sealant. Sealants are generally used in applications where elastic properties are needed while adhesives are generally used in applications where bonding strength and rigidity are needed. With technology advancements both sealants and adhesives can be used interchangeably depending on the applications performance requirements.
2. Sealant Types and Classes:

a. Federal Specifications:

- 1) Type I: Self-leveling, pour grade.
- 2) Type II: Non-sag, gun grade.
- 3) Type NS: Non-sag, gun grade.
- 4) Class A: +25 percent, -25 percent expansion - contraction.

b. ASTM Specifications:

- 1) Type S: Single-component sealant.
- 2) Type M: Multi-component sealant.
- 3) Grade P: Pourable or self-leveling sealant for joints on horizontal surfaces.
- 4) Grade NS: Non-sag or gunnable sealant for joints in vertical surfaces.
- 5) Class 25: Sealant that, when tested for adhesion or cohesion under cyclic movement shall withstand increase and decrease of at least 25 percent of joint width as measured at time of application.
- 6) Class 12: Sealant that, when tested for adhesion and cohesion under cyclic movement shall withstand increase and decrease of at least 12 percent of joint width as measured at time of application.
- 7) T: Sealant designed for use in joints in pedestrian and vehicular traffic areas such as walkways, plazas, decks and parking garages.
- 8) NT: Sealant designed for use in joints in non-traffic areas.
- 9) M: Sealant will remain adhered to mortar.
- 10) G: Sealant will remain adhered to glass.
- 11) A: Sealant will remain adhered to aluminum.
- 12) O: Sealant will remain adhered to substrates other than glass, aluminum, mortar.

B. Reference Standards:

1. ASTM International:

- a. ASTM C834-17, 'Standard Specification for Latex Sealants'.

- b. ASTM C919-18, 'Standard Practice for Use of Sealants in Acoustical Applications'.
  - c. ASTM C1193-16, 'Standard Guide for Use of Joint Sealants'.
  - d. ASTM E84-18b, 'Standard Test Method for Surface Burning Characteristics of Building Materials'.
  - e. ASTM E90-09(2016), 'Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements'.
2. Underwriters Laboratories, Inc.:
- a. UL 723: 'Standard for Safety Test for Surface Burning Characteristics of Building Materials'; (11th edition - 2018)

### 1.3 SUBMITTALS

A. Action Submittals:

1. Product Data:

- a. Manufacturer's literature for each Product.

B. Informational Submittals:

1. Certificates:

a. Manufacturer's Certificate:

- 1) Certify products are suitable for intended use and products meet or exceed specified requirements.
- 2) Certificate from Manufacturer indicating date of manufacture.

2. Manufacturers' Instructions:

- a. Manufacturer's installation recommendations for each Product.

### 1.4 QUALITY ASSURANCE

A. Regulatory Agency Sustainability Approvals:

1. Surface-Burning Characteristics:

- a. Class A flame spread rating in accordance with ASTM E84 or UL 723 Type 1.

- 1) Class A (Flame spread index 0-25; Smoke-developed index 0-450).

### 1.5 DELIVERY, STORAGE, AND HANDLING

A. Delivery And Acceptance Requirements:

- 1. Deliver and keep in original containers until ready for use.
- 2. Inspect for damage or deteriorated materials.

B. Storage And Handling Requirements:

- 1. Handle to prevent inclusion of foreign matter, damage by water, or breakage.
- 2. Store in cool, dry location, and at temperatures never under 40 deg F nor exceeding 80 deg F.



## 1.6 FIELD CONDITIONS

### A. Ambient Conditions:

1. Do not apply caulking at temperatures below 40 deg F.

## PART 2 - PRODUCTS

### 2.1 MANUFACTURERS

#### A. Sealants:

##### 1. Design Criteria:

- a. Meet requirements of ASTM C834.
- b. Meet Class A flame spread rating.

##### 2. Category Four Approved Products. See Section 01 6200 for definitions of Categories:

- a. OSI Pro-Series SC-175 Draft & Acoustical Sound Sealant by OSI Sealants Inc, Mentor, OH [www.osisealants.com](http://www.osisealants.com).
- b. QuietZone Acoustic Caulk by Owens Corning, Toledo, OH [www.owenscorning.com](http://www.owenscorning.com).
- c. Acoustical Sealant by Tremco, Beachwood, OH [www.tremcosealants.com](http://www.tremcosealants.com) or Toronto, ON (800) 363-3213.
- d. Acoustical Sound Sealant by Titebond.
- e. Acoustical Sealant by U S Gypsum, Chicago, IL [www.usg.com](http://www.usg.com).

### 2.2 ACCESSORIES

A. Bond Breaker: Pressure sensitive tape recommended by Sealant Manufacturer to suit application.

B. Joint Backing:

1. Flexible closed cell polyurethane or polyolefin rod or bond breaker tape as recommended by Sealant Manufacturer for joints being sealed.
2. Oversized 25 to 50 percent larger than joint width.

C. Joint Cleaner: Non-corrosive and non-staining type, recommended by Sealant Manufacturer, compatible with joint forming materials.

D. Masking Tape: Pressure sensitive tape recommended by Sealant Manufacturer to suit application.

E. Primer: Non-staining type, type, recommended by Sealant Manufacturer to suit application.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

A. Verification Of Conditions:

1. Examine substrate surfaces and joint openings are ready to receive Work.
2. Sealants provided shall meet Manufacturer's shelf-life requirements.
3. Notify Architect of unsuitable conditions in writing.

- a. Do not proceed until unsatisfactory conditions are corrected.
4. Commencement of Work by installer is considered acceptance of substrate.

### 3.2 PREPARATION

#### A. Surface Preparation:

1. Prepare joints in accordance with ASTM C1193 and Manufacturer's instructions.
2. Clean joint surfaces to remove dirt, dust, oils, wax, paints, and other contamination capable of affecting primer and sealant bond.
3. Protect elements surrounding the Work of this section from damage or disfiguration. Apply masking tape to adjacent surfaces when required to prevent damage to finishes from sealant installation.

#### B. Surface Preparation:

1. Clean joint surfaces of residual sealant and other contaminates capable of affecting sealant bond to joint surface.
2. Surfaces shall be clean, dry, and free of dust, oil, grease, dew, or frost.

### 3.3 INSTALLATION

#### A. General:

1. Do not use damaged or deteriorated materials.
2. Install primer and sealants in accordance with ASTM C1193 and Manufacturer's instructions where required for sealant adhesion.
3. Install sealants immediately after joint preparation.
4. Do not apply caulking/sealant at temperatures below 40 deg F.

#### B. Joint Backing:

1. Rod for open joints shall be at least 1-1/2 times width of open joint and of thickness to give solid backing. Backing shall fill up joint so depth of sealant bite is no more than 3/8 inch deep.
2. Apply bond-breaker tape in shallow joints as recommended by Sealant Manufacturer.

#### C. Install at perimeter joints and mechanical and electrical penetrations in sound insulated rooms. Apply sealant with hand-caulking gun with nozzle of proper size to fit joints. Use sufficient pressure to insure full contact to both sides of joint to full depth of joint.

#### D. Tool joints immediately after application of sealant if required to achieve full bedding to substrate or to achieve smooth sealant surface.

#### E. Depth of sealant bite shall be 1/4 inch minimum and 1/2 inch maximum, but never more than one half or less than one fourth joint width.

### 3.4 FIELD QUALITY CONTROL

#### A. Inspection:

1. Examine sealant joints to verify compliance with Contract Document requirements.

#### B. Non-Conforming Work. Non-conforming work as covered in the General Conditions applies, but is not limited to the following:

1. Sealant material found to be contaminated or damaged or inadequate preparation of substrate results in deficiencies in joint sealant adhesion is considered defective or not complying with Contract Document requirements.
2. Correct any work found defective or not-complying with Contract Document requirements at no additional cost to Owner.

### **3.5 CLEANING**

#### **A. General:**

1. Remove sealant from adjacent surfaces in accordance with Sealant Manufacturer and Substrate Manufacturer recommendations as work progresses.
2. Remove masking tape and any other foreign material.
3. Clean adjacent materials that have been soiled immediately (before setting) as recommended by Manufacturer.

#### **B. Waste Management: Dispose of products in accordance with Sealant Manufacturer's recommendation.**

**END OF SECTION**

**DIVISION 8 - OPENINGS:**

08 1429	Flush Wood Doors: Factory-Finished, Clear
08 3110	Access Doors and Panels
08 4113	Aluminum-Framed Entrances and Storefronts
08 4600	Glazed Interior Wall And Door Assemblies
08 7101	Common Finish Hardware Requirements
08 7102	Hanging Devices
08 7103	Securing Devices
08 7106	Closing Devices
08 7108	Stops and Holders
08 7109	Accessories
08 7913	Key Storage and Control Equipment
08 8100	Glass Glazing

## SECTION 08 1429 - FLUSH WOOD DOORS: FACTORY-FINISHED, CLEAR

### PART 1 - GENERAL

#### 1.1 SUMMARY

- A. Products Furnished But Not Installed Under This Section:
  - 1. Factory-finished flush wood doors.
- B. Related Requirements:
  - 1. Section 06 2024: 'Door, Frame, And Finish Hardware Installation' for installation.
  - 2. Section 06 4114: 'Wood-Veneer-Faced Architectural Cabinets' for cabinet doors.
  - 3. Section 09 9324: 'Interior Clear-Finished Hardwood'.

#### 1.2 REFERENCES

- A. Abbreviations And Acronyms:
  - 1. AWS: Architectural Woodwork Standards (formerly AWI).
  - 2. FD: Fire-resistant core, fire-resistant materials assembled to stiles and rails according to methods prescribed by the testing agency to meet rigorous smoke, flame, and pressure tests.
  - 3. FD-5: Core with 2 layers on each side.
  - 4. ME: Matching edges, i.e., vertical edges same as decorative faces.
  - 5. PC: Particleboard core, solid core door with stiles and rails bonded to the core and abrasive planed flat prior to the application of the faces.
  - 6. PC-5: Core with 2 layers on each side.
- B. Association Publications:
  - 1. Architectural Woodwork Institute / Architectural Woodwork Manufacturers Association of Canada, 46179 Westlake Drive, Suite 120, Potomac Falls, VA [www.awinet.org](http://www.awinet.org).
    - a. Architectural Woodwork Standards (AWS), 2nd Edition, 2014.
- C. Definitions:
  - 1. Book-Match: Matching between adjacent veneer leaves on one panel face. Every other piece of veneer is turned over so that the adjacent leaves are "opened" as two pages in a book. The fibers of the wood, slanting in opposite directions in the adjacent leaves, create a characteristic light and dark effect when the surface is seen from an angle.
  - 2. Grade: Unless otherwise noted, this term means Grade rules for Economy, Custom, and/or Premium Grade.
    - a. Custom Grade: Typically specified for and adequately covers most high-quality architectural woodwork, providing a well-defined degree of control over a project's quality of materials, workmanship, or installation.
    - b. Premium Grade: The highest Grade available in both material and workmanship where the highest level of quality, materials, workmanship, and installation is required.
  - 3. Running Match: Each panel face is assembled from as many veneer leaves as necessary. Any portion left over from one panel may be used to start the next.
- D. Reference Standards:

1. American Architectural Manufacturers Association / Window & Door Manufacturers Association / CSA Group:
    - a. AAMA/WDMA/CSA 101/I.S.2/A440-17, 'North American Fenestration Standard/Specification for windows, doors, and skylights'
  2. ASTM International:
    - a. ASTM C1036-16, 'Standard Specification for Flat Glass'.
    - b. ASTM C1048-18, 'Standard Specification for Heat-Strengthened and Fully Tempered Flat Glass'.
  3. Consumer Products Safety Commission (CPSC):
    - a. CPSC 16 CFR 1201 'Safety Standard for Architectural Glazing Materials' (January 1, 2012).
  4. Hardwood, Plywood, and Veneer Association:
    - a. HPVA HP-1-2016 'Standard for Hardwood and Decorative Plywood'.
  5. International Building Code (IBC):
    - a. 715.4, 'Fire Door and Shutter Assemblies'. (2018 or most recent edition adopted by AHJ).
  6. National Particleboard Association / Composite Panel Association:
    - a. NPA A208.1-2009, 'Particleboard'.
- E. Action Submittals:
1. Shop Drawings:
    - a. Schedule showing type of door at each location. Included shall be size, veneer, core type, fire rating, hardware prep, openings, blocking, etc.
    - b. Indicate factory finish color and type.
  2. Samples:
    - a. Interior Hardwood for Transparent Finish:
      - 1) Approval subject to Annual Review:
        - a) Prepare sample to match Control Sample available from Architect to be used as finishing standard for interior clear finished hardwood as specified in Section 09 9324.
      - 2) Design Criteria:
        - a) Provide 8 inch by 10 inch sample of rift cut white Maple to match stain Control Sample provided by Owner.
- F. Informational Submittals:
1. Source Quality Control Submittals:
    - a. Samples:
      - 1) Interior Hardwood for Transparent Finish:

- a) Architect will provide Control Sample for finish.

G. Closeout Submittals:

1. Include following information in Operations And Maintenance Manuals specified in Section 01 7800:

- a. Record Documentation:

- 1) Manufacturers Documentation:

- a) Manufacturer's product literature on doors and factory finish.
- b) Maintenance and repair instructions.

### 1.3 DELIVERY, STORAGE, AND HANDLING

A. Delivery And Acceptance Requirements:

1. Deliver in clean truck and, in wet weather, under cover.
2. Deliver to building site only after plaster, cement, and taping compound are completed and dry and after interior painting operations have been completed.
3. Individually wrap in polyethylene bags for shipment and storage.

B. Storage And Handling Requirements:

1. Store doors in a space having controlled temperature and humidity range between 25 and 55 percent.
2. Store flat on level surface in dry, well ventilated space.
3. Cover to keep clean but allow air circulation.
4. Do not subject doors to direct sunlight, abnormal heat, dryness, or humidity.
5. Handle with clean gloves and do not drag doors across one another or across other surfaces.
6. Leave shipping bag on door after installation until immediately before substantial completion inspection.
7. Doors have been acclimated to the field conditions for a minimum of 72 hours before installation is commenced.

### 1.4 WARRANTY

A. Manufacturer Warranty:

1. Manufacturer's standard full door warranty for lifetime of original installation.
  - a. Warranty shall include finishing, hanging, and installing hardware if manufacturing defect was discovered after door was finished and installed.
  - b. Warranty to include defects in materials including following:
    - 1) Delaminating in any degree.
    - 2) Warp or twist of 1/4 inch or more in door panel at time of one-year warranty inspection.
    - 3) Telegraphing of core assembly: Variation of 1/100 inch or more in 3 inch span.

## PART 2 - PRODUCTS

### 2.1 MANUFACTURED UNITS

A. Suppliers:

1. Category Three Approved Suppliers. See Section 01 6200 for definitions of Categories and Section 01 4301 for Qualification Requirements:
  - a. Architectural Building Supply, Salt Lake City, UT [www.cookandboardman.com](http://www.cookandboardman.com):
    - 1) Contact Information: Russ Farley: phone (800) 574-4369, fax 801-484-6817, or e-mail [russf@absdoors.com](mailto:russf@absdoors.com).
  - b. Beacon Metals Inc, Salt Lake City, UT [www.beacon-metals.com](http://www.beacon-metals.com):
    - 1) Contact Information: Jared Butler: phone (801) 486-4884, cell (435) 216-2297, FAX 801-485-7647, or e-mail [Jared@beacon-metals.com](mailto:Jared@beacon-metals.com).
  - c. Midwest D-Vision Solutions, Salt Lake City, UT [www.mwdsutah.com](http://www.mwdsutah.com).
    - 1) Contact Information: Dan Mercer, office (801) 377-4355, cell (801) 618-9456, e-mail [danm@mwdsutah.com](mailto:danm@mwdsutah.com).

B. Manufacturers:

1. Category Four Approved Manufacturers. See Section 01 6200 for definitions of Categories:
  - a. Graham Wood Doors, Mason City, IA.
  - b. Marshfield Door Systems Inc, Marshfield, WI.
  - c. VT Industries, Holstein, IA.

C. Wood Doors:

1. Type: AWS PC-5ME or FD-5ME.
2. Grade: AWS Premium, except face veneer.
3. Fully Type I Construction: Adhere all glue lines with Type I adhesive, including veneer lay-up.
4. Face Veneer:
  - a. Rift cut Maple meeting requirements of AWS Grade A, 1/50 inch thick minimum immediately before finishing.
  - b. Face veneers shall be running book matched.
5. Core:
  - a. Fully bonded to stiles and rails and sanded as a unit before applying veneers.
  - b. Non-Rated:
    - 1) 32 lb density meeting requirements of ANSI A208.1 Mat Formed Wood Particle Board, Grade 1-L-1 minimum.
    - 2) Stiles:
      - a) 1-3/8 inches deep minimum before fitting.
      - b) Stile face to be hardwood matching face veneer material, thickness manufacturer's standard.
    - 3) Rails:
      - a) 1-1/8 inches.
      - b) Manufacturer's option.



6. Factory Glazing:
  - a. Tempered clear glazing.
    - 1) Meet US Consumer Product Safety Commission safety rating (CPSC 16 CFR 1201).
    - 2) Thickness 1/4 inch.

D. Fabrication:

1. Doors shall be factory-machined. Coordinate with Section 08 4600 and Sections under 08 7000.
2. Provide doors requiring lites with factory- or shop-installed lites and wood stops to match door specie.

E. Finishes:

1. Factory Finishing:
  - a. Applied by Door Manufacturer before leaving factory.
  - b. Performance / Design Criteria:
    - 1) Finish factory-finish to match Owner selected sample as specified in Section 09 9324.
  - c. Finish: AWS Finish System TR-6 Catalyzed Polyurethane Premium Grade for unfilled, open-grain woods.

## 2.2 SOURCE QUALITY CONTROL

A. Inspections:

1. Verification of Performance:
  - a. Doors shall have following information permanently affixed on top of door:
    - 1) Manufacturer:
    - 2) Door designation or model.
    - 3) Veneer species.
    - 4) Factory finish.
2. Clear Finished Hardwood:
  - a. Color matches Owner provided sample specified in Section 09 9324.

## PART 3 - EXECUTION: Not Used

**END OF SECTION**

## SECTION 08 3110 - ACCESS DOORS AND PANELS

### PART 1 - GENERAL

#### 1.1 SUMMARY

- A. Products Furnished But Not Installed Under This Section:
  - 1. Manufactured access doors.
- B. Related Requirements:
  - 1. Section 06 2001: 'Common Finish Carpentry Requirements' for Installation.

### PART 2 - PRODUCTS

#### 2.1 MANUFACTURED UNITS

- A. Acceptable Manufacturers:
  - 1. Babcock-Davis, Minneapolis, MN [www.babcock-davis.com](http://www.babcock-davis.com).
  - 2. The Bilco Company, New Haven, CT [www.bilco.com](http://www.bilco.com) or Bilco Canada, London, ON (519) 659-7331.
  - 3. Dur-Red Products, Cudahy, CA [www.dur-red.com](http://www.dur-red.com).
  - 4. Elmdor Stoneman, City of Industry, CA [www.elmdorstoneman.com](http://www.elmdorstoneman.com).
  - 5. Jensen Industries, Los Angeles, CA [www.jensen-ind.com](http://www.jensen-ind.com).
  - 6. Karp Associates Inc, Maspeth, NY [www.karpinc.com](http://www.karpinc.com).
  - 7. Larsen's Manufacturing Co, Minneapolis, MN [www.larsensmfg.com](http://www.larsensmfg.com).
  - 8. Mifab Manufacturing Co, Minneapolis, MN [www.mifab.com](http://www.mifab.com).
  - 9. Milcor, Bensenville, IL [www.milcorinc.com](http://www.milcorinc.com).
  - 10. Nystrom Inc, Brooklyn Park, MN [www.nystrom.com](http://www.nystrom.com).
  - 11. Williams Brothers Corporation of America, Reno, NV [www.wbdoors.com](http://www.wbdoors.com).
  - 12. Equal as approved by Architect before bidding. See Section 01 6200.
- B. Standard Ceiling Access Doors:
  - 1. Manually operated with single key operated lock, interior latch release, and continuous piano hinge hardware.
  - 2. Factory powder-coated prime finish.
  - 3. Non-Fire-Rated, Class Two Quality Standards:
    - a. Drywall: KDW or Sesame (KSTDW or KSTE) by Karp.
  - 4. Non-Fire-Rated Insulated, Class Two Quality Standard:
    - a. KRP-150 FR or KRP-350.FR by Karp.

### PART 3 - EXECUTION: Not Used

END OF SECTION

## SECTION 08 4113 - ALUMINUM-FRAMED ENTRANCES AND STOREFRONTS

### PART 1 - GENERAL

#### 1.1 SUMMARY

A. Includes But Not Limited To:

1. Furnish and install aluminum storefront entry and window systems, including hardware, glazing, and caulking, as described in Contract Documents and including the following:
  - a. Low energy swinging operators for ADA compliance.

B. Related Requirements:

1. Section 01 1100: 'Summary Of Work' for cores for High Security Cylinders and wireless access control system are excluded from Contract and provided by Owner. This specification establishes quality of materials and installation of those items for information of Contractor, Architect, and Owner's Representatives.
2. Section 06 1100: 'Wood Framing':
  - a. Pre-installation conference held jointly with Section 08 4113.
3. Section 07 9213: 'Elastomeric Joint Sealant' for quality of sealants.
4. Section 08 8100: 'Glass Glazing' for quality of glass glazing.
5. Section 28 1316: 'Access Control System':
  - a. Coordination and location of pull string inside storefront door mullion for electric strike and proximity reader.
6. Division 26: 'Electrical' for power source, raceway, boxes, wiring for controls and operator.

#### 1.2 REFERENCES

A. Association Publications:

1. American Architectural Manufacturers Association (AAMA):
  - a. AAMA 501-15, 'Methods of Test for Exterior Walls'.
  - b. AAMA 609 & 610-15, 'Cleaning and Maintenance Guide for Architecturally Finished Aluminum' (combined documents).
  - c. AAMA SFM 1-14, 'Aluminum Store Front and Entrance Manual'.
  - d. AAMA 2605-17a, 'Voluntary Specification, Performance Requirements and Test Procedures for Superior Performing Organic Coatings on Aluminum Extrusions and Panels'.

B. Definitions:

1. Glass Surface:
  - a. Insulated glass unit:
    - 1) Surface 1: Exterior surface of outer lite.
    - 2) Surface 2: Interspace-facing surface of outer lite.
    - 3) Surface 3: Interspace-facing surface of inner lite.
    - 4) Surface 4: Interior surface of inner lite.

- b. Monolithic glass:
    - 1) Surface 1: Exterior surface.
    - 2) Surface 2: Interior surface.
- C. Reference Standards:
1. American National Standards Institute / Builders Hardware Manufacturers Association:
    - a. ANSI/BHMA A156.19-2013, 'Power Assist & Low Energy Operated Doors'.
  2. ASTM International:
    - a. ASTM B221-14, 'Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes'.
    - b. ASTM B456-17, 'Standard Specification for Electrodeposited Coatings of Copper Plus Nickel Plus Chromium and Nickel Plus Chromium'.
    - c. ASTM B633-15, 'Standard Specification for Electrodeposited Coatings of Zinc on Iron and Steel'.
    - d. ASTM C920-18, 'Standard Specification for Elastomeric Joint Sealants'.
    - e. ASTM C1184-18, 'Standard Specification for Structural Silicone Sealants'.
    - f. ASTM E283-04(2012), 'Standard Test Method for Determining Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen'.
    - g. ASTM E330/E330M-14, 'Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference'.
    - h. ASTM E331-00(2016), 'Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform Static Air Pressure Difference'.
  3. International Building Code (IBC) (2018 or most recent edition adopted by AHJ):
    - a. Chapter 10, 'Means of Egress'.
    - b. Chapter 16, 'Structural Design'.
      - 1) Section 1609 'Wind Loads'.
  4. International Code Council / American National Standards Institute:
    - a. ICC / ANSI A117.1-2009, 'Accessible and Usable Buildings and Facilities'.
  5. National Fenestration Rating Council (NFRC):
    - a. NFRC 100-2017, 'Procedure for Determining Fenestration Product U-factors'.

### 1.3 ADMINISTRATIVE REQUIREMENTS

- A. Pre-Installation Conference:
1. Participate in MANDATORY pre-installation conference as specified in Section 06 1100.
    - a. Schedule pre-installation conference one (1) week before scheduled installation of storefront system.
    - b. In addition to requirements of Section 01 3100, review following:
      - 1) Review rough opening requirements:
        - a) Make certain rough openings are within tolerances required for installation of factory-fabricated frames.

- b) These dimensions have been agreed upon between Owner and Manufacturer and are shown on Standard Plan Drawings.
- 2) Review installation scheduling, coordination, placement of doors.
- 3) Review low-energy door operator location and requirements.
- 4) Review delivery, storage, and handling requirements.
- 5) Review 'Examination' requirements before sliding door installation.
- 6) Review 'Finish' door and hardware requirements.
- 7) Review 'Protection' responsibilities.
- 8) Review 'Cleaning' responsibilities.

#### 1.4 SUBMITTALS

##### A. Action Submittals:

###### 1. Product Data:

- a. Manufacturer's literature.
  - 1) Storefront entry system.
  - 2) Low-energy door operator.
- b. Color and finish.

###### 2. Shop Drawings:

- a. Clearly mark components to identify their location in Project.
- b. Show exact dimensions of factory-fabricated frames and required tolerances for rough openings. Submit shop drawings in time for Pre-Installation Conference specified in Section 06 1100.
- c. Show locations, sizes, etc, of hardware reinforcing.

##### B. Informational Submittals:

###### 1. Qualification Statement:

- a. Installer.
  - 1) Provide Qualification documentation if requested by Architect or Owner.

##### C. Closeout Submittals:

###### 1. Include following in Operations And Maintenance Manual specified in Section 01 7800:

- a. Operations and Maintenance Data:
  - 1) Maintenance, adjustment, and repair instructions.
- b. Warranty Documentation:
  - 1) Final, executed copy of Warranty.
    - a) Storefront warranty.
    - b) Storefront closers.
    - c) Low-energy door operator.

- c. Record Documentation:
  - 1) Manufacturers documentation:
    - a) Manufacturer's literature or cut sheets for storefront system and for each item of hardware.
    - b) Manufacturer's literature of cut sheets for low-energy door operators.
    - c) Color and finish selections.
    - d) Parts lists.

## 1.5 QUALITY ASSURANCE

### A. Regulatory Agency Sustainability Approvals:

#### 1. Storefront System Performance Requirements:

##### a. Provide test reports from AAMA accredited laboratories certifying performances if requested:

- 1) Air Leakage: Meet requirements of ASTM E283.
- 2) Limit air leakage through assembly to 0.06 CFM/min/sq ft of wall area at 6.24 PSF as measured in accordance with ASTM E283.
- 3) Water Resistance: No water leakage when measured in accordance with ASTM E331 with static test pressure of 8PSF as defined by AAMA 501.
- 4) Dynamic Water Resistance: No water leakage, when measured in accordance with AAMA 501 with dynamic test pressure of 8 PSF.
- 5) Limit mullion wind load deflection of L/175 with full recovery of glazing materials, when measured in accordance with ASTM E330/E330M.
- 6) System shall not deflect more than 1/8 inch at center point, or 1/16 inch at enter point of horizontal member, once dead load points have been established.
- 7) System shall accommodate expansion and contraction movement due to surface temperature differential of 180 deg F.
- 8) Seismic testing shall conform to AAMA recommended static test method for evaluating performance of curtain walls and storefront wall systems due to horizontal displacements associated with seismic movements and building sway.

### B. Qualifications: Requirements of Section 01 4301 applies, but not limited to following:

#### 1. Manufacturer Qualifications:

- a. Provide aluminum entrances and storefront systems produced by firm experienced in manufacturing systems that are similar to those indicated for this project and have record of successful in-service performance.

#### 2. Fabricator Qualifications:

- a. Provide aluminum entrances and storefront systems fabricated by a firm experienced in producing systems that are similar to those indicated for this Project and have record of successful in-service performance.
- b. Fabricator shall have sufficient production capacity to produce components required without causing delay in progress of the Work.

#### 3. Installer Qualifications:

- a. Minimum three (3) years' experience in storefront installations.
- b. Minimum five (5) satisfactorily completed projects of comparable quality, similar size, and complexity in past three (3) years before bidding.
- c. Upon request, submit documentation.

## 1.6 DELIVERY, STORAGE, AND HANDLING

### A. Delivery And Acceptance Requirements:

1. Deliver all parts of door, together with hardware, in original, unopened packages with labels intact to Project at same time.

### B. Storage And Handling Requirements:

1. Store in clean, dry location, indoors in Manufacturer's unopened packaging until ready for installation and in accordance with Manufacturer's instructions.
2. Stack framing components in a manner that will prevent bending and avoid significant or permanent damage.
3. Protect materials and finish from damage during storage, handling and installation.

## 1.7 WARRANTY

### A. Manufacturer Warranty:

#### 1. Storefront Entrances:

- a. Manufacturer's Warranty to be free of defects in material and workmanship.
- b. Manufacturer's Warranty against deterioration or fading.
- c. Manufacturer's Lifetime Warranty for Door Construction for normal use.

#### 2. Closers:

- a. Closer Manufacturer's standard warranty, 10 years minimum.

#### 3. Low-Energy Door Operator:

- a. Manufacturer's standard warranty.

## PART 2 - PRODUCTS

### 2.1 ASSEMBLIES

#### A. Manufacturers:

##### 1. Category Three Approved Manufacturers. See Section 01 6200 for definitions of Categories:

- a. Arcadia Inc., Vernon CA [www.arcadiainc.com](http://www.arcadiainc.com).
  - 1) Contact Information: Ken Martinek, (602) 734-5327 [kmartinek@arcadiainc.com](mailto:kmartinek@arcadiainc.com).
- b. Kawneer North America, Norcross, GA, [www.kawneer.com/kawneer/north\\_america](http://www.kawneer.com/kawneer/north_america).
  - 1) Contact Information: Bart Daniels cell (385) 214-4650 [bart.daniels@alcoa.com](mailto:bart.daniels@alcoa.com).

#### B. General:

##### 1. In addition to requirements shown or specified, comply with:

- a. Applicable provisions of AAMA SFM 1, 'Aluminum Store Front and Entrance Manual' for design, materials, fabrication and installation of component parts.

C. Design Criteria:

1. Storefront System suitable for outside or inside glazing.

D. Materials:

1. Framing Components and Accessories:

- a. Aluminum Extrusions:

- 1) 6063-T6 aluminum alloy or meet requirements of ASTM B221, alloy GS 10a T6.

- 2) Anchors, Clips, and Accessories:

- a) Aluminum, nonmagnetic stainless steel, or zinc-coated steel or iron complying with ASTM B633 for SC 3 severe service conditions or other suitable zinc coating; provide sufficient strength to withstand design pressure indicated (properly isolated steel from aluminum).

- 3) Fasteners:

- a) Aluminum, nonmagnetic stainless steel or other materials to be non-corrosive and compatible with aluminum window members, trim hardware, anchors, and other components.

- 4) Glazing Gasket:

- a) Compression-type design with replaceable extruded EPDM rubber.

- 5) Reinforcing Members:

- a) Aluminum, nonmagnetic stainless steel, or nickel/chrome-plated steel complying with ASTM B456 for Type SC 3 severe service conditions, or zinc-coated steel or iron complying with ASTM B633 for SC 3 severe service conditions or other suitable zinc coating; provide sufficient strength to withstand design pressure indicated.

- b) Mullion:

- (1) Steel reinforced or heavy duty as necessary to prevent lateral flexing of mullion.

- 6) Sills:

- a) Match height of door bottoms.

- 7) Sealant:

- a) Structural Sealant meeting requirements of ASTM C1184 for fabrication within storefront system:

- (1) Permanently elastic, non-shrinking, and non-migrating type for joint size and movement.

- (2) Single-component neutral-curing silicone formulation compatible with system components specifically formulated and tested for use as structural sealant and approved by structural-sealant manufacturer for use in aluminum-framed systems indicated.

- (3) Color: Black.

- b) Joint Sealants used at perimeter of storefront framing system: Elastomeric Sealant as specified in Section 07 9213.

- c) Provide sealants for use inside of the weatherproofing system that have a VOC content of 250 g/L or less when required by local codes or AHJ.



- 8) Tolerances:
  - a) Tolerances for wall thickness and other cross-sectional dimensions of storefront members in compliance with AA Aluminum Standards and Data.
- b. Storefront Framing System:
  - 1) Brackets and Reinforcements:
    - a) Manufacturer's standard high-strength aluminum with non-staining, nonferrous shims for aligning system components.
  - 2) Fasteners and Accessories:
    - a) Manufacturer's standard corrosion-resistant, non-staining, non-bleeding fasteners and accessories compatible with adjacent materials.
  - 3) Perimeter Anchors:
    - a) When steel anchors are used, provide insulation between steel material and aluminum material to prevent galvanic action.
- c. Finish:
  - 1) Match doors.
- d. Category Four Approved Products. See Section 01 6200 for definitions of Categories:
  - 1) Non-Thermal, 2 inch Sightline:
    - a) Single Glazed:
      - (1) AR450 by Arcadia.
      - (2) Trifab VG 450 by Kawneer.
    - b) Double Glazed:
      - (1) AG451 by Arcadia.
      - (2) Trifab VG 451 by Kawneer.
- e. Category Four Approved Products. See Section 01 6200 for definitions of Categories:
  - 1) Non-Thermal:
    - a) Single Glazed:
      - (1) IP2550 by Arcadia.
      - (2) IR 500 by Kawneer.
    - b) Double Glazed:
      - (1) IP2551 by Arcadia.
      - (2) IR 501 by Kawneer.

2. Manually Operated Doors:
  - a. Aluminum:
    - 1) 6063-T6 aluminum alloy or meet requirements of ASTM B221, alloy GS 10a T6.
  - b. Stiles:
    - 1) 3-1/2 inches by 1-3/4 inches by 0.125 inches thick nominal.
  - c. Top Rails:
    - 1) 3-1/2 inches minimum by 1-3/4 inches by 0.125 inches thick nominal.
  - d. Bottom Rails:
    - 1) 10 inches minimum by 1-3/4 inches by 0.125 inches thick nominal.
  - e. Construction:
    - 1) Manufacturer's standard.
  - f. Glazing Stops:
    - 1) Snap-in type with neoprene bulb-type glazing. Units shall be glazed from exterior side.
  - g. Weatherstripping:
    - 1) Neoprene bulb-type.
    - 2) Category Four Approved Products. See Section 01 6200 for definitions of Categories:
      - a) Peri-Plus Seal (PPS) by Arcadia.
      - b) Sealair by Kawneer.
  - h. Framing System Gaskets and Sealants:
    - 1) Manufacturer's standard, recommended by manufacturer for joint type:
    - 2) Sealants: As specified in Framing Components and Accessories.
  - i. Factory Finishing:
    - 1) Clear Anodized Aluminum Finish:
      - a) Class II, Clear Anodic Finish: AA-M12C22A31 (Mechanical Finish: nonspecular as fabricated; Chemical Finish: etched, medium matte; clear coating 0.40 mils to 0.70 mils thick) complying with AAMA 611.
  - j. Category Four Approved Products. See Section 01 6200 for definitions of Categories:
    - 1) Non-Thermal:
      - a) MS362 Medium Stile by Arcadia.
      - b) 350 Medium Stile by Kawneer.
  - k. Category Four Approved Products. See Section 01 6200 for definitions of Categories:

- 1) Single Glazed:
  - a) MS362IP Medium Stile by Arcadia.
  - b) 350 IR by Kawneer.
  
3. Glazing:
  - a. Glazing as specified in Section 08 8100: 'Glass Glazing'.
  - b. Glazing Gaskets:
    - 1) Compression-type design with replaceable extruded EPDM rubber.
  - c. Spacers and Setting Blocks: Elastomeric.
  - d. Bond-Breaker (Sealer) Tape: Standard TFE-fluorocarbon or polyethylene material to which sealants will not develop adhesion.
  - e. Glazing Sealant:
    - 1) Structural Sealant meeting requirements of ASTM C1184:
      - a) Permanently elastic, non-shrinking, and non-migrating type for joint size and movement.
      - b) Single-component neutral-curing silicone formulation compatible with system components specifically formulated and tested for use as structural sealant and approved by structural-sealant manufacturer for use in aluminum-framed systems indicated.
      - c) Color: Black.
    - 2) Weather Sealant:
      - a) ASTM C 920 for Type S, Grade NS, Class 25, Uses NT, G, A, and O; single-component neutral-curing formulation that is compatible with structural sealant and other system components with which it comes in contact; recommended by structural-sealant, weather seal sealant, and aluminum-framed-system manufacturers for this use.
      - b) Color: Match structural sealant.
    - 3) Provide sealants for use inside of the weatherproofing system that have a VOC content of 250 g/L or less when required by local codes or AHJ.
  
4. Hardware:
  - a. Hinging:
    - 1) Top and bottom offset, ball bearing pivots per door leaf.
  - b. Overhead Door Closers:
    - 1) Provide parallel arms on closers unless door position requires otherwise.
    - 2) Where possible, closers shall allow for 180 degree opening and not be used as stop. Provide Cush-N-Stop or equivalent arm where wall stop cannot be used.
    - 3) Adjust closers to provide maximum opening force as required by governing code authority.
    - 4) Closers shall have following features:
      - a) Adjustable sweep speed.
      - b) Adjustable backcheck.
      - c) Non-handed, non-sized.
      - d) Cush arm by LCN or equal by Norton.
    - 5) Category Four Approved Products. See Section 01 6200 for definitions of Categories.

- a) Surface mounted:
  - b) 4041 Series parallel arm by LCN.
  - c) 7500 Series Parallel arm by Norton.
- c. Exit Devices:
- 1) Entry Doors:
    - a) Operation:
      - (1) Entry shall be by key. Device shall be locked by cylinder from outside. Key shall be removable when cylinder is in locked or unlocked position.
      - (2) Dogging operation shall be by manufacturer's accessible thumbturn cylinder function.
      - (3) Exterior Trim: Bar pull as described on door hardware schedule on drawings.
      - (4) Types: Rim Type. Provide type of strike that will allow installation of specified panic devices on storefront system specified.
  - 2) Access Doors:
    - a) Operation:
      - (1) Access accomplished by dogging device. Dogging operation shall be by accessible, permanent knob, not by removable allen wrench devices.
      - (2) Exterior Trim: Match Entry Doors.
      - (3) Types: Rim Type. Provide type of strike that will allow installation of specified panic devices on storefront system specified.
  - 3) Color:
    - a) Equivalent to clear anodized.
  - 4) Category Four Approved Products. See Section 01 6200 for definitions of Categories:
    - a) Apex Series by Precision.
    - b) 80 Series by Sargent.
    - c) 98 or 99 Rim Series by Von Duprin.
- d. Low-Energy Swing Door Operator:
- 1) Meet requirements of ICC/ANSI 117.1 and BHMA A156.19.
  - 2) Frame or wall-mounted push button operation as shown on drawings.
  - 3) Solid state electronic control.
  - 4) Adjustable closing speed and hold-open range.
  - 5) Automatic and manual operating modes.
  - 6) Metal cover finished to match door.
  - 7) Category Four Approved Products. See Section 01 6200 for definitions of Categories:
    - a) Besam SW100 by Besam (subsidiary of ASSA ABLOY) US-Monroe, NC [www.besam.us](http://www.besam.us).
    - b) Horton Series 7100 Low Energy by Horton Automatics (Division of Overhead Door Corp.), Corpus Christi, TX [www.hortondoors.com](http://www.hortondoors.com).
    - c) Record 6100 Series Low Energy Swing Door Operator by Record-USA, Monroe, NC [www.record-usa.com](http://www.record-usa.com).
    - d) Stanley Magic-Force by Stanley Access Technologies, Farmington, CT [www.stanleyaccesstechnologies.com](http://www.stanleyaccesstechnologies.com).

- e. Thresholds:
  - 1) Exterior:
    - a) Design Criteria: Meet handicap accessibility requirements.
    - b) Exterior to Carpet Tile: Similar to Pemko 273 Profile.
  - 2) Interior:
    - a) Design Criteria: Meet handicap accessibility requirements.
    - b) Carpet Tile / Carpet to Carpet: Similar to Pemko 236.
- f. Sweep Strips:
  - 1) Class Two Quality Standard:
    - a) Entrance Manufacturer's standard (cover cap with no exposed fasteners).
    - b) Pemko 293100 N8.
- g. Push / Pulls:
  - 1) See hardware schedule on drawings.
- h. High Security Cylinders And Cores:
  - 1) Schlage cores with Everest keying system with special Church side bit milling:
    - a) Church And Factory Authorized USA Distributors:
      - (1) Architectural Building Supply, P O Box 65678, Salt Lake City, UT 84165-0678 or 2965 South Main St, Salt Lake City, UT 84115.
        - (a) (801) 486-3481.
        - (b) FAX: (801) 484-6817.

E. Fabrication:

1. Construction shall meet Manufacturer's recommendations.
2. Fabricate components that, when assembled, have following characteristics:
  - a. Profiles sharp, straight, and free of defects or deformations.
  - b. Accurately fit joints; make joints flush, hairline and weatherproof.
  - c. Means to drain water passing joints, condensation within framing members, and moisture migrating within system to exterior.
  - d. Physical and thermal isolation of glazing from framing members.
  - e. Accommodations for thermal and mechanical movements of glazing and framing to maintain required glazing edge clearances.
  - f. Provisions for field replacement of glazing.
  - g. Fasteners, anchors, and connection devices that are concealed from view to greatest extent possible.
  - h. Framing members shall be internally reinforced and secured at head and sill as necessary for structural performance requirements and for hardware attachment.
3. Fabricate in factory to dimensions required to fit framed openings detailed on Contract Documents. Joints shall be tightly closed.

4. Mortise in manner to give maximum hardware-door connection strength and neatness of appearance. Adequately reinforce with back plates or rivnuts to hold pivots and closers.
5. Mechanically Glazed Framing Members: Fabricate for flush glazing without projecting stops.
6. Structural-Sealant-Glazed Framing Members: Include accommodations for using temporary support device to retain glazing in place while structural sealant cures.
7. Storefront Framing: Fabricate components for assembly using manufactures standard installation instructions.
8. After fabrication, clearly mark components to identify their locations in Project according to Shop Drawings.

F. Hardware Finishes:

1. Finishes for steel, brass, or bronze hardware items shall be satin chromium plated.
2. Materials other than steel, brass, or bronze shall be finished to match the appearance of satin chromium plated.

## **PART 3 - EXECUTION**

### **3.1 INSTALLERS**

A. Performance Standard Installers: See Section 01 6200 for definitions of Categories. See Section 01 4301 and 'Quality Assurance' in Part 1 'General' for Installer Qualifications of this specification:

1. General Contractor responsible for Installer(s), verification of qualifications, and performance. Contact Approved Manufacturer's Representative specified in Part 2 'Products' of this specification for potential installers if desired.

### **3.2 EXAMINATION**

A. Verification Of Conditions:

1. Verify that framed openings will accommodate factory-fabricated storefront entry and window frames of dimensions agreed upon by Owner and Manufacturer and shown on Standard Plan documents.
2. Verify floor is level across entire width of automatic door opening.
3. Verify sill conditions are level and/or sloped away from openings as specified.
4. Verify wall framing is dry, clean, sound, and free of voids and offsets, construction debris, sharp edges or anything that will prevent a successful installation of storefront system.
5. Notify Architect and Owner in writing if framed openings are not as agreed upon.
  - a. Do not install storefront entry and window frames until deficiencies in framed openings have been corrected to allow installation of standard entries and windows.
  - b. Commencement of Work by installer is considered acceptance of substrate.

### **3.3 INSTALLATION**

A. General:

1. Installation shall meet or exceed all applicable federal, state and local requirements, referenced standards and conform to codes and ordinances of authorities having jurisdiction.
2. All installation shall be in accordance with manufacturer's published recommendations and in accordance with approved shop drawings.
3. Do not install damaged components. Fit frame joints tight, free of burrs and distortion. Rigidly secure non-movement joints.

4. Isolate metal surfaces in contact with incompatible metal or corrosive substrates, including wood, by applying sealer tape to prevent electrolytic action.
- B. Set plumb, square, level, and in correct alignment and securely anchor to following tolerances:
1. Variation from plane: Limit to 1/8 inch in 12 feet; 1/4 inch over total length.
  2. Offset from Alignment: For surfaces abutting in line, limit offset to 1/16 inch.
  3. Offset at Corners: For surfaces meeting at corner, limit offset to 1/32 inch.
  4. Diagonal measurements: Limit difference between diagonal measurements to 1/8 inch.
  5. Sidelites: Line up horizontal rail in sidelight with door rail.
- C. Install doors without warp or rack. Adjust doors and hardware to provide ninety (90) degree operation, tight fit at contact points and smooth operation.
- D. Install exterior window units with through wall sill flashing.
- E. Thresholds:
1. Accurately cut thresholds to fit profile of storefront frame. Bed exterior thresholds in specified sealant at contact points with floor and make watertight.
- F. Sealants:
1. Apply in accordance with Section 07 9213 'Elastomeric Joint Sealant' requirements.
  2. Caulk joints between frames and walls, both interior and exterior to provide weather tight installation.
- G. Glazing Characteristics:
1. Interior Vestibule Glazing: Clear.
  2. Exterior Storefront Doors And Sidelights Opening Into Foyers And Corridors:
    - a. Clear interior pane and Clear exterior pane with Low E treatment on surface 2.

### 3.4 FIELD QUALITY CONTROL

- A. Field Tests And Inspections:
1. Pull test doors, especially pairs of single doors separated by permanent mullions, to ensure security of opening.
  2. Make all necessary final adjustments to attain normal operation of each door and its mechanical hardware.
- B. Non-Conforming Work: Non-conforming work as covered in the General Conditions applies, but is not limited to the following:
1. Correct any work found defective or not complying with contract document requirements including removal and replacement of glass that has been broken, chipped, cracked, abraded, or damaged during construction period at no additional cost to the Owner.

### 3.5 ADJUSTING

- A. Adjust swing doors for proper operation after glazing entry. After repeated operation of completed installation, re-adjust door for optimum operating condition and safety if required.

### 3.6 PROTECTION

#### A. During Installation:

##### 1. Installer's Responsibility:

- a. During installation, all adjacent work shall be protected from damage.

#### B. After Installation:

##### 1. General Contractor's Responsibility:

- a. Institute protective measures required throughout remainder of construction period to ensure that aluminum entrances and storefronts will be without damage or deterioration, other than normal weathering, at time of acceptance.

### 3.7 CLEANING

#### A. General:

##### 1. Installer's Responsibility:

- a. Follow Manufacturer's written recommendations for cleaning and maintenance or guidelines of AAMA 609 & 610 'Cleaning and Maintenance Guide for Architecturally Finished Aluminum' (combined documents). Avoid damaging protective coatings and finishes.
- b. Clean glass and aluminum surfaces, inside and out, promptly after installation. Remove excess glazing and sealant compounds, dirt, and other substances. Exercise care to avoid damage to coatings.
- c. Remove nonpermanent labels, protective films, and clean surfaces following recommended procedures.
  - 1) Do NOT remove permanent AAMA/CSA or NFRC labels.

#### B. Waste Management:

1. Upon completion and verification of performance of installation, remove surplus materials, excess materials, rubbish, tools and equipment.

**END OF SECTION**



## 08 4600 - GLAZED INTERIOR WALL AND DOOR ASSEMBLIES

### PART 1 - GENERAL

#### 1.1 SECTION INCLUDES

- A. Framed glazed interior wall and door assemblies.

#### 1.2 RELATED REQUIREMENTS

- A. Section 08 1429 - Flush Wood Doors.
- B. Section 08 7100 - Door Hardware.

#### 1.3 REFERENCE STANDARDS

- A. AAMA 611 - Voluntary Specification for Anodized Architectural Aluminum; 2012.
- B. ASTM B221 - Standard Specification for Aluminum and Aluminum - Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes; 2013.
- C. ASTM B221M - Standard Specification for Aluminum and Aluminum - Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes; 2013.
- D. ASTM C920 - Standard Specification for Elastomeric Joint Sealants; 2014.
- E. ASTM C1036 - Standard Specification for Flat Glass; 2011e1.
- F. ASTM C1048 - Standard Specification for Heat - Strengthened and Fully Tempered Flat Glass; 2012.
- G. WDMA I.S.1 - A - Architectural Wood Flush Doors; Window and Door Manufacturers Association; 2011.

#### 1.4 ADMINISTRATIVE REQUIREMENTS

- A. Pre - installation Meeting: Convene at project site seven calendar days prior to scheduled beginning of construction activities of this section to review section requirements.
  - 1. Require attendance by representatives of installer, other entities directly affecting, or affected by, construction activities of this section.
  - 2. Notify Architect four calendar days in advance of scheduled meeting date.

#### 1.5 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Manufacturer's descriptive literature for each component in partition assembly.
- C. Shop Drawings: Drawings showing layout, dimensions, identification of components, and interface with adjacent construction.
  - 1. Include field measurements of openings.
  - 2. Include Elevations Showing:

- a. Locations and identification of manufacturer - supplied door hardware and fittings.
  - b. Locations and sizes of cut - outs and drilled holes for other door hardware.
- 3. Include Details Showing:
  - a. Requirements for support and bracing of overhead track.
  - b. Installation details.
  - c. Appearance of manufacturer - supplied door hardware and fittings.
- D. Selection Samples: Two sets, representing manufacturer's full range of available metal materials and finishes.
- E. Design Data: Design calculations, bearing seal and signature of structural engineer licensed to practice in the State in which the Project is located, showing loads at points of attachment to the building structure.
- F. Certificates: Contractor to certify that installer of partition assemblies meets specified qualifications.
- G. Operation and Maintenance Data: For manufacturer - supplied operating hardware.
- H. Warranty Documentation: Submit manufacturer warranty and ensure that forms have been completed in Owner's name and registered with manufacturer.
- I. Specimen Warranty.
- J. Manufacturer's Installation Instructions: Include complete preparation, installation, and cleaning requirements.

#### **1.6 QUALITY ASSURANCE**

- A. Fabricator Qualifications: Minimum three years of experience designing, assembling, and installing partition assemblies similar to those specified in this section.

#### **1.7 DELIVERY, STORAGE, AND HANDLING**

- A. Store products in manufacturer's unopened packaging until installation.

#### **1.8 WARRANTY**

- A. See Section 01 7800 - Closeout Submittals, for additional warranty requirements.
- B. Correct defective Work within a one year period after date of Substantial Completion.
- C. Provide five year manufacturer warranty against excessive degradation of metal finishes. Include provision for replacement of units with excessive fading, chalking, or flaking.

### **PART 2 - PRODUCT**

#### **2.1 MANUFACTURERS**

- A. Framed Glazed Interior Wall and Door Assemblies:
  - 1. C.R. Laurence Co., Inc; CRL 487 Series Framed Glass Wall Office System; [www.crl-arch.com](http://www.crl-arch.com)
  - 2. Substitutions: See Section 01 6100 – Product Requirements.

## 2.2 FRAMED GLAZED INTERIOR WALL AND DOOR ASSEMBLIES

- A. Framed Glazed Interior Wall Assembly: Factory fabricated assemblies consisting of center - glazed rectilinear aluminum framing with screw spline or clip joinery.
1. Configuration: As indicated on drawings.
  2. Profile Width: 1-1/2 inch.
  3. Profile Depth: 5-11/16 inch overall.
  4. Profile Face Trim: 1-1/2 inch wide by 3/8 inch deep, snap in place.
  5. Wall Construction Width, Throat Size: 4-7/8 inch maximum wall, consisting of metal studs.
  6. Frame Finish: Class I natural anodized.
  7. Provide wood blocking at sill of glazing frame to match height of floor finish.
  8. Exposed Fasteners: Aluminum.
  9. Perimeter Anchors: Steel, properly separated from aluminum framing.
  10. Coordinate wall and door assembly preparation and provide hardware as necessary for fully operable installation.
  11. Design system to withstand normal operation without damage, racking, sagging, or deflection.
  12. Factory assembled to greatest extent practical; may be disassembled to accommodate shipping constraints.
- B. Other Manufacturers: Provide either the product identified as "Basis of Design" or an equivalent product of another manufacturer.
- C. Substitutions: See Section 01 6100 - Product Requirements. 1. For any product not identified as "Basis of Design", submit information as specified for substitutions.
1. For any product not identified as "Basis of Design", submit information as specified for substitutions.

## 2.3 FITTINGS AND HARDWARE

- A. Operable Panel Hardware: Coordinate with additional requirements as specified in Section 08 7100.

## 2.4 MATERIALS

- A. Glass: Flat glass meeting requirements of ASTM C1036, Type I - Transparent Flat Glass, Quality Q3, fully tempered in accordance with ASTM C1048, Kind FT, and as follows:
1. Thickness: As indicated.
  2. Color: As indicated on drawings.
  3. Glazing Stops: Square edge, with rubber glazing gaskets.
  4. Glazing Gaskets: Provide flexible vinyl for non-fire rated and elastomeric silicone for fire rated frames.
  5. Prepare glazing panels for indicated fittings and hardware before tempering.
  6. Polish edges that will be exposed in finished work to bright flat polish.
  7. Temper glass materials horizontally; visible tong marks or tong mark distortions are not permitted.
- B. Aluminum Components: Conforming to ASTM B221 (ASTM B221M), Alloy 6063, T5 Temper.
- C. Sealant: One-part silicone sealant, conforming to ASTM C920, clear.

## 2.5 FINISHES

- A. Class I Natural Anodized Finish: AAMA 611 AA-M12C22A41 Clear anodic coating not less than 0.7 mils thick.

## **PART 3 - EXECUTION**

### **3.1 EXAMINATION**

- A. Verify that field measurements are as indicated.
- B. Verify that track supports are properly braced, level within 1/4 inch (6 mm) of required position and parallel to the floor surface.
- C. Verify floor flatness of 1/8 inch in 10 feet (3 mm in 3 m), non-cumulative.
- D. Do not begin installation until supports and adjacent substrates have been properly prepared.
- E. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

### **3.2 PREPARATION**

- A. Clean substrates thoroughly prior to installation.
- B. Prepare substrates using the methods recommended by the manufacturer for achieving acceptable result for the substrate under the project conditions.

### **3.3 INSTALLATION**

- A. Install in accordance with glazed interior wall and door assembly manufacturer's instructions.
- B. Fit and align glazed interior wall and door assembly level and plumb.

### **3.4 ADJUSTING**

- A. Adjust glazed interior wall and door assembly to operate smoothly from pivoting positions.
- B. Adjust swing door hardware for smooth operation.

### **3.5 CLEANING**

- A. Clean installed work to like-new condition.

### **3.6 CLOSEOUT ACTIVITIES**

- A. See Section 01 7800 - Closeout Submittals, for closeout submittals.
- B. Demonstrate operation of glazed interior wall and door assembly and identify potential operational problems.

### **3.7 PROTECTION**

- A. Protect installed products until completion of project.
- B. Touch-up, repair or replace damaged products before date of Substantial Completion.

**END OF SECTION**

# SECTION 08 7101 - COMMON FINISH HARDWARE REQUIREMENTS

## PART 1 - GENERAL

### 1.1 SUMMARY

- A. Includes But Not Limited To:
  - 1. General requirements for finish hardware related to architectural wood doors.
- B. Related Requirements:
  - 1. Section 06 2024: 'Door, Frame, And Finish Hardware Installation' for installation of hardware.
  - 2. Section 06 4114: 'Wood-Veneer-Faced Architectural Cabinets' for architectural woodwork hardware.
  - 3. Section 08 4113: 'Aluminum-Framed Entrances and Storefronts' for storefront hardware.

### 1.2 REFERENCES

- A. Association Publications:
  - 1. Builders Hardware Manufacturers Association (BHMA), 355 Lexington Avenue, 15th Floor, New York, NY 10017-6603, Tel: 212-297-2122 Fax: 212-370-9047, [www.buildershardware.com](http://www.buildershardware.com).
- B. Reference Standards:
  - 1. International Code Council / American National Standards Institute:
    - a. ICC / ANSI A117.1-2009, 'Accessible and Usable Buildings and Facilities'.
  - 2. Underwriters Laboratories (UL):
    - a. UL 10B, 'Fire Tests of Door Assemblies' (10th Edition).
    - b. UL 10C, 'Positive Pressure Fire Tests of Door Assemblies' (Third Edition).

### 1.3 ADMINISTRATIVE REQUIREMENTS

- A. Coordination:
  - 1. Hardware Templates:
    - a. Provide hardware templates to Sections 08 4600 and 08 1429 within fourteen (14) days after Architect approves hardware schedule.
    - b. Supply necessary hardware installation templates to Section 06 2024 before pre-installation conference.

### 1.4 SUBMITTALS

- A. Action Submittals:
  - 1. Product Data:
    - a. Manufacturer's cut sheets.

- b. Two (2) copies of Manufacturer's installation, adjustment, and maintenance instructions for each piece of hardware. Include one (1) set in 'Operations And Maintenance Manual' and send one (1) set with hardware when delivered.
      - c. Copy of hardware schedule.
      - d. Written copy of keying system explanation.
  - 2. Shop Drawings:
    - a. Submit hardware schedule indicating hardware to be supplied.
    - b. Schedule shall indicate details such as proper type of strikeplates, spindle lengths, hand, backset, and bevel of locks, hand and degree opening of closer, length of kickplates, length of rods and flushbolts, type of door stop, and other necessary information necessary to determine exact hardware requirements.
- B. Closeout Submittals:
- 1. Include following in Operations And Maintenance Manual specified in Section 01 7800:
    - a. Operations and Maintenance Data:
      - 1) Manufacturer's installation, adjustment, and maintenance instructions for each piece of hardware.
    - b. Record Documentation:
      - 1) Manufacturers documentation:
        - a) Manufacturer's literature and/or cut sheets.
        - b) Include keying plan and bitting schedule.

## 1.5 DELIVERY, STORAGE, AND HANDLING

- A. Storage And Handling Requirements:
- 1. Neatly and securely package hardware items by hardware group and identify for individual door with specified group number and set number used on Supplier's hardware schedule.
  - 2. Include fasteners and accessories necessary for installation and operation of finish hardware in same package.

## PART 2 - PRODUCTS

### 2.1 SUPPLIERS

- A. Category Three Approved Suppliers. See Section 01 6200 for definitions of Categories:
- 1. Architectural Building Supply, Salt Lake City, UT [www.cookandboardman.com](http://www.cookandboardman.com):
    - a. Contact Information: Russ Farley, phone (800) 574-4369, fax 801-484-6817, or e-mail [russf@absdoors.com](mailto:russf@absdoors.com).
  - 2. Beacon Metals Inc, Salt Lake City, UT [www.beacon-metals.com](http://www.beacon-metals.com):
    - a. Contact Information: Jared Butler, phone (801) 486-4884, cell (435) 216-2297, FAX 801-485-7647, or e-mail [Jared@beacon-metals.com](mailto:Jared@beacon-metals.com).
  - 3. Midwest D-Vision Solutions, Salt Lake City, UT [www.mwdsutah.com](http://www.mwdsutah.com).
    - a. Contact Information: Dan Mercer, office (801) 377-4355, cell (801) 618-9456, e-mail [danm@mwdsutah.com](mailto:danm@mwdsutah.com).

## 2.2 FINISHES

### A. Hardware Finishes:

1. Finishes for brass or bronze hardware items shall be:
  - a. ANSI / BHMA Finish Code 626.
    - 1) Description: Satin Chromium Plated.
    - 2) Base Metal: Brass. Bronze.
2. Finishes for flat goods items may be:
  - a. ANSI / BHMA Finish Code 630.
    - 1) Description: Satin Stainless Steel.
    - 2) Base Metal: Stainless Steel (300 Series).
3. Materials other than steel, brass, or bronze shall be finished to match appearance satin chromium plated, except flat goods which shall be satin stainless steel.

## 2.3 FASTENERS

- ### A. Fasteners shall be of suitable types, sizes and quantities to properly secure hardware. Fasteners shall be of same material and finish as hardware unless otherwise specified. Fasteners exposed to weather shall be non-ferrous or corrosion resisting steel.

## PART 3 - EXECUTION

### 3.1 PREPARATION

- #### A. Before ordering materials, examine Contract Documents to be assured that material to be ordered is appropriate for thickness and substrate to which it is to be secured and will function as intended.

**END OF SECTION**



# SECTION 08 7102 - HANGING DEVICES

## PART 1 - GENERAL

### 1.1 SUMMARY

- A. Products Furnished But Not Installed Under This Section:
  - 1. Hinges for flush wood doors.
- B. Related Requirements:
  - 1. Section 08 4600: 'Glazed Interior Wall And Door Assemblies.'
  - 2. Section 08 7101: 'Common Hardware Requirements'.

## PART 2 - PRODUCTS

### 2.1 MANUFACTURED UNITS

- A. Manufacturers:
  - 1. Manufacturer Contact List:
    - a. Hager Companies, St Louis, MO [www.hagerhinge.com](http://www.hagerhinge.com).
    - b. Ives, New Haven, CT [www.iveshardware.com](http://www.iveshardware.com).
    - c. McKinney, Scranton, PA [www.mckinneyhinge.com](http://www.mckinneyhinge.com).
    - d. PBB, Ontario, CA [www.pbbinc.com](http://www.pbbinc.com).
    - e. Stanley (dormakaba Americas), Indianapolis IN [www.stanleyhardwarefordoors.com/products/](http://www.stanleyhardwarefordoors.com/products/).
- B. Hinges:
  - 1. Doors:
    - a. Sizes:
      - 1) Non-Fire-Rated Doors:
        - a) 1-3/4 inch non-fire-rated wood doors: 4 inches by 4 inches.
  - 2. Category Four Approved Products. See Section 01 6200 for definitions of Categories:
    - a. Interior:
      - 1) Hager: BB 1279.
      - 2) Ives: 5BBI.
      - 3) McKinney: TA 2714.
      - 4) MacPro / McKinney: MPB79.
      - 5) PBB: BB81.
      - 6) Stanley: FBB 179.

END OF SECTION

## SECTION 08 7103 - SECURING DEVICES

### PART 1 - GENERAL

#### 1.1 SUMMARY

- A. Products Furnished But Not Installed Under This Section:
  - 1. Items for architectural wood doors:
    - a. Locksets and latchsets.
- B. Related Requirements:
  - 1. Section 08 7101: Common Hardware Requirements.

#### 1.2 REFERENCES

- A. Definitions:
  - 1. Grade 1 Heavy Duty Key-In Lever Cylindrical Lockset:
    - a. Performance Features:
      - 1) Exceeds 1,000,000 ANSI cycles.
      - 2) Clutching mechanism standard.
      - 3) Thru-bolt design and heavy-duty spring tension provides longer performance life and prevents lever sag.
      - 4) ADA-compliant thumbturn.
      - 5) Mortise case is easily field reversible.
      - 6) Pre-assembled trims with spring-loaded spindles automatically adjust to door thickness.
      - 7) Partial security separator prevents spindle manipulation.
      - 8) Anti-friction throwbolt.
  - 2. Grade 2 Standard Duty Key-In Lever Cylindrical Lockset:
    - a. Performance Features:
      - 1) Exceeds 400,000 ANSI cycles.
      - 2) Single motion egress provides easy emergency exit.
      - 3) Full 1 inch throwbolt with saw resistant hardened steel roller pin.
      - 4) Anti-drill design deadbolt. Two (2) ball bearings inserted to prevent drill attacks.
      - 5) ADA-compliant thumbturn.

#### 1.3 DELIVERY, STORAGE, AND HANDLING

- A. Delivery And Acceptance Requirements:
  - 1. Standard Key Delivery:
    - a. Include change keys with hardware.

## **PART 2 - PRODUCTS**

### **2.1 MANUFACTURED UNITS**

#### **A. Manufacturers:**

1. Manufacturer List:
  - a. Marks USA, Amityville, NY [www.marksusa.com](http://www.marksusa.com).
  - b. Sargent, New Haven, CT [www.sargentlock.com](http://www.sargentlock.com).
  - c. Schlage, Colorado Springs, CO [www.schlage.com](http://www.schlage.com).
  - d. Yale Commercial Locks, Lenoir City, TN [www.yalecommercial.com](http://www.yalecommercial.com).

#### **B. General:**

1. Backsets shall be 2-3/4 inches.
2. Furnish lead shields where required.

#### **C. Flush Bolts:**

1. Rod length: 12 inch minimum.
2. Type Two Acceptable Products:

#### **D. Locksets And Latchsets:**

1. Design Criteria:
  - a. Grade 1 Heavy Duty Key-In Lever Cylindrical Lockset:
    - 1) ANSI/BHMA A156.02 Series 4000 Grade 1.
    - 2) Meet UL 3 hour fire rating.
    - 3) Meet ADA Compliant ANSI A117.1 Accessibility Code.
    - 4) Door Lever:
      - a) Meet California code for 1/2 inch or less return to door.
      - b) Vandal-Resistant Lever.
    - 5) Deadlocking Latchbolt.
2. Lever Operated:
  - a. See Door Hardware Schedule On Drawings.

## **PART 3 - EXECUTION**

### **3.1 CLOSE-OUT ACTIVITIES**

#### **A. Owner's Instructions:**

1. Before Final Acceptance Meeting, send master keys to Facilities Manager.

**END OF SECTION**

## SECTION 08 7106 - CLOSING DEVICES

### PART 1 - GENERAL

#### 1.1 SUMMARY

- A. Products Furnished But Not Installed Under This Section:
  - 1. Closers for flush wood doors.
- B. Related Requirements:
  - 1. Section 08 7101: 'Common Finish Hardware Requirements'.
  - 2. Section 08 7108: 'Stops And Holders'.

#### 1.2 SUBMITTALS

- A. Closeout Submittals:
  - 1. Include following in Operations And Maintenance Manual specified in Section 01 7800:
    - a. Warranty Documentation:
      - 1) Manufacturer's final executed copy of warranty.

#### 1.3 WARRANTY

- A. Manufacturer Warranty:
  - 1. Manufacturer's Standard Warranty, five (5) years minimum.

### PART 2 - PRODUCTS

#### 2.1 MANUFACTURED UNITS

- A. Manufacturers:
  - 1. Category Four Approved Manufacturers. See Section 01 6200 for definitions of Categories:
    - a. 8900 Series by Dorma Architectural Hardware, Reamstown, PA [www.dorma.com/usa](http://www.dorma.com/usa).
    - b. 1461 Series by LCN Closers, Princeton, IL [www.lcnclosers.com](http://www.lcnclosers.com).
    - c. 8501 Series by Norton Door Controls, Charlotte, NC [www.nortondoortcontrols.com](http://www.nortondoortcontrols.com).
    - d. 1431 Series by Sargent, New Haven, CT [www.sargentlock.com](http://www.sargentlock.com).
    - e. D-3550/D-3551 Series by Stanley (dormakaba Americas), Indianapolis IN [www.stanleyhardwarefordoors.com/products/](http://www.stanleyhardwarefordoors.com/products/).
- B. Surface-Mounted Overhead Door Closers:
  - 1. Closers provided under this Section shall be from same Manufacturer.
  - 2. Provide parallel arms on closers unless door position in relation to adjacent wall requires otherwise. Provide covers.

3. Door Closers on doors that swing 180 degree as shown on Contract Documents:
  - a. Closers shall allow for 180 degree opening without engaging stop function. Wall stop or Floor stop is specified in Door Schedule and Section 08 7108, 'Stops And Holders'.
  - b. Closers shall have following features:
    - 1) Adjustable sweep speed.
    - 2) Adjustable backcheck.
    - 3) Non-handed, non-sized.
    - 4) Hold open arm function (Friction Hold Open) (Non-Fire-Rated Corridors).
  
4. Door Closers on doors that swing 90 degree as shown on Contract Documents:
  - a. Closers shall allow for 100 degree opening with engaging stop function.
  - b. Closers shall have following features:
    - 1) Adjustable sweep speed.
    - 2) Adjustable backcheck.
    - 3) Non-handed, non-sized.
    - 4) Hold open arm function with thumb turn or handle control (Cush And Hold) (Non-Fire-Rated Corridors).

### **PART 3 - EXECUTION**

#### **3.1 INSTALLATION**

- A. Mount closers on stop side of door wherever conditions permit.
- B. Through-bolt hardware-to-door connections.

#### **3.2 ADJUSTING**

- A. Adjust closers to provide maximum opening force as required by governing code authority and proper backcheck and sweep speed.

**END OF SECTION**

# SECTION 08 7108 - STOPS AND HOLDERS

## PART 1 - GENERAL

### 1.1 SUMMARY

- A. Products Supplied But Not Installed Under This Section:
  - 1. Door stops.
- B. Related Sections:
  - 1. Section 08 7101: Common Hardware Requirements.

## PART 2 - PRODUCTS

### 2.1 MANUFACTURED UNITS

- A. Manufacturers:
  - 1. Manufacturer Contact List:
    - a. Hager, St Louis, MO [www.hagerhinge.com](http://www.hagerhinge.com).
    - b. Ives, Wallingford, CT [www.iveshardware.com](http://www.iveshardware.com).
    - c. Rockwood Manufacturing Co, Rockwood, PA [www.rockwoodmfg.com](http://www.rockwoodmfg.com).
- B. Stops:
  - 1. Use wall type stops unless indicated otherwise on Door Schedule.
  - 2. Provide model appropriate for substrate. Wall stops may be either cast or wrought.
  - 3. Type Two Acceptable Products:

	Interior Wall	Exterior Wall
a.		
b. Hager	236W	255W
c. Ives	WS407CCV	WS447
d. Rockwood	409	474 / 475
e.	Equal as approved by Architect before Installation. See Section 01 6200.	

## PART 3 - EXECUTION

### 3.1 INSTALLATION

- A. Interface With Other Work: When using overhead stops, coordinate installation with door closer and other door hardware.

END OF SECTION

## SECTION 08 7109 - ACCESSORIES

### PART 1 - GENERAL

#### 1.1 SUMMARY

- A. Products Furnished But Not Installed Under This Section:
  - 1. Smoke Gaskets.
- B. Related Requirements:
  - 1. Section 08 4113: 'Aluminum-Framed Entrances And Storefronts' for thresholds.
  - 2. Section 08 7101: 'Common Finish Hardware Requirements' for general finish hardware requirements and Approved Suppliers.
  - 3. Section 09 3013: 'Ceramic Tiling' for stone thresholds.

#### 1.2 REFERENCES

- A. Association Publications:
  - 1. American Architectural Manufacturers Association (AAMA):
    - a. AAMA 609 & 609-09, 'Cleaning and Maintenance Guide for Architecturally Finished Aluminum' (combined document).
    - b. AAMA 611-12, 'Voluntary Standards for Anodized Architectural Aluminum'.
    - c. AAMA 701/702-11, 'Voluntary Specification for Pile Weatherstripping and Replaceable Fenestration Weatherseals'.
  - 2. National Association of Architectural Metal Manufacturers (NAAMM):
    - a. AMP 500-06, 'Metal Finishes Manual' for Architectural and Metal Products.
- B. Reference Standards:
  - 1. American National Standards Institute / Builders Hardware Manufacturers Association:
    - a. ANSI / BHMA A156.18-2012, 'Materials and Finishes'.
    - b. ANSI / BHMA A156.21-2014, 'American National Standard for Thresholds'.
  - 2. International Code Council / American National Standards Institute:
    - a. ICC / ANSI A117.1-2009, 'Accessible and Usable Buildings and Facilities'.

### PART 2 - PRODUCTS

#### 2.1 MANUFACTURED UNITS

- A. Manufacturers:
  - 1. Manufacturer Contact List:



- a. Hager, St Louis, MO [www.hagerhinge.com](http://www.hagerhinge.com).
  - b. NGP - National Guard Products, Memphis, TN [www.ngpinc.com](http://www.ngpinc.com).
  - c. Pemko Manufacturing, Ventura, CA [www.pemko.com](http://www.pemko.com).
- B. Smoke Gaskets:
1. Color as selected by Architect.
  2. Type One Acceptable Products:
    - a. 726 by Hager.
    - b. 5050 by NGP.
    - c. PK 55 by Pemko.
    - d. Equal as approved by Architect before bidding. See Section 01 6200.

## **PART 3 - EXECUTION**

### **3.1 INSTALLATION**

- A. Install smoke gaskets in manner to give continuous air-tight fit.
1. Install smoke gaskets as per Manufacturer's installation requirements:
    - a. Hinge Jamb: Install smoke gaskets on jamb face of door frame so door will compress smoke gasket.
    - b. Header and Strike Jamb: Install smoke gaskets on face of stop of door frame so door will compress smoke gasket.

**END OF SECTION**

## **SECTION 08 7913 - KEY STORAGE AND CONTROL EQUIPMENT**

### **PART 1 - GENERAL**

#### **1.1 SUMMARY**

- A. Products Furnished But Not Installed Under This Section:
  - 1. Key cabinet.
- B. Related Requirements:
  - 1. Section 08 0601: Keying schedule.
  - 2. Section 08 7101: Common Hardware Requirements.

### **PART 2 - PRODUCTS**

#### **2.1 MANUFACTURED UNITS**

- A. Key Cabinet:
  - 1. Provide cabinet with 20 hooks minimum.
  - 2. 20 ga steel with prime coat and provided with lock.

### **PART 3 - EXECUTION**

#### **3.1 INSTALLATION**

- A. Turn key cabinet over to Owner's designated representative at Substantial Completion with all keys required for every locking device on Project identified by tags and on hooks. Owner will be responsible for installation.

**END OF SECTION**

## SECTION 08 8100 - GLASS GLAZING

### PART 1 - GENERAL

#### 1.1 SUMMARY

A. Includes But Not Limited To:

1. Quality of glazing used in entries, doors, and windows.

B. Related Requirements:

1. Sections Under 08 1000 Heading: 'Doors And Frames' for furnishing and installing of flush wood door lites in new doors.
2. Section 08 4113: 'Aluminum-Framed Entrances And Storefronts' for furnishing and installing of glazing in aluminum-framed storefront.
3. Section 08 4600: 'Glazed Interior Wall And Door Assemblies.'
4. Section 08 1429: 'Flush Wood Doors.'
5. Section 10 2200: 'Partitions.'

#### 1.2 REFERENCES

A. Definitions:

1. Glass Surface:

a. Insulated glass unit:

- 1) Surface 1: Exterior surface of outer lite.
- 2) Surface 2: Interspace-facing surface of outer lite.
- 3) Surface 3: Interspace-facing surface of inner lite.
- 4) Surface 4: Interior surface of inner lite.

b. Monolithic glass:

- 1) Surface 1: Exterior surface.
- 2) Surface 2: Interior surface.

2. Insulated Glass: Two pieces of glass spaced apart and hermetically sealed to form single-glazed unit with air space between. Heat transmission through this type of glass may be as low as half that without air space. Also called double glazing, double pane, insulated unit, and thermal pane.
3. Low-Emissivity Glass (Low-E): Reduces wintertime heat loss from interior with thin, almost colorless metallic coating that reflects heat back inside structure. Allows moderate solar heat gain while reducing harmful ultraviolet light in any season. Minimizes summertime air conditioning loss by reflecting radiated heat to outside. May be tempered for where safety glass is required. Available in single strength clear, gray and bronze (brown) color.
4. Shading Coefficient: Ratio of solar heat gain passing through a glazing system to solar heat gain that occurs under the same conditions if the window was made of clear, unshaded double strength glass. Lower SC number, the better solar control efficiency of glazing system.
5. Solar Heat Gain Coefficient (SHGC): Ratio of total solar heat passing through a given window relative to the solar heat incident on the projected window surface at normal solar incidence. (Percentage of solar energy directly transmitted or absorbed and re-radiated into a building). Lower SHGC, the better it is able to reduce heat.
6. Solar Reflectance (R): Percent of incident solar radiation that is reflected by window film/glass system. Lower the number, the less solar radiation reflected.

7. Tempered Glass: Glass strengthened through process of heating, creating tensile strength that causes glass to resist breakage, yet disintegrate into small pieces if break occurs. Tempered glass is type of safety glass.
8. U-Value: Measurement of heat transfer through film due to outdoor/indoor temperature differences. Lower U-value, less heat transfers. When using performance data, the lower U-value, better insulating qualities of window film/glass system.
9. Visible Light Transmitted (VLT): Percent of total visible light (380-780 nanometers) that passes through glass. Lower the number, the less visible light transmitted.

B. Reference Standards:

1. American National Standards Institute:
  - a. ANSI Z97.1-2009, 'Safety Glazing Materials Used in Buildings - Safety Performance Specifications and Methods of Test'.
2. ASTM International:
  - a. ASTM C1036-16, 'Standard Specification for Flat Glass'.
  - b. ASTM C1048-18, 'Standard Specification for Heat-Treated Flat Glass - Kind H, Kind FT Coated and Uncoated Glass'.
  - c. ASTM C1281-16, 'Standard Specification for Preformed Tape Sealants for Glazing Applications'.
  - d. ASTM E2190-10, 'Standard Specification for Insulating Glass Unit Performance and Evaluation'.
3. Consumer Products Safety Commission (CPSC):
  - a. 16 CFR, Part 1201 CAT 1 and 11, 'Safety Standard for Architectural Glazing Materials'.

### 1.3 SUBMITTALS

A. Action Submittals:

1. Product Data:
  - a. Manufacturer's data sheets for each glass product and glazing material.

B. Informational Submittals:

1. Qualification Statement:
  - a. Installer:
    - 1) Provide Qualification documentation if requested by Architect or Owner.

C. Closeout Submittals:

1. Include following in Operations And Maintenance Manual specified in Section 01 7800:
  - a. Warranty Documentation:
    - 1) Final, executed copy of Warranty.

### 1.4 QUALITY ASSURANCE

A. Regulatory Agency Sustainability Approvals:

1. Glazing shall meet applicable requirements of Federal Consumer Product Safety Standard 16 CFR 1201.

2. Comply with published recommendations of glass product Manufacturers and organizations, except where more stringent requirements are indicated.

B. Qualifications:

1. Installer: Requirements of Section 01 4301 applies, but not limited to following:
  - a. Satisfactorily completed at least three (3) installations of similar size, scope, and complexity in each of past two (2) years and be approved by glass product Manufacturer before bidding.
  - b. Upon request, submit documentation.

C. Certifications:

1. Labels showing strength, grade, thickness, type, and quality are required on each piece of glass.
2. Manufacturers/Fabricators certifying products furnished comply with project requirements.
3. Insulating-Glass Certification Program: Indicate compliance with requirements of Insulating Glass Certification Council on applicable glazing products.

## 1.5 DELIVERY, STORAGE, AND HANDLING

A. Delivery And Acceptance Requirements:

1. Follow Manufacturer's instruction for receiving, handling, and protecting glass & glazing materials to prevent breakage scratching, damage to seals, or other visible damage.
2. Deliver materials in manufacturer's original, unopened, undamaged containers with identification labels intact.

B. Storage And Handling Requirements:

1. Follow Manufacturer's instruction for storing and protecting glass & glazing materials.
2. Store materials protected from exposure to harmful environmental conditions and at temperatures and humidity conditions recommended by Manufacturer.
3. Protect edge damage to glass, and damage/deterioration to coating on glass.

## 1.6 FIELD CONDITIONS

A. Ambient Conditions:

1. Do not proceed with glazing when ambient and substrate temperature conditions are outside the limits permitted by glazing material manufacturer or when joint substrates are wet due to rain, frost, condensation or other causes.

## 1.7 WARRANTY

A. Manufacturer Warranty:

1. Insulating Glass Warranty:
  - a. Manufacturer's standard form, signed by insulating-glass product Manufacturer/Fabricator, agreeing to replace insulating-glass units that exhibit failure of hermetic seal under normal use evidenced by obstruction of vision by dust, moisture, or film on interior surfaces of glass, for ten [10] years of date of installation.
2. Installer's Warranty:

- a. Form acceptable to Owner, signed by glass product Installer, agreeing to replace glass products that deteriorate, or that exhibit damage or deterioration of glass or glazing products due to faulty installation, for two (2) years from date of installation.

## PART 2 - PRODUCTS

### 2.1 MATERIALS

#### A. Manufacturers:

##### 1. Manufacturer Contact List for Low E Glazing:

- a. AGC Flat glass North America, Kingsport, TN [www.us.agc.com](http://www.us.agc.com).
- b. Carlex (subsidiary of Central Glass Co., Ltd., Nashville, TN [www.carlex.com](http://www.carlex.com).
- c. Guardian Industries Corp., Auburn Hills, MI [www.guardian.com](http://www.guardian.com).
- d. Oldcastle BuildingEnvelope, Santa Monica, CA [www.oldcastlebe.com](http://www.oldcastlebe.com).
- e. Pilkington North America Inc., Toledo, OH [www.pilkington.com](http://www.pilkington.com).
- f. Vitro Architectural Glass (formerly PPG glass), Cheswick, PA [www.ppgglass.com](http://www.ppgglass.com) or PPG Canada Ltd, Glass Division, Toronto, ON (416) 789-3331.

#### B. Storefront Glazing:

##### 1. Thickness: 1/4 inch.

##### 2. Glazing shall have following characteristics:

###### a. Low-Emissivity (or Low E):

###### 1) Design Criteria:

- a) Clear.
- b) Insulated Glass: 1 inch units with 1/2 inch airspace and two (2) 1/4 inch lites.
- c) Meet requirements of ASTM C1036, Type I, Class I, Quality Q3.
- d) Location: Surface 2.

###### 2) Type Two Low-Emissivity (or Low E) Acceptable Product:

###### a) Performance Standard:

- (1) 64 percent Visible Light Transmission (VLT).
- (2) 0.28 U-value winter.
- (3) 0.26 U-value summer.
- (4) 0.27 Solar Heat Gain Coefficient (SHGC).
- (5) 0.32 Shading Coefficient.
- (6) 12 percent Visible Light Reflectance.

###### b) Quality Standard:

- (1) Cardinal LoE<sup>3</sup>-366.
- (2) Solarban 70 XL.
- (3) Equal product by Acceptable Manufacturer as approved by Architect before bidding. See Section 01 6200.

###### 3) Acceptable Manufacturers:

- a) AGC.
    - b) Guardian.
    - c) Vitro Architectural Glass.
    - d) Equal as approved by Architect before bidding. See Section 01 6200.
  - b. Etched Glass: ASTM C 1036, Type II, Class 1 (clear), Form 3; Quality-Q6, Finish F1 (etched one side).
    - 1) Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
      - a) AFG Industries, Inc.; Matelux Clear.
  - c. Glazing Below Door Height:
    - 1) Design Criteria:
      - a) Tempered.
      - b) Meet requirements of ASTM C1048, Kind FT, Condition A, Type I, Class I, Quality Q3.
- C. Fabrication:
- 1. Except where glass exceeds 66 inches in width, cut clear glass so any wave will run horizontally when glazed.
  - 2. Sealed, Insulating Glazing Units:
    - a. Double pane, sealed insulating glass units. Install at exterior aluminum-framed storefront.
    - b. Unit Thickness: One inch.
    - c. Insulated etched units shall consist of one pane of specified etched glass and one pane of standard glass.
    - d. Type Seal:
      - 1) Metal-to-glass bond and separated by 1/2 inch dehydrated air space.
      - 2) Use non-hardening sealants.
    - e. Category Four Approved Fabricators. See Section 01 6200 for definitions of Categories.
      - 1) Members of Sealed Insulating Glass Manufacturer's Association.

## 2.2 ACCESSORIES

- A. Cleaners, Primers, and Sealers: Types recommended by sealant or gasket manufacturer.
- B. Glazing Tape: Butyl-based elastomeric tape with integral resilient tube spacer, 10 to 15 Shore A durometer hardness, black color, coiled on release paper; widths required for specified installation, complying with ASTM C1281 and AAMA 800 for application.

### PART 3 - EXECUTION: Not Used

**END OF SECTION**

**DIVISION 9 - FINISHES:**

09 0000	Finish Schedule
09 0503	Flooring Substrate Preparation
09 2216	Non-Structural Metal Framing
09 2226	Metal Suspension System
09 2900	Gypsum Board
09 3013	Ceramic Tiling
09 5113	Acoustical Panel Ceilings
09 5323	Metal Acoustical Suspension Assemblies
09 5426	Wood Grille Ceiling Panels
09 6513	Resilient Base and Accessories
09 6813	Tile Carpeting
09 9001	Common Painting and Coating Requirements
09 9113	Exterior Painted Galvanized Metal
09 9123	Interior Painted Gypsum Board, Plaster
09 9124	Interior Painted Metal
09 9125	Interior Painted Wood
09 9324	Interior Clear-Finished Hardwood
09 9600	High-Performance Coatings



## SECTION 09 0000 - FINISH SCHEDULE

MARK	PRODUCT	MANUFACTURER	DESCRIPTION
<b>FLOOR MATERIALS</b>			
F01	Carpet.	Tarkett	Mentor; Be True; Owner furnished & installed
F02	Carpet.	Tarkett	Mentor; Be Honest; Owner furnished & installed
F03	Carpet.	Tarkett	Visual Path; Be True; Owner furnished & installed
F04	Carpet.	Tarkett	Visual Path; Be Honest; Owner furnished & installed
F05	Walk off carpet.	Tarkett	Abrasive Action; Winter Gray; Owner furnished & installed
F06	Floor tile.	Daltile	Haut Monde; Glitterati Granite Square; Matte; 12"x12"
F07	Painted plywood floor.	Benjamin Moore	Amherst Gray HC-167

<b>BASE MATERIALS</b>			
B01	4" covered rubber base.	Johnsonite/Tarkett	Charcoal WG; 4" Traditional Duracove Rubber
B02	Tile base.	Daltile	Cove Base Trim; Haut Monde; Glitterati Granite; 6"x12"
B03	No base.	-	Provide sealant between wall and floor
B04	Hardwood base.	-	Maple; Natural; Semi Gloss; Re: Detail 05/A1.32

<b>WALL MATERIALS</b>			
W01	Primed & painted wall surface.	Benjamin Moore	Mountainscape 870, Eggshell
W02	Primed & painted wall surface.	Benjamin Moore	Blooming Grove 413, Eggshell
W03	Primed & painted wall surface.	Benjamin Moore	Pumpkin Spice 126, Eggshell
W04	Primed & painted wall surface (Epoxy).	Benjamin Moore	Mountainscape 870, Satin
W05	Wall tile.	Daltile	Color Wheel; Linear; Arctic White; Semi-Gloss; 4"x12"
W06	Wall tile.	Daltile	Color Wheel; Linear; Arctic White; Semi-Gloss; 4"x8"
W07	Wall tile.	Daltile	Color Wheel; Linear; Arctic White; Semi-Gloss; 2"x8"
W08	Wall tile.	Daltile	Color Wheel; Linear; Arctic White; Semi-Gloss; 4"x4"
W09	Wall graphic.	-	Re: interior elevations & General Wall Covering/Graphic Notes
W10	Hardwood veneer.	-	Maple; Rift Cut; Natural; Semi-Gloss
W11	Mezzanine walls.	-	Re: specifications

<b>CEILING MATERIALS</b>			
C01	Suspended 2'x2' acoustical lay-in ceiling.	Armstrong	Optima
C02	Suspended 2'x4' & 6"x4' acoustical lay-in ceiling.	Armstrong	Optima
C03	Suspended 5/8" gypsum board ceiling system (1 layer). Smooth texture. Paint.	Benjamin Moore	Mountainscape 870; Flat
C04	5/8" gypsum board ceiling (1 layer) installed over	Benjamin Moore	Mountainscape 870; Flat

	framing. Smooth texture. Paint.		
C05	Wood slat soffit system installed over gypsum board.	-	Stain wood, Paint gypsum board, Smooth texture, See details, Colors as selected by owner/architect
C06	Exposed structure.	-	-
C07	1" pre-finished metal soffit system.	-	-

<b>MILLWORK FINISHES</b>			
M01	Hardwood veneer.	-	Maple; Rift Cut; Natural; Semi-Gloss
M02	Quartz.	Cosentino	Ethereal Glow
M03	Solid Surface.	Formica	416 Luna Pewter
M04	Millwork base.	Johnsonite/Tarkett	Charcoal WG; 4" Traditional Duracove Rubber
M05	Melamine.	-	White, Matte; Interior cabinet finish

**END OF SECTION 09 0000**

# SECTION 09 0503 - FLOORING SUBSTRATE PREPARATION

## PART 1 - GENERAL

### 1.1 SUMMARY

A. Includes But Not Limited To:

1. Preparing floor substrate to receive flooring as described in Contract Documents.

B. Related Requirements:

1. Pre-Installation conferences held jointly with Section 09 0503 as described in Administrative Requirements on Part 1 of this specification section.
2. Section 03 3111: 'Cast-In-Place Structural Concrete' for installation tolerances for concrete slabs.

### 1.2 ADMINISTRATIVE REQUIREMENTS

A. Pre-Installation Conference:

1. Participate in MANDATORY pre-installation conference held jointly if possible for all related Division 09 6000 'Flooring' used for Project.
2. Schedule conference after substrate preparation and before installation of flooring system. (If more than one (1) flooring system is included for project, hold conference at same time if schedule permits).
3. Conference may be held at project site or another convenient site. Participants may also attend by video or audio conference if approved by Project Manager.
4. In addition to agenda items specified in Section 01 3100, review following:
  - a. Review condition of floor with regards to compliance with concrete installation tolerances and other work necessary to prepare floors for installation of flooring.
5. Review condition of floor regarding compliance with concrete installation tolerances and other work necessary to prepare floors for installation of flooring.
6. Review additional agenda items all related flooring sections.

### 1.3 DELIVERY, STORAGE, AND HANDLING

A. Storage And Handling Requirements:

1. Provide storage space and protection for flooring and installation accessories if materials are delivered before start of flooring installation.

## PART 2 - PRODUCTS Not Used

## PART 3 - EXECUTION

### 3.1 PREPARATION

A. Flooring Preparation:

1. General:
    - a. Prepare floor substrate in accordance with ASTM F710, 'Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring' (This standard is used for preparing concrete floors for all flooring).
      - 1) Required RH test and alkalinity test of concrete slab has been performed.
    - b. Concrete floor slab patching:
      - 1) Cracks, chips and joints must be properly patched or repaired.
    - c. Concrete surface cured, clean, dry, and free of dirt, dust, grease, wax, and other foreign substances that will compromise flooring installations.
      - 1) Removal of curing compounds.
      - 2) Remove paint, sealer, grease, oil, silicone sealants, and other materials incompatible with flooring adhesives.
      - 3) Removal of overspray from painted walls (essential so glue will stick).
    - d. Vacuum and damp mop floor areas to receive flooring before flooring installation.
  2. Carpeted floor areas:
    - a. Prepare floor substrate in accordance with Carpet And Rug Institute (CRI) best practices to receive carpet installation and to provide installation that meets Carpet Manufacturer's warranty requirements.
- B. Carpet Accessories:
1. Sundry items, such as adhesives, shall be conditioned to building ambient conditions before use.

**END OF SECTION**

## SECTION 09 2216 - NON-STRUCTURAL METAL FRAMING

### PART 1 - GENERAL

#### 1.1 SUMMARY

- A. Includes But Not Limited To:
  - 1. Furnish and install metal framing and furring systems and blocking as described in Contract Documents.
- B. Related Requirements:
  - 1. Section 06 1100: 'Wood Framing' for wood blocking.
  - 2. Section 09 2226: 'Metal Suspension System' for furring on suspended ceilings.

#### 1.2 REFERENCES

- A. Association Publications:
  - 1. Steel Framing Industry Association (SFIA):
    - a. SFIA 'Technical Guide for Cold-Formed Steel Framing Products', [www.sfia.net](http://www.sfia.net).
  - 2. Steel Stud Manufacturers Association (SSMA):
    - a. 2015 IBC - SSMA 'Product Technical Guide'.
- B. Definitions:
  - 1. Non-Structural Member: Member in steel-framed system that is not part of the gravity load resisting system, lateral force resisting system or building envelope.
- C. Reference Standards:
  - 1. American Iron and Steel Institute (AISI):
    - a. AISI S220-15, 'North American Specification For The Design Of Cold-Formed Steel Framing – Nonstructural Members'.
  - 2. ASTM International:
    - a. ASTM A653/A653M-15, 'Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process'.
    - b. ASTM A1003/A1003M-15, 'Standard Specification for Steel Sheet, Carbon, Metallic- and Nonmetallic-Coated for Cold-Formed Framing Members'.
    - c. ASTM C645-18, 'Standard Specification for Nonstructural Steel Framing Members'.
    - d. ASTM C754-18, 'Standard Specification for Installation of Steel Framing Members to Receive Screw-Attached Gypsum Panel Products'.
    - e. ASTM C1513-18, 'Standard Specification for Steel Tapping Screws for Cold-Formed Steel Framing Connections'.
    - f. ASTM E119-18, 'Standard Test Methods for Fire Tests of Building Construction and Materials'.

### 1.3 ADMINISTRATIVE REQUIREMENTS

#### A. Pre-Installation Conferences:

1. Schedule pre-installation conference to be held after submittals have been reviewed and returned by Architect, but before beginning metal framing work.
2. In addition to agenda items specified in Section 01 3100, review following:
  - a. Identify location of required blocking.

### 1.4 SUBMITTALS

#### A. Action Submittals:

1. Shop Drawings:
  - a. Show special components and installations not fully dimensioned or detailed in Manufacturer's Product data.

#### B. Informational Submittals:

1. Test And Evaluation Reports:
  - a. ATI, ICC or other Approved Testing Agency (active member) Evaluation Report.
2. Manufacturer Instructions:
  - a. Technical product data, installation instructions, and recommendations for each component of system.

### 1.5 QUALITY ASSURANCE

#### A. Regulatory Agency Sustainability Approvals:

1. ICC approved.

## PART 2 - PRODUCTS

### 2.1 SYSTEMS

#### A. Manufacturers:

1. Type One Acceptable Manufacturers:
  - a. CEMCO, City of Industry, CA [www.cemcosteel.com](http://www.cemcosteel.com).
  - b. ClarkDietrich Building Systems, West Chester, OH [www.clarkdietrich.com](http://www.clarkdietrich.com).
  - c. Any member of Steel Framing Industry Association (SFIA).
  - d. Any member of Steel Stud Manufacturer's Association (SSMA).
  - e. Equal as approved by Architect before bidding. See Section 01 6200.

#### B. Materials:

1. Framing:

- a. General:
    - 1) 20 gauge minimum, unless noted greater on Drawings, meeting requirements of ASTM C645.
    - 2) Steel Sheet Components: Comply with ASTM C645 requirements for metal unless otherwise indicated.
    - 3) Steel Coating Requirement: Comply with ASTM C645 roll-formed from hot dipped galvanized steel complying with ASTM A1003/A1003M and/or ASTM A653/A653M G40 (Z120) or equivalent corrosion resistant coating. A40 galvanized products are not acceptable.
      - a) Coatings shall demonstrate equivalent corrosion resistance with evaluation report from approved testing agency.
  - b. Steel Studs and Runners: Cold-formed galvanized steel C-studs, as per ASTM C645 for conditions indicated.
  - c. Bridging, blocking, strapping, and other accessories shall be as described in Contract Documents or as required by Manufacturer's system.
- C. Fasteners:
- 1. Corrosion resistant coated, self-drilling, self-threading steel drill screws complying with ASTM C1513.

### **PART 3 - EXECUTION**

#### **3.1 INSTALLATION**

- A. Interface With Other Work:
- 1. Coordinate with other Sections to provide blocking necessary for their work.
  - 2. Coordinate with other Sections for location of blocking required for installation of equipment and building specialties.
- B. Tolerances:
- 1. 1/4 inch in 20 feet, non-cumulative in length of wall.
  - 2. 1/8 inch in 10 feet with 1/4 inch maximum in height of wall.
  - 3. Distances between parallel walls shall be 1/4 inch maximum along length and height of wall.
- C. Framing:
- 1. Installation Standard: ASTM C754.
  - 2. Specifications of Stud Wall Manufacturer shall govern this work unless more stringent requirements are required by Contract Documents.

**END OF SECTION**

## SECTION 09 2226 - METAL SUSPENSION SYSTEM: GYPSUM BOARD

### PART 1 - GENERAL

#### 1.1 SUMMARY

- A. Includes But Not Limited To:
1. Furnish and install metal suspension system for supporting gypsum drywall in typical ceiling and soffit areas and to support items penetrating ceiling as described in Contract Documents including:
    - a. Hanger wires, fasteners, main runners/tees, cross runners/tees, and wall molding/track.
- B. Related Requirements:
1. Section 09 2900: 'Gypsum Board'.
  2. Section 26 5100: 'Interior Lighting' for electrical fixtures installed in ceiling.
  3. Division 21: 'Fire Suppression' for sprinklers installed in ceiling.
  4. Division 23: 'Mechanical' for related sections for HVAC installed in ceiling.
  5. Division 26: 'Electrical' for related electrical work.
  6. Division 27: 'Communications' for related sound and video work.

#### 1.2 REFERENCES

- A. Association Publications:
1. The Ceilings & Interior Systems Construction Association (CISCA), 405 Illinois Avenue, 2B, St Charles IL. [www.cisca.org](http://www.cisca.org).
    - a. *'Ceiling Systems Handbook'*: Recommendations for direct hung acoustical tile and lay-in panel ceiling installation.
    - b. CISCA 0-2, *'Guidelines for Seismic Restraint for Direct-hung Suspended Ceiling Assemblies (zones 0-2)'* Covers Seismic Design Category C.
    - c. CISCA 3-4, *'Guidelines for Seismic Restraint for Direct-hung Suspended Ceiling Assemblies (zones 3-4)'* Covers Seismic Design Category D, E, and F.
    - d. *'Production Guide'*: Practical reference for ceiling systems and estimating costs.
- B. Definitions:
1. Ceiling Suspension System: System of metal members, designed to support a suspended ceiling. May accommodate lighting fixtures or air diffusers.
  2. Clips: Designs to suit applications such as fire resistance, wind uplift and impact.
  3. Compression Post (Vertical Strut, Seismic Struts): Rigid member used to provide lateral force bracing of suspension system.
  4. Cross Runner, Cross Tee: Cross runner is secondary or cross beams of mechanical ceiling suspension system, usually supporting only acoustical tile. Cross tee is inserted into main runner to form different module sizes. In some suspension systems, however, cross runners also provide support for lighting fixtures, air diffusers and other cross runners.
  5. Hanger Wires: Wire employed to suspend acoustical ceiling from existing structure. Standard material is 12 gauge 0.105 inch (-2.70 mm) galvanized, soft annealed steel wire, conforming to ASTM A641/A641M. Heavier gauge wire is available for higher load carrying installations, or situations where hanger wire spacing exceeds 4 feet on center. Seismic designs or exterior installations subject to wind uplift may require supplemental bracing or substantial hanger devices such as metal straps, rods or structural angles.
  6. Heavy-Duty Systems: Primarily used for installations in which the quantities and weights of ceiling fixtures (lights, air diffusers, etc.) are greater than those for ordinary commercial structure.
  7. Main Beam, Main Runner, Main Tee: Primary or main beams of type of ceiling suspension system in which structural members are mechanically locked together. Provide direct support for cross runners and may support lighting fixtures and



air diffusers, as well as acoustical tile. Supported by hanger wires attached directly to existing structure; or installed perpendicular to carrying channels and supported by specially designed sheet metal or wire clips attached to carrying channels.

8. Splay Wires: Wires installed at angle rather than perpendicular to grid.
9. Stiffening Brace: Used to prevent uplift of grid caused by wind pressure in exterior applications.

C. Reference Standards:

1. American Society of Civil Engineers/Structural Engineering Institute:
  - a. ASCE/SEI 7-10, 'Minimum Design Loads for Buildings and Other Structures'.
2. ASTM International:
  - a. ASTM A641/A641M-09a(2014), 'Standard Specification for Zinc-Coated (Galvanized) Carbon Steel Wire'.
  - b. ASTM A653/A653M-18, 'Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process'.
  - c. ASTM A1008/A1008M-18, 'Standard Specification for Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, Solution Hardened, and Bake Hardenable'.
  - d. ASTM C635/C635M-17, 'Standard Specification for the Manufacture, Performance, and Testing of Metal Suspension Systems for Acoustical Tile and Lay-in Panel Ceilings'.
  - e. ASTM C636/C636M-13, 'Standard Practice for Installation of Metal Ceiling Suspension Systems for Acoustical Tile and Lay-In Panels'.
  - f. ASTM C645-18, 'Standard Specification for Nonstructural Steel Framing Members'.
  - g. ASTM C754-18, 'Standard Specification for Installation of Steel Framing Members to Receive Screw-Attached Gypsum Panel Products'.
  - h. ASTM C841-03(2018), 'Standard Specification for Installation of Interior Lathing and Furring'.
  - i. ASTM D610-08(2012), 'Standard Practice for Evaluating Degree of Rusting on Painted Steel Surfaces'.
  - j. ASTM E119-18, 'Standard Test Methods for Fire Tests of Building Construction and Materials'.
  - k. ASTM E580/E580M-17, 'Standard Practice for Installation of Ceiling Suspension Systems for Acoustical Tile and Lay-in Panels in Areas Subject to Earthquake Ground Motions'.
3. International Building Code (IBC) (2018 or most recent edition adopted by AHJ):
  - a. IBC 808.1.1.1, 'Suspended Acoustical Ceiling'.
4. Underwriters Laboratories (UL):
  - a. UL 263: 'Standard for Fire Test of Building Construction and Materials' (14th Edition).
  - b. UL 723, 'Standard for Safety Test for Surface Burning Characteristics of Building Materials' (11th Edition).

### 1.3 ADMINISTRATIVE REQUIREMENTS

A. Coordination:

1. Coordinate layout of suspension system with other construction that penetrates ceilings or is supported by them, including drywall furring, light fixtures, HVAC equipment, and fire-suppression systems.
2. All work above ceiling should be completed prior to installing suspended system. There should be no materials resting against or wrapped around suspension system, hanger wires or ties.

### 1.4 SUBMITTALS

A. Action Submittals:

1. Product Data:
    - a. Provide Manufacturer's technical literature on suspension system including listing dimensions, load carrying capacity and standard compliance.
  2. Samples:
    - a. Minimum 8 inch long samples of suspension system components, including main runner/tee and cross runner/tee with couplings.
- B. Informational Submittals:
1. Certificates:
    - a. Manufacturer's certifications that products comply with specified requirements, including laboratory reports showing compliance with specified tests and standards.
    - b. Installer's certificates of training.
  2. Manufacturer's Instructions:
    - a. Seismic Design Categories D, E and F:
      - 1) Manufacturer's details and installation instructions for seismic bracing. If requested, provide copy of code requirements applicable to Project.

## 1.5 QUALITY ASSURANCE

- A. Regulatory Agency Sustainability Approvals:
1. All system components conform to ASTM standards.
  2. Fire-Resistance Rating: UL approved metal suspension system.
  3. Seismic Standard: Acoustical ceilings shall be designed and installed to withstand effects of earthquake motions according to following requirements:
    - a. CISCA's Recommendations for Acoustical Ceilings: Comply with CISCA's *'Recommendations for Direct-Hung Acoustical Tile and Lay-in Panel Ceilings-Seismic Zones 0-2'* (Apply to Seismic Categories A & B).
    - b. CISCA's Guidelines for Systems Requiring Seismic Restraint: Comply with CISCA's *'Guidelines for Seismic Restraint of Direct-Hung Suspended Ceiling Assemblies-Seismic Zones 3 & 4'* (Apply to Seismic Categories C, D, E & F).
    - c. Seismic Design Categories D, E and F:
      - 1) Standard for Ceiling Suspension Systems Requiring Seismic Restraint: Comply with ASTM E580/E580M.
      - 2) Meet seismic bracing requirements of ASCE 7, ASTM C635/C635M and ASTM C636/C636M or equivalent governing standard for project site.
- B. Qualifications. Requirements of Section 01 4301 applies, but not limited to following:
1. Installer:
    - a. Installer training ('Ceiling Masters' training course or equivalent).
  2. Manufacturer:
    - a. Manufacturer in good standing of CISCA (Ceiling and Interior Systems Construction Association).

## 1.6 DELIVERY, STORAGE, AND HANDLING

### A. Delivery And Acceptance Requirements:

1. Materials shall be delivered in original, unopened packages with labels intact.

### B. Storage And Handling Requirements:

1. Materials shall be delivered in original, unopened packages with labels intact.
2. Store material in fully enclosed space protected against damage from moisture, direct sunlight, surface contamination, and general damage.

## 1.7 WARRANTY

### A. Manufacturer Warranty:

1. Manufacturer standard ten (10) years warranty on suspension system including repair or replacement of rusting as defined by ASTM D610.

## PART 2 - PRODUCTS

### 2.1 SYSTEMS

#### A. Manufacturers:

1. Type One Acceptable Systems:
  - a. Drywall Grid by Armstrong World Industries, Lancaster, PA [www.armstrongceilings.com](http://www.armstrongceilings.com).
  - b. Drywall Grid System by Chicago Metallic Corporation, Chicago, IL [www.chicagometallic.com](http://www.chicagometallic.com).
  - c. Drywall Suspension System - Flat Ceilings by USG, Chicago, IL [www.usg.com](http://www.usg.com).
  - d. Equal as approved by Architect before bidding. See Section 01 6200.

#### B. Components:

1. Main Runners/Tee and Cross Runners/Tee:
  - a. Heavy-duty in accordance with ASTM C635/C635M.
  - b. Cold-formed from ASTM A653/A653M, CS Type B steel and hot dipped galvanized G-40 coating for interior ceilings.
  - c. Double-Web construction.
2. Wall Track/Molding.
3. Fasteners:
  - a. Nails are not permitted when subjected to direct tension such as installed vertically into bottom of structural member.
  - b. Metal attachment:
    - 1) Acoustical Eye Lag Screws:
      - a) 1/4 inch screws zinc coated with self-drilling or self-piercing sharp point.
  - c. Wood attachment:
    - 1) Acoustical Eye Lag Screws:

- a) 3 inch x 1/4 inch screws zinc coated for wood joists with Type 17 self-drilling point.
- d. Wire Tie to Metal Structural Member attachment:
  - 1) Wire wrapped to structural member with pigtail knot with three (3) tight wraps within 3 inch length at top connection.
- 4. Hanger Wires, Braces, and Ties:
  - a. Zinc-Coated, carbon-steel wire meeting requirements of ASTM A641/A641M, Class 1 zinc coating, soft temper.
  - b. Size:
    - 1) Standard size: 12 gauge (0.105 inch) () galvanized, soft annealed steel wire.
    - 2) Select wire diameter so its stress is less than yield when loaded at three (3) times hanger design load (ASTM C635/C635M), Table 1, 'Direct Hung') will be less than yield stress of wire, but provide not less than 12 gauge (0.105 inch) ().
  - c. Protect with rust inhibitive paint.
- 5. Seismic Joint Clip:
  - a. Required for Seismic Design Categories D, E and F.
    - 1) Quality Standard Product:
      - a) SJCG by Armstrong.
      - b) Equal as approved by Architect before bidding. See Section 01 6200.
- 6. Compression Posts/Struts:
  - a. Required for Seismic Design Categories D, E and F.
    - 1) Meet seismic requirements for Project.

## **PART 3 - EXECUTION**

### **3.1 EXAMINATION**

- A. Verification Of Conditions:
  - 1. Inspect area receiving suspension system to identify conditions which will adversely affect installation.
    - a. Work trades work to be thoroughly dry and complete prior to installation.
    - b. Verify weather tightness of area to receive suspension system prior to installation.
  - 2. Notify Architect of unsuitable conditions in writing.
    - a. Do not install suspension system until adverse conditions have been remedied.

### **3.2 INSTALLATION**

- A. Interface With Other Work:

1. All work above ceiling should be completed prior to installing suspended ceiling system including related work including: drywall furring work, acoustical tile, light fixtures, mechanical systems, electrical systems, and sprinklers.

B. General:

1. Install suspension system in accordance with Manufacturer's written instructions, and in compliance with ASTM installation standard, and applicable codes as required by AHJ with modifications listed below except where Manufacturer's instructions are more stringent:
  - a. Main runners/tees hanger wires 48 inches on center maximum.
  - b. Cross runners/tees hanger wires 24 inches on center maximum.
  - c. Do not kink, twist, or bend hanger wires as a means of leveling assembly.
  - d. Do not attach suspension system to adjustable folding partition headers.
2. Hanger Wires:
  - a. Install hanger wire to structure as required with necessary on center spacing to support expected ceiling load requirements, following local practices, codes and regulations. Attach with pigtail knot with three (3) tight wraps within 3 inch length at each end.
  - b. Provide additional wires at light fixtures, grilles, and access doors where necessary by appropriate method in accordance with industry accepted practice.
  - c. Additional Hanger Wires: Wrapped tightly three (3) full turns within 3 inch length to structure and component at locations where imposed loads could cause deflection exceeding  $1/360$  span.

C. Seismic:

1. Required for Seismic Design Categories D, E and F:
  - a. Installation must be in accordance with ASCE 7.

D. Tolerances:

1. Main Runners/Tees:
  - a. Installed and leveled to meet IBC requirements to within  $1/4$  inch in 10 foot with supporting wire taut to prevent any subsequent downward movement of main runners when ceiling loads are imposed.
2. Cross Runners/Tees:
  - a. Main runners, or other cross runners, must support cross runners to within  $1/32$  inch of required center-to-center spacing. This tolerance must be noncumulative beyond 12 feet.
  - b. Intersecting runners must be installed to form right angle to supporting members.

### 3.3 FIELD QUALITY CONTROL

A. Field Inspections:

1. Inspect:
  - a. Suspended ceiling system.
  - b. Hanger wires, braces, ties, anchors and fasteners.

B. Non-Conforming Work:

1. Remove and replace defective materials at no additional cost to Owner.

END OF SECTION

## SECTION 09 2900 - GYPSUM BOARD

### PART 1 - GENERAL

#### 1.1 SUMMARY

A. Includes But Not Limited To:

1. Furnish and install gypsum board as described in Contract Documents, except behind ceramic tile.
2. Furnish and install acoustical sealants as described in Contract Documents.

B. Related Requirements:

1. Section 07 9219: 'Acoustical Joint Sealants' for quality of acoustical sealants.
2. Section 09 2216: 'Non-Structural Metal Framing'.
3. Section 09 3013: 'Ceramic Tile' for installation of backerboard joint reinforcing.

#### 1.2 REFERENCES

A. Definitions:

1. Accessories: Metal or plastic beads, trim, or moulding used to protect or conceal corners, edges, or abutments of the gypsum board construction.
2. Drywall Primer: Paint material specifically formulated to fill the pores and equalize the suction difference between gypsum board surface paper and the compound used on finished joints, angles, fastener heads, and accessories and over skim coatings.
3. Skim Coat: Either a thin coat of joint compound trowel applied, or a material manufactured especially for this purpose and applied in accordance with manufacturer's recommendations, over the entire surface.

B. Reference Standards:

1. ASTM International:

- a. ASTM C11-18, 'Standard Terminology Relating to Gypsum and Related Building Materials and Systems'.
- b. ASTM C475/C475M-17, 'Standard Specification for Joint Compound and Joint Tape for Finishing Gypsum Board'.
- c. ASTM C840-18a, 'Standard Specification for Application and Finishing of Gypsum Board'.
- d. ASTM C1002-18, 'Standard Specification for Steel Self-Piercing Tapping Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Wood Studs or Steel Studs'.
- e. ASTM C1047-14a, 'Standard Specification for Accessories for Gypsum Wallboard and Gypsum Veneer Base'.
- f. ASTM C1178/C1178M-18, 'Standard Specification for Coated Glass Mat Water-Resistant Gypsum Backing Panel'.
- g. ASTM C1396/C1396M-17, 'Standard Specification for Gypsum Board'.
- h. ASTM E84-18b, 'Standard Test Method for Surface Burning Characteristics of Building Materials'.
- i. ASTM E90-09(2016), 'Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements'.
- j. ASTM E119-18b, 'Standard Test Method for Fire Tests of Building Construction and Materials'.
- k. ASTM E413-16, 'Classification for Rating Sound Insulation'.

2. Gypsum Association:

- a. GA-214-15, 'Recommended Levels of Gypsum Board Finish'.
- b. GA-216-16: 'Application and Finishing of Gypsum Panel Products'.
- c. GA-600-15, 'Fire Reference Design Manual'.

- d. GA-801-2017, 'Handling and Storage of Gypsum Panel Products: A Guide for Distributors, Retailers, and Contractors'.
3. International Building Code (IBC) (2018 or latest approved version):
  - a. Chapter 25, 'Gypsum Board And Plaster'.
4. Underwriters Laboratories, Inc.
  - a. UL 263: 'Test Method for Fire Tests of Building Construction and Materials' (14th Edition).
  - b. UL 723: 'Test for Surface Burning Characteristics of Building Materials; (11th Edition).

### **1.3 ADMINISTRATIVE REQUIREMENTS**

- A. Pre-Installation Conference:
  1. Schedule MANDATORY pre-installation conference immediately before installation of gypsum wallboard.
  2. In addition to agenda items specified in Section 01 3100, review following:
    - a. Finish requirements necessary for installation of finish materials over gypsum wallboard, and location and installation of ceramic tile backerboard.

### **1.4 SUBMITTALS**

- A. Informational Submittals:
  1. Test And Evaluation Reports:
    - a. Fire test results or assembly diagrams and numbers confirming products used will provide required fire ratings with installation configurations used.

### **1.5 DELIVERY, STORAGE, AND HANDLING**

- A. General:
  1. Following recommendations of GA-801 Guide for Handling and Storage of Gypsum Panel Products unless local, state or federal laws or agency rules differing from the recommendations shall take precedence.
- B. Delivery And Acceptance Requirements:
  1. Deliver materials in original packages, containers, or bundles bearing brand name, applicable standard designation, and Manufacturer's name.
- C. Storage And Handling Requirements:
  1. Store material under roof and keep dry and protected against damage from weather, condensation, direct sunlight, construction traffic, and other causes. Stack gypsum board flat to prevent sagging.

### **1.6 FIELD CONDITIONS**

- A. Ambient Conditions:
  1. Comply with ASTM C840 or GA-216 requirements, whichever are more stringent:



- a. Do not install interior products until installation areas are enclosed and conditioned.
  - 1) Temperature shall be 50 deg F and 95 deg F maximum day and night during entire joint operation and until execution of Certificate of Substantial Completion.
  - 2) Provide ventilation to eliminate excessive moisture.
  - 3) Avoid hot air drafts that will cause too rapid drying.
- b. Do not install panels that are wet, those that are moisture damaged, and those that are mold damaged.

## **PART 2 - PRODUCTS**

### **2.1 MATERIALS**

#### **A. Manufacturers:**

##### **1. Manufacturer Contact List:**

- a. American Gypsum, Dallas, TX [www.americangypsum.com](http://www.americangypsum.com).
- b. CertainTeed Gypsum, Inc; Tampa, FL [www.certainteed.com](http://www.certainteed.com).
- c. Georgia Pacific, Atlanta, GA [www.gp.com](http://www.gp.com).
- d. National Gypsum, Charlotte, NC [www.nationalgypsum.com](http://www.nationalgypsum.com).
- e. Pabco Gypsum, Newark, CA [www.pabcogypsum.com](http://www.pabcogypsum.com).
- f. United States Gypsum Co, Chicago, IL [www.usg.com](http://www.usg.com).

#### **B. Materials:**

##### **1. Interior Gypsum Board:**

###### **a. General:**

###### **1) Size:**

- a) Provide maximum lengths and widths available that will minimize joints in each area and that correspond with support system indicated.

###### **2) Class Two Quality Standard:**

- a) Core: Fire-resistant rated gypsum core.
- b) Complies with Type X requirements of ASTM C1396/C1396M (Section 5).
- c) Surface paper: Face paper suitable for painting.
- d) Long edges: Tapered edge.
- e) Overall thickness: 5/8 inch.

##### **2. Glass Mat Gypsum Tile Backer:**

- a. Product meeting requirements of ASTM C1178/C1178M.
- b. 5/8 inch.
- c. Square edges.
- d. Category Four Approved Manufacturer. See Section 01 6200 for definitions of Categories:
  - 1) DensShield Tile Backer by Georgia Pacific.
  - 2) GlasRoc Tilebacker by CertainTeed.

## 2.2 ACCESSORIES

### A. Manufacturers:

1. Manufacturer Contact List:
  - a. Magnum Products, Lenaxa, KS [www.levelcoat.com](http://www.levelcoat.com).
  - b. National Gypsum, Charlotte, NC [www.nationalgypsum.com](http://www.nationalgypsum.com).
  - c. United States Gypsum Co, Chicago, IL [www.usg.com](http://www.usg.com).
  - d. Westpac Materials Inc, Orange, CA [www.westpacmaterials.com](http://www.westpacmaterials.com).
  - e. Wm. Zinsser & Co, Somerset, NJ [www.zinsser.com](http://www.zinsser.com).
2. Gypsum Board Mounting Accessories:
  - a. Furring Channels:
    - 1) Class Two Quality Standards. See Section 01 6200 for definitions:
      - a) Walls: Galvanized DWFC-25.
    - 2) Accessories as required by Manufacturer's fire tests to provide necessary fire ratings.
  - b. Corner And Edge Trim:
    - 1) Metal, paper-faced metal, paper-faced plastic, or solid vinyl meeting requirements of ASTM C1047. Surfaces to receive bedding cement treated for maximum bonding.
  - c. Control Joint:
    - 1) Bent zinc sheet with V-shaped slot, perforated flanges, covered with plastic tape meeting requirements of ASTM C1047.
3. Joint Compound:
  - a. Best grade or type recommended by Board Manufacturer and meeting requirements of ASTM C475/C475M.
    - 1) Use Taping Compound for first coat to embed tape and accessories.
    - 2) Use Taping Compound or All-Purpose Compound for subsequent coats except final coat.
    - 3) Use Finishing Compound for final coat and for skim coat.
4. Joint Reinforcing:
  - a. Paper reinforcing tape acceptable to Gypsum Board Manufacturer.
5. Fasteners:
  - a. Bugle head screws meeting requirements of ASTM C1002:
    - 1) Gypsum Board:
      - a) Type W: For fastening gypsum board to wood members, of length to penetrate wood framing 5/8 inch minimum.
      - b) Type S: For fastening gypsum board to steel framing and ceiling suspension members, of length to penetrate steel framing 3/8 inch minimum.
    - 2) Glass Mat Gypsum Tile Backer:

- a) Wood Framing: 11 ga (0.1233 in galvanized with 7/16 inch head, hot dipped. Screws: Type W or Type S Hi-Lo, bugle head, rust resistant.

## **PART 3 - EXECUTION**

### **3.1 EXAMINATION**

#### **A. Verification Of Conditions:**

1. Examine substrate and verify framing is suitable for installation of gypsum board.
2. Examine gypsum board before installation. Reject panels that are wet, moisture damaged, and mold damaged.
3. Notify Architect of unsuitable conditions in writing.
  - a. Do not install board over unsuitable conditions.
4. Commencement of Work by installer is considered acceptance of substrate.

### **3.2 INSTALLATION**

#### **A. Interface With Other Work:**

1. Coordinate with Division 06 for location of backblocking for edges and ends of gypsum board and for blocking required for installation of equipment and building specialties.
2. Do not install gypsum board until required blocking is in place.

#### **B. General: Install and finish as recommended in ASTM C840 or GA-216 unless specified otherwise in this Section.**

#### **C. Interior Gypsum Board:**

##### **1. General:**

- a. Install so trim and reinforcing tape are fully backed by gypsum board. No hollow spaces between pieces of gypsum board over 1/8 inch wide before taping are acceptable.
- b. Rout out backside of gypsum board to accommodate items that extend beyond face of framing, but do not penetrate face of gypsum board, such as metal door frame mounting brackets, etc.
- c. On walls over 108 inches high, apply board perpendicular to support
- d. Butt edges in moderate contact. Do not force in place. Shim to level.
- e. Leave facings true with joint, finishing flush. Vertical work shall be plumb and ceiling surfaces level.
- f. Scribe work closely:
  - 1) Keep joints as far from openings as possible.
  - 2) If joints occur near an opening, apply board so vertical joints are centered over openings.
  - 3) No vertical joints shall occur within 8 inches of external corners or openings.
- g. Install board tight against support with joints even and true. Tighten loose screws.
- h. Caulk perimeter joints in sound insulated rooms with specified acoustical sealant.

##### **2. Ceilings:**

- a. Apply ceilings first using minimum of two (2) men.
- b. Use board of length to give minimum number of joints.
- c. Apply board perpendicular to support.

3. Fastening:
  - a. Apply from center of board towards ends and edges.
  - b. Apply screws 3/8 inch minimum from ends and edges, one inch maximum from edges, and 1/2 inch maximum from ends.
  - c. Spacing:
    - 1) Ends: Screws not over 7 inches on center at edges where blocking or framing occurs.
    - 2) Wood Framed Walls And Ceilings: Screws 7 inches on center in panel field.
    - 3) Metal Framed Walls: Screws 12 inches on center in panel field.
  - d. Set screw heads 1/32 inch below plane of board, but do not break face paper. If face is accidentally broken, apply additional screw 2 inches away.
  - e. Screws on adjacent ends or edges shall be opposite each other.
  - f. Drive screws with shank perpendicular to face of board
4. Trim:
  - a. Corner Beads:
    - 1) Attach corner beads to outside corners.
      - a) Attach metal corner bead with staples spaced 4 inches on center maximum and flat taped over edges of corner bead. Also, apply screw through edge of corner bead where wood trim will overlay corner bead.
      - b) Set paper-faced trim in solid bed of taping compound.
  - b. Edge Trim: Apply where gypsum board abuts dissimilar material. Hold channel and 'L' trim back from exterior window and door frames 1/8 inch to allow for caulking.
5. Finishing:
  - a. General:
    - 1) Tape and finish joints and corners throughout building as specified below to correspond with final finish material to be applied to gypsum board. When sanding, do not raise nap of gypsum board face paper or paper-faced trim.
    - 2) First Coat:
      - a) Apply tape over center of joint in complete, uniform bed of specified taping compound and wipe with a joint knife leaving a thin coating of joint compound. If metal corner bead is used, apply reinforcing tape over flange of metal corner bead and trim so half of tape width is on flange and half is on gypsum board.
      - b) Completely fill gouges, dents, and fastener dimples.
      - c) Allow to dry and sand lightly if necessary, to eliminate high spots or excessive compound.
    - 3) Second Coat:
      - a) Apply coat of specified joint compound over embedded tape extending 3-1/2 inches on both sides of joint center. Use finishing compound only if applied coat is intended as final coat.
      - b) Re-coat gouges, dents, and fastener dimples.
      - c) Allow to dry and sand lightly to eliminate high spots or excessive compound.
    - 4) Third Coat: Apply same as second coat except extend application 6 inches on both sides of joint center. Allow to dry and sand with fine sandpaper or wipe with damp sponge.
    - 5) Fourth Coat: Apply same as second coat except extend application 9 inches on both sides of joint center. Allow to dry and sand with fine sandpaper or wipe with damp sponge.

- a. Finishing Levels: Finish panels to levels indicated below and according to ASTM C840, GA-214 and GA-216:
  - 1) Gypsum Board Surfaces not painted or finished:
    - a) GA-214 Level 1: 'All joints and interior angles shall have tape set in joint compound. Surface shall be free of excess joint compound. Tool marks and ridges are acceptable'.
  - 2) Gypsum Board Surfaces to Receive: Smooth Gypsum Board Surfaces:
    - a) GA-214 Level 4: 'All and interior angles shall have tape embedded in joint compound and two separate coats of joint compound applied over all flat joints and one separate coat of joint compound applied over interior angles. Fastener heads and accessories shall be covered with three separate coats of joint compound. All joint compound shall be smooth and free of tool marks and ridges. Coat prepared surface with specified primer'.
  - 3) Painted, Untextured Gypsum Board Surfaces, Except in Mechanical, Storage, And Utility Areas:
    - a) GA-214 Level 5: 'All joints and interior angles shall have tape embedded in joint compound and two separate coats of joint compound applied over flat joints and one separate coat of joint compound applied over interior angles. Fastener heads and accessories shall be covered with three separate coats of joint compound. A thin skim coat of joint compound trowel applied, or a material manufactured especially for this purpose and applied in accordance with manufacturer's recommendations, shall be applied to the entire surface. The surface shall be smooth and free of tool marks and ridges. Coat prepared surface with specified primer.'

D. Glass Mat Gypsum Tile Backer:

- 1. Apply glass mat gypsum tile backer to framing. Attach using specified fasteners spaced 6 inches on center on edges and into all framing members. Drive screws flush with surface of board.
- 2. Shim board to be plumb and flat or level and flat, depending on location.
- 3. Apply reinforcing only at joints where abutting different materials.

### 3.3 FIELD QUALITY CONTROL

A. Non-Conforming Work:

- 1. Remove and replace panels that are wet, moisture damaged, and mold damaged.
  - a. Indications that panels are wet, or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.
  - b. Indications that panels are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

### 3.4 CLEANING

- A. Remove from site debris resulting from work of this Section including taping compound spills.

**END OF SECTION**

# SECTION 09 3013 - CERAMIC TILING

## PART 1 - GENERAL

### 1.1 SUMMARY

- A. Includes But Not Limited To:
  - 1. Furnish and install ceramic tile and tile setting materials and accessories as described in Contract Documents.
- B. Related Requirements:
  - 1. Section 09 2900: 'Gypsum Board' for installation of backerboard behind ceramic tile, except for joint reinforcing.
  - 2. Section 22 1319: 'Facility Sanitary Sewer Specialties' for floor drains installed in ceramic tile floors.
- C. Products Installed But not Furnished Under This Section:
  - 1. Interior Ceramic Tile Joint Sealants:
- D. Related Requirements:
  - 1. Section 07 9213: 'Elastomeric Joint Sealants'.

### 1.2 REFERENCES

- A. Association Publications:
  - 1. American National Standard Specification (ANSI) for the Installation of Ceramic Tile.
  - 2. International Standards Organization (ISO) 13007, 'Classification for Adhesives and Grout'.
  - 3. Tile Council of North America:
    - a. TCNA Handbook, 'Handbook for Ceramic, Glass, and Stone Tile Installation, 2015'.
- B. Definitions:
  - 1. Crack Isolation: Prevention of transfer of cracks from substrate through tile or stone when substrate is subjected to horizontal movement of cracks.
  - 2. Dynamic Coefficient of Friction (DCOF): Measures ratio of forces necessary to keep two surfaces sliding.
  - 3. Epoxy Grout: Mortar system employing epoxy resin and epoxy hardener portions.
  - 4. Grout: Rich or strong cementitious or chemically setting mix used for filling tile joints.
  - 5. ISO 13007 Standards Product Classifications:
    - a. Adhesives:

Types	Classes	Special Characteristics
C = Cementitious (Thin-Set Mortars)	1 = Normal 2 = Improved	F = Fast-Setting T = Slip-Resistant E = Extended Open Time S1 = Deformable S2 = Highly Deformable P1 = Plywood Adhesion P2 = Improved Plywood Adhesion

D = Dispersion (Mastics)	1 = Normal 2 = Improved	F = Fast-Setting T = Slip-Resistant E = Extended Open Time
R = Reaction Resin (Epoxies)	1 = Normal 2 = Improved	T = Slip-Resistant

- 1) Cementitious Adhesive (C): Mixture of hydraulic binding agents (e.g. portland cement), aggregates, and organic additives (e.g. latex polymers, moisture retention additive, etc...) to be mixed with water or latex admix before mixing.
- 2) Dispersion Adhesive (D): Ready-to-use mixture of organic binding agents in the form of an aqueous polymer dispersion, organic additives and mineral fillers - mastic type products.
- 3) Reaction Resin Adhesive (R): Single or multi-component mixture of synthetic resin, mineral fillers and organic additives in which curing occurs by chemical reaction - epoxy or urethane based products.
- 4) Class 1 (1): Adhesive has passed minimum pass level tests that are mandatory for that adhesive type.
- 5) Class 2 (2): Adhesive has passed same tests as Class 1 and/or other applicable tests, but at higher pass levels.
- 6) Fast-Setting (F): Adhesive with accelerated cure time that must achieve minimum strength requirements of fast setting adhesive. This designation does not apply to reaction resin adhesives (R).
- 7) Slip-Resistance (T): Downward movement of a tile applied to combed adhesive layer on vertical surface must be  $\leq 0.5\text{mm}$  for a C or D adhesive, and  $\leq 5\text{mm}$  for a type R adhesive.
- 8) Extended Open Time (E): Maximum time interval after application at which tiles can be embedded in applied adhesive and meet tensile adhesion strength requirement must be  $\geq 30$  minutes. This designation does not apply to reaction resin adhesives (R).
- 9) Deformability (S): Capacity of hardened adhesive to be deformed by stresses between tile and substrate without damage to installed surface - to pass S1 requirements an adhesive must be able to deform  $\geq 2.5\text{mm}$  but  $< 5\text{mm}$ ; to pass S2 requirements an adhesive must be able to deform  $\geq 5\text{mm}$ . This designation does not apply to reaction resin adhesives (R).
- 10) Exterior Glue Plywood (P): Adhesive with ability to bond tile or stone to exterior glue plywood substrates (interior only). This designation does not apply to reaction resin adhesives (R) or dispersion adhesives (D).

b. Grouts:

Types	Classes	Special Characteristics
CG = Cementitious Grout	1 = Normal 2 = Improved	F = Fast-Setting A = High Abrasion Resistance W = Reduced Water Absorption
RG = Reaction Resin Grouts	1 = Normal 2 = Improved	Higher performance characteristics than improved cementitious grouts

- 1) Cementitious Grout (CG): Mixture of hydraulic binding agents (e.g. portland cement), aggregates, inorganic and organic additives (e.g. latex polymers, moisture retention additive, etc...).
- 2) Reaction Resin Grout (RG): Single or multi-component mixture of synthetic resin, mineral fillers and organic additives in which curing occurs by chemical reaction - epoxy or urethane based products.
- 3) Class 1 (1): Grout has passed minimum pass level tests that are mandatory for cementitious grouts.
- 4) Class 2 (2): Cementitious grout has passed same tests as Class 1 and/or other applicable tests, but at higher pass levels.
- 5) Fast-Setting (F): Grout with accelerated cure time that must achieve minimum compressive strength requirements under normal conditions within twenty four (24) hours. This designation applies only to cementitious grouts (CG).
- 6) High Abrasion Resistance (A): Capability of grout to resist wear. This designation applies only to cementitious grouts (CG).
- 7) Reduced Water Absorption (W): Grout has lower water absorption rate than standard cementitious grout. This designation applies only to cementitious grouts (CG).

6. Latex/Polymer Modified Portland Cement Mortar: Latex/Polymer modified portland cement mortar is a mixture of portland cement, sand, and special latex/polymer additive that is used as a bond coat for setting tile.
7. Pavers: Unglazed porcelain or natural clay tile formed by dust-pressed method and similar to ceramic mosaics in composition and physical properties but relatively thicker with 6 inch - or more of facial area. (ASTM C242).
8. Sanded Cement Grout: Factory prepared mixture of cement, graded sand, and other ingredients to produce water-resistant, dense, uniformly colored material. Used for joints of 1/8 inch width or greater.
9. Static Coefficient of Friction (SCOF): Measures ratio of forces necessary to start two surfaces sliding (older measurement of friction replaced by dynamic coefficient of friction (DCOF)).
10. Unsanded Cement Grout: Factory prepared mixture of cement and additives that provide water retentivity. Used for joints of 1/8 inch or less.

C. Reference Standard:

1. American National Standards Institute:

- a. ANSI A108/A118/A136.1, 'American National Standards Specifications for the Installation of Ceramic Tile', Version 2015 (compilation of standards):

1) Installation Standards:

- a) A108.01, 'General Requirements: Subsurfaces and Preparation by Other Trades'.
- b) A108.02, 'General Requirements: Materials, Environmental, and Workmanship'.
- c) A108.05, 'Installation of Ceramic Tile with Dry-Set Portland Cement Mortar of Latex-Portland Cement Mortar'.
- d) A108.6, 'Installation of Tile with Chemical Resistant, Water Cleanable Tile-Setting and Grouting Epoxy'.
- e) A108.10, 'Installation of Grout in Tilework'.
- f) A108.17, 'Installation of Crack Isolation Membranes for Thin-Set Ceramic Tile and Dimension Stone'.

2) Material Specifications:

- a) A118.1, 'Dry-Set Portland Cement Mortar'.
- b) A118.3, 'Chemical Resistant, Water Cleanable Tile-Setting and -Grouting Epoxy and Water Cleanable Tile-Setting Epoxy Adhesive'.
- c) A118.4, 'Latex Portland Cement Mortar'.
- d) A118.6, 'Cement Grouts for Tile Installation'.
- e) A118.7, 'High-Performance Polymer Modified Latex/Portland Cement Grouts for Tile Installation'.
- f) A118.10, 'Load Bearing, Bonded, Waterproof Membranes for Thin-Set Ceramic Tile and Dimension Stone Installations'.
- g) A118.12, 'Crack Isolation Membranes for Thin-set Ceramic Tile and Dimension Stone Installations'.

- b. ANSI A137.1, 'National Standard Specifications for Ceramic Tile'.

2. ASTM International:

- a. ASTM A1064/A1064M-18a, 'Standard Specification for Carbon-Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete'.
- b. ASTM C144-18, 'Standard Specification for Aggregate for Masonry Mortar'.
- c. ASTM C150/C150M-18, 'Standard Specification for Portland Cement'.
- d. ASTM C206-14, 'Standard Specification for Finishing Hydrated Lime'.
- e. ASTM C207-18, 'Standard Specification for Hydrated Lime for Masonry Purposes'.
- f. ASTM C242-18, 'Standard Terminology of Ceramic Whitewares and Related Products'.
- g. ASTM C373-18, 'Standard Test Method for Water Absorption, Bulk Density, Apparent Porosity, and Apparent Specific Gravity of Fired Whiteware Products'.
- h. ASTM C482--02(2014), 'Standard Test Method for Bond Strength of Ceramic Tile to Portland Cement Paste'.
- i. ASTM C501-84(2015), 'Standard Test Method for Relative Resistance to Wear of Unglazed Ceramic Tile by the Taber Abraser'.



- j. ASTM C648-04(2014), 'Standard Test Method for Breaking Strength of Ceramic Tile'.
  - k. ASTM C847-18, 'Standard Specification for Metal Lath'.
3. International Organization for Standardization:
- a. ISO 13007-1-2014, ' Ceramic tiles - Grouts and adhesives - Part 1: Terms, definitions and specifications for adhesives'.
  - b. ISO 13007-2-2013, ' Ceramic tiles - Grouts and adhesives - Part 2: Test methods for adhesives'.
  - c. ISO 13007-3-2013, ' Ceramic tiles - Grouts and adhesives - Part 3: Terms, definitions and specifications for grouts'.
  - d. ISO 13007-4-2013, ' Ceramic tiles - Grouts and adhesives - Part 4: Test methods for grouts'.
4. Tile Council of North America:
- a. TCNA F115-15, 'On-Ground Concrete, Ceramic Tile, Epoxy or Furan Grout'.
  - b. TCNA W245-15, 'Wood or Metal Studs, Coated Glass Mat Water-Resistant Gypsum Backer Board, Ceramic Tile'.

### 1.3 ADMINISTRATIVE REQUIREMENTS

#### A. Pre-Installation Conference:

- 1. In addition to agenda items specified in Section 01 3100, review following:
  - a. Review installation scheduling, coordination with related work, and placement of tile.
  - b. Review Manufacturer's installation requirements, submittals, and Installers requirements to assure issuance of Manufacturer's system warranty.
  - c. Review surface preparation.
  - d. Review water-proofing and crack isolation membrane requirements.
  - e. Review tile base installation requirements.
  - f. Review floor tile grout thickness requirements.

### 1.4 SUBMITTALS

#### A. Action Submittals:

- 1. Samples:
  - a. **24 inch** square sample on specified tile backer showing all types of tile, grout, and colors specified in this Section.
  - b. One sample of each type of base tile and trim piece to be used on Project.

#### B. Informational Submittals:

- 1. Certificates:
  - a. Master grade certificate.
    - 1) Conform to ANSI A137.1.
- 2. Manufacturer's Instructions:
  - a. Provide instructions for installation of tile-setting materials.
- 3. Source Quality Control Submittals:
  - a. Provide Manufacturer documentation indicating proposed materials will satisfy requirements for Manufacturer's Warranty.
- 4. Qualification Statement. See Section 01 4301 for qualifications:

- a. Installer:
  - 1) Provide Qualification documentation if requested by Architect or Owner.
- C. Closeout Submittals:
  - 1. Include following in Operations And Maintenance Manual specified in Section 01 7800:
    - a. Operations and Maintenance Data:
      - 1) Cleaning and maintenance instructions.
    - b. Warranty Documentation:
      - 1) Include copy of final, executed warranty.
    - c. Record Documentation:
      - 1) Manufacturers Documentation:
        - a) Source Quality Control Submittal documentation showing materials will satisfy requirements for Manufacturer's Warranty.
        - b) Manufacturer's cut sheets of materials used in installed system.
        - c) Tile color and pattern selections.

## 1.5 QUALITY ASSURANCE

- A. Source Of Materials:
  - 1. Provide materials obtained from one (1) source for each type and color of tile, grout, and setting materials for Manufacture's system warranty.
- B. Qualifications:
  - 1. Installer: Requirements of Section 01 4301 applies, but not limited to following:
    - a. Minimum three (3) years' experience installing specified tile installations.
    - b. Minimum five (5) satisfactorily completed installations of comparable quality, scope, similar size, and complexity in past two (2) years before bidding.
    - c. Upon request, submit documentation.

## 1.6 DELIVERY, STORAGE, AND HANDLING

- A. Delivery And Acceptance Requirements:
  - 1. Deliver and store packaged materials in their original unopened containers with labels intact until time of use.
- B. Storage and Handling Requirements:
  - 1. Store and handle materials in a manner to prevent damage or contamination by water, freezing, or foreign matter.
  - 2. Keep grade seals intact and cartons dry until tile are used.

## 1.7 FIELD CONDITIONS

- A. Ambient Conditions:
  - 1. Do not apply tile setting materials to surfaces that contain frost.

2. Keep ambient temperatures of area to receive tile work and surface temperatures of substrates at **50 deg F** minimum during preparation of mortar bed, laying of tile, and for seventy-two (72) hours after completion of tile work. Use electric heat to prevent discoloration of grout.
3. Temperature of substrate shall be **60 deg F** and rising for application of epoxy and furan unless otherwise specifically authorized by Manufacturer.
4. Maintain epoxy at stable temperature between **60 deg F** and **90 deg F** during curing period.

## **PART 2 - PRODUCTS**

### **2.1 SYSTEMS**

- A. Category Two National Contract Suppliers. See Section 01 6200 for definitions of Categories:
    1. Contact following suppliers to procure components of tile assembly:
      - a. Daltile And Stone, Salt Lake City, UT:
        - 1) LDS Project Coordinators:
          - a) Russ Green and Larry McCleary, (801) 487-9901, cell (801) 301 1461, fax (801) 487-0345  
[larry.mccleary@daltile.com](mailto:larry.mccleary@daltile.com) - [www.daltileproducts.com](http://www.daltileproducts.com) or [www.daltilegreenworks.com](http://www.daltilegreenworks.com).
- B. Materials:
  1. Floor Tile:
    - a. Category Four Approved Products. See Section 01 6200 for definition of Categories:
      - 1) Haut Monde; glitterati granite square; matte; 12"x12" by Daltile.
  2. Cove Base:
    - a. Category four approved products. See section 01 6200 for definition of categories:
      - 1) Haut Monde; glitterati granite square; matte; 12"x12" by Daltile.
  3. Wall Tile:
    - a. Category Four Approved Products. See Section 01 6200 for definition of Categories:
      - 1) Color wheel; linear; arctic white; semi-gloss by Dal-Tile.
      - 2) Sizes: 4"x12", 4"x8", 2"x8", 4"x4".
  4. Mortar Bed:
    - a. Portland Cement: Meet requirements of ASTM C150/C150M, Type 1, designation shall appear on bag.
    - b. Hydrated Lime:
      - 1) Meet Requirements of one of following:
        - a) ASTM C206.
        - b) ASTM C207, Type S (designation shall appear on bag).

- c. Sand: Clean, washed, well-graded, meeting requirements of ASTM C144 with gradation of 100 percent passing No. 8 sieve with not over five (5) percent passing No. 100 sieve.
  - d. Latex Additive; in lieu of all water:
    - 1) Design Criteria:
      - a) Meet material specification requirements of ANSI A118.4 or ANSI 118.11.
      - b) Meet ANSI installation specification requirements of ANSI A108.5.
      - c) Expansion joints complies with TCA method EJ171.
    - 2) Type Two Acceptable Products:
      - a) ARDEX: Ardex E 90 Mortar Admix.
      - b) CUSTOM: Thin-Set Mortar Admix.
      - c) LATICRETE: 4237 Latex Additive with 211 Powder.
      - d) MAPEI: Planicrete AC.
      - e) MERKRETE: 150 Latex Admixture.
5. Metal Trim:
- a. Category Four Approved Products. See Section 01 6200 for definitions of Categories:
    - 1) Schluter trim styles and sizes as noted on drawings.
6. Joint Sealants:
- a. Interior Ceramic Tile Joints are furnished in Section 07 9213 and installed in Section 09 3013 'Ceramic Tiling' including the following:
    - 1) Ceramic and cove base inside corners.
7. Backer Board Joint Reinforcing: 2 inch wide glass fiber mesh tape.
8. Tile Setting Products:
- a. Use only products of same Manufacturer to validate warranty, unless otherwise acceptable to Ceramic Tile Supplier.
  - b. Latex-Portland Cement Mortar For Floors:
    - 1) Design Criteria:
      - a) Meet ANSI material specification requirements of ANSI 118.4, ANSI 118.11, or ANSI A118.15.
      - b) Meet ANSI installation specification requirements of ANSI A108.4 or ISO material specification ISO13007 installation material specification and . C2ES1P2 performance requirements for adhesive.
    - 2) Category Four Approved Products. See Section 01 62 00 for definitions of Categories:
      - a) ARDEX: Ardex X77.
      - b) CUSTOM: Megalite Crack Prevention Mortar or FlexBond Premium Crack Prevention Thin-set Mortar (no additives needed).
      - c) LATICRETE: 254 Platinum Thinset.
      - d) MAPEI: Ultraflex 3.
      - e) MERKRETE: 735 Premium Flex.
  - c. Latex/Polymer Modified Portland Cement Mortar For Walls:
    - 1) Design Criteria:

- a) Meet ANSI material specification requirements of ANSI 118.4, ANSI 118.11, or ANSI A118.15.
  - b) Meet ANSI installation specification requirements of ANSI A108.4 or ISO material specification ISO13007 installation material specification and C2ES1P2 performance requirements for adhesive.
- 2) Category Four Approved Products. See Section 01 6200 for definitions of Categories:
- a) ARDEX: Ardex X77.
  - b) CUSTOM: Megalite Thin-Set Mortar or FlexBond Fortified Thin-Set Mortar.
  - c) LATICRETE: 254 Platinum Thinset.
  - d) MAPEI: Ultraflex 3.
  - e) MERKRETE: 735 Premium Flex.
- d. Floor Grout (Epoxy):
- 1) Design Criteria:
- a) Meet ANSI material specification requirements of ANSI 118.3.
  - b) Meet ANSI installation specification requirements of ANSI A108.6 and ISO material specification ISO13007 RG.
- 2) Approved Color:
- a) To be selected by Architect.
- 3) Category Four Approved Products. See Section 01 6200 for definitions of Categories:
- a) ARDEX: Ardex WA.
  - b) CUSTOM: CEG-Lite 100% Solids Commercial Epoxy Grout.
  - c) LATICRETE: SpectraLOCK PRO.
  - d) MAPEI: Kerapoxy (sanded).
  - e) MERKRETE: Pro Epoxy.
- e. Wall Grout (Modified Polymer):
- 1) Design Criteria:
- a) Meet ANSI material specification requirements of ANSI A118.6 or ANSI A118.7.
  - b) Meet ANSI installation specification requirements of ANSI 108.10 or ISO material specification ISO13007 C2ES1P2.
- 2) Color:
- a) To be selected by Architect.
- 3) Category Four Approved Products. See Section 01 6200 for definitions of Categories:
- a) ARDEX: Ardex FH.
  - b) CUSTOM: PolyBlend Non-Sanded Grout or Prism Color Consistent Grout.
  - c) LATICRETE: 1600 Series Unsanded Dry Set Wall Grout with 1776 Grout Admix Plus additive.
  - d) MAPEI: Keracolor-U Unsanded Polymer-Modified Grout.
  - e) MERKRETE: Non-Sanded ColorGrout, latex modified.
- f. Waterproofing Membrane:
- 1) Design Criteria:

- a) Meet ANSI installation specification requirements of ANSI 108.10.
  - b) ANSI installation specification requirements not required.
- 2) Category Four Approved Products. See Section 01 6200 for definitions for Categories:
- a) Troweled applied, cement based:
    - (1) ARDEX: Ardex 8+9.
    - (2) MAPEI: Mapelastc 315.
  - b) Liquid applied, latex based:
    - (1) CUSTOM: RedGard Waterproofing or Crack Prevention Membrane or FractureFree Crack Prevention Membrane.
    - (2) LATICRETE: Hydro Ban.
    - (3) MAPEI: Mapelastc AquaDefense.
    - (4) MERKRETE: Hydro-Guard SP-1.
- g. Crack Isolation Membrane:
- 1) Design Criteria:
- a) Meet ANSI installation specification requirements of ANSI 118.12.
  - b) ANSI installation specification requirements not required.
- 2) Category Four Approved Products. See Section 01 6200 for definitions for Categories:
- a) Flexible, thin, load-bearing, fabric-reinforced:
    - (1) ARDEX: Ardex 8+9 with SK Mesh Tape.
    - (2) CUSTOM: Crack Buster Pro Crack Prevention Mat Underlayment, with Peel & Stick Primer.
    - (3) LATICRETE: Blue 92 Anti-Fracture Membrane.
    - (4) MAPEI: Mapeguard 2, and Primer SM.
    - (5) MERKRETE: Hydro-Guard SP-1.
  - b) Liquid applied, latex based:
    - (1) CUSTOM: RedGard Waterproofing and Crack Prevention Membrane or FractureFree Crack Prevention Membrane.
    - (2) LATICRETE: Hydro Ban.
    - (3) MAPEI: Mapelastc AquaDefense.
    - (4) MERKRETE: Fracture Guard 5000.
- h. Stone Thresholds:
- 1) Texture and color variation shall be within limits established by Architect's approved sample.
  - 2) Free of defects that would materially impair strength, durability, and appearance.
  - 3) Finish: 80 grit exterior hone.
  - 4) Black marble, one (1) piece, 7/8 inch thick by 2 1/2 inches by door opening width. Cross-section to meet handicap accessibility requirements.

C. Mixes:

1. Mortar Beds:

	Portland Cement	Dry Sand	Damp Sand	Hydrated Lime*
Floor Mix	One Part	5 Parts	4 Part	1/10 Part
Wall Mix	One Part	--	5-1/2 to 7 Parts	1/2 Part

\* Optional

### **PART 3 - EXECUTION:**

#### **3.1 INSTALLERS**

A. Acceptable Installers. See Section 01 4301:

1. Meet Quality Assurance Applicator Qualifications as specified in Part 1 of this specification.

#### **3.2 EXAMINATION**

A. Verification Of Conditions:

1. Examine substrates where tile will be installed for compliance with requirements for installation tolerances and other conditions effecting performance of installed tile.
2. Verify tile substrate is well cured, dry, clean, and free from oil or waxy films, and curing compounds.
3. Notify Architect in writing if surfaces are not acceptable to install tile:
  - a. Do not lay tile over unsuitable surface.
  - b. Commencing installation constitutes acceptance of surfaces and approval of existing conditions.

#### **3.3 PREPARATION**

A. Surface Preparation:

1. Allow concrete to cure for twenty-eight (28) days minimum before application of mortar bed.
2. Repair and clean substrate in accordance with installation standards and manufacturer's instructions.

#### **3.4 INSTALLATION**

A. Interface With Other Work:

1. Grounds, anchors, plugs, hangers, door frames, electrical, mechanical, and other work in or behind tile shall be installed before tile work is started.

B. Special Techniques:

1. Install in accordance with following latest TCNA installation methods:
  - a. Flush Concrete Slabs with crack isolation membrane: TCNA F115.
  - b. Framed Walls: TCNA W245 with waterproof membrane.
  - c. Tile Cove Base: TCNA Flush style.

C. Tolerances:

1. Plane of Vertical Surfaces:
  - a. **1/8 inch in 8 feet** from required plane shall be plumb and true with square corners.
2. Variation In Slab Grade:
  - a. Plus or minus **1/8 inch** in any **10 feet** of floor slab and distance between high point and low point of slab of **1/2 inch**.
  - b. Slab Testing Procedure:

- 1) Place ends of straightedge on **3/8 inch** high shims.
- 2) Floor is satisfactory if **1/4 inch** diameter steel rod rolled under straightedge will not touch anywhere along **10 foot** length and **1/2 inch** diameter steel rod will not fit under straightedge anywhere along **10 foot** length.

D. General:

1. Install tile in pattern indicated:
  - a. Align joints when adjoining tiles on floor, base, walls, and trim are same size.
  - b. Adjust to minimize tile cutting and to avoid tile less than half size.
  - c. Center and balance areas of tile if possible.
2. Extend tile into recesses and under equipment and fixtures to form a complete covering without interruption:
3. Maintain heights of tilework in full courses to nearest obtainable dimension where heights are given in **feet and inches (meters and millimeters)** and are not required to fill vertical spaces exactly.
4. Install cut tile with cuts on outer edges of field:
  - a. Provide straight cuts that align with adjacent materials.
  - b. When possible, smooth cut edges of tile or use appropriate cutter or wet saw to produce smooth cuts.
  - c. Do not install tile with jagged or flaked edges.
5. Terminate tile neatly at obstructions, edges, and corners, without disruption of pattern or joint alignment:
  - a. Fit tile closely where edges are to be covered by trim, escutcheons, or similar devices.
6. Provide straight tile joints of uniform width, subject to variance in tolerance allowed in tile size:
  - a. Make joints smooth and even, without voids, cracks, or excess mortar or grout.
7. Use a beating block and hammer or rubber mallet so faces and edges of individual tiles are flush and level with faces and edges of adjacent tiles, and to reduce lippage.
8. Accessories in tilework shall be evenly spaced, properly centered with tile joints, and level, plumb, and true to correct projection.
9. Leave finished installation clean and free of cracked, chipped, broken, unbonded, and otherwise defective tile work.

E. Application On Concrete Floor:

1. Clean substrate surface thoroughly.
  - a. Dampen if very dry, but do not saturate.
2. Install tile with 100 percent contact with mortar bed.
  - a. Obtaining 100 percent contact may require troweling mortar layer on back of each tile before placing on mortar bed.
3. Install base by flush method (square or thin-lip method is not acceptable):
  - a. Allow for expansion joint directly above any expansion or control joints in slab.
4. Insert temporary filler in expansion joints.

F. Application Of Mortar:

1. Do not spread more mortar than can be covered within ten (10) to fifteen (15) minutes:
  - a. If 'skinning' occurs, remove mortar and spread fresh material.



- b. Spread mortar with notches running in one (1) direction, perpendicular to pressing, pushing and pulling of tile during placement.
  2. Install tile before mortar has started initial cure:
    - a. For thin set mortar application, use notch trowel that will achieve the recommended coverage of mortar after tiles have been installed.
  3. Place tile in fresh mortar, press, push and pull tile slightly to achieve as near 100 percent coverage and contact of tile with setting material and substrate as possible:
    - a. Average contact area shall be not less than eighty (80) percent except on exterior or shower installations where contact area shall be ninety-five (95) percent when not less than three (3) tiles or tile assemblies are removed for inspection. The eighty (80) percent or ninety-five (95) percent coverage shall be sufficiently distributed to give full support of the tile.
    - b. Support corners and edges with mortar leaving no hollow corners or edges.
  4. Install so there is **1/8 inch** of mortar between tile and substrate after proper bedding:
    - a. Periodically remove sheets or individual tiles to assure proper bond coverage consistent with industry specifications.
    - b. If coverage is found to be insufficient, use a larger size notch trowel.
- G. Application Of Grout:
  1. Firmly set tile before applying grout:
    - a. This requires forty-eight (48) hours minimum.
  2. Before grouting:
    - a. Remove all paper and glue from face of mounted tile.
    - b. Remove spacers or ropes before applying grouting:
  3. Mixing Grout:
    - a. Use clean buckets and mixing tools:
      - 1) Use sufficient pressure and flow grout in progressively to avoid air pockets and voids.
    - b. Machine mixing of grout is preferred to assure uniform blend. To prevent trapping air bubbles into prepared grout, use slow speed mixer.
    - c. Slake for fifteen (15) minutes.
    - d. Water or latex additives used for mixing with dry grout shall be measured accurately.
  4. Before grouting entire area, do a test area to assure there will be no permanent staining or discoloration of tile and to verify that excess grout can be easily removed from tile surface:
    - a. If necessary, pre-coat exposed surfaces of tile with a grout release recommended by Grout Manufacturer to facilitate removal of excess grout.
  5. Installing Grout:
    - a. Use caution, when grouting glazed ceramic tiles to prevent scratching or damaging surface of tile.
    - b. Dampen dry joints prior to grouting with sand-portland cement grout, standard sanded cement grout, standard unsanded cement grout, polymer modified sanded tile grout, and polymer modified unsanded tile grout. Do not leave puddles of water in joints before grouting.

- c. Keep an adequate joint depth open for grouting. Force maximum amount of grout into joints.
- d. Apply grout to produce full, smooth grout joints of uniform width, and free of voids and gaps
  - 1) Fill joints of cushion edge tile to depth of cushion.
  - 2) Fill joints of square edge tile flush with surface.
  - 3) Fill joint between wall tile and bull-nosed paver tile base with floor grout.
- e. Install floor tile with grout thickness of **3/16 inch** maximum.
- f. Remove excess grout from surface of tile before it loses its plasticity or begins to set.
- g. Finished grout shall be uniform in color, smooth, and without voids, pin holes, or low spots.

H. Curing:

- 1. Keep installation at **65 to 85 deg F** during first eight (8) hours of cure. Shade area completely from sun during this period.

I. Application of Joint Sealants:

- 1. Apply joint sealants after grout has cured:
  - a. This requires forty-eight (48) hours minimum.
- 2. Before applying sealant:
  - a. Remove spacers or ropes before applying joint sealants.
  - b. Apply backer rod and joint sealants at expansion joints.

### 3.5 FIELD QUALITY CONTROL

A. Non-Conforming Work:

- 1. Correct any work found cracked, chipped, broken, unbounded and otherwise defective or not complying with contract document requirements at no additional cost to the Owner.

### 3.6 CLEANING

A. If one has been used, remove grout release and clean tile surfaces so they are free of grout residue and foreign matter:

- 1. If a grout haze or residue remains, use a suitable grout haze remover or cleaner.
- 2. Flush surface with clean water before and after cleaning.

### 3.7 PROTECTION

A. Close to traffic areas where tile is being set and other tile work being done:

- 1. Keep closed until tile is firmly set.
- 2. Before, during, and after grouting, keep area clean, dry, and free from foreign materials and airflow that will interfere with setting and curing of grout.

B. Newly tiled floors shall not be walked on nor worked on without using kneeling boards or equivalent protection of tiled surface.

C. After cleaning, provide protective covering and maintain conditions protecting tile work from damage and deterioration:

- 1. Where tiled surfaces will be subject to equipment or wheel traffic or heavy construction traffic, cover protective covering with **1/4 inch** hardboard, plywood, or similar material.

**END OF SECTION**

## SECTION 09 5113 - ACOUSTICAL PANEL CEILINGS

### PART 1 - GENERAL

#### 1.1 SUMMARY

A. Includes But Not Limited To:

1. Furnish and install acoustical ceiling panels for suspended acoustical ceilings as described in Contract Documents.

B. Related Requirements:

1. Section 09 5323: 'Metal Acoustical Suspension Assemblies'.
2. Section 26 5100: 'Interior Lighting' for light fixtures.
3. Division 23: Related sections for HVAC installed in ceiling.

#### 1.2 REFERENCES

A. Association Publications:

1. The Ceilings & Interior Systems Construction Association (CISCA), *Ceiling Systems Handbook*. 405 Illinois Avenue, 2B, St Charles IL. [www.cisca.org](http://www.cisca.org).
  - a. Recommendations for direct hung acoustical tile and lay-in panel ceilings.

B. Definitions:

1. Acoustical Panel: Form of a prefabricated sound absorbing ceiling element used with exposed suspension systems.
2. Absorption: Materials that have capacity to absorb sound. Absorption is the opposite of reflection.
3. Ceiling Attenuation Class (CAC): Rates ceiling's efficiency as barrier to airborne sound transmission between adjacent closed offices. Shown as minimum value, previously expressed as CSTC (Ceiling Sound Transmission Class). Single-figure rating derived from normalized ceiling attenuation values in accordance with classification ASTM E413, except that resultant rating shall be designated ceiling attenuation class. (Defined in ASTM E1414.) Acoustical unit with high CAC may have low NRC.
4. Center Line: Line indicating midpoint of surface in either direction. Used as guide in starting ceiling.
5. Class A: Fire classification for product with flame spread rating of no more than 25 and smoke developed rating not exceeding 50, when tested in accordance with ASTM E84 or UL 723.
6. Flame Spread: The propagation of flame over a surface.
7. Flame Spread Index: Comparative measure, expressed as a dimensionless number, derived from visual measurements of the spread of flame versus time for a material tested in accordance with ASTM E84 or UL 723.
8. Interior Finish: Interior finish includes interior wall and ceiling finish and interior floor finish.
9. Mineral Base: Ceilings composed principally of mineral materials such as fibers manufactured from rock or slab, with or without binders.
10. Noise Reduction Coefficient (NRC): Average sound absorption coefficient measured at four frequencies: 250, 500, 1,000 and 2,000 Hertz expressed to the nearest integral multiple of 0.05. Rates ability of ceiling or wall panel or other construction to absorb sound. NRC is fraction of sound energy, averaged over all angles of direction and from low to high sound frequencies that is absorbed and not reflected.
11. Reflection Factor: Percentage of light a surface reflects.
12. Reveal Edge: Acoustical lay-in panels with step-down edge are intended for use in direct hung exposed suspension systems.
13. Smoke-Developed Index: The numerical value assigned to a material tested in accordance with ASTM E84 or UL 723.
14. Sound Absorption: Property possessed by materials and objects, including air, of converting sound energy into heat energy. Sound wave reflected by surface always loses part of its energy. Fraction of energy that is not reflected is called

- sound absorption coefficient of reflecting surface. For instance, if material reflects 80 percent of sound energy, then sound absorption coefficient would be 20 percent (0.20).
15. Surface Burning Characteristic: Rating of interior and surface finish material providing indexes for flame spread and smoke developed, based on testing conducted according to ASTM Standard E84 or UL 723.
  16. Textured Pattern: Granular or raised (fine, coarse, or a blend), felted or matted surface as an integral part of the basic product or superimposed on the product surface.

C. Reference Standards:

1. American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc. (ASHRA):
  - a. ASHRAE Standard 62.1-2016, 'Ventilation for Acceptable Indoor Air Quality'.
2. ASTM International:
  - a. ASTM C423-17, 'Standard Test Method for Sound Absorption and Sound Absorption Coefficients by the Reverberation Room Method'.
  - b. ASTM D3273-16, 'Standard Test Method for Resistance to Growth of Mold on the Surface of Interior Coatings in an Environmental Chamber'.
  - c. ASTM E84-18b, 'Standard Test Method for Surface Burning Characteristics of Building Materials'.
  - d. ASTM E119-18c, 'Standard Test Methods for Fire Tests of Building Construction and Materials'.
  - e. ASTM E1111/E1111M-14, 'Standard Test Method for Measuring the Interzone Attenuation of Open Office Components'.
  - f. ASTM E1264-14, 'Standard Classification for Acoustical Ceiling Products'.
  - g. ASTM E1414/E1414M-16, 'Standard Test Method for Airborne Sound Attenuation Between Rooms Sharing a Common Ceiling Plenum'.
  - h. ASTM E1477 - 98a(2017), 'Standard Test Method for Luminous Reflectance Factor of Acoustical Materials by Use of Integrating-Sphere Reflectometers'.
3. International Building Code (IBC) (2018 or most recent edition adopted by AHJ):
  - a. Chapter 8, 'Interior Finishes':
    - 1) Section 803, 'Wall And Ceiling Finishes':
      - a) 803.1.1, 'Interior Wall and Ceiling Finish Materials'.
      - b) 803.1.2, 'Room Corner Test for Interior Wall or Ceiling Finish Materials'.
4. National Fire Protection Association:
  - a. NFPA 101: 'Life Safety Code' (2018 or most recent edition adopted by AHJ).
  - b. NFPA 265: 'Standard Methods of Fire Tests for Evaluating Room Fire Growth Contribution of Textile Coverings on Full Height Panels and Walls', (2015 or most recent edition adopted by AHJ).
5. Underwriters Laboratories Inc.:
  - a. UL 723: 'Standard for Safety Test for Surface Burning Characteristics of Building Materials'; (11th Edition - 2018).

### 1.3 SUBMITTALS

A. Action Submittals:

1. Produce Data: Technical data for each type of acoustical ceiling unit required.
2. Sample: Minimum 6 inch x 6 inch samples of specified acoustical panel.

- B. Informational Submittals:
  - 1. Certificates:
    - a. Manufacturer's certifications that products comply with specified requirements including laboratory reports showing compliance with specified tests and standards. For acoustical performance, each carton of material must carry approved independent laboratory classification of NRC, CAC, and AC.
  - 2. Test And Evaluation Reports:
    - a. If requested by Owner, provide copies of Quality Assurance requirements for 'Class A' flame spread rating and 'Room-Corner Test'.
- C. Closeout Submittals:
  - 1. Include following in Operations And Maintenance Manual specified in Section 01 7800:
    - a. Warranty Documentation:
      - 1) Final, executed copy of Warranty.
    - b. Record Documentation:
      - 1) Manufacturers Documentation:
        - a) Manufacturer's literature.
        - b) Color and pattern selection.
- D. Maintenance Material Submittals:
  - 1. Extra Stock Materials:
    - a. Provide Owner with one (1) carton of each type of tile for future use.
      - 1) Packaged with protective covering for storage and identified with appropriate labels.

#### 1.4 QUALITY ASSURANCE

- A. Regulatory Agency Sustainability Approvals:
  - 1. Fire-Test-Response Characteristics: As determined by testing identical ceiling tile applied with identical adhesives to substrates according to test method indicated below by qualified testing agency. Identify products with appropriate markings of applicable testing agency.
    - a. Surface-Burning Characteristics:
      - 1) Ceiling tile shall have Class A flame spread rating in accordance with ASTM E84 or UL 723 Type 1.
        - a) Class A (Flame spread index 0-25; Smoke-developed index 0-450).
        - b) Flash point: None.
  - 2. Passage of 'Room-Corner Test' as recognized by AHJ, is required for system. Adhesive cited in test literature is required for installation of ceiling tile on Project.
    - a. Room Corner Tests:

- 1) ASTM E84, 'Standard Test Method for Surface Burning Characteristics of Building Materials'.
- 2) IBC 803.2.1, 'Room Corner Test for Interior Wall or Ceiling Finish Materials'.
- 3) NFPA 265: 'Room Corner Test for Interior Wall or Ceiling Finish Materials'.
- 4) UL 723, 'Standard for Safety Test for Surface Burning Characteristics of Building Materials'.

## 1.5 DELIVERY, STORAGE, AND HANDLING

### A. Delivery and Acceptance Requirements:

1. Materials shall be delivered in original, unopened packages with labels intact.

### B. Storage And Handling Requirements:

1. Store materials where protected from moisture, direct sunlight, surface contamination, and damage.
2. Store in cool, dry location, out of direct sunlight and weather, and at temperatures between 32 deg F and 86 deg F.
3. Handle acoustical ceiling panels carefully to avoid chipping edges or damage. Use no soiled, scratched, or broken material in the Work.

## 1.6 FIELD CONDITIONS

### A. Ambient Conditions:

1. Building shall be enclosed, mechanical system operating with proper filters in place, and temperature and humidity conditions stabilized within limits under which Project will operate before, during, and after installation until Substantial Completion.
2. Installation shall be at temperatures between 32 deg F and 86 deg F or as per Manufacturer recommendations.

## 1.7 WARRANTY

### A. Manufacturer's Warranty:

1. Acoustical ceiling panels:
  - a. Manufacturer's warranty to be free from defects in materials and factory workmanship.
  - b. Manufacturer's warranty against sagging and warping.
  - c. Manufacturer's warranty against mold/mildew, and bacterial growth.

## PART 2 - PRODUCTS

### 2.1 MANUFACTURERS

#### A. Manufacturers Contact List:

1. Armstrong World Industries, Lancaster, PA [www.ceiling.com](http://www.ceiling.com).
  - a. Contact Information:
    - 1) For pricing and ordering of tile, contact Sherry Brunt / Phyllis Miller at (800) 442-4212, FAX 800-233-5598, or [bpo\\_strategic\\_accounts@armstrong.com](mailto:bpo_strategic_accounts@armstrong.com).
    - 2) For Strategic Account information, contact Randy Lay at (303) 775-1409 [ralay@armstrong.com](mailto:ralay@armstrong.com).

## 2.2 MATERIALS

### A. Acoustic Ceiling Panels:

- a. Description:
- b. Color: White (surface factory-applied).
- c. Composition: Wet-formed mineral fiber.

### 2. Design Criteria:

- a. Acoustics:
  - 1) Noise Reduction Coefficient (NRC): ASTM C423; 0.70 minimum.
  - 2) Ceiling Attenuation Class (CAC): ASTM E1414/E1414M; 35 minimum.
- b. Classification:
  - 1) Meet requirements of ASTM E1264, Type III (mineral base with painted finish), Form 1 (nodular) or Form 4 (cast or molded), Pattern E1 (lightly textured).
- c. Fire Performance: As specified in Quality Assurance in Part 1 of this specification.
- d. Light Reflectance (LR): ASTM E1477; 0.83 minimum.
- e. Sag Resistance: Resistance to sagging in high humidity conditions.
- f. VOC: Low.

### 3. Narrow Face Design:

- a. Category Four Product: See Section 01 6200 for definitions of Categories:
  - 1) Design Criteria:
    - a) Grid Face: 9/16 inch.
  - 2) Sizes: 24 inch x 24 inch x 3/4"; 24" x 48" x 3/4"; 6" x 3/4"
  - 3) Optima by Armstrong:
    - a) Grid System: Silhouette XL 9/16 inch Bolt Slot - 1/8 inch Reveal.
    - b) Edge profile: Tegular.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

#### A. Verification Of Conditions:

1. Inspect for defects in support that are not acceptable.
  - a. All wet work (concrete, painting, and etc.) must be completed and dry.
  - b. Temperature conditions within Manufacturer's written recommendation.
2. Notify Architect of unsuitable conditions in writing.

- a. Do not install acoustical ceiling panels until defects in support or environmental conditions are corrected.

### **3.2 PREPARATION**

- A. Materials shall be dry and clean at time of application.
- B. Measure each ceiling area and establish layout of acoustical units to balance border widths at opposite edges of each ceiling. Avoid use of less than half width units at borders and comply with reflected ceiling plans. Coordinate panel layout with mechanical and electrical fixtures.

### **3.3 INSTALLATION**

- A. Install acoustical panels in coordination with suspended system, with edges resting on flanges of main runner and cross tees. Cut and fit panels neatly against abutting surfaces. Support edges by wall moldings.
- B. Special Techniques:
  1. If recommended by Manufacturer, use tile one at a time from at least four (4) open boxes to avoid creating any pattern due to slight variations from box to box. Use tile from same color run in individual rooms to assure color match.
  2. Leave tile in true plane with straight, even joints.

### **3.4 FIELD QUALITY CONTROL**

- A. Non-Conforming Work:
  1. Remove and replace defective materials at no additional cost to Owner including, but not limited to following:
    - a. Remove and replace damaged or broken acoustical ceiling panels.
    - b. Remove and replace discolored acoustical ceiling panels to match adjacent.
    - c. Remove and replace work that cannot be successfully cleaned and repaired to permanently eliminate evidence of damage.

### **3.5 CLEANING**

- A. Clean exposed surfaces of acoustical ceiling panels, including trim, edge moldings, and suspension members.
  1. Comply with Manufacturer's written instructions for cleaning and touch up of minor finish damage.
- B. Waste Management:
  1. Remove from site all debris connected with work of this Section.

**END OF SECTION**



## SECTION 09 5323 - METAL ACOUSTICAL SUSPENSION ASSEMBLIES

### PART 1 - GENERAL

#### 1.1 SUMMARY

A. Includes But Not Limited To:

1. Furnish and install metal acoustical suspension system as described in Contract Documents including:
  - a. Suspension system framing.
  - b. Wire hangers, fasteners, main runners, cross tees, and wall angle moldings.

B. Related Requirements:

1. Section 09 5113: 'Acoustical Panel Ceiling'.
2. Section 26 5100: 'Interior Lighting' for electrical fixtures installed in ceiling.
3. Division 21: 'Fire Suppression' for sprinklers installed in ceiling.
4. Division 23: 'Mechanical' for related sections for HVAC installed in ceiling.
5. Division 26: 'Electrical' for related electrical work.
6. Division 27: 'Communications' for related sound and video work.

#### 1.2 REFERENCES

A. Association Publications:

1. The Ceilings & Interior Systems Construction Association (CISCA), 405 Illinois Avenue, 2B, St Charles IL. [www.cisca.org](http://www.cisca.org).
  - a. *'Ceiling Systems Handbook'*: Recommendations for direct hung acoustical tile and lay-in panel ceiling installation.
  - b. CISCA 0-2, *'Guidelines for Seismic Restraint for Direct-hung Suspended Ceiling Assemblies (zones 0-2)'* Covers Seismic Design Category C.
  - c. CISCA 3-4, *'Guidelines for Seismic Restraint for Direct-hung Suspended Ceiling Assemblies (zones 3-4)'* Covers Seismic Design Category D, E, and F.
  - d. *'Production Guide'*: Practical reference for ceiling systems and estimating costs.

B. Definitions:

1. Ceiling Suspension System: System of metal members, designed to support a suspended ceiling, typically acoustical ceiling. May also be designed to accommodate lighting fixtures or air diffusers.
2. Clips: Several clip designs are available to suit applications such as fire resistance, wind uplift and impact. Fire-resistance rated designs have exact requirements, including mandatory use of hold down clips for acoustical panels or tiles weighing less than 1 lb per sq ft. For rooms with significant air pressure differential from adjacent spaces, retention clips may be necessary to retain panels in place. Maintaining air pressure values may also require perimeter panel seals, typically closed cell foam gasket with adhesive on one side.
3. Compression Post (Vertical Strut, Seismic Struts): Rigid member used to provide lateral force bracing of suspension system.
4. Cross Runner, Cross Tee: Cross runner is secondary or cross beams of mechanical ceiling suspension system, usually supporting only acoustical tile. Cross tee is inserted into main runner to form different module sizes. In some suspension systems, however, cross runners also provide support for lighting fixtures, air diffusers and other cross runners.
5. Exposed Grid System: Structural suspension system for lay-in ceiling panels. Factory-painted supporting members are exposed to view. Exposed tee surfaces may be continuous or have integral reveal. Reveals are typically formed as channel or rail profiles extending down from tee leg.
6. Flange: Horizontal surface on face of tee, visible from below ceiling. Part of grid to which color cap is applied. Most grid system flanges are either 15/16 inch or 9/16 inch.

7. Hanger Wires: Wire employed to suspend acoustical ceiling from existing structure. Standard material is 12 gauge (0.105 inch -) galvanized, soft annealed steel wire, conforming to ASTM A641/A641M. Heavier gauge wire is available for higher load carrying installations, or situations where hanger wire spacing exceeds 4 feet on center. Seismic designs or exterior installations subject to wind uplift may require supplemental bracing or substantial hanger devices such as metal straps, rods or structural angles.
8. Heavy-Duty Systems: Primarily used for installations in which the quantities and weights of ceiling fixtures (lights, air diffusers, etc.) are greater than those for ordinary commercial structure.
9. Hold Down Clip: Mechanical fastener that snaps over bulb of grid system to hold ceiling panels in place.
10. Main Beam, Main Runner, Main Tee: Primary or main beams of type of ceiling suspension system in which structural members are mechanically locked together. Provide direct support for cross runners and may support lighting fixtures and air diffusers, as well as acoustical tile. Supported by hanger wires attached directly to existing structure; or installed perpendicular to carrying channels and supported by specially designed sheet metal or wire clips attached to carrying channels.
11. Splay Wires: Wires installed at angle rather than perpendicular to grid.
12. Stiffening Brace: Used to prevent uplift of grid caused by wind pressure in exterior applications.
13. Suspension System: Metal grid suspended from hanger rods or wires, consisting of main beams and cross tees, clips, splines and other hardware which supports lay-in acoustical panels or tiles. Completed ceiling forms barrier to sound, heat and fire. It also absorbs in-room sound and hides ductwork and wiring in plenum.
14. T-Bar: Any metal member of "T" cross section used in ceiling suspension systems.

C. Reference Standards:

1. American Society of Civil Engineers/Structural Engineering Institute:
  - a. ASCE/SEI 7-16, 'Minimum Design Loads for Buildings and Other Structures' (Section 9, 'Earthquake Loads).
2. ASTM International:
  - a. ASTM A568/A568M-17a, 'Standard Specification for Steel, Sheet, Carbon, Structural, and High-Strength, Low-Alloy, Hot-Rolled and Cold-Rolled, General Requirements for'.
  - b. ASTM A641/A641M-09a(2014), 'Standard Specification for Zinc-Coated (Galvanized) Carbon Steel Wire'.
  - c. ASTM B117-18, 'Standard Practice for Operating Salt Spray (Fog) Apparatus'.
  - d. ASTM C635/C635M-15, 'Standard Specification for the Manufacture, Performance, and Testing of Metal Suspension Systems for Acoustical Tile and Lay-in Panel Ceilings'.
  - e. ASTM C636/C636M-13, 'Standard Practice for Installation of Metal Ceiling Suspension Systems for Acoustical Tile and Lay-In Panels'.
  - f. ASTM D610-08(2019), 'Standard Practice for Evaluating Degree of Rusting on Painted Steel Surfaces'.
  - g. ASTM E580/E580M-17, 'Standard Practice for Installation of Ceiling Suspension Systems for Acoustical Tile and Lay-in Panels in Areas Subject to Earthquake Ground Motions'.
3. International Building Code (IBC) ((2018 or most recent edition adopted by AHJ):
  - a. IBC 808.1.1.1, 'Suspended Acoustical Ceilings'.
4. Underwriters Laboratories / American National Standards Institute:
  - a. UL 263: 'Standard for Fire Test of Building Construction and Materials' (14th Edition).
  - b. UL 723, 'Standard for Safety Test for Surface Burning Characteristics of Building Materials' (11th Edition).

### 1.3 ADMINISTRATIVE REQUIREMENTS

A. Coordination:

1. Coordinate layout of suspension system with other construction that penetrates ceilings or is supported by them, including light fixtures, HVAC equipment, and fire-suppression systems.

2. All work above ceiling should be completed prior to installing suspended system. There should be no materials resting against or wrapped around suspension system, hanger wires or ties.

#### 1.4 SUBMITTALS

##### A. Action Submittals:

1. Product Data:
  - a. Provide Manufacturer's technical literature on suspension system including listing dimensions, load carrying capacity and standard compliance.
2. Samples:
  - a. Minimum 8 inch long samples of exposed wall molding and suspension system, including main runner/tee and cross runner/tee with couplings.

##### B. Informational Submittals:

1. Certificates:
  - a. Manufacturer's certifications that products comply with specified requirements, including laboratory reports showing compliance with specified tests and standards.
  - b. Installer's certificates of training.
2. Manufacturer's Instructions:
  - a. Manufacturer's details and installation instructions for seismic bracing. If requested, provide copy of code requirements applicable to Project.

#### 1.5 QUALITY ASSURANCE

##### A. Regulatory Agency Sustainability Approvals:

1. All system components conform to ASTM standards.
2. Fire-Resistance Rating: UL approved metal suspension system.
3. Meet seismic bracing requirements of ASCE 7, ASTM C635/C635M and ASTM C636/C636M or equivalent governing standard for project site.
4. Seismic Standard: Acoustical ceilings shall be designed and installed to withstand the effects of earthquake motions according to the following:
  - a. Standard for Ceiling Suspension Systems Requiring Seismic Restraint: Comply with ASTM E580/E580M.
  - b. CISCA's Recommendations for Acoustical Ceilings: Comply with CISCA's *Recommendations for Direct-Hung Acoustical Tile and Lay-in Panel Ceilings-Seismic Zones 0-2* (Apply to Seismic Categories A & B).
  - c. CISCA's Guidelines for Systems Requiring Seismic Restraint: Comply with CISCA's *Guidelines for Seismic Restraint of Direct-Hung Suspended Ceiling Assemblies-Seismic Zones 3 & 4* (Apply to Seismic Categories C, D, E & F).

##### B. Qualifications. Requirements of Section 01 4301 applies, but not limited to following:

1. Installer:
  - a. Installer training (Ceiling Masters training course or equivalent).

2. Manufacturer:
  - a. Manufacturer in good standing of CISCA (Ceiling and Interior Systems Construction Association).

## 1.6 DELIVERY, STORAGE, AND HANDLING

- A. Delivery And Acceptance Requirements:
  1. Materials shall be delivered in original, unopened packages with labels intact.
- B. Storage And Handling Requirements:
  1. Materials shall be delivered in original, unopened packages with labels intact.
  2. Store material in fully enclosed space protected against damage from moisture, direct sunlight, surface contamination, and general damage.

## 1.7 WARRANTY

- A. Manufacturer Warranty:
  1. Suspension system: Manufacturer warranty including repair or replacement of rusting as defined by ASTM D610 and defects in material or factory workmanship.

## PART 2 - PRODUCTS

### 2.1 SYSTEM

- A. Manufacturers:
  1. Category Four Acceptable Manufacturers. See Section 01 6200 for definition of Categories:
    - a. Grid Face:9/16 inch.
      - 1) Armstrong World Industries, Lancaster, PA [www.ceilings.com](http://www.ceilings.com).
      - 2) USG Interiors Inc, Chicago, IL [www.usg.com](http://www.usg.com).
- B. Materials:
  1. Grid:
    - a. Systems shall meet requirements of ASTM C635/C635M, Heavy Duty suspension system required for Seismic Design Categories D, E, or F.
    - b. Exposed surfaces shall be finished with factory-applied white baked enamel.
    - c. Meet requirements of ASTM D610 for red rust.
    - d. Main runners and cross tees:
      - 1) All main beams and cross tees shall be commercial quality hot-dipped galvanized (galvanized steel, aluminum, or stainless steel) as per ASTM A653/A653M. Main beams and cross tees are double-web steel construction with type exposed flange design.
      - 2) Narrow-face design - main runners and cross tees shall have 9/16 inch exposed face in narrow revealed edge.

2. Performance Standards:
  - a. DXL Systems by USG Interiors required for Seismic Design Categories D, E, or F.
3. Wire Hangers, Braces, and Ties:
  - a. Zinc-Coated, carbon-steel wire meeting requirements of ASTM A641/A641M, Class 1 zinc coating, soft temper.
  - b. Size:
    - 1) Standard size: 12 gauge (0.105 inch galvanized, soft annealed steel wire).
    - 2) Select wire diameter so its stress is less than yield when loaded at three (3) times hanger design load (ASTM C635/C635M), Table 1, 'Direct Hung') will be less than yield stress of wire but provide not less than 12 gauge (0.105 inch).
  - c. Protect with rust inhibitive paint.
4. Wall Molding: Channel section of cold-rolled electro-galvanized steel.
5. Edge Moldings and Trim: Metal or extruded aluminum of types and profiles indicated or, if not indicated, manufacturer's standard moldings for edges and penetrations, including light fixtures, that fit type of edge detail and suspension system indicated. Provide moldings with exposed flange of same width as exposed runner.
6. Hold-down Clips: As required by UL to prevent lifting of panels under unusual draft conditions.
7. Seismic Joint Clip:
  - a. Required for Seismic Design Categories D, E, or F.
  - b. Quality Standard Product:
    - 1) SJCG by Armstrong World Industries, Lancaster, PA [www.armstrong.com](http://www.armstrong.com).
    - 2) Equal as approved by Architect before bidding. See Section 01 6200.
8. Seismic Suspension System:
  - a. Required for Seismic Design Categories A, B, C, D, E, or F:
  - b. Design Criteria:
    - 1) Installation of ceiling system must be as prescribed by ICC-ES Evaluation Reports ESR-1222 or ESR-1308 and applicable code.
    - 2) Meet requirements of ASTM A568/A568M for hot-dipped galvanized, cold-rolled steel.
    - 3) Attach cross runners to wall with seismic clips.
  - c. Wall Molding Size: 7/8 inch for all seismic design categories (code approved).
  - d. Category Four Acceptable Products. See Section 01 6200 for definition of Categories.
    - 1) ACM7 Clip by USG Inc, Chicago, IL [www.usg.com](http://www.usg.com).
    - 2) BERC-2 Clip by Armstrong World Industries, Lancaster, PA [www.ceilings.com](http://www.ceilings.com).
9. Compression Posts/Struts:
  - a. Required for Seismic Design Categories D, E, or F.
  - b. Meet seismic requirements for Project.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

#### A. Verification Of Conditions:

1. Inspect area receiving suspension system to identify conditions which will adversely affect installation.
  - a. Work trades work to be thoroughly dry and complete prior to installation.
  - b. Verify weather tightness of area to receive suspension system prior to installation.
2. Notify Architect of unsuitable conditions in writing.
  - a. Do not install ceiling panels until adverse conditions have been remedied.

### 3.2 INSTALLATION

#### A. Interface With Other Work:

1. All work above ceiling should be completed prior to installing suspended ceiling system including related work including drywall furring work, acoustical tile, light fixtures, mechanical systems, electrical systems, and sprinklers.

#### B. General:

1. Install suspension system and panels in accordance with Manufacturer's written instructions, and in compliance with ASTM C636/C636M, and with authorities having jurisdiction (AHJ).

#### C. Lay out suspension system symmetrically about center lines of room unless shown otherwise by Contract Drawings. Lay out system so use of tiles less than 1/2 size is minimized.

#### D. Suspend main runner/tee from overhead construction with hanger wires spaced 4 feet on center along length of main runner/tee. Install hanger wires plumb and straight. Hanger wires shall not be installed in convenience holes.

#### E. Maintain suspension system in true plane with straight, even joints.

#### F. Suspension system joints shall be straight and in alignment, and exposed surface flush and level. Wherever system abuts walls, columns, and other vertical surfaces, furnish and install appropriate molding.

#### G. Install wall moldings at intersection of suspended ceiling and vertical surfaces. Miter corners where wall moldings intersect or install corner caps.

#### H. Support edges with wall moldings.

#### I. Locate light fixtures, speakers, and mechanical diffusers and grilles symmetrically in room insofar as possible (unless shown otherwise). Locate fixtures, speakers, diffusers, and grilles within suspension grid spaces and centered at least one (1) direction within grid. Installed fixtures shall not compromise ceiling performance.

#### J. Pay attention to required hanger wire placement and fixture protection. Individual component deflection not to exceed 1/360 of span.

#### K. Nails installed vertically into bottom of structural members, which are subject to pullout, shall not be used to support metal acoustical suspended assemblies:

1. Nails may be used when installed horizontally into sides of structural members.

2. Embedment must be at least 5/8 inch.
- L. Screws, eyebolts or lag bolts used to support metal acoustical suspended assemblies must have minimum embedment of 5/8 inch when installed into structural members.

### **3.3 FIELD QUALITY CONTROL**

A. Field Inspections:

1. Inspect:

- a. Suspended ceiling system.
- b. Hangers, anchors and fasteners.

B. Non-Conforming Work:

1. Correct any work found defective or not complying with contract document requirements at no additional cost to Owner.

**END OF SECTION**

## 09 5426 – WOOD GRILLE CEILING PANELS

### PART 1 - GENERAL

#### 1.1 SUMMARY

- A. Section includes:
  - 1. Concealed suspension system for Wood Grille ceiling panels.
  - 2. Wood Grille ceiling panels for concealed suspension system.
  - 3. Trim and accessories.
  - 4. Seismic restraints for suspended ceiling system.

#### 1.2 RELATED WORK IN OTHER SECTIONS:

- A. Division 1 – “General Conditions” for substitution requests, submittals, etc.
- B. Division 9 – “Acoustic Ceilings.”
- C. Division 15 – “Mechanical” for work to be coordinated with ceiling.
- D. Division 16 – “Electrical” for light fixture coordination.

#### 1.3 REFERENCES

- A. ASTM A 641: Standard Specification for Zinc Coated (Galvanized) Carbon Steel Wire; 1992.
- B. ASTM C 423: Standard Test Method for Sound Absorption and Sound Absorption Coefficients by the Reverberation Room Method; 1990.
- C. ASTM C 635: Standard Specifications for Metal Suspension Systems for Acoustical Tile and Lay-In Panel Ceilings.
- D. ASTM C 636: Standard Practice for Installation of Metal Ceiling Suspension Systems for Acoustical Tile and Lay-in Panels; 1992.
- E. ASTM E 84: Standard Test Method for Surface Burning Characteristics of Building Materials; 1991.
- F. ASTM E 580: Standard Practice for Application of Ceiling Suspension Systems for Acoustical Tile and Lay-in Panels in Areas Requiring Seismic Restraint; 1991.
- G. AWI (QSI): Architectural Woodwork Quality Standards Illustrated; 2003.
- H. CISCA: Ceiling Systems Handbook.

#### 1.4 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Manufacturers other than those listed in Paragraph 2.1 are required to submit for approval prior to bidding per Section One.



- B. Installer Qualifications: Engage an experienced Installer, approved by wood ceiling manufacturer, who has completed panel ceilings similar in species, design, and extent to that indicated for this Project and with a record of successful in-service performance.
- C. Inspection: All work must pass inspection and approval of architect, as well as the local codes and regulations or authorities having jurisdiction.
- D. Single-Source Responsibility for Wood Ceiling System: Obtain each type of Wood Grille ceiling panels from a single fabricator, with in-house Shop Drawing capabilities, in-house assembly and finishing capabilities, and with resources to provide products of consistent quality in appearance and physical properties without delaying the project.
- E. Single-Source Responsibility for Suspension System: Obtain each type of suspension system from a single source with resources to provide products of consistent quality in appearance and physical properties without delaying project.
- F. Pre-Installation Conference: Conduct conference at Project site to comply with requirements of Division 1 Section "Project Meetings."

## **1.5 SUBMITTALS**

- A. General: Submit each item in this Section according to the Conditions of the Contract and Division 1 Specification Sections.
- B. Product Data: For each type of product specified.
- C. Samples: For verification of each type of exposed finish required, prepared on samples of size indicated below. Where finishes involve normal color and texture variations, include sample sets showing the range of variations expected.
  - 1. 12" x 12" samples of each panel type, pattern, and color.

## **1.6 SHOP DRAWINGS & COORDINATION WITH OTHER TRADES**

- A. Shop Drawings: Provide Shop Drawings/Coordination Drawings for all ceilings, which should include RCP and product details. Coordinate Wood Grille ceiling panels layout and installation of wood panels and suspension system components with other construction elements that penetrates ceilings or is supported by them, including light fixtures, HVAC equipment, fire-suppression system components, partition assemblies and all perimeter conditions.

## **1.7 PROJECT CONDITIONS**

- A. Space Enclosure and Environmental Limitations: Do not install wood panel ceilings until spaces are enclosed and weatherproof, wet-work in spaces is completed and dry, work above ceilings is complete, and ambient temperature and humidity conditions are being maintained at the levels indicated for Project when occupied for its intended use.

## **1.8 DELIVERY, STORAGE, AND HANDLING**

- A. Delivery & Unloading: Coordinate crate sizes, weights, unloading options, and delivery schedule with manufacturer prior to fabrication. Deliver wood panels and suspension system components to Project site in original, unopened packages and store them in a fully enclosed space where they will be protected against damage from moisture, direct sunlight, surface contamination, and other mistreatment.
- B. Acclimatization: Before installing wood panels, permit them to reach room temperature and a stabilized moisture content (at least 72 hours) per AWI standards.

- C. Handling: Handle Wood Grille ceiling panels carefully to avoid chipping edges or damaging units in any way.
- D. Protection:
  - 1. Personnel: Follow good safety and industrial hygiene practices during handling and installing of all products and systems, with personnel to take necessary precautions and wear appropriate protective equipment as needed. Read related literature for important information on products before installation. Contractor to be solely responsible for all personal safety issues during and subsequent to installation; architect, specifier, owner, and manufacturer will rely on contractor's performance in such regard.
  - 2. Existing completed work: Protect completed work above suspension system from damage during installation of suspension system components.

## **PART 2 - PRODUCTS**

### **2.1 WOOD GRILLE CEILING PANELS AND SUSPENSION SYSTEM**

- A. General: The following manufacturer is basis of design:
  - 1. Ceiling Systems Inc. ([www.csi-wood.com](http://www.csi-wood.com))
- B. Or equal, as prior approved by architect.

### **2.2 WOOD GRILLE CEILING PANELS**

- A. Basis of Design: Ceiling Systems Inc. Wood Plank Panel
  - 1. Product Number: G-75-250-5
    - a. Species: Maple.
    - b. Member Size: 3/4" x 2 1/2".
    - c. Members/LF: 5 Members/LF
    - d. Assembly Style: Cross Piece Backer
    - e. Panel Sizes: 2' x 8' (Nom)
    - f. Stain Finish: Natural with Clear Finish
    - g. Paint Finish: Color to be selected by Architect.
    - h. Reveal Scrim: Black Reveal Scrim

### **2.3 METAL SUSPENSION SYSTEMS, GENERAL**

- A. Metal T-Grid Suspension System: Provide standard interior Heavy Duty 15/16" Suspension system using Main Runners, Cross-tees, Wall Angle or Shadow Moldings of types, structural classifications, and black finishes indicated and that comply with applicable ASTM C 635 requirements. Comply with all applicable seismic codes and ordinances.
- B. Attachment Devices: Size for 3 times the design load indicated in ASTM C 635, Table 1, Direct Hung unless otherwise indicated.
- C. Wire, Braces, Ties, Hanger Rods, Flat Hangers and Angle Hangers: Provide wires, rods and hangers that comply with applicable ASTM specifications.

## **PART 3 - EXECUTION**

### **3.1 EXAMINATION**

- A. General: Examine substrates and structural framing to which ceilings attach or abut, with installer present, for compliance with requirements specified in this and other sections that affect ceiling installation and anchorage. Do not proceed with installation until unsatisfactory conditions have been corrected.

### **3.2 PREPARATION**

- A. Coordination: Furnish layouts for cast-in-place anchors, clips, and other ceiling anchors whose installation is specified in other Sections.
- B. Layout: Measure each ceiling area and establish the layout of Wood Grille Panel to balance border widths at opposite edges of each ceiling. Avoid using less-than-half-width panels at borders, and conform to the layout shown on reflected ceiling plans in accordance with Shop Drawings approved or provided by Ceiling System Inc.

### **3.3 INSTALLATION**

- A. General: Install CSI Wood Grille Panels to comply with manufacturer's guidelines.
- B. Attachments: Suspend ceiling hangers from building's structural members per manufacturer's instructions and in compliance with all local codes and regulations.
- C. Installation of Metal Suspension Grid: Install, align, brace, tie-off, mount, handle interferences, and space suspension T-Grid in accordance with suspension manufacturer's instructions and in compliance with all local codes and regulations.
- D. Install CSI Wood Grille Panels in accordance with manufacturer's installation instructions and in compliance with all local codes and regulations. Install with undamaged edges and fitted accurately to suspension system runners and edge moldings. Scribe and cut panels at borders and penetrations to provide a neat, precise fit, as required.
- E. Suspension Runners: Install suspension system runners so they are square and securely interlocked with one another. Install number and use on-center spacing per wood ceiling manufacturer's instructions, as indicated on approved Shop Drawings and in compliance with all local codes.

### **3.4 CLEANING**

- A. General: Clean exposed wood surfaces of CSI Wood Grille Panels. Comply with manufacturer's instructions for cleaning and touchup of minor finish damage.

**END OF SECTION 09 5426**

## SECTION 09 6513 - RESILIENT BASE AND ACCESSORIES

### PART 1 - GENERAL

#### 1.1 SUMMARY

A. Section Includes But Not Limited To:

1. Coordination, sequencing, and scheduling of owner-furnished Resilient Base as described in Contract Documents.

B. Related Requirements

1. Section 01 1200: 'Multiple Contract Summary' for resilient base excluded from Contract and furnished and installed by Owner. This Section establishes quality of materials and installation for information of Contractor, Architect, and Owner's Representatives.

#### 1.2 REFERENCES

A. Definitions:

1. Flame Spread: Propagation of flame over a surface.
2. Flame Spread Index: The numerical value assigned to a material tested in accordance with ASTM E84 or UL 723.
3. Resilient Wall Base Classification:
  - a. Type:
    - 1) TS: Rubber, vulcanized thermoset.
    - 2) TP: Rubber, thermoplastic.
    - 3) TV: Vinyl, thermoplastic.
  - b. Group:
    - 1) Group 1: Solid (homogeneous).
    - 2) Group 2: Layered (multiple layers).
  - c. Styles:
    - 1) Style A: Straight.
    - 2) Style B: Cove.
    - 3) Style C: Butt-to.
4. Smoke-Developed Index: The numerical value assigned to a material tested in accordance with ASTM E84 or UL 723.

B. Reference Standards:

1. ASTM International:
  - a. ASTM E84-18b, 'Standard Test Method for Surface Burning Characteristics of Building Materials'.
  - b. ASTM F1861-16, 'Standard Specification for Resilient Wall Base'.
2. Underwriters Laboratories, Inc.:
  - a. UL 723: 'Standard for Safety Test for Surface Burning Characteristics of Building Materials'; (2010 - Tenth Edition).

### 1.3 ADMINISTRATIVE REQUIREMENTS

#### A. Coordination:

1. Coordinate completion of resilient base and accessories installation with other trades.

#### B. Pre-Installation Conference:

1. Participate in pre-installation conference as specified in Section 09 0503 and held jointly with Section 09 6813 and Section 09 6816 pre-installation conference.

### 1.4 SUBMITTALS

#### A. Action Submittals:

##### 1. Product Data:

- a. Manufacturer's literature or cut sheet on base and adhesive.
- b. Color selection.

### 1.5 QUALITY ASSURANCE

#### A. Regulatory Agency Sustainability Approvals:

##### 1. Fire-Test-Response Characteristics:

###### a. Surface-Burning Characteristics:

- 1) Base shall have Class B flame spread rating in accordance with ASTM E84 or UL 723.

### 1.6 DELIVERY, STORAGE, AND HANDLING

#### A. Delivery And Acceptance Requirements:

1. Materials shall be delivered in original, unopened packages with labels intact.

#### B. Storage And Handling Requirements:

1. Store materials in dry space protected from weather at not less than 55 deg F or more than 85 deg F or as per Manufacturer's recommendation.
2. Materials from containers which have been distorted, damaged or opened prior to installation will be rejected.

### 1.7 FIELD CONDITIONS

#### A. Ambient Conditions:

1. Store materials at not less than 70 deg F for at least twenty four (24) hours before installation.
2. Do not apply in temperatures below 70 deg F.

## PART 2 - PRODUCTS

### 2.1 OWNER-FURNISHED PRODUCTS

#### A. Materials:

##### 1. Wall Base:

##### a. General:

##### 1) Size:

- a) Minimum body thickness: 1/8 inch by 4 inch.
- b) Length: not less than normal.

##### 2) Corners:

- a) Use preformed, molded external corners for outside corners.
- b) Butt joint interior corners.
- c) Corners must meet same height and thickness requirements as wall base.

##### b. Design Criteria:

- 1) Meet requirements of ASTM F1861, Type TP or TS, Group 1 (solid), Style B (cove).
- 2) Free from objectionable odors, blisters, cracks, and other defects affecting appearance or serviceability of rubber, and not containing fabric.
- 3) Style: Cove.

##### c. Colors:

- 1) Color pigments used shall be highly fade-resistant, insoluble in water, and resistant to light, alkali, and cleaning agents.
- 2) Colors as selected by Architect from Manufacturer's standard colors.

##### d. Category Four Approved Products. See Section 01 6200 for definitions of Categories:

- 1) Rubber Wall Base by Johnsonite/Tarkett.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

#### A. Verification Of Conditions:

- 1. Inspect surfaces for conditions not suitable for installation. Surface to receive specified items shall be sound, clean, free from foreign matter, tightly nailed, and dry.
- 2. Notify Architect of unsuitable conditions in writing:
  - a. Do not start work until defects are corrected.
- 3. Commencement of Work by installer is considered acceptance of substrate.

### 3.2 PREPARATION

#### A. Surface Preparation:

1. Remedy cracks and minor irregularities in substrate in accordance with Manufacturer's recommendations.

### 3.3 INSTALLATION

#### A. Base:

1. Install in manner to produce smooth, even finished surfaces tightly jointed and accurately aligned.
2. Fit specified items tightly. Use fillers where necessary. Fit neatly against projections, piping, electrical service outlets, etc.
3. Secure specified items with specified adhesive. Cement substantially to vertical surfaces including rubber base to cabinet work base.
4. Line up top and bottom lines of base throughout.
5. Do not stretch base during installation.
6. Roll until firm bond has been established. Leave level, free from buckles, cracks, and projecting edges.
7. In wall runs longer than 12 inches, install no lengths of base shorter than 12 inches long.

### 3.4 FIELD QUALITY CONTROL

#### A. Non-Conforming Work:

1. Replace damaged materials at no additional cost to Owner.
2. Damaged materials are defined as having cuts, gouges, scrapes or tears, and not fully adhered.

### 3.5 CLEANING

#### A. General:

1. Base:
  - a. Clean all exposed surfaces of base of adhesive spatter before it sets in accordance with Manufacturer's cleaning instructions.
  - b. Damp-mop surfaces to remove marks and soil.
2. Adjacent Work:
  - a. Clean all exposed surfaces of adjoining areas of adhesive spatter before it sets.

### 3.6 PROTECTION

#### A. Base:

1. Cover material until Substantial Completion.
2. Keep traffic away until adhesive has set.

END OF SECTION





2. Section 01 3100: 'Project Management and Coordination' for pre-installation conference.
3. Section 03 3111: 'Cast-In-Place Structural Concrete' for provision of acceptable concrete substrate.
4. Section 09 0503: 'Flooring Substrate Preparation' for:
  - a. Floor substrate preparation.
  - b. Pre-installation conference for Sections under 09 6000 heading 'Flooring'.
5. Section 09 6513: 'Resilient Base And Accessories' for resilient base installed at Carpeting.

## 1.2 REFERENCES

### A. Association Publications:

1. The Carpet and Rug Institute Inc. (CRI), Dalton, GA [www.carpet-rug.org](http://www.carpet-rug.org):
  - a. CRI Indoor Air Quality (IAQ):
    - 1) CRI Green Label Plus Certification.

### B. Reference Standards:

1. The Carpet and Rug Institute (CRI):
  - a. CRI 104, 'Standard For Installation of Commercial Carpet' (Sept 2015).
  - b. CRI TM-102, 'School Carpet Minimum Average Specifications'.

## 1.3 ADMINISTRATIVE REQUIREMENTS

### A. Coordination:

1. Coordinate completion of flooring installation with other trades.

### B. Pre-Installation Conference:

1. Participate in MANDATORY pre-installation conference as specified in Section 09 0503 and held jointly with Section 09 6816 pre-installation conference.
2. Schedule pre-installation conference after Concrete Moisture testing and before installation of flooring system.
3. Conference may be held at project site or another convenient site. Participants may also attend by video or audio conference if approved by Project Manager.
4. Schedule conference after substrate preparation and ONE (1) week before installation of flooring system.
5. In addition to agenda items specified in Section 01 3100 and Section 09 0503, review following:
  - a. Review Owner's Representative schedule for furnishing and installation carpet.
  - b. Review Flooring Manufacturer's installation conditions verification procedure and requirements.
  - c. Review Building Ambient Conditions including normal levels of humidity, lighting, heating, and air conditioning for acceptability for beginning floor preparation and carpet installation.
  - d. Review cleaning and disposal requirements.
  - e. Review protection requirements of carpet after installation of carpeting.

### C. Scheduling:

1. Notify Flooring Installer when Building Ambient Conditions requirements are met before installation of flooring system.
2. Notify Owner's Representative to coordinate installation of carpet.

## 1.4 SUBMITTALS

### A. Closeout Submittals:

1. Include following in Operations And Maintenance Manual specified in Section 01 7800:
  - a. Warranty Documentation:
    - 1) Copy of Warranty.
  - b. Record Documentation:
    - 1) Owner will provide Project Carpet Request Documentation forms in both hard copy and digital format:
      - a) Carpet Request Information Sheet.
      - b) Carpet Vendor Quotation.
      - c) Carpet Pre-installation Meeting Agenda.
      - d) Carpet Installation Notice to Proceed or Cancel.
      - e) Carpet Inspection and Completion.
      - f) Carpet Overage Report and Completion.
      - g) Carpet Quotation Change Request.

### B. Maintenance Material Submittals:

1. Extra Stock Materials:
  - a. Leave carpet tiles equivalent to 15 percent of number installed as attic stock.
  - b. Tie securely and wrap in protective cover.

## 1.5 QUALITY ASSURANCE

### A. Regulatory Agency Sustainability Approvals:

1. All products provided will meet requirements of all federal, state, and local codes having jurisdiction.
2. Label meeting Federal Labeling Requirements, as stated in Textile Products Identification Act under Federal Trade Commission, shall be attached to certification samples and products delivered.

### B. Qualifications: Section 01 4301 applies, but is not limited to following:

1. Carpet Manufacturer Qualifications:
  - a. Not less than five (5) years of production experience, whose published literature clearly indicates general compliance of products with requirements of this section.
  - b. Category One Approved Carpet Manufacturers:
    - 1) Approval subject to agreement process approval.

## 1.6 DELIVERY, STORAGE, AND HANDLING

### A. Delivery And Acceptance Requirements:

1. Deliver materials and accessories necessary for completion of carpet installation to site before beginning installation of carpet.
2. Do not deliver materials before date scheduled for installation.

B. Storage And Handling Requirements:

1. Store carpet and related materials in a climate-controlled, dry space.
2. Protect carpet from soil, dust, moisture and other contaminants.

## 1.7 FIELD CONDITIONS

A. Ambient Conditions:

1. Building Conditions:

- a. Conditions inside building shall be brought to levels to be normal at occupancy of building. Conditions include normal levels of humidity, lighting, heating, and air conditioning.
  - 1) Carpet installation is not to begin until HVAC system is operational and following conditions are maintained for at least forty-eight (48) hours before, during and seventy-two (72) hours after completion:
    - a) Carpet is to be installed when indoor temperature is between 65° - 95° F with maximum relative humidity of 65%.
    - b) Substrate surface temperature should not be less than 65° F at time of installation.
    - c) Do not allow temperature of indoor carpeted areas to fall below 50° F, regardless of age of installation.
  - 2) Maintain fresh air ventilation after installation for seventy-two (72) hours minimum or until lingering odors are gone.

2. Concrete Slab:

a. General:

- 1) Do not install carpet over concrete slabs until slabs have cured and are sufficiently dry to bond with adhesive.

## 1.8 WARRANTY

A. Manufacturer Warranty:

1. Provide Carpet Manufacturer's standard Warranty which includes following:

- a. Warranty shall cover defects in installation, workmanship, and installation materials.
- b. Warranty includes specific workmanship warranties for delamination, edge raveling, fuzzing, pilling, and other textural changes which can be controlled through proper manufacturing (no fraying, zippering, delamination, edge raveling, fuzzing, pilling in carpet is acceptable for any reason).
- c. Warranty terms will include inspection of defective area within fifteen (15) days of receipt of written notice from Owner and completion of corrective work within forty-five (45) days, unless other arrangements are made in writing with Owner on case-by-case basis.
- d. If carpet defect or installation defect continues to appear after two (2) separate notices for correction from Owner, replace carpet where defects have occurred.
- e. If Carpet Manufacturer follows installation requirements of Section 09 0503 'Floor Substrate Preparation' Carpet Manufacture accepts liability of carpet installation for said given time as outlined in Special Warranty regardless of any climate or condition changes affecting RH levels of floor substrate.

2. Special Warranty:

a. Modular Carpeting:

- 1) General:
  - a) Appearance Retention to be provided with Special Warranty requirements if not already included in Standard Warranty.
- 2) S&I:
  - a) Owner Carpet Program Product: Provide fifteen (15) year minimum or Carpet Manufacturer's better Warranty on carpet system.

## **PART 2 - PRODUCTS**

### **2.1 OWNER-FURNISHED PRODUCTS**

A. Category One Approved Manufacturers. See Section 01 6200 for definitions of Categories:

1. Tarkett/Tandus Centiva, Dalton, GA [www.tandus-centiva.com](http://www.tandus-centiva.com).
  - a. Contact Information: Tracy Riddle - cell (801) 580-5147 fax (866) 861-7522 Tracy.Riddle@Tarkett.com.

### **2.2 CARPET F01:**

A. Products: Subject to compliance with requirements, provide the following:

1. Tarkett, Mentor.
  - a. Color: Be True
  - b. Pattern: See Drawings.

### **2.3 CARPET F02:**

A. Products: Subject to compliance with requirements, provide the following:

1. Tarkett, Mentor.
  - a. Color: Be Honest.
  - b. Pattern: See Drawings.

### **2.4 CARPET F03:**

A. Products: Subject to compliance with requirements, provide the following:

1. Tarkett, Visual Path.
  - a. Color: Be True.
  - b. Pattern: See Drawings.

### **2.5 CARPET F04:**

A. Products: Subject to compliance with requirements, provide the following:

1. Tarkett, Visual Path.
  - a. Color: Be Honest.
  - b. Pattern: See Drawings.

## 2.6 WALK - OFF CARPET F05:

- A. Products: Subject to compliance with requirements, provide the following:
  1. Tarkett, Abrasive action.
    - a. Color: Winter Gray.
    - b. Pattern: See Drawings.

## 2.7 INSTALLATION ACCESSORIES

- A. Trowelable Leveling and Patching Compounds: Latex-modified, hydraulic-cement-based formulation provided or recommended by carpet tile manufacturer.
- B. Metal Edge/Translation Strips: See Drawings for metal edge strip details and specification.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Verification Of Conditions:
  1. Verify required ambient conditions inside building for required normal levels of humidity, lighting, heating, and air conditioning have been maintained for at least forty-eight (48) hours before and during carpet installation and seventy-two (72) after installation of carpet.
- B. Evaluation And Assessment:
  1. Concrete Slab:
    - a. Variation In Grade: Plus or minus 1/8 inch in any 10 foot of floor slab and distance between high point and low point of slab of 1/2 inch.
    - b. Testing Procedure: Place ends of straightedge on 3/8 inch high shims. Floor is satisfactory if 1/4 inch diameter steel rod rolled under straightedge will not touch anywhere along 10 foot length and 1/2 inch diameter steel rod will not fit under straightedge anywhere along 10 foot length.
    - c. Notify Project Manager in writing if floor surface is not acceptable to install carpet. Do not lay carpet over unsuitable surface. Commencing installation constitutes acceptance of floor and approval of existing conditions.

### 3.2 PREPARATION

- A. Flooring Preparation:
  1. Prepare floor substrate in accordance with Carpet And Rug Institute (CRI) best practices to receive carpet installation and to provide installation that meets Carpet Manufacturer's warranty requirements:

- a. Concrete floor slab patching:
    - 1) Cracks, chips and joints must be properly patched or repaired.
  - b. Concrete surface cured, clean, dry, and free of foreign substances that will compromise carpet and/or other flooring installations.
    - 1) Removal of curing compounds.
    - 2) Remove paint, sealer, grease, oil, silicone sealants, and other materials incompatible with flooring adhesives.
    - 3) Removal of overspray from painted walls (essential so glue will stick).
2. Vacuum and damp mop floor areas to receive flooring before flooring installation.

B. Carpet Accessories:

1. Sundry items, such as adhesives, shall be conditioned to building ambient conditions before use.

### 3.3 INSTALLATION

A. Carpet:

1. General:
  - a. Install carpet in accordance with CRI Carpet Installation Standard and manufacturer's written instructions supplied with product.
  - b. Install carpet under edge of metal thresholds where possible. Use specified carpet accessories at exposed edges.

### 3.4 FIELD QUALITY CONTROL

A. Field Tests:

1. See Section 09 0503.02-FM 'Flooring Substrate Preparation' for Field Testing for Alkalinity and Concrete Moisture of concrete slab.

B. Field Inspections:

1. Unacceptable carpet after installation shall include but not be limited to:
  - a. Delaminating carpet from backings.
  - b. Fiber loss less than specified.
  - c. Edge raveling.
  - d. Fuzzing of carpet fibers.
  - e. Pilling of carpet fibers.
  - f. Appearance retention less than control samples attached to Agreement.
  - g. Dye bleeding.
  - h. Zippering fibers in carpet.
  - i. Color streaking.
  - j. Irregular tufts of fiber.
2. Unacceptable workmanship shall include but not be limited to:
  - a. Improper floor preparation before installation.
  - b. Failure of adhesive to completely adhere carpet to floor resulting in bubbles, ridges, or ripples where carpet has separated from floor.

- c. Failure to properly install carpet next to walls and door frames to eliminate gaps or puckering of carpet.
- d. Use of unspecified carpet.
- e. Carpet base ends not finished to terminate at door frames or vertical trim shall have 45 degree angle 'birdsmouth' finish.
- f. Adhesive exposed on carpet and on other surfaces of building.

C. Non-Conforming Work:

- 1. Basis of Acceptable Carpeting: Source Quality Control Testing:
  - a. Carpet products not meeting Design Criteria and Source Quality Control Testing of this specification will be considered unacceptable carpeting.
- 2. Unacceptable Carpeting:
  - a. Unacceptable carpeting will be rejected and shall be repaired or replaced at no additional cost to Owner. Owner's Representative will determine reasonable location of acceptable transition points for removal of unacceptable carpet.

### 3.5 CLEANING

A. General:

- 1. Carpet Installer's Responsibility:
  - a. Clean all exposed surfaces of adjoining areas of adhesive spatter before it sets.
  - b. Carpeting:
    - 1) Remove any soiling and/or staining from carpet.
    - 2) Remove excessive adhesive with manufacturer recommended adhesive removers.

B. Damage to building:

- 1. Carpeting:
  - a. Carpet Installer's Responsibility:
    - 1) Clean and repair of all damaged surfaces to their original condition from carpet installation.

C. Waste Management:

- 1. Carpet Installer's Responsibility:
  - a. All work areas are to be kept clean, clear and free of debris at all times.
  - b. Provide adequate waste receptacles and dispose of materials including all rubbish, wrapping paper, scraps, and trimmings from building and property in approved manner as specified in Section 01 7400 unless pre-arrangements have been made with Owner and estimated costs are included on estimate and Purchase Order (PO).

### 3.6 PROTECTION

A. Protection of Carpeting:

- 1. Owner Representative's Responsibility:
  - a. No traffic of any kind on newly installed carpet for minimum of twenty-four (24) hours after installation is completed.



- b. No wheeled traffic of any kind placement of furniture or equipment on carpet for minimum of forty-eight (48) hours after completion of carpet installation.
- c. Protect carpet from abuse, vandalism, or damage occurring after installation is complete.
- d. Protect carpet adequately from soil, dust, moisture and other contaminants after carpet installation.

**END OF SECTION**



# SECTION 09 9001 - COMMON PAINTING AND COATING REQUIREMENTS

## PART 1 - GENERAL

### 1.1 SUMMARY

- A. Includes But Not Limited To:
  - 1. Common procedures and requirements for field-applied painting and coating.
- B. Related Requirements:
  - 1. Section 05 0503: 'Shop-Applied Metal Coatings' for quality of shop priming of steel and iron.
  - 2. Section 07 9213: 'Elastomeric Joint Sealants' for quality of Elastomeric Joint Sealants.
  - 3. Sections under 09 9000 heading 'Paints and Coatings'.
    - a. Pre-Installation conferences held jointly with Section 09 9001.
  - 4. Divisions 22 and 23: Painting of plumbing and HVAC identification, refrigerant line insulation, and duct interiors.
  - 5. Section 32 1723: 'Pavement Marking'.

### 1.2 REFERENCES

- A. Definitions:
  - 1. Damage Caused By Others: Damage caused by individuals other than those under direct control of Painting Applicator (MPI(a), PDCA P1.92).
  - 2. Gloss Levels:
    - a. Specified paint gloss level shall be defined as sheen rating of applied paint, in accordance with following terms and values, unless specified otherwise for a specific paint system.

Gloss Level '1'	Traditional matte finish - flat	0 to 5 units at 60 degrees to 10 units maximum at 85 degrees.
Gloss Level '2'	High side sheen flat -'velvet-like' finish	10 units maximum at 60 degrees and 10 to 35 units at 85 degrees.
Gloss Level '3'	Traditional 'eggshell-like finish	10 to 25 units at 60 degrees and 10 to 35 units at 85 degrees.
Gloss Level '4'	'Satin-like' finish	20 to 35 units at 60 degrees and 35 units minimum at 85 degrees.
Gloss Level '5'	Traditional semi-gloss	35 to 70 units at 60 degrees.
Gloss Level '6'	Traditional gloss	70 to 85 units at 60 degrees.
Gloss Level "7'	High gloss	More than 85 units at 60 degrees.

- 3. Properly Painted Surface:
  - a. Surface that is uniform in appearance, color, and sheen and free of foreign material, lumps, skins, runs, sags, holidays, misses, strike-through, and insufficient coverage. Surface free of drips, spatters, spills, and overspray caused by Paint Applicator. Compliance will be determined when viewed without magnification at a distance of 5 feet minimum under normal lighting conditions and from normal viewing position (MPI(a), PDCA P1.92).

4. Latent Damage: Damage or conditions beyond control of Painting Applicator caused by conditions not apparent at time of initial painting or coating work.

B. Reference Standards:

1. The latest edition of the following reference standard shall govern all painting work:
  - a. MPI(a), 'Architectural Painting Specification Manual' by Master Painters Institute (MPI), as issued by local MPI Accredited Quality Assurance Association having jurisdiction.

### 1.3 ADMINISTRATIVE REQUIREMENTS

A. Pre-Installation Conferences:

1. Schedule painting pre-installation conference after delivery of paint or coatings and before or at same time as application of field samples.
  - a. Coordinate pre-installation conferences of all related painting and coating Sections under 09 9000 heading 'Paints and Coatings'.
  - b. Schedule conference before preparation of control samples as specified in Sections under 09 9000 heading 'Paints and Coatings'.
  - c. Conference to be held at same time as Section 09 2900 to review gypsum board finish preparation.
2. In addition to agenda items specified in Section 01 3100, review following:
  - a. Review Quality Assurance for Approval requirements.
  - b. Review Quality Assurance Field Sample requirements.
  - c. Review Submittal requirements for compliance for MPI Approved Products.
  - d. Review Design Criteria requirements.
  - e. Review Cleaning requirements.
  - f. Review painting schedule.
  - g. Review safety issues.
3. Review additional agenda items from Sections under 09 9000 heading 'Paints and Coatings'.

### 1.4 SUBMITTALS

A. Action Submittals:

1. Product Data:
  - a. Include following information for each painting product, arranged in same order as in Project Manual.
    - 1) Manufacturer's cut sheet for each product indicating ingredients and percentages by weight and by volume, environmental restrictions for application, and film thicknesses and spread rates.
    - 2) Provide one (1) copy of 'MPI Approved Products List' showing compliance for each MPI product specified.
      - a) MPI Information is available from MPI Approved Products List using the following link:  
<http://www.paintinfo.com/mpi/approved/index.shtml>.
    - 3) Confirmation of colors selected and that each area to be painted or coated has color selected for it.
2. Samples: Provide two 4 inch by 6 inch minimum draw-down cards for each paint or coating color selected for this Project.

- B. Informational Submittals:
  - 1. Manufacturer Instructions:
    - a. Manufacturer's substrate preparation instructions and application instruction for each painting system used on Project.
  - 2. Qualification Statement:
    - a. Applicator:
      - 1) Provide Qualification documentation if requested by Architect or Owner.
- C. Closeout Submittals:
  - 1. Include following in Operations And Maintenance Manual specified in Section 01 7800:
    - a. Record Documentation:
      - 1) Manufacturer's documentation:
        - a) Manufacturer's cut sheet for each component of each system.
        - b) Schedule showing rooms and surfaces where each system was used.

## 1.5 QUALITY ASSURANCE

- A. Regulatory Agency Sustainability Approval:
  - 1. Conform to work place safety regulations and requirements of those authorities having jurisdiction for storage, mixing, application and disposal of all paint and related hazardous materials.
  - 2. Paint and painting materials shall be free of lead and mercury, and have VOC levels acceptable to local jurisdiction.
  - 3. Master Painters Institute (MPI) Standards:
    - a. Products: Comply with MPI standards indicated and listed in 'MPI Approved Products List'.
    - b. Preparation and Workmanship: Comply with requirements in 'MPI Architectural Painting Specification Manual' for products and coatings indicated.
- B. Qualifications:
  - 1. Applicator: Requirements of Section 01 4301 applies, but not limited to following:
    - a. Minimum five (5) years experience in painting installations.
    - b. Minimum five (5) satisfactorily completed projects of comparable quality, similar size, and complexity in past three (3) years before bidding.
    - c. Maintain qualified crew of painters throughout duration of the Work.
    - d. Upon request, submit documentation.
- C. Field Samples:
  - 1. Before application of any paint system, meet on Project site with Architect, Owner's representative, and Manufacturer's representative. Architect may select one (1) surface for application of each paint system specified. This process will include establishing acceptable substrate conditions required for Project before application of paints and coatings.
  - 2. Apply paint systems to surfaces indicated by Architect following procedures outlined in Contract Documents and Product Data submission specified above.
  - 3. After approval of samples, proceed with application of paint system throughout Project. Approved samples will serve as standard of acceptability.

## 1.6 DELIVERY, STORAGE, AND HANDLING

### A. Delivery And Acceptance Requirements:

1. Deliver specified products in sealed, original containers with Manufacturer's original labels intact on each container.
2. Deliver amount of materials necessary to meet Project requirements in single shipment.

### B. Storage And Handling Requirements:

1. Store materials in single place.
2. Keep storage area clean and rectify any damage to area at completion of work of this Section.
3. Maintain storage area at 55 deg F minimum.

## 1.7 FIELD CONDITIONS

### A. Ambient Conditions:

1. Perform painting operations at temperature and humidity conditions recommended by Manufacturer for each operation and for each product for both interior and exterior work.
2. Apply painting systems at lighting level of 540 Lux (50 foot candles) minimum on surfaces to be painted.
  - a. Inspection of painting work shall take place under same lighting conditions as application.
  - b. If painting and coating work is applied under temporary lighting, deficiencies discovered upon installation of permanent lighting will be considered latent damage as defined in MPI Manual, PDCA P1-92.

## PART 2 - PRODUCTS

### 2.1 SYSTEMS

#### A. Performance:

1. Design Criteria:
  - a. Provide materials for use within each coating system that are compatible with one another and substrates indicated, under conditions of service and application as demonstrated by manufacturer, based on testing and field experience.
  - b. All materials, preparation and workmanship shall conform to requirements of 'Architectural Painting Specification Manual' by Master Painters Institute (MPI).
  - c. All paint manufacturers and products used shall be as listed under Approved Product List section of MPI Painting Manual.
  - d. Provide Premium Grade systems (2 top coats) as defined in MPI Architectural Painting Specification Manual, except as otherwise indicated.
  - e. Where specified paint system does not have Premium Grade, provide Budget Grade.
  - f. Provide products of same manufacturer for each coat in coating system.
  - g. Where required to meet LEED (Leadership in Energy and Environmental Design) program requirements, use only MPI listed materials having an "L" rating designation.
- 1) Color Level III:
  - a) Number and placement of interior and exterior paint colors and gloss levels shall be Color Level III from MPI Manual, PDCA P3-93 as modified in following paragraph.
  - b) Several paint colors or gloss levels will be selected for same substrate within designated interior rooms or exterior areas.

B. Materials:

1. Materials used for any painting system shall be from single manufacturer unless approved otherwise in writing by painting system manufacturers and by Architect. Include manufacturer approvals in Product Data submittal.
2. Linseed oil, shellac, turpentine, and other painting materials shall be pure, be compatible with other coating materials, bear identifying labels on containers, and be of highest quality of an approved manufacturer listed in MPI manuals. Tinting color shall be best grade of type recommended by Manufacturer of paint or stain used on Project.

## **PART 3 - EXECUTION**

### **3.1 APPLICATORS**

A. Acceptable Applicators. See Section 01 4301:

1. Meet Quality Assurance Applicator Qualifications as specified in Part 1 of this specification.

### **3.2 EXAMINATION**

A. Verification Of Conditions:

1. Directing applicator to begin painting and coating work will indicate that substrates to receive painting and coating materials have been previously inspected as part of work of other Sections and are complete and ready for application of painting and coating systems as specified in those Sections.

B. Pre-Installation Testing:

1. Before beginning work of this Section, examine, and test surfaces to be painted or coated for adhesion of painting and coating systems.
2. Report in writing to Architect of conditions that will adversely affect adhesion of painting and coating work.
3. Do not apply painting and coating systems until party responsible for adverse condition has corrected adverse condition.

C. Evaluation And Assessment:

1. Report defects in substrates that become apparent after application of primer or first finish coat to Architect in writing and do not proceed with further work on defective substrate until such defects are corrected by party responsible for defect.

### **3.3 PREPARATION**

A. Protection Of In-Place Conditions:

1. Protect other finish work and adjacent materials during painting. Do not splatter, drip, or paint surfaces not intended to be painted. These items will not be spelled out in detail but pay special attention to the following:
  - a. Do not paint finish copper, bronze, chromium plate, nickel, stainless steel, anodized aluminum, or monel metal except as explicitly specified.
  - b. Keep cones of ceiling speakers completely free of paint.

B. Surface Preparation:

1. Prepare surfaces in accordance with MPI requirements and requirements of Manufacturer for each painting system specified, unless instructed differently in Contract Documents. Bring conflicts to attention of Architect in writing.
2. Fill minor holes and cracks in wood surfaces to receive paint or stain.

3. Surfaces to be painted shall be clean and free of loose dirt. Clean and dust surfaces before painting or finishing.
4. Do no exterior painting while surface is damp, unless recommended by Manufacturer, nor during rainy or frosty weather. Interior surfaces shall be dry before painting. Moisture content of materials to be painted shall be within tolerances acceptable to Paint Manufacturer.
5. Sand woodwork smooth in direction of grain leaving no sanding marks. Clean surfaces before proceeding with stain or first coat application.

### 3.4 APPLICATION

- A. Interface With Other Work:
  1. Coordinate with other trades for materials and systems that require painting before installation.
  2. Schedule painting and coating work to begin when work upon which painting and coating work is dependent has been completed. Schedule installation of pre-finished and non-painted items, which are to be installed on painted surfaces, after application of final finishes.
- B. Paint or finish complete all surfaces to be painted or coated as described in Contract Documents, including but not limited to following items.
  1. Finish casework and wood trims that are specified to be installed under Section 06 2001 and that are not called out to be factory-or shop-finished. Back prime wood elements to be installed against concrete or masonry or that may be subjected to moisture.
  2. Paint mechanical, electrical, and audio/visual items that require field painting as indicated in Contract Documents. These include but are not limited to:
    - a. Gas pipe from gas meter into building.
  3. Paint inside of chases in occupied spaces flat black for **18 inches** or beyond sightline, whichever is greater.
- C. Apply sealant in gaps **3/16 inch** and smaller between two substrates that are both to be painted or coated. Sealants in other gaps furnished and installed under Section 07 9213.
- D. On wood to receive a transparent finish, putty nail holes in wood after application of stain using natural colored type to match wood stain color. Bring putty flush with adjoining surfaces.
- E. In multiple coat paint work, tint each succeeding coat with slightly lighter color, but approximating shade of final coat, so it is possible to check application of specified number of coats. Tint final coat to required color.
- F. Spread materials smoothly and evenly. Apply coats to not less than wet and dry film thicknesses and at spreading rates for specified products as recommended by Manufacturer.
- G. Touch up suction spots after application of first finish coat.
- H. Paint shall be thoroughly dry and surfaces clean before applying succeeding coats.
- I. Use fine sandpaper between coats as necessary to produce even, smooth surfaces.
- J. Make edges of paint adjoining other materials or colors clean, sharp, and without overlapping.
- K. Finished work shall be a 'Properly Painted Surface' as defined in this Section.



### 3.5 FIELD QUALITY CONTROL

#### A. Non-Conforming Work:

1. Correct deficiencies in workmanship as required to leave surfaces in conformance with 'Properly Painted Surface,' as defined in this Section.
2. Correction of 'Latent Damage' and 'Damage Caused By Others,' as defined in this Section, is not included in work of this Section.

### 3.6 CLEANING

#### A. General:

1. As work proceeds and upon completion of work of any painting Section, remove paint spots from floors, walls, glass, or other surfaces and leave work clean, orderly, and in acceptable condition.

#### B. Waste Management:

1. Remove rags and waste used in painting operations from building each night. Take every precaution to avoid danger of fire.
2. Paint, stain and wood preservative finishes and related materials (thinners, solvents, caulking, empty paint cans, cleaning rags, etc.) shall be disposed of subject to regulations of applicable authorities having jurisdiction.
3. Remove debris caused by work of paint Sections from premises and properly dispose.
4. Retain cleaning water and filter out and properly dispose of sediments.

**END OF SECTION**

# SECTION 09 9113 - EXTERIOR PAINTED GALVANIZED METAL

## PART 1 - GENERAL

### 1.1 SUMMARY

- A. Includes But Not Limited To:
  - 1. Preparing and painting new exterior exposed galvanized metal surfaces as Described in Contract Documents.
- B. Related Requirements:
  - 1. Section 09 9001: 'Common Painting And Coating Requirements':
    - a. Pre-installation conference for Sections under 09 9000 heading 'Paints and Coatings'.
  - 2. Section 09 9600: 'High Performance Coatings' for exposed exterior structural steel.

### 1.2 ADMINISTRATIVE REQUIREMENTS

- A. Pre-Installation Conferences:
  - 1. Participate in pre-installation conference as specified in Section 09 9001.

## PART 2 - PRODUCTS

### 2.1 SYSTEM

- A. Manufacturers:
  - 1. Category Four Approved Products and Manufacturers. See Section 01 6200 for definitions of Categories.
    - a. Products listed in edition of MPI Approved Product List current at time of bidding and later are approved, providing they meet VOC requirements in force where Project is located.
- B. Description:
  - 1. Miscellaneous Steel Fabrications:
    - a. New Surfaces: Use MPI(a) EXT 5.3H Latex Finish system.
- C. Performance:
  - 1. Design Criteria:
    - a. New Surfaces: MPI Premium Grade finish requirements.
    - b. Gloss / Sheen Level Required: Gloss Level 5.
- D. Materials:
  - 1. Latex:

- a. Waterborne Primer Coat: MPI Product 134: 'Primer, Galvanized, Water Based'.
- b. Finish Coats: MPI Product 11: 'Latex, Exterior Semi-Gloss (MPI Gloss Level 5)'.

### **PART 3 - EXECUTION**

#### **3.1 APPLICATION**

- A. General: See appropriate paragraphs of Section 09 9001.
- B. New Surfaces:
  - 1. Clean 'passivated' or 'stabilized' galvanized steel as specified in SSPC-SP1.
  - 2. After removal of 'passivated' or 'stabilized' coating or for surfaces without coating, clean surfaces to be painted with mineral spirits or product recommended by Paint Manufacturer. Change to clean rags or wiping cloths regularly to reduce possibility of re-contamination of surface.
  - 3. Apply prime coat.
  - 4. Apply finish coats.

**END OF SECTION**

## SECTION 09 9123 - INTERIOR PAINTED GYPSUM BOARD, PLASTER

### PART 1 - GENERAL

#### 1.1 SUMMARY

- A. Includes But Not Limited To:
  - 1. Preparing, priming, and finish painting new interior gypsum board and plaster surfaces as described in Contract Documents.
- B. Related Requirements:
  - 1. Section 09 2900: 'Gypsum Board' for:
    - a. Priming new interior gypsum board surfaces to receive sheet wall covering system or texturing.
    - b. Pre-installation conference.
  - 2. Section 09 9001: 'Common Painting And Coating Requirements':
    - a. Pre-installation conference for Sections under 09 9000 heading 'Paints and Coatings'.

#### 1.2 ADMINISTRATIVE REQUIREMENTS

- A. Pre-Installation Conferences:
  - 1. Participate in pre-installation conference as specified in Section 09 2900.
    - a. In addition to agenda items specified in Section 01 3100 and Section 09 2900, review following:
      - 1) Review finish level requirements of gypsum wallboard as specified in Section 09 2900.
  - 2. Participate in pre-installation conference as specified in Section 09 9001.

### PART 2 - PRODUCTS

#### 2.1 SYSTEM

- A. Manufacturers:
  - 1. Category Four Approved Manufacturers and Products. See Section 01 6200 for definitions of Categories.
    - a. Products listed in edition of MPI Approved Product List current at time of bidding and later are approved, providing they meet VOC requirements in force where Project is located.
- B. Description:
  - 1. Rest Rooms And Custodial Rooms:
    - a. New Surfaces: Use MPI(a) INT 9.2F Waterborne Epoxy Finish system.

2. All Other:
  - a. New Surfaces: Use MPI(a) INT 9.2B Latex Finish system.

C. Performance:

1. Design Criteria:
  - a. New Surfaces: MPI Premium Grade finish requirements.
  - b. Gloss / Sheen Required:
    - 1) Rest Rooms And Custodial Rooms: See 09 0000 'Finish Schedule'.
    - 2) Remaining Painted Surfaces: See 09 0000 'Finish Schedule'.

D. Materials:

1. Primers:
  - a. MPI Product 50, 'Primer Sealer, Latex, Interior'.
2. Finish Coats:
  - a. Rest Rooms And Custodial Rooms:
    - 1) Buildings with only Gypsum Board surfaces in rooms:
      - a) MPI Product 115, 'Epoxy-Modified Latex, Interior'.
  - b. Remaining Painted Surfaces:
    - 1) MPI Product 141, 'Latex, Interior, High Performance Architectural'.

## **PART 3 - EXECUTION**

### **3.1 APPLICATION**

- A. General: See appropriate paragraphs of Section 09 9001.
- B. New Surfaces:
  1. Primer: Apply primer to be covered with other paint coats with roller only, or with spray gun and back-rolled.

**END OF SECTION**

## SECTION 09 9124 - INTERIOR PAINTED METAL

### PART 1 - GENERAL

#### 1.1 SUMMARY

- A. Includes But Not Limited To:
  - 1. Preparing and painting new interior metal surfaces as described in Contract Documents.
- B. Related Requirements:
  - 1. Section 05 5871: 'Metal Brackets'.
  - 2. Section 09 9001: 'Common Painting And Coating Requirements':
    - a. Pre-installation conference for Sections under 09 9000 heading 'Paints and Coatings'.
  - 3. Section 23 0553: 'I. D. For HVAC Piping And Equipment' for field painting requirements of HVAC piping and equipment.

#### 1.2 ADMINISTRATIVE REQUIREMENTS

- A. Pre-Installation Conferences:
  - 1. Participate in pre-installation conference as specified in Section 09 9001.
- B. Sequencing:
  - 1. Paint brackets furnished under Section 05 5871 before installation of bracket.

### PART 2 - PRODUCTS

#### 2.1 SYSTEM

- A. Manufacturers:
  - 1. Category Four Approved Products and Manufacturers. See Section 01 6200 for definitions of Categories.
    - a. Products listed in edition of MPI Approved Product List current at time of bidding and later are approved, providing they meet VOC requirements in force where Project is located.
- B. Description:
  - 1. Ferrous Metal:
    - a. New Surfaces: Use MPI(a) INT 5.1B Waterborne Light Industrial Finish system.
  - 2. Galvanized Metal:
    - a. New Surfaces: Use MPI(a) INT 5.3J Latex Finish system

C. Performance:

1. Design Requirements:

- a. New Surfaces: MPI Premium Grade finish requirements.
- b. Gloss / Sheen Level Required: See 09 0000 'Finish Schedule'.

D. Materials:

1. Primers:

- a. Ferrous Metal: MPI Product 107, 'Primer, Rust-Inhibitive, Water Based'.
- b. Galvanized Metal: MPI Product 134: 'Primer, Galvanized, Water Based'.

2. Finish Coats: MPI Product 153: 'Light Industrial Coating, Interior, Water Based'.

### **PART 3 - EXECUTION**

#### **3.1 APPLICATION**

A. General:

- 1. See appropriate paragraphs of Section 09 9001.
- 2. Systems specified are in addition to prime coats furnished under other Sections.

B. New Surfaces: Remove rust spots by sanding and immediately spot prime. If all traces of rust cannot be removed, apply rust blocker recommended by Paint Manufacturer before applying full primer coat.

**END OF SECTION**

## SECTION 09 9125 - INTERIOR PAINTED WOOD

### PART 1 - GENERAL

#### 1.1 SUMMARY

- A. Includes But Not Limited To:
  - 1. Preparing and painting new woodwork and wood floors not requiring transparent finish, as described in Contract Documents.
- B. Related Requirements:
  - 1. Section 09 9001: 'Common Painting And Coating Requirements':
    - a. Pre-installation conference for Sections under 09 9000 heading 'Paints and Coatings'.

#### 1.2 ADMINISTRATIVE REQUIREMENTS

- A. Pre-Installation Conferences:
  - 1. Participate in pre-installation conference as specified in Section 09 9001.

### PART 2 - PRODUCTS

#### 2.1 SYSTEM

- A. Manufacturers:
  - 1. Category Four Approved Products and Manufacturers. See Section 01 6200 for definitions of Categories:
    - a. Products listed in edition of MPI Approved Product List current at time of bidding and later are approved, providing they meet VOC requirements in force where Project is located.
- B. Description:
  - 1. Systems:
    - a. Floors:
      - 1) New Surfaces: Use MPI(a) INT 6.5H Waterborne Epoxy Finish system.
    - b. All Other:
      - 1) New Surfaces: Use MPI(a) INT 6.3T or U Latex Finish system.
- C. Performance:
  - 1. Design Criteria:
    - a. New Surfaces: MPI Premium Grade finish requirements.



- b. Gloss / Sheen Level Required: See 09 0001 – Finish Schedule.
- D. Materials:
- 1. Wood Floors:
    - a. Low to medium traffic: MPI Product 60, 'Floor Paint, Latex, Low Gloss'.
  - 2. Woodwork:
    - a. Primer Coat: MPI Product 39, 'Primer, Latex, for Interior Wood' or MPI Product 45, 'Primer Sealer, Alkyd, Interior'.
    - b. Finish Coats: MPI Product 153, 'Light Industrial Coating, Interior, Water Based, Semi-Gloss (MPI Gloss Level 5)'.

### **PART 3 - EXECUTION**

#### **3.1 APPLICATION**

- A. General: See appropriate paragraphs of Section 09 9001.
- B. Interface With Other Work:
  - 1. Where back-priming is required, apply one (1) coat of primer.
- C. New Surfaces:
  - 1. Spot prime nail holes, cracks, and blemishes before and after puttying.
  - 2. Apply stain blocker or other product recommended by Paint Manufacturer to knots before applying primer coat.

**END OF SECTION**

# SECTION 09 9324 - INTERIOR CLEAR-FINISHED HARDWOOD

## PART 1 - GENERAL

### 1.1 SUMMARY

- A. Includes But Not Limited To:
  - 1. Preparing and finishing of new interior clear finished hardwood as described in Contract Documents.
- B. Related Requirements:
  - 1. Section 06 4114: 'Wood-Veneer-Faced Architectural Cabinets'.
  - 2. Section 08 1429: 'Interior Flush Wood Doors'.
  - 3. Section 09 9001: 'Common Painting And Coating Requirements':
    - a. Pre-installation conference for Sections under 09 9000 heading 'Paints and Coatings'.
  - 4. Section 09 9001: 'Common Painting And Coating Requirements':
    - a. Pre-installation conference for Sections under 09 9000 heading 'Paints and Coatings'.

### 1.2 REFERENCES

- A. Reference Standards:
  - 1. Kitchen Cabinet Manufacturers Association / American National Standards Institute:
    - a. ANSI/KCMA A161.1-2000 (R2005) 23-Jan-2001 'Recommended Performance and Construction Standards for Kitchen and Vanity Cabinets.'

### 1.3 ADMINISTRATIVE REQUIREMENTS

- A. Pre-Installation Conferences:
  - 1. Participate in pre-installation conference as specified in Section 09 9001.
  - 2. In addition to agenda items specified in Section 01 3100 and Section 09 9001, review following:
    - a. Review control sample(s).

### 1.4 SUBMITTALS

- A. Action Submittals:
  - 1. Samples:
    - a. Interior Hardwood for Transparent Finish:
      - 1) Requirements for samples are specified in Related Requirement Sections listed above.
    - b. Design Criteria:

- 1) Sample will be used as performance standard for evaluating finish provided.

B. Informational Submittals:

1. Test And Evaluation Reports:

- a. Before beginning finish work, submit Finish Manufacturer's literature or certification that finish material meets requirements of ANSI / KCMA A161.1.

## PART 2 - PRODUCTS

### 2.1 SYSTEM

A. Materials:

1. Design Criteria:

- a. See appropriate paragraphs of Section 09 9001.

2. Stain: MPI 90, 'Stain, Semi-Transparent, for Interior Wood'.

3. Clear Finish Coats:

- a. Field Finished:

- 1) Chemcraft International Inc:

- a) First, Second, And Third Coats: 20 Sheen Opticlear Pre-Catalyzed Lacquer.

- 2) ICI Dulux / Trinity:

- a) First Coat: ICE Vinyl Sanding Sealer.
- b) Second And Third Coats: ICI Pre-Catalyzed Lacquer.

- 3) Lilly / Valspar:

- a) First, Second, And Third Coats: 20 Sheen Pre-Catalyzed Lacquer 587E208.

- 4) Sherwin-Williams:

- a) First Coat: T67F3 Vinyl Sealer.
- b) Second And Third Coats: T77F38 Sherwood Pre-Catalyzed Lacquer DRE.

- b. Mill Finished: Architectural Woodwork finished in a mill may use one (1) coat of Vinyl Sealer and two (2) coats of Conversion Varnish or three (3) coats of Conversion Varnish from one (1) of the approved Finish Manufacturers, as recommended by Finish Manufacturer.

- c. Products meeting testing requirements for finishes of ANSI / KCMA A161.1 may be used upon approval of submission by Architect before use. See Section 01 6200.

4. Color:

- a. Design Criteria:

- 1) Finish to match Architect selected sample.

## **PART 3 - EXECUTION**

### **3.1 APPLICATION**

#### **A. General:**

1. See appropriate paragraphs of Section 09 9001.
2. Sand entire exposed surface of item to be finished lightly with 120 to 150 non-steared sandpaper and clean before applying dye or stain.
3. Apply stain in accordance with Manufacturer's recommendations and as necessary to attain correct color.
4. Scuff sand with 220 non-steared sandpaper between application of application stain and first finish coat.
5. If wood is finished before installation, finish cut ends and other unfinished, exposed surfaces same as previously finished surfaces after installation of wood.

#### **B. Where back-priming is required, apply one coat of finish material.**

#### **C. Architectural Woodwork Door Surfaces (cabinetry doors only):**

1. Finish tops, bottoms, and edges before faces.
2. Finish architectural woodwork doors with no hardware applied to doors.

**END OF SECTION**

## SECTION 09 9600 - HIGH-PERFORMANCE COATINGS

### PART 1 - GENERAL

#### 1.1 SUMMARY

- A. Section includes surface preparation and the application of high-performance coating systems
  - 1. Exterior Substrates:
    - a. Steel.

#### 1.2 DEFINITIONS

- A. MPI Gloss Level 5: 35 to 70 units at 60 degrees, according to ASTM D 523.
- B. MPI Gloss Level 6: 70 to 85 units at 60 degrees, according to ASTM D 523.
- C. MPI Gloss Level 7: More than 85 units at 60 degrees, according to ASTM D 523.

#### 1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product. Include preparation requirements and application instructions.
  - 1. Include printout of current "MPI Approved Products List" for each product category specified, with the proposed product highlighted.
- B. Samples: For each type of coating system and in each color and gloss of topcoat indicated.

### PART 2 - PRODUCTS

#### 2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
  - 1. Tnemec Inc.
- B. Products: Subject to compliance with requirements, provide product listed in the Exterior High-Performance Coating Schedule for the coating category indicated.

#### 2.2 HIGH-PERFORMANCE COATINGS, GENERAL

- A. MPI Standards: Products shall comply with MPI standards indicated and shall be listed in its "MPI Approved Products Lists."
- B. Material Compatibility:
  - 1. Materials for use within each paint system shall be compatible with one another and substrates indicated, under conditions of service and application as demonstrated by manufacturer, based on testing and field experience.
  - 2. For each coat in a paint system, products shall be recommended in writing by topcoat manufacturers for use in paint system and on substrate indicated.
  - 3. Products shall be of same manufacturer for each coat in a coating system.

- C. Colors: As selected by Architect from manufacturer's full range.

## **PART 3 - EXECUTION**

### **3.1 EXAMINATION**

- A. Examine substrates and conditions, with Applicator present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.
- B. Verify suitability of substrates, including surface conditions and compatibility with existing finishes and primers.
- C. Proceed with coating application only after unsatisfactory conditions have been corrected.
  - 1. Application of coating indicates acceptance of surfaces and conditions.

### **3.2 PREPARATION**

- A. Comply with manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual" applicable to substrates and coating systems indicated.
- B. Remove hardware, covers, plates, and similar items already in place that are removable and are not to be painted. If removal is impractical or impossible because of size or weight of item, provide surface-applied protection before surface preparation and painting.
  - 1. After completing painting operations, use workers skilled in the trades involved to reinstall items that were removed. Remove surface-applied protection if any.
- C. Clean substrates of substances that could impair bond of coatings, including dust, dirt, oil, grease, and incompatible paints and encapsulants.
  - 1. Remove incompatible primers and reprime substrate with compatible primers or apply tie coat as required to produce coating systems indicated.

### **3.3 APPLICATION**

- A. Apply high-performance coatings according to manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual."
- B. Apply coatings to produce surface films without cloudiness, spotting, holidays, laps, brush marks, runs, sags, ropiness, or other surface imperfections. Produce sharp glass lines and color breaks.

### **3.4 EXTERIOR HIGH-PERFORMANCE COATING SCHEDULE**

- A. Steel Substrates:
  - 1. Pigmented Polyurethane over Epoxy Zinc-Rich Primer and High-Build Epoxy System MPI EXT 5.1G:
    - a. Prime Coat: Primer, zinc rich, epoxy, MPI #20.
      - 1) Tnemec Series 90-97 Tneme-Zinc.
    - b. Intermediate Coat: Epoxy, high build, low gloss, MPI #108.
      - 1) Tnemec Series 66HS Hi-Build Epoxoline II.

- c. First and Second Topcoat: Polyurethane, two component, pigmented, gloss (MPI Gloss Level 6), MPI #72.
  - 1) Tnemec Series 1070V Flvoronar.

**END OF SECTION 09 9600**



WEST FIELD SR. SEMINARY

**DIVISION 10 - SPECIALTIES:**

10 1116	Fixed Markerboards
10 1424	Engraved Stone Panel Signage
10 1425	Applied Films
10 1453	Traffic Signage
10 1495	Miscellaneous Interior Signage
10 2200	Partitions
10 2600	Rigid Vinyl Rubrails
10 2613	Corner Guards
10 2813	Commercial Toilet Accessories
10 4400	Fire Protection Specialties
10 5516	Mail Collection Boxes
10 7113	Exterior Sun Control Devices
10 8200	Louvered Rooftop Equipment Screens



## SECTION 10 1116 - FIXED MARKERBOARDS

### PART 1 - GENERAL

#### 1.1 SUMMARY

- A. Section includes but not limited to:
  - 1. Coordination and Scheduling of Owner-Furnished and Installed "Writable Wall" Markerboard Units: Visual Display Board.
- B. Related Requirements:
  - 1. Section 01 1200. 'Multiple contract Summary' for fixed markerboards excluded from contract and furnished and installed by owner.
  - 2. Section 06 1100: 'Wood Framing' for blocking.
  - 3. Section 06 2001: 'Common Finish Carpentry Requirements' for installation.

#### 1.2 REFERENCES

- A. ASTM B221 – Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Shapes, and Tubes.
- B. ASTM E84 – Test Method for Surface Burning and Characteristics of Building Materials.
- C. ASTM C540 – GlossTest for Porcelain Enamel Steel (Porcelain Enamel Institute PEI – 501).

#### 1.3 SUBMITTALS

- A. Informational Submittals:
  - 1. Manufacturer Instructions:
    - a. Published installation instructions.
    - b. Printed cleaning instructions.
- B. Closeout Submittals:
  - 1. Include following in Operations And Maintenance Manual specified in Section 01 7800:
    - a. Operations and Maintenance Data:
      - 1) Maintenance instructions.
      - 2) Printed cleaning instructions.
    - b. Warranty Documentation:
      - 1) Manufacturer Warranty.
    - c. Record Documentation:
      - 1) Manufacturer's documentation:
        - a) Manufacturer's product literature.

## 1.4 WARRANTY

- A. Submit manufacturer's "Life of Building" warranty, stating that under normal usage and maintenance, and when installed in accordance with manufacturer's instructions and recommendations, Porcelain-on-Steel Markerboards are guaranteed for the life of the building.
- B. Warranty shall cover replacement of defective Porcelain-on Steel Markerboards due to discoloration, excessive fading of color, crazing, cracking, or flaking. Warranty does not cover the cost of removal or reinstallation.

## PART 2 - PRODUCTS

### 2.1 OWNER FURNISHED PRODUCTS

- A. Category Two Approved Manufacturers. See Section 01 6200 for definitions of Categories:
  - 1. Platinum Visual Systems, Corona, CA (800) 498-2990 [www.ovsusa.com](http://www.ovsusa.com).
- B. Porcelain on Steel Markerboards:
  - 1. Provide Markerboards for project from manufacturer's FCS Series.
    - a. Metal trim and accessories: FCS Series aluminum extrusions with clear satin anodized finish.
      - 1) Frame CH358: Channel frame with 3/4" face. No exposed fasteners permitted.
      - 2) Chalktray CR310: Standard continuous solid magnetic chalktray with ribbed section and smoothly curved ends. Length to be 24". One per elevation.
      - 3) Spline: Continuous aluminum stabilizing spline at each joint.
    - b. Floor to Ceiling Markerboards Panels:
      - 1) Panel Sizes: Width to be 4' wide with equal size panels at ends. Height to be a maximum of 12' high.
      - 2) Joints: Butt joint factory fired edges vertically to form smooth transition from panel to panel.
      - 3) Splines: Panels to be factory milled to accept aluminum stabilizing spline at each joint.
    - c. Size: As shown on drawings.
    - d. Color: White.
- C. Fabrication:
  - 1. Laminate facing sheet and backing sheet to core material under pressure, using manufacturer's recommended adhesive.
  - 2. Provide factory-assembled visual display boards, except where sized demand partial field assembly.
  - 3. Assemble units in one piece without joints, wherever possible. Where required dimensions exceed maximum panel size available, provide two or more pieces of equal length, as indicated on approved shop drawings. Assemble to verify fit at factory, then disassemble for delivery and final assembly at project site.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Verify that substrates are properly prepared to receive visual display boards. Do not begin installation until unsatisfactory conditions have been corrected.

### **3.2 INSTALLATION**

- A. Comply with manufacturer's installation instructions.
- B. Where visual display boards must be partly assembled at project site, use factory-supplied H-bar to maintain proper alignment.
- C. Install visual display boards level and plumb, keeping perimeter trim aligned in accordance with manufacturer's recommendations.

### **3.3 ADJUSTING AND CLEANING**

- A. Verify that all accessories are installed as required for each unit.
- B. Upon completion of installation, clean surfaces and trim in accordance with manufacturer's recommendations, leaving all materials ready for use.

**END OF SECTION**

# SECTION 10 1424 - ENGRAVED STONE PANEL SIGNAGE

## PART 1 - GENERAL

### 1.1 SUMMARY

- A. Products Furnished But Not Installed Under This Section:
  - 1. Stone Seminary building sign with Church logo and 'SEMINARY'.
  - 2. Stone building address sign.
- B. Related Requirements:
  - 1. Section 04 2113: 'Veneer Masonry' for installation and cleaning.

### 1.2 SUBMITTALS

- A. Action Submittals:
  - 1. Shop Drawings:
    - a. Show details of attachment system.
  - 2. Samples:
    - a. Submit stone sample of approved stone type specified by Architect.
- B. Informational Submittals:
  - 1. Approved Stone Type:
    - a. Notify Sign Fabricator of approved stone ten (10) week minimum before installation of sign(s).
  - 2. Stone building address sign:
    - a. Notify Sign Fabricator of correct address that will be used in address ten (10) week minimum before installation of sign.

### 1.3 DELIVERY, STORAGE, AND HANDLING

- A. Delivery And Acceptance Requirements:
  - 1. Sign Fabricator Responsibility:
    - a. Deliver material to site, carefully unload, and check in such manner as to avoid soiling, damaging, or chipping.
    - b. Protect material from damage while in transit to job site.
- B. Storage And Handling Requirements:
  - 1. General Contractor Responsibility:
    - a. Store material on planks clear of ground.

- b. Protect material from damage, dirt, or disfigurement until installation.

## **PART 2 - PRODUCTS**

### **2.1 MATERIAL**

#### **A. Fabricators:**

1. Category Four Approved Sign Fabricators. See Section 01 6200 for definitions of Categories:
  - a. Hans Monument Co, Salt Lake City, UT [www.hansmonuments.com](http://www.hansmonuments.com).
    - 1) Contact Information: Debbie Christensen (801) 484-1594 or fax (801) 467-8308.
  - b. Mark H. Bott Co., Ogden, UT [www.markbottco.com](http://www.markbottco.com).
    - 1) Contact Information: David E. Bott (801) 393-8087 or fax (801) 393-8080.

#### **B. Stone:**

1. Description:
  - a. Stone building signs.
2. Design Criteria:
  - a. Texture and color variation shall be within limits established by Architect's approved sample.
  - b. Monument quality, free of defects that would materially impair strength, durability, and appearance.
3. Dimensions:
  - a. Thickness: 1-1/4 inch thick.
  - b. Stone sign dimensions are shown on drawings.
4. Stone Type Shall Be Selected By Architect From The Following:
  - a. Bethel White Granite.
  - b. Elberton Sunset Granite.
  - c. Morning Rose Granite.
  - d. Medium Barre Granite.

#### **C. Finish: Low pressure, 30 lb, steeled finish on 80 grit honed surface.**

### **2.2 ACCESSORIES**

#### **A. Fasteners And Anchors:**

1. Provided by Sign Fabricator for method shown on Contract Documents:
  - a. 'J' bolt system for mounting sign recessed in masonry veneer on framing.

## **PART 3 - EXECUTION**

### **3.1 INSTALLATION**

#### **A. General:**

1. Set stone sign using mechanical fasteners provided by Sign Fabricator.
2. Joints shall be 3/8 inch wide. Use plastic spacers in wall joints.

#### **B. Stone Damage:**

1. Installer responsible for repair of damaged surface during installation.

### **3.2 CLEANING**

#### **A. General:**

1. After stone sign installation is completed, clean using non-metallic fiber brushes and clean water.

### **3.3 PROTECTION**

#### **A. General Contractor Responsibility:**

1. Provide protection for stone sign(s) from masonry cleaning chemicals and other damaging materials until Substantial Completion.

**END OF SECTION**

## SECTION 10 1425 – APPLIED FILMS

### PART 1 - GENERAL

#### 1.1 SUMMARY

- A. Glazing Films
- B. Applied Wall Graphics

#### 1.2 SUBMITTALS

- A. Shop Drawings: Provide plans, elevations, and sections showing typical members, anchors, layout, reinforcement, accessories, and installation details. Include the following:
  - 1. Setting drawings, templates, and directions for installing.

### PART 2 - PRODUCTS

#### 2.1 PRODUCTS

- A. Primed wall surface & wall covering 'W09': Acrylic primer, smooth finish, (1) week dry time prior to wallcovering installation. Type I or II vinyl wall covering with poly-cotton Osnaburg or Polyester non-woven fabric backing. Re: finish/signage plans & signage details.
  - 1. Basis-of-Design Manufacturer: Ogden Blue; Vision Wall Coverings; Vision Suede DS-1090D.
  - 2. Architect may accept equal products by other manufacturers submitted prior to bidding.
- B. Glazing film: Privacy vinyl. Pressure-sensitive acrylic, permanent. Second surface. Re: finish/signage plans.
  - 1. Basis-of-Design Manufacturer: 3M Dusted Crystal Glass Finish
  - 2. Architect may accept equal products by other manufacturers submitted prior to bidding.

### PART 3 - EXECUTION

#### 3.1 INSTALLATION

- A. Locate films where indicated, using mounting methods specified. Install level, plumb, and at the height indicated, with surfaces free from distortion or other defects in appearance.
- B. Cleaning: After installation, clean soiled surfaces. Protect units from damage until acceptance by the Owner.

END OF SECTION 10 1425

## SECTION 10 1453 - TRAFFIC SIGNAGE

### PART 1 - GENERAL

#### 1.1 SUMMARY

- A. Includes But Not Limited To:
  - 1. Furnishing and installing of exterior post-mounted site signage as described in Contract Documents.
- B. Related Requirements:
  - 1. Section 03 3111: 'Cast-In-Place Structural Concrete' for quality requirements of concrete used for parking sign posts.

#### 1.2 REFERENCES

- A. Reference Standards:
  - 1. International Code Council / American National Standards Institute:
    - a. ICC/ANSI A117.1-2010, 'Accessible and Usable Buildings and Facilities'.
  - 2. U.S. Department of Justice:
    - a. 2010 'ADA Standards for Accessible Design'.

#### 1.3 QUALITY ASSURANCE

- A. Regulatory Agency Sustainability Approvals:
  - 1. Sign shall meet ANSI A117.1 accessibility code and ADA standards for accessible design and local and state authorities having jurisdiction (AHJ) requirements.

### PART 2 - PRODUCTS

#### 2.1 ASSEMBLIES

- A. Permanently Mounted:
  - 1. Post Foundation Concrete: One cu ft cement, 2 cu ft sand, 4 cu ft gravel, and 5 gallons minimum to 6 gallons maximum of water.
  - 2. Accessible Parking Signs:
    - a. Design Criteria:
      - 1) Meet regulatory agency requirements for accessibility.
      - 2) Sign graphics and lettering shall be minimum required by agency having jurisdiction:
        - a) International symbol of accessibility should be posted on all accessible parking spaces.



- b) Letters must contain visual characters and high dark to light contrast between characters and background as per ADA requirements:
  - c) Provide reflective background.
  - d) Van-accessible parking spaces to have additional 'text' or 'sign' below the accessibility symbol to mark the van-accessible area specifically:
- 3) Size: 12 inches x 18 inches aluminum sign.
  - 4) Sign shall have rounded corners.
- b. Type Two Acceptable Products:
- 1) Parking signs by My Parking Sign, Brooklyn, NY [www.MyParkingSign.com](http://www.MyParkingSign.com).
  - 2) Equal as approved by Architect before use. See Section 01 6200.
3. Posts:
- a. Handicap Accessible Parking Signage:
    - 1) Provide galvanized post as shown on Contract Drawings.

## **PART 3 - EXECUTION**

### **3.1 INSTALLATION**

A. Permanently Mounted:

- 1. Locate as shown on Site Plan.
  - a. Follow ADA guidelines and local and state authorities having jurisdiction (AHJ) for placement of sign requirements:
    - 1) Signs should be placed at such a height (at least 60 inches above surface) that they do not get obscured by any parked vehicles or other obstructions. Signs must be viewable from drivers' seat of vehicle and located right in view of parking spaces.
- 2. Install signs square and plumb.
- 3. Post Foundations:
  - a. Follow requirements of Section 03 3053: 'Miscellaneous Exterior Cast-In-Place Concrete' for post foundation:
    - 1) Mix concrete components thoroughly, place in post foundation holes sized as shown on Contract Drawings.
  - b. Mow Strips:
    - 1) At mow strips where shown on Site Plan, set top of post foundation below grade sufficient to allow for placing of mow strip.
  - c. Placement Before Installation of Slabs:
    - 1) Measure post foundation depth from top of slab. Extend bottom of slab footing sufficient to allow specified amount of concrete around post.
  - d. Placement After Installation of Slabs:

- 1) Where posts are installed after installation of slabs, core slab width of foundation diameter as shown on Contract Documents to accommodate post foundation.
4. Handicap Accessible Parking Signage:
- 1) Attach sign to galvanized steel posts as shown on Contract Drawings with stainless steel self tapping screws.
  - 2) Isolate dissimilar materials (steel tube and aluminum sign).

**END OF SECTION**

# SECTION 10 1495 - MISCELLANEOUS INTERIOR SIGNAGE

## PART 1 - GENERAL

### 1.1 SUMMARY

- A. Products Installed But Not Furnished Under This Section:
  - 1. Owner-furnished interior signs.
- B. Related Requirements:
  - 1. Section 01 6400: Owner will furnish designated interior signs. This Section establishes quality of materials and installation for information of Contractor, Architect, and Owner's Representatives.

## PART 2 - PRODUCTS

### 2.1 OWNER FURNISHED PRODUCTS

- A. Category Two Approved Distributors. See Section 01 6200 for definitions of Categories:
  - 1. Standard Interior Signs:
    - a. Visual Identity Office:
      - 1) Contact Information:
        - a) 50 E. North Temple St. Rm. 2350, Salt Lake City, UT 84150-3232.
        - b) Phone: 1-801-240-1302.
        - c) Fax: 1-801-240-5997.
        - d) [vidoffice@ldschurch.org](mailto:vidoffice@ldschurch.org).
    - b. Room Signs: Molded clear acrylic sub-surface graphics sign with set-screw to attach to included mounting bracket.
      - 1) Provide tactile / braille features in signage.
    - c. Cabinet Door Signs: Flat clear acrylic sub-surface graphics sign with mounting adhesive in position.
    - d. Color:
      - 1) Background: Blue.
      - 2) Lettering: White.

## PART 3 - EXECUTION

### 3.1 INSTALLATION

- A. Install interior signs square and plumb:
  - 1. Room Signs: