project manual

THE CHURCH OF
JESUS CHRIST
OF LATTER-DAY SAINTS

Ogden ERC
Relocation

435 North Wall Ave. - Harrisville, UT

Project Number: 500021624030101

bradley gygi architect & associates, pllc
PO Box 521048 • salt lake city, utah 84152
801•747•2451

mechanical engineer
David L. Jensen & Associates
547 West 500 South, #140
Bountiful, Utah 84010
801.294.9299

electrical engineer
Envision Engineering
240 East Morris Ave., Suite 200
Salt Lake City, Utah 84115
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Professional Consultants

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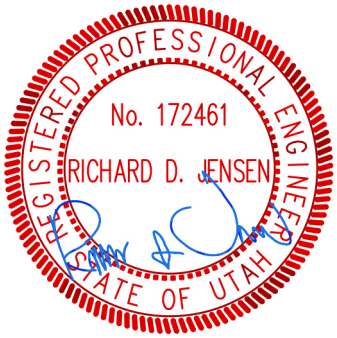

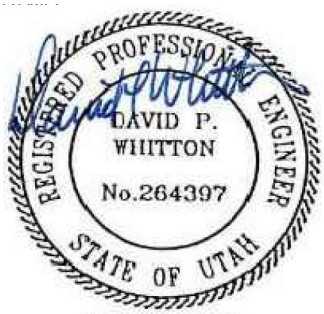

2025/06/30

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B L A N K P A G E

BIDDING REQUIREMENTS

FOR SMALL PROJECTS (U.S.)

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INVITATION TO BID (U.S.)

1. CONTRACTORS INVITED TO BID THE PROJECT:

To Be Announced

2. PROJECT:

Ogden ERC Relocation
Project Number: 500021624030101

3. LOCATION:

435 North Wall Ave.
Harrisville, UT

4. OWNER:

The Church of Jesus Christ of Latter-day Saints, a Utah corporation sole
c/o
Craig Homer, Utah North PM Office
435 North Wall St., Ste. D
Ogden, UT 84484

5. CONSULTANT:

Bradley Gygi Architect & Associates, PLLC
PO Box 521048, Salt Lake City, UT 84152

6. DESCRIPTION OF PROJECT:

A. Interior remodeling and reconfiguration of existing office area and entry vestibule.

B. Products or systems may be provided through relationships the Owner has negotiated with suppliers as indicated in the Specifications.

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

8. TIME OF SUBSTANTIAL COMPLETION: The time limit for substantial completion of this work will be seventy-five (75) calendar days and will be as noted in the Agreement.

9. BID OPENING: Bids will be received by Owners preferred method at time and date at place to be announced. Bids will be publicly opened at time and date at place to be announced.

10. BIDDING DOCUMENTS:

A. Bidding Documents may be examined at the following plan room locations:

1) Dodge Data and Analytics
Office # (859) 885-1091
Fax # (801) 606-7722
email: kim.mccallon@construction.com

Steps for downloading from McGraw-Hill Dodge:

Purchasing Individual Reports/Plans/Specs/Addenda from Dodge Data and Analytics

- Access the web-page http://dodgeprojects.construction.com/
- Search the Dodge Database by state (required) using the Dodge Report Number or Project Name for a single project report. To see a listing of all of the LDS projects in a particular state, enter the State name from the drop down box and then enter LDS in the second search box. Click Search.
- Select the project from the results list. By clicking on the blue project description, a more descriptive title will help to make sure you are purchasing the correct documents.
- When you find the correct project, select: Get This Report, Get Plans & Specs, or Monthly Access. Add to Cart and Proceed to Checkout or Continue Shopping. After the purchase, select View This Project.

2)

B. Bidding Documents may be obtained from the Architect.

C. Bidding Documents may be obtained from Owner's electronic bidding tool.

11. BIDDER'S QUALIFICATIONS: Bidding by the Contractors will be by invitation only.

12. OWNER'S RIGHT TO REJECT BIDS: Owner reserves the right to reject any or all bids and to waive any irregularity therein.

END OF DOCUMENT

INSTRUCTIONS TO BIDDERS (U.S.)

1. DOCUMENTS:

A. Bidding Documents include Bidding Requirements and proposed Contract Documents. Proposed Contract Documents consist of:
   1) Agreement Between Owner and Contractor for Small Project (U.S.)
   2) Other documents included by reference
   3) Addenda.

B. Bidding Requirements are those documents identified as such in proposed Project Manual.

C. Addenda are written or graphic documents issued prior to execution of the Contract which modify or interpret the Bidding Documents. They become part of the Contract Documents as noted in the Agreement Between Owner and Contractor for Small Project (U.S.) upon execution of the Agreement by Owner.

2. BIDDER'S REPRESENTATIONS:

A. By submitting a bid proposal, bidder represents that
   1) Bidder has carefully studied and compared 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 and any building located thereon, has become familiar with local conditions which might directly or indirectly affect contract work, and has correlated its personal observations with requirements of proposed Contract Documents, and
   3) Bid is based on materials, equipment, and systems required by Bidding Documents without exception.

3. BIDDING DOCUMENTS:

A. Copies
   1) Owner will provide the Bidding Documents as set forth in the Invitation to Bid.
   2) Partial sets of Bidding Documents will not be issued.

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) Base bid only on materials, equipment, systems, suppliers or performance qualities specified in the Bidding documents.
   3) Where a specified product is identified as a "quality standard", products of other manufacturers that meet the performance, properties, and characteristics of the specified "quality standard" may be used without specific approval as a substitute.

D. Addenda - Addenda will be sent to bidders and to locations where Bidding Documents are on file no later than 2 business days prior to bid opening.

4. BIDDING PROCEDURES:

A. Form and Style of Bids

1) Use Owner's online bidding tool.
2) Fill in all blanks on online bidding tool. Signatures will be executed by representative of bidder duly authorized to make contracts.
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. Submission of Bids
1) Follow the instructions in the Owner's bidding tool when submitting your bid.
2) It is bidder's sole responsibility to see that its bid is received at specified time.
3) No oral, facsimile transmitted, telegraphic, or telephonic bids, modifications, or cancellations will be considered.

C. 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 from Owner's bidding tool.

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. FORM OF AGREEMENT BETWEEN OWNER AND CONTRACTOR:

A. Agreement form will be "Small Project Agreement Between Owner and Contractor (U.S.)" and "Supplementary Conditions for Small Project Agreement (U.S.).

7. MISCELLANEOUS:

A. Pre-Bid Conference. A pre-bid conference may be held at a time and place to be announced.

B. Examination Schedule for Existing Building and Site
1) Coordinate with FM Manager for access to the building during bidding.

END OF DOCUMENT

INFORMATION AVAILABLE TO BIDDERS (U.S.)

1. GEOTECHNICAL DATA

A. No Geotechnical Data provided for this scope of work.

2. ASBESTOS-CONTAINING MATERIAL (ACM)

A. The building upon which work is being performed has been examined for asbestos-containing material.
B. Owner will provide a report to the Contractor to maintain on site during construction activities.
C. Refer to Section 01 3500, Article 1.3 “Environmental Procedures” for requirements to be followed.

END OF DOCUMENT

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CONSTRUCTION MATERIAL ASBESTOS STATEMENT (U.S.)

PROJECTS FOR:
THE CHURCH OF JESUS CHRIST OF LATTER-DAY SAINTS,
a Utah corporation sole

Building Name: Ogden ERC Relocation

Building Plan Type: Welfare

Building Address: 435 North Wall Ave. - Harrisville, UT

Building Owner: The Church of Jesus Christ of Latter-day Saints, a Utah corporation sole.

Project Number: 500021624030101

Completion Date:

As PROJECT CONSULTANT and principal in charge; based on my best knowledge, information, inspection, and belief; I certify that on the above referenced Project, no asbestos-containing building materials were specified in the construction documents or given approval in shop drawings or submittals.

Project Consultant and Principal in Charge (signature) Date

Company Name

As GENERAL CONTRACTOR in charge of construction; based on my best knowledge, information, inspection, and belief; I affirm that on the above-referenced Project, no asbestos-containing building materials were used in the construction.

General Contractor (signature) Date

Company Name

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SMALL PROJECT AGREEMENT
BETWEEN OWNER AND CONTRACTOR
Fixed Sum (U.S.)

The Church of Jesus Christ of Latter-day Saints, a Utah corporation sole ("Owner") and _____ ("Contractor") enter into this *Small Project Agreement Between Owner and Contractor (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 Work.** Contractor will furnish all labor, materials, tools, and equipment necessary to complete the Work in accordance with the Contract Documents. The Work is all labor, materials, tools, equipment, construction, and services required by the Contract Documents (the "Work").

3. **Contract Documents.** Contract Documents consist of:
   a. This Agreement;
   b. Supplementary Conditions for Small Project Agreement Between Owner and Contractor (U.S.);
   c. The Specifications (Division 01 and Divisions _____);
   d. Drawings entitled and dated _____;
   e. Addendum No. with date(s) _____;
   g. All written Field Changes, written Construction Change Directives and written Change Orders when prepared and signed by Owner and Contractor.

4. **Compensation.** Owner will pay Contractor for performance of Contractor's obligations under the Contract Documents the sum of _____ Dollars ($_____) (the "Contract Sum"). This Contract Sum includes all labor, materials, equipment, tools, costs, expenses, work and services of Contractor and its subcontractors necessary to perform the Work in accordance with the terms of this Agreement, including without limitation travel, communications and copying costs.

5. **Payment.**
   a. If the Contract Sum is over $100,000 or if otherwise requested by Owner, Contractor will submit to Owner a schedule of values which allocates the Contractor's Bid Proposal Amount to various portions of the Work. This schedule, when accepted by Owner will be used as a basis for reviewing Contractor's payment requests.
   b. Not more than once each month, Contractor will submit a payment request to Owner. Owner will pay Contractor for work completed within thirty (30) days after Owner receives:
      1) Contractor's payment request for work to date;
      2) a certification by Contractor that Contractor has paid for all labor, materials, and equipment relating to the Work covered by prior payment requests and that Contractor will pay for all labor, materials, and equipment relating to the Work covered by the current payment request; and
      3) releases of all mechanics' liens and claims of subcontractors, laborers, or material suppliers who supplied labor and/or materials for the Work covered by the payment request.
      4) updated Construction Schedule.
   c. Owner may modify or reject the payment request if, in Owner's opinion, the Work for which payment is requested is not acceptable or is less complete than represented on the payment request.
   d. Contractor will timely pay subcontractors their portion of fees and expenses that Owner has paid to Contractor.

6. **Extras and Change Orders.** Owner may order changes in the Work by altering, adding to, or deducting from the Work. In the event of such a change, the Contract Sum and/or the time of completion will be adjusted to reflect the change by means of a written Change Order signed by Contractor and Owner. Contractor will not commence work on any change until either: (a) Contractor and Owner have executed a Change Order; or (b) Owner has issued a written order for the change acknowledging that there is a dispute regarding the compensation adjustment relating to the change. If Contractor proceeds with a change in the Work without complying with the preceding sentence, Contractor agrees that it will not be entitled to any additional compensation for such change.

7. **Warranty and Correction of Work.** For all Work, services, labor, materials, products, and equipment provided under the Contract Documents, Contractor provides and extends to Owner all statutory, common law, and standard industry warranties as well as those warranties set forth in Owner's Contract Documents. Unless a longer period is specified by Owner's Contract Documents or otherwise, Contractor, at a minimum and in addition to all other warranties, warrants all Work under the Contract Documents for at least one year. Specifically, and without limitation, Contractor will promptly correct at its own expense:
   a. any portion of the Work which
      1) fails to conform to the requirements of the Contract Documents, or
      2) is rejected by the Owner as defective or because it is damaged or rendered unsuitable during installation or resulting from failure to exercise proper protection
   b. any defects due to faulty materials, equipment, or workmanship which appear within a period of one year from the date of completion of the Work or within such longer period of time as may be prescribed by law or the terms of any applicable special warranty required by the Contract Documents.

8. **Time of Completion.** Contractor will complete the Work and have it ready for Owner's inspection within _____ (_____) calendar days from Notice to Proceed issued by Owner. Time is of the essence. If Contractor is delayed at any time in the progress of the Work by any act or neglect of Owner, or by changes in the Work, or by strikes, lockouts, unusual delay in transportation, unavoidable casualties, or acts of nature beyond Contractor's control, then the time for completion will be extended by the time that completion of the Work is delayed. However, Contractor expressly waives any damages for any such delays.

9. **Owner Provided Items.** Owner may provide furnishings, equipment, and/or other items for the Project. Contractor will install items furnished by Owner and/or receive, store, and protect such items on site until the date Owner accepts the Project.

10. **Product Requirements.** Contractor will provide products that comply with Contract Documents, are undamaged, and, unless otherwise indicated, are new and unused at time of installation. Contractor will provide products complete with accessories, trim, finish, safety guards, and other devices and details needed for complete installation and intended use and effect.

11. **Permits, Surveys, and Taxes.** Contractor will obtain and pay for all permits and licenses, and also pay any applicable taxes. Contractor will also obtain and pay for any surveys it needs to perform the Work.

12. **Independent Contractor Relationship.** Contractor is not an agent or employee of Owner but is an independent contractor.

13. **Comply with Laws.** Contractor will comply, and ensure that all subcontractors comply, with all applicable laws, ordinances, rules, regulations, covenants, and restrictions.

14. **Indemnity and Hold Harmless.**
   a. Contractor will indemnify and hold harmless Owner and Owner's representatives, employees, agents, architects, and consultants from and against any and all claims, liens, 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 or failure to perform 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 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, non-performance or delay in performance of the Work by Contractor.
d. The indemnification obligation herein will not be limited by limitations on the amount or type of damages, compensation or benefits payable by or for Contractor or any subcontractor under workers compensation acts, disability benefit acts, or other employee benefit acts.

15. **Work Restrictions.** Contractor will ensure that Contractor's agents, employees, and subcontractors:
    a. Do not use or consume alcohol or cannabis, or illegally use drugs, on the Project Site or enter on or perform any Work on the Project Site while under their influence.
    b. Do not smoke or vape anything on the Project Site. Do not use tobacco in any form on the Project Site.
    c. Do not perform Work on the Project Site on Sundays except for emergency work.
    d. Refrain from using profanity or being discourteous or uncivil to others on the Project Site or while performing Work under this Agreement.
    e. Do not view or allow pornographic or other indecent materials on the Project Site.
    f. Do not play obscene and/or loud music on the Project Site. Do not play any music within existing facilities.
    g. Refrain from wearing immodest, offensive, or obnoxious clothing, while on the Project Site.
    h. Do not bring weapons on the Project Site.

16. **Safety Hazards.** Contractor will ensure that no work or services will be performed that may pose an undue safety hazard to Contractor, Contractor's employees, or any other person.

17. **Contractor's Insurance.** Prior to performing any work, Contractor will obtain and maintain during the term of this Agreement the following insurance:
    a. Workers Compensation Insurance or evidence of exemption.
    b. 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.
    c. 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:
        1) Limits of the greater of: Contractor's actual coverage amounts or the following:

a) $2,000,000 General Aggregate;
b) $2,000,000 Products - Comp/Ops Aggregate;
c) $1,000,000 Personal and Advertising Liability;
d) $1,000,000 Each Occurrence; and
e) $50,000 Fire Damage to Rented Premises (Each Occurrence)

2) Endorsements attached to the General Liability policy including the following or their equivalent:
   a) 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.
   b) ISO Form CG 20 10 (07/04), Additional Insured – Owners, Lessees, Or Contractors (Form B), naming Owner and Architect as additional insureds.

d. Automobile Liability Insurance, with:
   1) Combined Single Limit each accident in the amount of no less than $500,000 and
   2) Coverage applying to "Any Auto" or its equivalent.

Contractor will provide evidence of these insurance coverages to Owner by providing an ACORD 25 (2010/05) Form or its equivalent: (1) listing Owner as the Certificate Holder and Additional Insured on the general liability and any excess liability policies, (2) 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 higher), (3) attaching the endorsements set forth above for the Certificate of Liability Insurance, and (4) 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.) Notwithstanding the foregoing, Owner may in writing and at its sole discretion, modify these insurance requirements.

18. **Resolution of Disputes.** In the event there is any dispute arising under the Contract Documents which cannot be resolved by agreement between the parties, either party may submit the dispute with all documentation upon which it relies to Director of Architecture, Engineering, and Construction, 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, attorney fees incurred by that party in obtaining the dismissal, including without limitation copy costs, and expert and consultant fees and expenses. Pending final resolution of a dispute hereunder, Contractor will proceed diligently with the performance of its obligations pursuant to this Agreement.

19. **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 this 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 as well as all warranties relative to Work provided through the date of termination survive a termination hereunder.

20. **Termination by Owner for Cause.** Should Contractor fail to timely provide Owner with the certificates of insurance, 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 this 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, less any offsets. 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 as well as all warranties relative to Work provided through the date of termination survive a termination hereunder.

21. **Termination by Owner for Convenience.** Notwithstanding any other provision contained in the Contract Documents, Owner may, without cause and in its absolute discretion, terminate this 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 Owner and/or its 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 profit 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 as well as all warranties relative to Work provided through the date of termination survive a termination hereunder.

22. **Enforcement.** In the event either party commences legal action to enforce or rescind any term of this Agreement, the prevailing party will be entitled to recover its attorney fees, costs and legal expenses, 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.

23. **Ownership of Materials, Documents, and Intellectual Property Rights.** 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 and its subcontractors for products, services, and Work provided under this Agreement, such products, services, and Work of Contractor and its subcontractors constituting works made for hire. Neither Contractor nor its subcontractors will reuse any portion of such items provided by Owner or work products developed by Contractor or its subcontractors 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. Contractor shall obtain the written agreement of each of its subcontractors to the terms of this section prior to permitting the subcontractor to perform any services contemplated by this Agreement.

24. **Comply with Intellectual Property Rights of Others.** Contractor represents and warrants that no Work or services (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).

25. **Ownership and Use of Renderings and Photographs.** Renderings, photographs, and/or other images of or representing the services, Work, or any improvement on or relative to the Project Site, whether created before, during, or at completion of construction (and whether created by Owner, Contractor, or Contractor's subcontractors), are the property of the Owner. Contractor hereby transfers and assigns to Owner all ownership and intellectual property rights that Contractor and/or its subcontractors may have in and to all such renderings, photographs, and other images. The Owner reserves all rights including copyrights and other intellectual property rights to such renderings, photographs, and other images. No such renderings, photographs, or other images shall be used or distributed without written consent of the Owner.

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

27. **Confidentiality.** Contractor shall ensure that Contractor and its 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:
    a. The name or address of any affiliate, customer or contractor of Owner or any information concerning the transactions of any such person with Owner;
    b. Any contracts, agreements, business plans, budgets or other financial information, renderings, photographs, and materials provided by Owner relating to the Work or any improvement on the Project Site to the extent such has not been made available to the public by the Owner;
    c. Any other information that is marked or noted as confidential at the time of its disclosure.

28. **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, or employees shall make any private commercial use of their relationship to Owner or the Project, including, without limitation:
    a. By referring to the Owner or 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 Work or 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 work, 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 Owner or Project.

    Notwithstanding the foregoing, Contractor may include a reference to Owner or the Project 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 or the Project is included with at least several other similar references to projects of different owners and is given no more prominence than such other references.

29. **Entire Agreement.** This Agreement contains the entire and integrated agreement between the parties hereto and supersedes all prior negotiations, representations, or agreements, either written or oral, relating to the Project. This Agreement may be amended only by a writing signed by both parties. This Agreement will not be construed to create a contractual relationship of any kind between any persons or entities other than Owner and Contractor.

30. **Assignment.** Contractor will not assign any right or obligation hereunder without the prior written consent of the Owner, which consent may be granted or withheld in Owner's absolute discretion.

31. **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.

32. **Effective Date.** The effective date of this Agreement is the date indicated by Owner's signature.

OWNER:	**CONTRACTOR:**
The Church of Jesus Christ of Latter-day Saints, a Utah corporation sole	
Signature:	Signature:
Print Name:	Print Name:
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:

B L A N K P A G E

SUPPLEMENTARY CONDITIONS

FOR SMALL PROJECT AGREEMENT BETWEEN OWNER AND CONTRACTOR (U.S.)

ITEM 1 - GENERAL

1. Conditions of the Small Project Agreement Between Owner and Contractor (U.S.) apply to each Division of the Specifications.

2. Provisions contained in Division 01 apply to all Divisions of the Specifications.

ITEM 2 - LIQUIDATED DAMAGES PAYABLE TO OWNER

This section may be included as a separate additional paragraph to the Small Project Agreement Between Owner and Contractor (U.S.), at Owner's discretion:

Delay in Completion of the Work. For each day after the expiration of the designated Time of Completion that Contractor has not completed the Work, Contractor will pay Owner the amount of One Hundred Fifty dollars ($150.00) per day as liquidated damages for Owner's loss of use 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, attorneys' 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.

ITEM 3 - PERMITS

1. Owner will pay the costs of permits, fees, impact fees and improvement bonds required by local agencies necessary for the proper execution and completion of the work. Contractor shall obtain all permits and pay all fees, which will be reimbursed by the Owner without markup. These costs shall not be included in the bid amount. Contractor will conform to all ordinances and covenants governing the Project Site and/or Work.

ITEM 4 - STATE SPECIFIC SUPPLEMENTARY CONDITIONS

UTAH STATE SALES TAX:

Add the following to the Small Project Agreement Between Owner and Contractor (U.S.):

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 Small Project Agreement Between Owner and Contractor (U.S.):

A. Contractor shall 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 Small Project Agreement Between Owner and Contractor (U.S.):

A. Within five (5) calendar days of final completion of the Project and in compliance with Section 38-1a-507 Utah Code Annotated, Contractor shall file with the State Construction Registry, and copy to Owner, a notice of completion which shall 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 STATE PROGRESS PAYMENTS AND FINAL PAYMENT:

Replace paragraph 5 of the Small Project Agreement Between Owner and Contractor (U.S.) with the following:

5. <u>Payment</u>

a. If the Contractor's Bid Proposal Amount is over $100,000, Contractor will submit to Owner a schedule of values which allocates the Contractor's Bid Proposal Amount to various portions of the Work. This schedule, when accepted by Owner, will be used as a basis for reviewing Contractor's payment requests.

b. Progress Payments: Not more than once each month, Contractor will submit a payment request to Owner. Owner will pay Contractor progress payments for work completed within fifteen (15) days after Owner receives:
    1. Contractor's progress payment request for work to date;
    2. A certification by Contractor that Contractor has paid for all labor, materials, and equipment relating to the Work covered by prior payment requests and that Contractor will pay for all labor, materials, and equipment relating to the Work covered by the current payment request; and
    3. Conditional Waiver and Release Upon Progress Payment documents submitted by Contractor (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.

c. Final Payment: Owner will make full and final payment of the Contract Sum due within thirty (30) days of the completion of all of the following requirements:
    1. Contractor has submitted its final payment request;
    2. Contractor has submitted a certification that Contractor has paid for all labor, materials, and equipment relating to the Work covered by prior payment requests and that Contractor will pay for all labor, materials, and equipment relating to the Work covered by the final payment request; and
    3. Contractor has submitted 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.

Acceptance of final payment by Contractor or any Subcontractor will constitute a waiver of claims by the payee except for those claims previously made to Owner in writing and identified by Contractor in its affidavit as still pending.

If the aggregate of previous payments made by Owner exceeds the amount due Contractor, Contractor will reimburse the difference to Owner.

d. Owner may modify or reject any payment request if, in Owner’s opinion, the Work for which payment is requested is not acceptable or is less complete than represented on the payment request.

e. 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.

f. Contractor will maintain a copy of each payment request at the Project site for review by the Subcontractors.

g. No payment made, either in whole or in part, by Owner will be construed to be an acceptance of defective or improper materials or workmanship.

END OF DOCUMENT

B L A N K P A G E

DIVISION 01

SECTION 01 0000

GENERAL REQUIREMENTS: R&I PROJECT

SECTION 01 1000 SUMMARY

A. Work Covered By Contract Documents:
   1. Provisions contained in Division 01 apply to all other sections and divisions of Specifications. All instructions contained in Specifications are directed to Contractor. Unless specifically provided otherwise, all obligations set forth in Specifications are obligations of Contractor.
   2. Comply with applicable laws and regulations.
B. Work By Owner:
   1. Owner will furnish and install some portions of the Work with its own forces. Complete the Work necessary to accommodate the Work to be performed by Owner before scheduled date for performance of such Work.
   2. Owner may provide furnishings and/or equipment for Project. Contractor will receive, store, and protect such items on site until the date Owner accepts Project.

SECTION 01 1200 MULTIPLE CONTRACT SUMMARY

A. Separate Contracts:
   1. Contracts may be issued by Owner for performance of certain construction operations at Project site.
   2. 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:

SECTION 01 1400 WORK RESTRICTIONS

A. Project Conditions:
   1. During construction period, Contractor will have use of premises for construction operations. Contractor will ensure that Contractor, its employees, subcontractors, and employees comply with following requirements:
      a. Confine operations to areas within Contract limits shown on Drawings. Do not disturb portions of site beyond Contract limits.
      b. Do not allow alcoholic beverages, illegal drugs, or persons under their influence on Project Site.
      c. Do not allow use of tobacco in any form on Project Site.

d. Do not allow pornographic or other indecent materials on site.
e. Do not allow work on Project Site on Sundays except for emergency work.
f. Refrain from using profanity or being discourteous or uncivil to others on Project Site or while performing The Work.
g. Wear shirts with sleeves, wear shoes, and refrain from wearing immodest, offensive, or obnoxious clothing, while on Project Site.
h. Do not allow playing of obnoxious and loud music on Project Site. Do not allow playing of any music within existing facilities.
i. Do not build fires on Project Site.
j. Do not allow weapons on Project Site, except those carried by law enforcement officers and/or other uniformed security personnel who have been retained by Owner or Contractor to provide security services.

2. Existing Facilities:
   a. If Owner will occupy existing building, reasonably accommodate use of existing facilities by Owner.

SECTION 01 3000 ADMINISTRATIVE REQUIREMENTS

A. Administrative Requirements:
   1. Coordination:
      a. Coordinate construction activities to ensure efficient and orderly installation of each part of the Work.
      b. Coordinate construction operations that are dependent upon each other for proper installation, connection, and operation.
      c. Coordinate construction activities to ensure that operations are carried out with consideration given to conservation of energy, water, and materials.

SECTION 01 3100 PROJECT MANAGEMENT AND COORDINATION

A. Multiple Contract Coordination:
   1. Contractor shall be responsible for coordination of Temporary Facilities and Controls, Construction Waste Management and Disposal services, and Final Cleaning for entire Project unless directed otherwise by Owner's Representative for those who perform work on Project from Notice to Proceed to date of Substantial Completion.

B. Project Meetings And Conferences:
   1. Attend preconstruction conference and organizational meeting scheduled by Architect or Owner Representative 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, equipment deliveries, general inspection of tests, preparation of record documents and O&M manuals, project cleanup, security, shop drawings, samples, use of premises, work restrictions, and working hours.
   2. Pre-Installation Conferences.
      a. Attend pre-installation conferences specified in Contract Document.

SECTION 01 3300 SUBMITTAL PROCEDURES

A. Submittal Procedure:
   1. Coordination: Coordination preparation and processing of submittals with performance of construction activities. Transmit each submittal sufficiently before performance of related construction activities to avoid delay.
   2. Process Time: Allow sufficient review time so installation will not be delayed by time required to process submittals.
   3. Identification: Place permanent label or title block on each submittal for identification. Include name of entity that prepared each submittal on label or title block.
   4. Transmittal: Package each submittal appropriately for transmittal and handling.

      General:
      a. Transmit each submittal from Contractor to Architect using transmittal letter. Transmittal letter shall provide sufficient space for Architect review stamp and comments (5" wide x 3" high minimum space).

b. All submittals shall 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.
c. Submittals received from sources (both electronic and physical sources) other than Contractor or not marked with Contractor's approval will be returned without action.

Electronic Submittals:
d. Preferred method of transmittal for most submittals previously in paper format is via email attachment to Architect in .pdf format.
e. Maintain original size of .pdf files submitted from subcontractors (24"x36" drawings shall remain original size in electronic format, for example).
f. Electronic submittals shall be submitted as a single file (.pdf) per submittal item / discipline.
g. Do not submit multiple files, cut sheets, product information, etc.
h. Contractor shall compile each submittal including transmittal letter as first page of each submittal.
i. Contractor shall submit each submittal item / discipline in a separate email, not multiple submittals in a single email.
j. Subject line of submittal email shall include project name and submittal title / category.

Physical Submittals:
k. Submittals requiring hard copies or including physical product samples shall be delivered or shipped to Architect's office. Deliveries are accommodated from 8:30am to 4:30pm Monday through Friday on regular business days.
l. Package each submittal appropriately for transmittal and handling. On transmittal, record relevant information and requests for data.

B. Action Submittals:
1. Product Data: Submit product data, as required by individual Sections of Specifications.
2. Shop Drawings: Submit shop drawings for review and designate (stamp) approval of shop drawings.
3. Samples: Samples used for comparison with actual component to be installed. Samples when accepted will be used for quality comparisons throughout course of construction.

C. Informational Submittals:
1. 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.
a. Return copies or PDF files marked with action taken and with corrections or modifications required.

D. Closeout Submittals:
1. Submittals that occur during project closeout.

SECTION 01 3500 SPECIAL PROCEDURES

A. Quality Assurance:
1. Hot Work Permit (Available from Owner's Representative):
a. Required for doing hot work involving open flames or producing heat or sparks such as:
1) Brazing.
2) Cutting.
3) Grinding.
4) Soldering.
5) Thawing pipe.
6) Torch applied roofing.
7) Welding.

SECTION 01 4000 QUALITY REQUIREMENTS

A. Administrative Requirements:
1. Conflicting Requirements:
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.
2. Minimum Quantity or Quality Levels:

a. Quantity or quality level shown or specified shall be the minimum provided or performed. Actual installation may comply exactly with minimum quantity or quality specified, or it may exceed minimum within reasonable limits.

3. Submit to Owner permits, licenses, certifications, inspection reports, releases, jurisdictional settlements, notices, receipts for fee payments, judgments, and similar documents, correspondence, and records establishing compliance with standards and regulations bearing upon performance of the Work.

B. Quality Assurance:
1. 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.
2. Quality Assurance Services: 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. Owner or Owner's designated representative(s) will perform quality assurance to verify compliance with Contract Documents.
3. Notify Owner immediately if asbestos-containing materials or other hazardous materials are encountered while performing the Work.

C. Quality Control:
1. Quality Control Services:
a. Quality Control will be sole responsibility of Contractor.
1) 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.
a) They do not include inspections, tests or related actions performed by Architect or Owner Representative, governing authorities or independent agencies hired by Owner or Architect.
b) Quality assurance performed by Owner will be used to validate Quality Control performed by Contractor.
2) Where services are indicated as Contractor's responsibility, engage qualified Testing Agency to perform these quality control services:
a) Contractor will not employ same testing entity engaged by Owner, without Owner's written approval.

D. Repair And Protection:
1. On completion of testing, inspecting, sample taking, and similar services, repair damaged construction and restore substrates and finishes.
2. Protect construction exposed by or for Quality Assurance and Quality Control activities.
3. Repair and protection are Contractor's responsibility, regardless of assignment of responsibility for Quality Assurance and Quality Control Services.

SECTION 01 4301 QUALITY ASSURANCE - QUALIFICATIONS

A. Qualifications: Qualifications in this Section establish minimum qualification levels required; individual Specification Sections specify additional requirements:
1. Fabricator / Supplier / Installer Qualifications:
a. 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:
1) Where heading *'VMR (Value Managed Relationship) Suppliers / Installers*' is used to identify list of specified suppliers or installers, Owner has established relationships that extend beyond requirements of this Project. No other suppliers / installers will be acceptable. Follow specified procedures to preserve relationships between Owner and specified suppliers / installers and advantages that accrue to Owner from those relationships.
2) Where heading 'Acceptable or Approved Suppliers / Installers / Fabricators' is used to identify list of specified suppliers / installers / fabricators, use only one of listed suppliers / installers / fabricators. No others will be acceptable.
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 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 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:
      1) 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 will be performed by entities who are recognized experts in those operations:
      1) Specialists will satisfy qualification requirements indicated and will be engaged for activities indicated.
      2) Requirement for special will 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.
   b. Testing Laboratory:
      1) AASHTO Materials Reference Laboratory (AMRL) Accreditation Program.
      2) Cement and Concrete Reference Laboratory (CCRL).
      3) Nationally Recognized Testing Laboratory (NRTL): Nationally recognized testing laboratory according to 29 CFR 1910.7.
      4) 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.

SECTION 01 4523 TESTING AND INSPECTION SERVICES

A. Submittals:
   1. Certificates: Testing Agency will submit certified written report of each inspection, test, or similar service.
   2. 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 to Owner's Representative and to each of following if involved on project: Architect, Consulting Engineers (Engineer of Record), General Contractor, Authorities Having Jurisdiction (if required).
   3. Testing Agency:
      a. Qualifications of Testing Agency management, personnel, inspector and technicians designated to project.
      b. Provide procedures for non-destructive testing, equipment calibration records, personnel training records, welding inspection, bolting inspection, shear connector stud inspection, and seismic connection inspections.

B. Quality Assurance:
   1. 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.

2. Owner will employ independent Testing Agencies to perform certain specified testing, as Owner deems necessary.
3. Certification:
   a. 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.
   b. 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.
4. Written Practice for Quality Assurance:
   a. 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.
   b. Written practice will describe testing agency procedures for determining acceptability of structure in accordance with applicable codes, standards, and specifications.
   c. Written practice will describe Testing Agency inspection procedures, including general inspection, material controls, visual welding inspection, and bolting inspection.

C. Quality Control:
1. Quality Control will be sole responsibility of Contractor. Contractor will be responsible for testing, 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.
2. Notify results of all Testing and Inspection performed by Contractor's independent Testing Agencies to Architect and/or Owner's Representative within 24 hours of test or inspection having been performed:
   a. Testing and Inspection Reports will be distributed as follows:
      1) 1 copy to Owner's Representative.
      2) 1 copy to Architect.
      3) 1 copy to Consulting Engineer(s) (Engineer of Record).
      4) 1 copy to Authorities Having Jurisdiction (if required).
3. Contractor's Responsibility:
   a. 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.
   b. Tests and inspections that are not explicitly assigned to Owner are responsibility of Contractor.
   c. 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:
      1) 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.
      2) Taking adequate quantities of representative samples of materials that require testing or helping Testing Agency in taking samples.
      3) Providing facilities for storage and curing of test samples, and delivery of samples to testing laboratories.
      4) Providing Testing Agency with preliminary design mix proposed for use for materials mixes that require control by Testing Agency.
   d. For any requested inspection, Contractor will complete prior inspections to ensure that items are ready for inspection.
   e. All Work is subject to testing and inspection and verification of correct operation.
   f. Comply:
      1) 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.
      2) Comply with Contract Documents in making such repairs.
   g. Data:
      1) Furnish records, drawings, certificates, and similar data as may be required by testing and inspection personnel to assure compliance with Contract Documents.
   h. Defective Work (Non-Conforming Work): Non-conforming Work as covered in General Conditions applies, but is not limited to following requirements Protection:
      1) 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.
      2) Where testing personnel take cores or cut-outs to verify compliance, repair prior to acceptance.

3) Contractor will be responsible for any and all costs incurred resulting from inspection that was scheduled prematurely or retesting due to failed tests.
4) Remove and replace any Work found defective or not complying with contract document requirements at no additional cost to Owner.
5) 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.

i. Protection:
1) Protect construction exposed by or for quality assurance and quality control service activities, and protect repaired construction.

j. Scheduling: Contractor is responsible for scheduling times for inspections, tests, taking samples, and similar activities:
1) Schedule testing and inspections in advance so as not to delay the Work and to eliminate any need to uncover the Work for testing or inspection.
2) Notify Testing Agency and Architect or Owner as noted in Sections in Division 01 thru Division 50 prior to any time required for such services.
3) Incorporate adequate time for performance of all inspections and correction of noted deficiencies.
4) Schedule sequence of activities to accommodate required services with minimum of delay.
5) Schedule sequence of activities to avoid necessity of removing and replacing construction to accommodate testing and inspections.

k. Test and Inspection Log:
1) Provide system of tracking all field reports, describing items noted, and resolution of each item. Prepare record of tests and inspections. Include following requirements:
(a) Date test or inspection was conducted.
(b) Description of the Work tested or inspected.
(c) Date test or inspection results were transmitted to Architect or Owner Representative.
(d) Identification of Testing Agency or inspector conducting test or inspection.
2) Maintain log at Project site. Post changes and modifications as they occur. Provide access to test and inspection log for Architect's or Owner’s reference during normal working hours.

D. Tests And Inspections - General:
1. Testing specifically identified to be conducted by Owner, will be performed by an independent entity and will be arranged and paid for by Owner.
2. Individual Sections in Division 01 through Division 50 indicate if Owner will provide testing and inspection of the Work of that Section.
3. Owner may engage additional consultants for testing, air balancing, commissioning, or other special services:
a. 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.
b. Contractor must cooperate with persons and firms engaged in these activities.
4. 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 50.
5. Taking Specimens:
a. Only testing laboratory shall secure, handle, transport, or store any samples and specimens for testing.
6. Scheduling Testing Agency:
a. Contractor will coordinate the Work and facilitate timeliness of such testing and inspecting services so as not to delay the Work.
b. Contractor will notify Testing Agency and Architect or Owner Representative to schedule tests and / or inspections.

E. Testing Agency Services And Responsibility:
1. Testing Agency, including independent testing laboratories, will be licensed and authorized to operate in jurisdiction in which Project is located:
a. Approved Testing Agency Qualifications: Requirements of Section 01 4301 apply.
2. Testing and Inspection Services:
a. Testing Agency will not release, revoke, alter, or increase Contract Document requirements or approve or accept any portion of the Work.
b. Testing Agency will not give direction or instruction to Contractor.

c. 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.
d. Testing Agency will not provide additional testing and inspection services beyond scope of the Work without prior approval of Owner's Representative and/or Architect.

3. Testing Agency Duties:
   a. Independent Testing Agency engaged to perform inspections, sampling, and testing of materials and construction specified in individual specification Sections will cooperate with Architect or Owner Representative and Contractor in performance of its duties and will provide qualified personnel to perform required inspections and tests.
   b. Testing Agency will test or obtain certificates of tests of materials and methods of construction, as described herein or elsewhere in technical specification.
   c. Testing Agency will provide management, personnel, equipment, and services necessary to perform testing functions as outlined in this section.
   d. 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.
   e. 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.
   f. 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.
   g. Welding Procedure Review: Testing Agency will provide review and approval or rejection of all welding procedures to be used and verify compliance with all reference standard requirements.
4. Testing and Inspection Reports:
   a. Conduct and interpret tests and inspections and state in each report whether tested and inspected Work complies with or deviates from requirements.
   b. Laboratory Reports: Testing Agency will furnish reports of materials and construction as required, including:
      1) Description of method of test.
      2) Identification of sample and portion of the Work tested:
         (a) Description of location in the Work of sample.
         (b) Time and date when sample was obtained.
         (c) Weather and climatic conditions at time when sample was obtained.
      3) Evaluation of results of tests including recommendations for action.
   c. Inspection Reports:
      1) Testing Agency will furnish "Inspection at Site" reports for each site visit documenting activities, observations, and inspections.
      2) 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.
   d. Reporting Testing and Inspection (Conforming Work):
      1) Submit testing and inspection reports as required within twenty four (24) hours of test or inspection having been performed.
   e. Reporting Testing and Inspection Defective Work (Non-Conforming Work):
      1) 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:
         (a) 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).
         (b) Submit written inspection report and test results as required within twenty four (24) hours of test or inspection having been performed.
   f. Final Report:
      1) Submit final report of tests and inspections at Substantial Completion, which identify unresolved deficiencies.

F. Architect's Responsibility:
   1. Architect Duties:
      a. Notify Owner's Representative before each test and/or inspection:

G. Field Quality Control:
   1. Field Tests And Inspections:

a. Field Test and Inspection requirements are described in detail in 'Field Quality Control' in Part 3 Execution' of individual Sections in Division 01 thru Division 49.

SECTION 01 4546 DUCT TESTING, ADJUSTING, AND BALANCING

A. Related Requirements:
1. Section 01 4523: 'Testing and Inspecting Services' for testing and inspection, and testing laboratory services for materials, products, and construction methods.
2. 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.

B. Scheduling:
1. 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.

C. Submittals:
1. Informational Submittals:
   a. Test and Evaluation Reports:
   b. Preliminary Report(s): Four copies to be given to Owner's Representative.
   c. Final Report: Four copies to be given to Owner's Representative.
2. Closeout Submittals:
   a. Include following in Operations And Maintenance Manual specified in Section 01 7800:
      1) 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.

D. 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 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.

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 81/2 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.

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

SECTION 01 5000 TEMPORARY FACILITIES AND CONTROLS

A. Administrative Requirements:

1. Contractor is responsible for security of materials, tools, and equipment. Do not permit others to use building keys provided by Owner. Safeguard building and contents while the Work is being performed and secure building when the Work is finished for day.
2. 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:
   a. Avoid use of tools and equipment that produce harmful noise.
   b. Restrict use of noisemaking tools and equipment to hours that will minimize complaints from persons or firms near site.
   c. Protect the Work, materials, apparatus, and fixtures from injury due to weather, theft, and vandalism.
3. Existing restroom facilities may be used by Contractor. Clean restrooms and portions of existing building used in accessing restrooms daily. If existing facilities are not usable, provide and maintain temporary sanitary toilet.

B. Temporary Barriers And Enclosures:
   1. Protect existing trees and plants. Remove and replace vegetation that dies or is damaged beyond repair due to construction activities.
   2. Erect adequate barricades, warning signs, and lights necessary to protect persons from injury or harm.
   3. Provide temporary enclosures at exterior building openings for security and protection from weather, theft, and vandalism. Erect and maintain dust-proof partitions and enclosures as required to prevent spread of dust and fumes to occupied portions of building.
   4. 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:
      a. 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.
      b. 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').
      c. 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.
      d. 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.
      e. 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.

C. Utilities:
   1. Electrical Power: Owner will provide electric power for construction activities within limits available at existing facility.
   2. Fire Protection: Exercise caution to avoid fire damage: Do not build fires on site.
   3. Heating, Cooling, And Ventilation:
      a. Permanent mechanical system may be operated upon following conditions:
         1) Do not interfere with normal set-back temperature patterns except as approved by Project Manager.
         2) Do not operate system when the Work causing airborne dust is occurring or when dust caused by such Work is present without first installing temporary filtering system.
   4. Lighting: Existing lighting system may be used by Contractor.
   5. Water Service: Contractor will use existing water supply for construction purposes to extent of existing facilities.

SECTION 01 6100 COMMON PRODUCT REQUIREMENTS

A. Administrative Requirements:

1. Provide products that comply with Contract Documents, are undamaged, and, unless otherwise indicated, are 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.

SECTION 01 6200 PRODUCT OPTIONS

A. 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 Uniform Commercial Code, are not acceptable. However, equal products may be approved upon compliance with Contract Document requirements.
      b. Approved Products / Manufacturers / Suppliers / Installers:
         1) Category One:
            (a) Owner has established 'Value Managed Relationships' that extend beyond requirements of this Project. No substitutions or equal products will be allowed on this Project.
            (b) 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 National Contracts that contain provisions extending beyond requirements of this Project. No substitutions or equal products will be allowed on this Project.
            (b) 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) Specified products are provided to Church Projects under a National Account Program. Use these products to preserve advantages that accrue to Owner from those programs. No substitutions or equal products will be allowed on this Project.
         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 convenience to Contractor as 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 or Owner Representative by Addendum.
         2) Type Two: Use specified products / manufacturers unless approval to use other products and manufacturers has been obtained from Architect or Owner Representative 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 will conform to Contract Document requirements.

SECTION 01 6400 OWNER-FURNISHED PRODUCTS

A. Administrative Requirements:
   1. Install items furnished by Owner or receive and store in safe condition items purchased directly by Owner according to requirements of Contract Documents.

SECTION 01 6600 DELIVERY, STORAGE, AND HANDLING REQUIREMENTS

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

B. Delivery, Storage, and Handling:
   1. Delivery and Acceptable 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.
      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.
   2. 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 weather tight enclosure, with ventilation adequate to prevent condensation. Maintain temperature and humidity within range required by manufacturer's instructions.

SECTION 01 7000 EXECUTION REQUIREMENTS

A. Administrative Requirements:
   1. Require installer of each major component to inspect both substrate and conditions under which the Work is to be done:
      a. Notify Owner in writing of unsatisfactory conditions.
      b. Do not proceed until unsatisfactory conditions have been corrected.

B. Common Installation Provisions:
   1. Provide attachment and connection devices and methods necessary for securing the Work:
      a. Secure the Work true to line and level.
      b. Allow for expansion and building movement.
   2. Recheck measurements and dimensions before starting each installation.
   3. Design, furnish, and install all shoring, bracing, and sheathing as required for safety and for proper execution of the Work and, unless otherwise required, remove same when the Work is completed.
   4. Where mounting heights are not shown, install individual components at standard mounting heights recognized within industry or local codes for that application. Refer questionable mounting height decisions to Owner for final decision.

C. Protection:
   1. Cover and protect furniture, equipment, and fixtures from soiling and damage when demolition the Work is performed in rooms and areas from which such items have not been removed.

D. Completion Inspection:
   1. Upon 100 percent completion of Project, Contractor will request Substantial Completion Inspection.
   2. Owner will conduct Substantial Completion Inspection in presence of Contractor and furnish list of items to be corrected.
   3. Contractor will notify Owner in writing when items have been corrected.

SECTION 01 7400 CLEANING AND WASTE MANAGEMENT

A. Disposal Of Waste:
   1. Except for items or materials to be salvaged, recycled, or otherwise reused, remove waste materials from Project site and legally dispose of them in landfill or incinerator acceptable to authorities having jurisdiction:

a. Except as otherwise specified, do not allow waste materials that are to be disposed of accumulate on-site.
b. Remove and transport debris in manner that will prevent spillage on adjacent surfaces and areas.
2. Burning: Do not burn waste materials.
3. Disposal: Transport waste materials off Owner's property and legally dispose of them.

B. Progress Cleaning:
1. Keep premises broom-clean during progress of the Work.
2. 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.
3. Clean and maintain completed construction as frequently as necessary throughout construction period.
4. Remove waste materials and rubbish caused by employees, subcontractors, and contractors under separate contract with Owner and dispose of legally.

C. Final Cleaning:
1. Clean each surface or unit to condition expected in normal, commercial-building cleaning and maintenance program. Comply with manufacturer's instructions. Remove all rubbish from under and about building and leave building clean and habitable.
2. In addition to general cleaning noted above, perform cleaning for all trades at completion of the Work in areas where construction activities have occurred.
3. If Contractor fails to clean up, Owner may do so and charge cost to Contractor.

SECTION 01 7700 CLOSEOUT PROCEDURES

A. General:
1. 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.
2. 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.
3. Date of Substantial Completion shall not occur until completion of construction work, unless agreed to by Architect / Owner's Representative and included on Certificate of Substantial Completion.

B. Preliminary Closeout Review:
1. 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.
2. 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.
3. 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:
a. Punch list of items requiring completion and correction will be created.
b. Time frame for completion of punch list items will be established, and date for Substantial Completion Inspection shall be set.

C. Substantial Completion Inspection:
1. 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.
2. 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.
3. 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:
a. Date of Substantial Completion.
b. Punch List Work not yet completed, including seasonal and long lead items.
c. Amount to be withheld for completion of Punch List Work.
d. Time period for completion of Punch List Work.

e. 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.

4. 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.

D. Final Acceptance Meeting:
1. 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.
2. Owner, Architect and Contractor execute Owner's Project Closeout - Final Acceptance form, and verify:
   a. 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.
   b. Owner's maintenance personnel have been instructed on all system operation and maintenance as required by the Contract Documents.
   c. Final cleaning requirements have been completed.
3. 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.
4. When Owner and Architect confirm that The Work is satisfactorily completed, Architect will authorize final payment.

SECTION 01 7800 CLOSEOUT SUBMITTALS

A. Administrative Requirements:
1. Project Record Documents:
   a. Do not use record documents for construction purposes:
      1) Protect from deterioration and loss in secure, fire-resistive location.
      2) Provide access to record documents for reference during normal Working hours.
   b. Maintain clean, undamaged set of Drawings. Mark set to show actual installation where installation varies from the Work as originally shown. Give particular attention to concealed elements that would be difficult to measure and record at later date:
      1) Mark record sets with red erasable pencil. Use other colors to distinguish between variations in separate categories of the Work.
      2) Mark new information that is important to Owner, but was not shown on Contract Drawings.
      3) Note related Change Order numbers where applicable.
2. As Built Record Drawings:
   a. Provide two full-size sets of prints and PDF file of As Built Record Drawings to Facilities Management Office, printed from the updated AutoCAD drawing files or updated Revit model files, as specified by Owner, that have been modified to show actual dimensions and location of equipment, material, utility lines, and other work as actually constructed, based upon information provided by Contractor. Architect will submit updated As Built Record Drawings in PDF (ISO32000 format) to Owner. In addition, Architect will submit to Owner updated AutoCAD as built record drawing files with associated plot style tables or the Revit as built record model files, as specified by Owner.

B. Operations And Maintenance Manual:
1. General:
   a. Include closeout submittal documentation as required by Contract Documentation. Include only closeout submittals as defined in individual specification section.
   b. Submittal Format: Digital copies unless otherwise noted, required for each individual specification section that include 'Closeout Submittals'.
2. Project Manual:
   c. 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: (digital format only).
4. Operations and Maintenance Data (digital format only):

a. Operations and maintenance submittals includies cleaning instructions, maintenance instructions, operations instructions, equipment list, and parts lists.
5. Warranty Documentation: Digital format of final, executed warranties.
6. Record Documentation:
   a. Documentation includes Certifications, color and pattern selections, Design Date, Geotechnical Evaluation Reports (soils reports), Manufacture Reports, Literature or cut sheets, Shop Drawings, Source Quality Control, Special Procedures, and Testing and Inspection Reports.
7. Software: Audio and Video System software, programming and set-files.
8. Irrigation Plan: Laminated and un-laminated reduced sized hard copies.
9. Landscape Management Plan (LMP):
   a. Irrigation Section:
      (1) Documentation required by Sections under 32 8000 Heading: Irrigation.
   b. Landscaping Section:
      (1) Documentation required by Sections under 32 8000 Heading: Irrigation.

C. Warranties:
1. 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.
2. Delivery of guarantees and warranties will not relieve Contractor from obligations assumed under other provisions of Contract Documents.

END OF SECTION

B L A N K P A G E

DIVISION 06: WOOD, PLASTICS, AND COMPOSITES

END OF TABLE OF CONTENTS

B L A N K P A G E

SECTION 06 1011

WOOD FASTENINGS

PART 1 - GENERAL

1.1 SUMMARY

A. Includes But Not Limited To:
   1. Quality of wood fastening methods and materials used for Rough Carpentry unless specified otherwise.

B. Related Requirements:
   1. Section 03 1511: 'Concrete Anchors and Inserts' for Quality of Anchors and Inserts.
   2. Section 05 0523: 'Metal Fastenings' for Quality of bolts used for Rough Carpentry.
   3. Furnishing and installing of other fasteners are specified in individual Sections where installed.

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 D3498-03(2011), ‘Standard Specification for Adhesives for Field-Gluing Plywood to Lumber Framing for Floor Systems’.
      c. ASTM F1667-17, ‘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	Length	Diameter
8d Box	2-1/2 inches	0.113 inch	63.5 mm	2.827 mm
8d Common	2-1/2 inches	0.131 inch	63.5 mm	3.389 mm
10d Box	3 inches	0.128 inch	76.2 mm	3.251 mm
10d Common	3 inches	0.148 inch	76.2 mm	3.759 mm
16d Box	3-1/2 inches	0.135 inch	88.9 mm	3.411 mm
16d Sinker	3-1/4 inches	0.148 inch	82.6 mm	3.759 mm
16d Common	3-1/2 inches	0.162 inch	88.9 mm	4.115 mm

B. Materials:
1. Wood fastener list:
   a. Provide VMR Suppliers with wood fastener list.
2. Fasteners:
   a. General:
      1) Fasteners for preservative treated and fire-retardant-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.
      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.
         b) Redhead Division of ITW, Wood Dale, IL www.itw-redhead.com and Markham, ON 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.

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. Related Requirements:
   1. Sections under 06 4000 Heading: 'Architectural Woodwork' for wall blocking requirements.

1.2 REFERENCES

A. Reference Standards:
   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. CSA-O141-05 (R2014), ‘Softwood Lumber'.
      c. CSA-O151-09 (R2014), ‘Canadian Softwood Plywood'.

1.3 DELIVERY, STORAGE, AND HANDLING

A. Delivery And Acceptance Requirements:
   1. Protect lumber and plywood 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 plywood on level racks and keep free of ground to avoid warping.
   2. Stack to insure proper ventilation and drainage.

PART 2 - PRODUCTS

2.1 MATERIAL

A. Dimension Lumber:
   1. Meet requirements of PS 20 and National Grading Rules for softwood dimension lumber.
   2. Bear grade stamp of WWPA, SPIB, or other association recognized by American Lumber Standards Committee identifying species of lumber by grade mark or by Certificate of Inspection.
   3. Lumber 2 inches (50 mm) 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'.
   4. Preservative Treated Plates / Sills:
      a. 2x4 (38 mm by 64 mm): Standard and better Douglas Fir, Southern Pine, or HemFir, or StrandGuard by iLevel by Weyerhaeuser Boise, ID www.ilevel.com. (LSL 1.3 E)
      b. 2x6 (38 mm by 140 mm) 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. (LSL 1.3 E).

B. Lumber Ledgers:

1. No. 1 Douglas Fir, Larch, or Southern Pine.

C. Blocking:
1. Sound lumber without splits, warps, wane, loose knots, or knots larger than 1/2 inch (13 mm).

D. Furring Strips:
1. Utility or better.

PART 3 - EXECUTION

3.1 ERECTION

A. General:
1. Use preservative treated wood for wood members in contact with concrete or masonry.

B. Accessory / Equipment Mounting And Standing & Running Trim Blocking (nailers):
1. Furnish and install blocking in wood framing required for hardware, specialties, equipment, accessories, and mechanical and electrical items, etc.
2. Attach blocking not installed with clips with two fasteners in each end of each piece of blocking.

C. Furring Strips
1. On Wood or Steel: Nail or screw as required to secure firmly.
2. On Concrete or Masonry:
   a. Back up furring strips on exterior walls or walls in contact with earth with 15 lb (6.8 kg) felt strip.
   b. Nail at 12 inches (300 mm) on center maximum.

END OF SECTION

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. Chair Rails.
   3. Selected Building Specialties.
   4. Selected Equipment.
   5. TV Wall Mounted Support Bracket (Owner Furnished).
   6. Miscellaneous as specified elsewhere.

C. Related Requirements:
   1. Section 06 1100: 'Wood Framing' for furring and blocking.
   2. Section 06 2210: 'Miscellaneous Wood Trim'.
   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 4005: 'Plastic Laminate' for countertops.
      c. Section 06 4116: 'Plastic Laminated-Faced Architectural Cabinets'.
      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. 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.
   7. Sections in Division 10: Furnishing of Specialties.

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.
      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. Manufacturers:
   1. Manufacturer Contact List:
      a. Bommer Industries, Landrum, SC www.bommer.com.
      b. ClosetMaid, a division of Emerson Electric, Ocala, Florida www.closetmaid.com.
      c. Stanley, New Britain, CT www.stanleyhardware.com or Oakville, ON (800) 441-1759.

B. 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.
   6. Attach custom casework as specified in Sections under 06 4000 Heading: 'Furnishing of Architectural Woodwork' to wall blocking with #10 x 3 inch (76 mm) minimum Cabinet Screws. Attach wall cabinets with screws equally spaced horizontally not to exceed 12 inches (305 mm) O.C. with 3 inch (76 mm) maximum spacing at cabinet edges.

C. Items Installed But Not Furnished Under This Section: Install in accordance with requirements specified in Section furnishing item.
   1. TV Wall Mounted Support Bracket (Owner Furnished).
      a. Mounting Height:
         1) As shown on Contract Documents.

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. Salvage and reinstall existing.
   2. Hollow metal door frames.
   3. Finish hardware. Salvage and reinstall existing.

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 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 (1.6 mm) from top edge to opposite top edge.
   b. Plumbness: 1/16 inch (1.6 mm) from top of jamb to bottom of jamb.
   c. Alignment: 1/16 inch (1.6 mm) from plane of left side face of jamb to right side face of jamb.
   d. Twist: 1/16 inch (1.6 mm) 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 (1.6 mm) at head and hinge jamb plus 1/16 inch (1.6 mm) maximum
      2) 1/8 inch (3 mm) at strike jamb plus or minus 1/16 inch (1.6 mm) maximum.
      3) 1/2 inch (12.7 mm) to top of finished floor surface or 1/4 inch (6 mm) to top of threshold, plus or minus 1/16 inch (1.6 mm) 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. Caulk around both sides of frames installed in exposed masonry walls 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.

END OF SECTION

B L A N K P A G E

SECTION 06 2210

MISCELLANEOUS WOOD TRIM

PART 1 - GENERAL

1.1 SUMMARY

A. Includes But Not Limited To:
   1. Furnish and install wood trim not specified elsewhere as described in Contract Documents.

B. Related Requirements:
   1. Section 06 1100: 'Wood Framing' for wall blocking required for Wood Trim.
   2. Section 06 2001: ‘Common Finish Carpentry Requirements’:
      a. Installation of Wood Trim.
   3. Section 06 4001: 'Common Architectural Woodwork Requirements':
      a. Approved Fabricators.
      b. General standards for materials and fabrication of Architectural Woodwork.
   4. Section 06 4512: 'Architectural Woodwork Wood Trim'.
   5. Section 09 9324: ‘Interior Clear-Finished Hardwood’.

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.
      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. 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.

1.3 SUBMITTALS

A. Action Submittals:
   1. 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 (200 mm by 255 mm) sample of Red Oak 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) Owner will provide Control Sample for finish.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Design Criteria:
   1. General:
      a. Meet requirements of Section 06 4001 for general standards for materials and fabrication of Architectural Woodwork.
   2. Clear Finished Hardwood:
      a. Match materials specified in Section 06 4512.
      b. Match finish specified in Section 06 4512 and 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 provided sample specified in Section 09 9324.

PART 3 - EXECUTION: Not Used

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 2210: ‘Miscellaneous Wood Trim’.
   4. Section 06 4005: ‘Plastic Laminate’.
   5. Section 06 4114: ‘Wood-Veneer-Faced Architectural Cabinets’.
   6. Section 06 4512: ‘Architectural Woodwork Wood Trim’.
   7. Section 09 9324: ‘Interior Clear-Finished Hardwood’ for filling of nail holes and finishing.

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.
      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. 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.

1.4 QUALITY ASSURANCE

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

1. Fabricator:
   a. Fabricator Firm specializing in performing work of this section.
      1) Firm experience in supplying products indicated for this Project.
      2) Firm with sufficient production capacity to produce required units.
      3) Firm will comply with specifications and Contract Documents for this Project.
      4) Minimum five (5) years experience in Woodwork installations.
      5) Minimum five (5) satisfactorily completed installations in past three (3) years of projects similar in size, scope, and installation procedures required for this project before bidding.
   b. Upon request by Architect or Owner, submit documentation.

1.5 DELIVERY, HANDLING, AND STORAGE

A. Delivery And Acceptance Requirements:
   1. Assemble architectural woodwork at Architectural Woodwork Fabricator's plant and deliver ready for erection insofar as possible.
   2. Protect architectural woodwork from moisture and damage while in transit to job site.
   3. Report damaged materials received within two (2) days from delivery at project site.

B. Storage And Handling Requirements:
   1. Unload and store in place where it will be protected from moisture and damage and convenient to use.

PART 2 - PRODUCTS

2.1 FABRICATORS

A. Approved Fabricators. See Section 01 4301:
   1. Meet Quality Assurance Fabricator Qualifications as specified in Part 1 of this specification.

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 (3 871 sq cm).
            b) One defect per additional 150 sq inches (968 sq cm) 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 (3 mm) in diameter. No loose knots permitted.
            b) Patches (dutchmen) not apparent after finishing when viewed beyond 18 inches (450 mm).
            c) Checks or splits not exceeding 1/32 inch by 3 inches (1 mm by 75 mm) and not visible after finishing when viewed beyond 18 inches (450 mm).
            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 (3 meters) without joints. No joints shall occur closer than 72 inches (1 800 mm) in straight runs

exceeding 18 feet (3 600 mm). Runs between 18 feet (3 600 mm) and 10 feet (3 meters) may have no more than one joint. No joints shall occur within 72 inches (1 800 mm) of outside corners nor within 18 inches (450 mm) 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 (0.4 mm) maximum.
   d. Sanding Cross Scratches: 1/4 inch (6 mm) maximum.
   e. Plug screw holes. Screw locations not to be visible beyond 18 inches (450 mm).
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 slivers. Radius of 'easing' shall be uniform throughout Project and between 1/32 and 1/16 of an inch (0.8 and 1.6 of a millimeter).
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 of or defects in exposed finished surfaces of architectural woodwork to match adjacent similar undamaged surface.

PART 3 - EXECUTION: Not Used

END OF SECTION

B L A N K P A G E

SECTION 06 4005

PLASTIC LAMINATE

PART 1 - GENERAL

1.1 SUMMARY

A. Products Furnished But Not Installed Under This Section:
   1. Wall-hung counters.
   2. Countertops for custom casework.

B. Related Requirements:
   1. Section 06 2001: 'Common Finish Carpentry Requirements':
      a. Installation of wall-hung counters.
      b. Installation of countertops for custom casework.
   2. Section 06 4001: 'Common Architectural Woodwork Requirements':
      a. Approved Fabricators.
      b. General standards for materials and fabrication of Architectural Woodwork.

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.
      a. Architectural Woodwork Standards (AWS), 2nd Edition, 2014.

B. Definitions:
   1. Flame Spread: The propagation of flame over a surface.
      a. Flame Spread Index: The numerical value assigned to a material tested in accordance with ASTM E84 or UL 723.
   2. Grade: Unless otherwise noted, this term means Grade rules for Economy, Custom, and/or Premium Grade.
      a. Premium Grade: Highest Grade available in both material and workmanship where highest level of quality, materials, workmanship, and installation is required.
   3. High-Pressure Decorative Laminate (HPDL): Laminated thermosetting decorative sheets intended for decorative purposes. Also known as Plastic Laminate.
   4. Smoke-Developed Index: The numerical value assigned to a material tested in accordance with ASTM E84 or UL 723.

C. Reference Standards:
   1. ASTM International:
      a. ASTM E84-18, 'Standard Test Method for Surface Burning Characteristics of Building Materials'.
      b. ASTM E162-15a, 'Standard Test Method for Surface Flammability of Materials Using a Radiant Heat Energy Source'.
   2. Kitchen Cabinet Manufacturers Association:
      a. ASTM/KCMA A161.1-2012, 'Performance And Construction Standards For Kitchen And Vanity Cabinets'.
   3. National Electrical Manufacturer's Association / American National Standards Institute:
      a. ANSI/NEMA LD-3-2005, 'High Pressure Decorative Laminates'.
   4. Underwriters Laboratories, Inc.:
      a. UL 723: 'Standard for Safety Test for Surface Burning Characteristics of Building Materials'; (10th Edition).

1.3 SUBMITTALS

A. Action Submittals:
1. Product Data:
a. Color selections.
b. Manufacturer's technical data sheet.

B. Informational Submittals:
1. Certificates:
a. Provide Manufacturer's certification of compliance to ANSI/NEMA LD 3.
2. Test And Evaluation Reports:
a. Test reports: Certified test reports showing compliance with specified performance characteristics and physical properties for Quality Assurance if requested by Owner or Architect.

C. Closeout Submittals:
1. Include following in Operations And Maintenance Manual specified in Section 01 7800:
a. Record Documentation:
1) Manufacturers documentation:
a) Manufacturer's literature for plastic laminate.
b) Color selections.

1.4 QUALITY ASSURANCE

A. Regulatory Agency Sustainability Approvals:
1. Fire-Test-Response Characteristics: Provide plastic laminate with surface burning characteristics as determined by testing identical products by qualified testing agency.
a. Surface-Burning Characteristics:
1) Plastic Laminate 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.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Fabricators:
1. Approved Fabricators. See Section 06 4001 for Category Three Approved Fabricators.

B. Manufacturers:
1. Type Two Acceptable Manufacturers:
a. Formica, Cincinnati, OH www.formica.com or Formica Canada Inc, St Jean sur Richelieu, PQ (450) 347-7541, all matte finish.
b. Equal as approved by Architect before bidding. See Section 01 6200.

C. Plastic Laminates:
1. Design Criteria:
a. Countertops:
1) Post-formed front edge and backsplash, except where detailed otherwise, with plastic laminate meeting requirements of ANSI/NEMA LD 3: PF 42.
a) Vertical Applications: GP 28.
b) Horizontal (other than countertops): GP 38.
2) No raised lip on front edge.
b. Balancing Material: BK 20.
c. AWS Quality Grade: Premium.

2. Assemblies:
   a. Countertops shall meet requirements of KCMA A161.1.
   b. Adhesives for other than post-formed types shall be spray grade, high heat resistant, neoprene contact adhesive.
3. Category Four Approved Colors. See Section 01 6200 for definition of Categories:
   a. No. 507-58, Folkstone Grafix by Formica, all matte finish.

PART 3 - EXECUTION: Not Used

END OF SECTION

B L A N K P A G E

SECTION 06 4116

PLASTIC-LAMINATE-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: Furring and blocking.
   2. Section 06 2001: 'Common Finish Carpentry Requirements':
      a. Installation of wall-hung counters.
      b. Installation of countertops for custom casework.
   3. Section 06 4001: 'Common Architectural Woodwork Requirements':
      a. Approved Fabricators.
      b. General standards for materials and fabrication of Architectural Woodwork.
   4. Section 06 4006: 'Plastic Laminate' for countertops.
   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.
      a. Architectural Woodwork Standards (AWS), 2nd Edition, 2014.
   2. Hardwood Plywood & Veneer Association (HPVA), Reston, VA www.hpva@hpva.org.
   3. The Engineered Wood Association (APA), Tacoma, WA www.apawood.org.

B. Definitions:
   1. Adhesive, Type I (fully waterproof): Forms a bond that will retain practically all of its strength when occasionally subjected to a thorough wetting and drying; bond shall be of such quality that specimens will withstand shear and the two-cycle boil test specified in ANSI/HPVA HP (latest edition).
   2. Adhesive, Type II (water-resistant): Forms a bond that will retain practically all of its strength when occasionally subjected to a thorough wetting and drying; bond shall be of such quality that specimens will withstand the three-cycle cold soak test specified in ANSI/HPVA HP.
   3. Core: The material (typically, veneer, lumber, particleboard, medium-density fiberboard, or a combination of these) on which an exposed surface material (typically, veneer or high-pressure decorative laminate HPDL) is applied.
   4. Core, Solid: The innermost layer or section in flush door construction. Typical constructions are as follows:
      a. Core, Mineral: A fire-resistant core material generally used in wood doors requiring fire ratings of 3/4 hours or more.
      b. Particleboard - A solid core of wood or other lignocellulose particles bonded together with a suitable binder, cured under heat, and pressed into a rigid panel in a flat-platen press.
   5. Edge Banding: Method of concealing plies or inner cores of plywood or particleboard when edges are exposed.
   6. Exposed Surfaces: Surfaces normally visible after installation.
   7. Face: The better side of any panel in which the outer plies are of different veneer grades; also, either side of a panel in which there is no difference in veneer grade of the outer plies.
   8. 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.

9. High-Pressure Decorative Laminate (HPDL): Laminated thermosetting decorative sheets intended for decorative purposes. Sheets consist essentially of layers of fibrous sheet material, such as paper, impregnated with thermosetting condensation resin and consolidation under heat and pressure. Top layers have decorative color or printed design. Exposed surface has attractive exposed surface that is durable and resistant to damage from abrasion and mild alkalies, acids, and solvents. Also, known as Plastic Laminate.
10. 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.
11. Melamine: Resin-impregnated paper used in decorative composite panel products.
12. 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.

C. Reference Standards:
1. American National Standards Institute / Hardwood Plywood & Veneer Association:
a. ANSI/HPVA HP-1-2009, 'Standard for Hardwood and Decorative Plywood'.

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 (50mm x 100mm) 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.

1.5 DELIVERY, HANDLING, AND STORAGE

A. Delivery And Acceptance Requirements:
1. Assemble architectural woodwork at Architectural Woodwork Fabricator's plant and deliver ready for erection insofar as possible.
2. Protect architectural woodwork from moisture and damage while in transit to job site.
3. Report damaged materials received within two (2) days from delivery at project site.

B. Storage And Handling Requirements:
1. Unload and store in place where it will be protected from moisture and damage and convenient to use.

1.6 WARRANTY

A. Manufacturer Warranty:

1. Fabricator's written guarantee that all Goods and Services will be free from defects in materials and workmanship for warranted period from date of substantial completion.

PART 2 - PRODUCTS

2.1 ASSEMBLIES

A. Manufacturers:
   1. Manufacturer Contact List:
      a. Accuride, Santa Fe Springs, CA www.accuride.com.
      b. Blum Inc, Stanley, NC www.blum.com.
      c. Charter Industries, Kentwood, MI www.charterindustries.com.
      d. CompX National, Mauldin, SC www.nclnet.com.
      e. Formica, Cincinnati, OH www.formica.com.
      f. Grass America Inc, Kernerville, NC www.grassusa.com.
      g. Hafele America Co., Archdale, NC hafele.com.
      h. Ives, Indianapolis, IN www.iveshardware.com.
      i. Knape & Vogt, Grand Rapids, MI www.knapeandvogt.com.
      j. Nevamar, Odenton, MD www.nevamar.com.
      k. Olympus Lock Co, Seattle, WA www.olympus-lock.com.
      l. Salice America Inc, Charlotte, NC (800) 222-9652 or (704) 841-7810 www.saliceamerica.com.
      m. Stanley, New Britain, CT www.stanleyhardware.com.

B. Components:
   1. Design Criteria:
      a. General:
         1) Except as noted otherwise, fabricate the work of this section to AWS 'Custom Grade'.
   2. Panel Product:
      a. Glues (adhesives) used in manufacture and fabrication of panel products shall be Type I or II.
      b. Moisture content shall be same as specified for lumber.
      c. Cores:
         1) Cabinet Doors: Medium density fiberboard (MDF) with minimum density of 48 lbs per cu ft (769 kg per cu meter).
         2) All Other: Industrial grade particle board with minimum density of 45 lbs per cu ft (721 kg per cu meter).
      d. Facings And Colors:
         1) Plastic Laminate: Formica, 927-58 Folkstone.
         2) Melamine or Kortron: White.
      e. Edgings:
         1) Shelves And Exposed Panel Product Edges:
            a) Hot-glued, 2 mm thick minimum, PVC edge-banding.
            b) Wood-grained or solid color to match cabinet, except color matching Melamine or Kortron surface at shelf edges.
         2) Semi-Exposed Panel Product Edges:
            a) Hot-glued, 0.018 inch (0.46 mm) thick minimum, PVC edge-banding, wood grained or solid color to match cabinet.
         3) T-Molding (countertop in Accounting Office Room 109 only):
            a) PVC with 5/32 inch (3.97 mm) slot.
            b) Color: Black.
            c) Size: 1-1/2 inches (38 mm).
            d) Type Two Acceptable Products:
               (1) Model 4542 by Charter Industries.
               (2) Equal as approved by Architect before installation. See Section 01 6200.

C. Fabrication:

1. Construction:
   a. Cabinet Body:
      1) Use AWS Flush Overlay construction on cabinet bodies.
      2) If used, install Rail System adjustable shelf supports recessed.
   b. Drawers:
      1) Fabricate with separate, screw-attached drawer front.
      2) Joints shall be dowel and pressure glued, or lock shoulder, glued, and pin nailed.
      3) Set bottoms into sides, backs, and subfront with 1/4 inch (6 mm) deep groove with 3/8 inch (9.5 mm) minimum standing shoulder.
      4) Every drawer shall have specified drawer guides and pull installed. Install drawer guides with 'Euroscrews', and pulls with through-bolts passing through both front and sub-front.
   c. Cabinet Doors:
      1) Full height, panel product cabinet doors may be fabricated in two pieces and joined on back with metal backplate. Backplate shall match interior door surface color.
      2) Hinges: Install hinges using plastic insertion dowels for hinges and 'Euroscrews' for baseplates.
      3) Every cabinet door shall have specified pull installed.
2. Cabinet Component Thickness And Material:
   a. Use plastic laminate facing on panel product, except on following surfaces, where Kortron or Melamine shall be used.
      1) Cabinet interiors and shelving faces behind cabinet doors in all rooms.
      2) Cabinet interiors and shelving faces always open to view.
      3) Cabinet exteriors permanently concealed.
      4) Drawer sides, backs, bottoms, and subfronts.
   b. Ends, Divisions, Bottoms, Tops: 3/4 inch (19 mm) thick panel product.
   c. Rails: 3/4 inch (19 mm) thick panel product.
   d. Shelves:
      1) Panel product.
      2) Thickness:
         a) 30 Inch (750 mm) Span And Less: 3/4 inch (19 mm) thick.
         b) Spans Over 30 Inches (750 mm) To 42 Inches (1 050 mm): One inch (25 mm) thick.
         c) Spans Over 42 Inches: One inch (25 mm) thick and provide Hafele or equal center supports.
   e. Backs: 1/4 inch (6 mm) thick panel product.
   f. Doors: 3/4 inch (19 mm) thick panel product.
   g. Drawer Sides, Backs, And Subfronts: 1/2 inch (12.7 mm) thick minimum panel product.
   h. Drawer Bottoms: 1/4 inch (6 mm) thick panel product.
   i. Separate Drawer Front: 3/4 inch (19 mm) panel product.
3. Install plastic grommets in cable access holes in countertops.

2.2 ACCESSORIES

A. Cabinet And Drawer Hardware:
   1. Cabinet And Drawer Pulls:
      a. Satin Chromium Plated brass / bronze core bow handles, 4 inches (100 mm) long minimum.
      b. Type Two Acceptable Products:
         1) 4484 by Stanley.
         2) Equal as approved by Architect before installation. See Section 01 6200.
   2. Cabinet And Drawer Locks:
      a. Pin tumbler type suitable for location. Key individually, except key cabinets and drawers within an Office alike.
      b. Type Two Acceptable Manufacturers:
         1) Comp X National Lock.
         2) Olympus Lock.
         3) Equal as approved by Architect before installation. See Section 01 6200.
   3. Cabinet Adjustable Shelf Supports:
      a. Either of following systems are acceptable, at Fabricator's option:

1) 32mm System: Casework Fabricator's standard.
2) Traditional System:
3) Class Two Quality Standards: 255 and 256 by Knape & Vogt.

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 (1 200 mm) High or Less:
         a) Two (2) hinges.
         b) Hinge Opening: 165 degree minimum.
      2) Doors over 48 inches (1 200 mm) 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. Cabinet Inactive Leaf Catches:
   a. Class Two Quality Standards:
      1) Full-Height Doors: Two Surface Bolts No 043 - 2 inch (50 mm) by Ives.
      2) All Other Doors: Elbow Catch No 2 by Ives.
6. Drawer Guides:
   a. Keyboard / Pencil Drawers:
      1) Steel ball bearings, 45 lb (20 kg) load rating minimum.
      2) 3/4 extension, top mounting.
      3) Category Four Approved Products. See Section 01 6200 for definitions of Categories:
         a) Series 2006 by Accuride.
         b) Article 422.14.345 by Haffele.
         c) Series KV8200 by Knape & Vogt.
   b. Standard Drawers:
      1) Full extension, steel ball bearings, 100 lb (45 kg) load rating.
      2) Category Four Approved Products. See Section 01 6200 for definitions of Categories:
         a) Series 3832-Classic by Accuride.
         b) Article 422.04.552 by Haffele.
         c) Series KV8400 by Knape & Vogt.

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 (9.5 mm diameter x 1/8 inch (3 mm) thick.
3. Type Two Acceptable Products:
   a. WS-34 Cylindrical Soft Durometer Cabinet Bumper by Anybumper, Amite, LA www.Anybumper.com.
   b. Equal as approved by Architect before installation. See Section 01 6200.

C. Computer Keyboard Tray.
1. Category Four Approved Product. See Section 01 6000 for definitions of Categories:
   a. Model KMW-60067 by Kensington, Redwood Shores, CA www.us.kensington.com.
   b. Description:
      1) Under desk Adjustable Keyboard Platform.
   c. Design Criteria:

1) Dimensions: 30-1/2 inches (775 mm) wide by 10 inches (255 mm) deep with mouse tray.
2) Articulating arm offers positioning of platform, adjust height, +/- 15 deg tilt and 360 deg rotation.
3) Solid metal frame with wrist rests and mouse pad included.
4) Color: Gray.

D. Support Post:
1. Type Two Acceptable Product:
a. Model TL28R-390 by Doug Mockett & Company, Inc. Torrance, CA www.mockett.com.
b. Description:
1) Round support post for removable countertop as shown in Contract Documents.
c. Design Criteria:
1) Size: 28-1/2 inch (724 mm) table leg, 3 inch (76 mm) diameter.
2) Recessed glide leveler.
3) Cold rolled steel.
4) Polished and painted.
5) Color: Polished chrome.
d. Equal as approved by Architect before installation. See Section 01 6200.

PART 3 - EXECUTION: Not Used

END OF SECTION

SECTION 06 4512

ARCHITECTURAL WOODWORK WOOD TRIM

PART 1 - GENERAL

1.1 SUMMARY

A. Products Furnished But Not Installed Under This Section:
   1. Chair rails.

B. Related Requirements:
   1. Section 06 1100: 'Wood Framing' for wall blocking required for Wood Trim.
   2. Section 06 2001: ‘Common Finish Carpentry Requirements’:
      a. Installation of chair rails.
      b. Installation of Wood Trim.
   3. Section 06 2210: Remaining Wood Trim.
   4. Section 06 4001: 'Common Architectural Woodwork Requirements':
      a. Approved Fabricators.
      b. General standards for materials and fabrication of Architectural Woodwork.
   5. Section 09 9324: ‘Interior Clear-Finished Hardwood’.

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.
      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. 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.
   3. 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 (200 mm by 255 mm) sample of Red Oak 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) Owner 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 selected 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 plain sawn Red Oak.
2) Finish to match Owner selected sample as specified in Section 09 9324.
3) Color:
a) LDS 110. [verify to match existing stain on project]

D. Shelves:
1. Conform to applicable requirements of Sections 06 4001 and 06 4114.
2. Use 3/4 inch (19 mm) Kortron or Melamine faced Panel Product with hot glued 3 mm thick PVC edge banding with eased edges. Apply banding on exposed edges with one inch (25 mm) return onto unexposed edges. Edge banding color to match Panel Product.

2.2 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

DIVISION 07: THERMAL AND MOISTURE PROTECTION

END OF TABLE OF CONTENTS

B L A N K P A G E

SECTION 07 2116

BLANKET INSULATION

PART 1 - GENERAL

1.1 SUMMARY

A. Includes But Not Limited To:
   1. Furnish and install unfaced thermal batt insulation in metal framing 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) Certainteed Corp, Valley Forge, PA www.certainteed.com.
         2) FiberTEK, Salt Lake City, UT www.fibertekinsulation.com.
         3) Guardian Fiberglass, Greer, SC www.guardianbp.com.
         4) Johns Manville, Denver, CO www.jm.com.
         5) Knauf Fiber Glass, Shelbyville, IN www.knaufusa.com.
         6) Owens-Corning Fiberglass Corporation, Toledo, OH www.owens-corning.com.
         7) Thermafiber, Wabash, IL www.thermafiber.com.
      b. Equal as approved by Architect before bidding. See Section 01 6200.

B. Materials:
   1. Thermal And Acoustic Insulation:
      a. Unfaced Insulation: Meet requirements of ASTM C665, Type I.
      b. Order insulation by 'R' values rather than 'U' value, rating, or thickness, either 16 or 24 inches (400 or 600 mm) wide according to framing spacing.
      c. 'R' Value Required:
         1) Acoustically Insulated Ceilings:
            a) Enclosed Spaces: Fill framed cavity with batt of appropriate thickness.

b) Unenclosed Spaces: R-19.

2) Wood Wall Stud Framing:

R-11	3-1/2 inches deep	89 mm deep
R-19	5-1/2 inches deep	140 mm deep
R-25	7-1/4 inches deep	184 mm deep

3) Metal Wall Stud Framing:

R-11	3-1/2 inches deep	89 mm deep
R-19	5-1/2 inches deep	140 mm deep
R-25	7-1/4 inches deep	184 mm deep

PART 3 - EXECUTION

3.1 INSTALLATION

A. General:
1. Leave no gaps in insulation envelope.
2. 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.

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) (minus 73.3 deg C to + 316 deg C).

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 (4 deg C) or subjected to sustained temperatures exceeding 90 deg F (32 deg C) 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.
b. Franklin International, Inc. Columbus, OH www.titebond.com.
c. GE Sealants & Adhesives (see Momentive Performance Materials Inc.).

d. Laticrete International Inc., Bethany, CT www.laticrete.com.
e. Momentive Performance Materials Inc. (formally GE Sealants & Adhesives), Huntersville, NC www.ge.com/silicones.
f. Sherwin-Williams, Cleveland, OH www.sherwin-williams.com.
g. Sika Corporation, Lyndhurst, NJ www.sikaconstruction.com or Sika Canada Inc, Pointe Claire, QC www.sika.ca.
h. Tremco, Beachwood, OH 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 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) Gutters.
c) Penetrations in soffits and fascias.
d) Roof vents and flues.
e) Lightning protection components.
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.
3. 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.

4. 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: Latasil 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 contaminates 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 (4 deg C).
   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 (9.5 mm) 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 (6 mm) minimum and 1/2 inch (12.7 mm) 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 (5 mm) 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 (300 meters) of applied silicone sealant and one (1) test for each 1,000 linear feet (300 meters) 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 C919-12(2017), 'Standard Practice for Use of Sealants in Acoustical Applications'.
      c. ASTM C1193-16, ‘Standard Guide for Use of Joint Sealants'.
      d. ASTM E84-16, ‘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; Tenth Edition 2008.'

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 (4 deg C) nor exceeding 80 deg F (26.7 C).

1.6 FIELD CONDITIONS

A. Ambient Conditions:
   1. Do not apply caulking at temperatures below 40 deg F (4 deg C).

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.

b. QuietZone Acoustic Caulk by Owens Corning, Toledo, OH www.owenscorning.com.
c. Acoustical Sealant by Tremco, Beachwood, OH 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.

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 (4 deg C).

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 (9.5 mm) 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 (6 mm) minimum and 1/2 inch (12.7 mm) 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 08: OPENINGS

END OF TABLE OF CONTENTS

B L A N K P A G E

SECTION 08 0601

HARDWARE GROUP AND KEYING SCHEDULES

PART 1 - GENERAL

1.1 SUMMARY

A. Includes But Not Limited To:
   1. Furnish and install door hardware and keying as described in Contract Documents.

1.2 REFERENCES

A. Definitions:
   1. Builders Hardware Manufacturer's Association (BHMA) Hardware Functions:
      a. F75 Passage Latch: Latch bolt operated by lever from either side at all times.
      b. F76 Privacy Lock: Latch bolt operated by lever from either side. Outside lever locked by push button inside and unlocked by emergency key from outside or rotating lever from inside.
      c. F81 Office Door Lock: Dead locking latch bolt operated by lever from either side, except when outside lever is locked by turn button in inside lever. When outside lever is locked, latch bolt is operated by key in outside lever or by rotating inside lever. Turn button must be manually rotated to unlock outside lever.
      d. F84 Classroom Deadlock: Dead locking latch bolt operated by lever from either side, except when outside lever is locked, latch bolt is operated by key in outside lever or by rotating inside lever.
      e. F86 Utility Space Door Lock: Dead locking latch bolt operated by key in outside lever or by rotating inside lever. Outside lever is always fixed.
      f. F91 Store Door Lock: Deadlocking latch operated by either lever. Key in either lever locks / unlocks both levers.
      g. F109 Entrance Lock: Turn/push button locking: Pushing and turning button disengages outside lever, requiring using of key until button is manually unlocked. Push-button locking: Pushing button disengages outside lever until unlocked by key or by turning inside lever. Disengages outside spindle from latch when locked.
      h. E2142 Deadbolt: Dead bolt operated by key from either side. Bolt automatically dead locks when fully thrown.
      i. E2152 Deadbolt: Dead bolt operated by key from outside and turn unit from inside. Bolt automatically dead locks when fully thrown.

1.3 DELIVERY, STORAGE, AND HANDLING

A. Delivery And Acceptance Requirements:
   1. Materials shall be delivered in original, unopened packages with labels intact.

PART 2 - HARDWARE GROUPS

2.1 STOREFRONT ENTRY DOORS

A. Single Doors:
   1. **Group ST2**:
      a. 1 set: Pivots.
      b. 1 set: Weatherstrip.
      c. 1 each: Closer.

d. 1 each: Deadbolt.
e. 1 each: Pull.
f. 1 each: Push.
g. 1 each: Stop.
h. 1 each: Sweepstrip.
i. 1 each: Threshold.

2.2 INTERIOR DOORS

A. Single Interior Doors:
1. **Group 20A**:
a. 1 set: Smoke Gaskets.
b. 3 each: Hinges.
c. 1 each: Latchset Function F75.
d. 1 each: Stop (wall).
1. **Group 22**:
a. 1 set: Smoke Gaskets.
b. 3 each: Hinges.
c. 1 each: Lockset Function F86.
d. 1 each: Stop.
e. 1 each: Carpet Transition Strip.
2. **Group 22A**:
a. 1 set: Smoke Gaskets.
b. 3 each: Hinges.
c. 1 each: Lockset Function F86.
d. 1 each: Stop.

END OF SECTION

SECTION 08 1213

HOLLOW METAL FRAMES

PART 1 - GENERAL

1.1 SUMMARY

A. Products Furnished But Not Installed Under This Section:
   1. Hollow metal frames.

B. Related Requirements:
   1. Section 06 2024: 'Door, Frame, And Finish Hardware Installation' for installation.

1.2 REFERENCES

A. 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 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 A653/A653M-17, 'Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process'.
   3. Steel Door Institute:
      a. SDI A250.8-2017, 'Specifications for Standard Steel Doors and Frames'.
      b. SDI A250.11-2012, 'Recommended Erection Instructions for Steel Frames'.

1.3 SUBMITTALS

A. Informational Submittals:
   1. Copy of SDI A250.11.

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:
         1) Contact Information: Russ Farley: phone (800) 574-4369, fax 801-484-6817, or e-mail russf@absdoors.com.
      b. Beacon Metals Inc, Salt Lake City, UT 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.
      c. Midwest D-Vision Solutions, Salt Lake City, UT www.mwdsutah.com.
         1) Contact Information: Dan Mercer, office (801) 377-4355, cell (801) 618-9456, e-mail danm@mwdsutah.com.

B. Manufacturers:

1. Category Four Approved Manufacturers. See Section 01 6200 for definitions of Categories:
   a. Any current member of Steel Door Institute.

C. Frames:
1. Cold rolled furniture steel:
   a. Interior Frames: 16 ga. (1.6 mm).
   b. Exterior Frames: 14 ga. (1.9 mm).
2. Provide labeled frame to match fire rating of door.
3. Finish:
   a. Use one of following systems:
      1) Prime surfaces with rust inhibiting primer.
      2) Galvanize.
4. Anchors: 16 US ga (1.6 mm) minimum meeting UL or other code acceptable requirements for door rating involved.

D. Fabrication:
1. General Requirements:
   a. Frames shall be welded units. Provide temporary spreader on each welded frame.
   b. Provide Manufacturer's gauge label for each item.
   c. Make breaks, arrises, and angles uniform, straight, and true. Accurately fit corners.
2. Frame width dimension:
   a. Fabricate frame 1/8 inch (3 mm) wider than finished wall thickness as described in Contract Documents.
3. Provide mortar guards at strikes and hinges.
4. Anchors:
   a. Provide three jamb anchors minimum for each jamb. On hinge side, install one anchor at each hinge location. On strike side, install one anchor at strike level and anchors at same level as top and bottom hinges. Tack weld anchors on frames intended for installation in framed walls.
   b. Frames installed before walls are constructed shall be provided with extended base anchors in addition to other specified anchors.
   c. Anchor types and configurations shall meet wall conditions.

PART 3 - EXECUTION: Not Used

END OF SECTION

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 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.
      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. Fire-rated: Fire-retardant particleboard with an Underwriters’ Laboratory (UL) stamp for Class 1 fire rating (Flame Spread 20, Smoke Developed 25). Fire-rated doors are available with particleboard and mineral cores for ratings up to 1-1/2 hours.
   3. Fire-rated Door: A door made of fire-resistant material that can be closed to prevent the spread of fire and can be rated as resisting fire for 20 minutes (1/3 hour), 30 minutes (1/2 hour), 45 minutes (3/4 hour) (C), 1 hour (B), or 1-1/2 hours (B). The door must be tested and carry an identifying label from a qualified testing and inspection agency.
   4. 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.
   5. 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. Hardwood, Plywood, and Veneer Association:
   a. HPVA HP-1-2016 'Standard for Hardwood and Decorative Plywood'.
4. National Particleboard Association / Composite Panel Association:
   a. NPA A208.1-2009, 'Particleboard'.

1.3 SUBMITTALS

A. 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 Owner to be used as finishing standard for interior clear finished hardwood as specified in Section 09 9324.
            b) Approval of sample by Owner will establish performance standard of stain to be used until next annual review.
         2) Design Criteria:
            a) Provide 8 inch by 10 inch (200 mm by 255 mm) sample of Red Oak to match stain Control Sample provided by Owner.

B. Informational Submittals:
   1. Source Quality Control Submittals:
      a. Samples:
         1) Interior Hardwood for Transparent Finish:
            a) Owner will provide Control Sample for finish.

C. 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.

1.4 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.

1.5 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 (6 mm) or more in door panel at time of one-year warranty inspection.
      3) Telegraphing of core assembly: Variation of 1/100 inch (0.25 mm) or more in 3 inch (75 mm) 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:
      1) Contact Information: Russ Farley: phone (800) 574-4369, fax 801-484-6817, or e-mail russf@absdoors.com.
   b. Beacon Metals Inc, Salt Lake City, UT 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.
   c. Midwest D-Vision Solutions, Salt Lake City, UT www.mwdsutah.com.
      1) Contact Information: Dan Mercer, office (801) 377-4355, cell (801) 618-9456, e-mail 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. Plain sliced Red Oak meeting requirements of AWS Grade A, 1/50 inch (0.5 mm) 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 (35 mm) 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 (28 mm).
   b) Manufacturer's option.

6. Factory Glazing:
   a. Glazing (non-fire-rated openings): Tempered glazing meeting requirements of ASTM C1048, Kind FT, Condition A, Type I, Class I, Quality q3. Thickness 1/4 inch (6 mm).
   b. Lite Kit:
      1) Design Criteria:
         a) Pre-finished wood or wood veneer frames.
      2) Dimensions:
         a) Doors shown on Door Schedule are to have 6 inch (150 mm) wide by 33 inches (850 mm) high clear opening) security view window with bottom of opening located 42 inches (1 000 mm) above finish floor and side located 6 inches (150 mm) from strike edge of door.
      3) Category Four Approved Product. See Section 01 6200 for definitions of Categories:
         a) Profile M6G by Graham.
         b) Profile W6 by Marshfield.
         c) Profile VT1 by VT Industries.

D. Fabrication:
   1. Doors shall be factory-machined. Coordinate with Section 08 1213 and Sections under 08 7000.

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.
         2) Color:
            a) Match existing door stain color as directed by Architect.
      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 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.

B. Related Requirements:
   1. Section 06 2024: ‘Door, Frame, And Hardware Installation’ for installation of locking cylinders.
   2. Section 07 9213: ‘Elastomeric Joint Sealant’ for quality of sealants.
   3. Section 08 7103: 'Securing Devices' for furnishing of locking cylinders.
   4. Section 08 8100: 'Glass Glazing' for quality of glass glazing.

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 611-14, ‘Voluntary Standards for Anodized Architectural Aluminum’.
      d. AAMA 2605-17a, ‘Test Procedures for Superior Performing Organic Coatings on Aluminum Extrusions and Panels’.
      e. AAMA SFM 1-14, ‘Aluminum Store Front and Entrance Manual’.

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. 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’.
i. ASTM E1996-17, ‘Standard Specification for Performance of Exterior Windows, Curtain Walls, Doors, and Impact Protective Systems Impacted by Windborne Debris in Hurricanes’.

2. International Building Code (IBC) (2018 or most recent edition adopted by AHJ):
   a. Chapter 10, 'Means of Egress'.
3. International Code Council / American National Standards Institute:
   a. ICC / ANSI A117.1-2009, ‘Accessible and Usable Buildings and Facilities'.
4. National Fenestration Rating Council (NFNC):
   a. NFRC 100-2017, 'Procedure for Determining Fenestration Product U-factors’.

1.3 ADMINISTRATIVE REQUIREMENTS

A. Pre-Installation Conference:
   1. Participate in pre-installation conference for storefront entrance sections.
   2. Schedule conference one (1) week before scheduled installation of storefront system.
   3. Participate in pre-installation conference held jointly with following sections:
   4. In addition to agenda items specified in Section 01 3100, review following:
      a. Review installation scheduling, coordination, placement of storefront entrances.
      b. Review location of signage on entrance doors.
      c. Review delivery, storage, and handling requirements.
      d. Review safety issues.

1.4 SUBMITTALS

A. Action Submittals:
   1. Product Data:
      a. Manufacturer's literature or cut sheets.
      b. Color and finish selections.
   2. Shop Drawings:
      a. Show locations, sizes, etc, of hardware reinforcing.
      b. Show wind loads and engineering for Project conditions.
      c. Clearly mark components to identify their location in Project.

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. Record Documentation:
         1) Manufacturers documentation:
            a) Manufacturer's literature or cut sheets for storefront system and for each item of hardware.
            b) Color and finish selections.
            c) 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 (.00003 m3/sm2) of wall area at 6.24 PSF (300 Pa) 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 (384 Pa) 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 (384 Pa).
         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 (3 mm) at center point, or 1/16 inch (1.58 mm) 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 (82 deg C).
         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.
   2. Provide wind load and impact testing by testing laboratory when required by local codes and jurisdictions.
      a. See Section 01 4523 for Testing and Inspection administrative requirements and responsibilities for Testing Agencies and Section 01 4301 for Testing Agency Qualifications.

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 a firm experienced in manufacturing systems that are similar to those indicated for this project and that have a 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 that have a 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. Door Construction:
a. Lifetime warranty for normal use.
1) Warranty does not include door installation, attached hardware and finish.
2. Closers:
a. Closer Manufacturer's standard warranty, 10 years minimum.

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.
1) Contact Information: Ken Martinek, (602) 734-5327 kmartinek@arcadiainc.com.
b. Kawneer North America, Norcross, GA, www.kawneer.com/kawneer/north_america.
1) Contact Information: Bart Daniels cell (385) 214-4650 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.
6) 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.
7) 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 (50 mm) 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.
2. Manually Operated Doors:
a. Aluminum: 6063 T6 aluminum alloy, or meeting requirements of ASTM B221, alloy GS 10a T6.
b. Stiles:
1) 3-1/2 inches by 1-3/4 inches by 0.125 inches (89 mm by 45 mm by 3.175 mm) thick nominal.
c. Top Rails:
1) 3-1/2 inches by 1-3/4 inches by 0.125 inches (89 mm by 45 mm by 3.175 mm) thick nominal.
d. Bottom Rail:
1) 10 inches minimum by 1-3/4 inches by 0.125 inches (254 mm minimum by 45 mm by 3.175 mm) thick nominal.
e. Construction:
1) Manufacturer's standard.
f. Glazing Stops:
1) Snap-in type with neoprene bulb-type glazing.
2) Units shall be glazed from exterior side.
g. Weatherstripping:
1) Neoprene bulb-type.
2) Category Four Approved Products:
a) Peri-Plus Seal (PPS) by Arcadia.
b) Kawneer Sealair.
h. 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 (0.01016 mm) to 0.70 mils (0.01778 mm) thick) complying with AAMA 611.
i. 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.

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 C920 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 calculated according to 40 CFR 59, Subpart D (EPA Method 24).
4. Hardware:
   a. Manually Operated Doors:
      1) Hinging:
         a) Top and bottom offset, ball bearing pivots per door leaf.
      2) Overhead Door Closers:
         a) Provide parallel arms on closers unless door position requires otherwise.
         b) Closers shall allow for 180 degree opening and not be used as stop.
         c) Adjust closers to provide maximum opening force as required by governing code authority.
         d) Closers shall have following features:
            (1) Adjustable sweep speed.
            (2) Adjustable backcheck.
            (3) Non-handed, non-sized.
            (4) Cush arm by LCN or equal by Norton.
         e) Category Four Approved Products. See Section 01 6200 for definitions of Categories:
            (1) Surface mounted.
            (2) 4041 Series parallel arm by LCN.
            (3) 7700 Series Parallel arm by Norton.
      3) Deadbolts:
         a) Thumbturn on Processing Room side: keyed on Office area side.
         b) Approved Products: Match manufacturer of locksets provided under Section 08 7103.
      4) Exit Devices:
         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.
         b) Types:
            (1) Double Doors Without Mullions: Concealed vertical rods, three-point locking on Doors 101B and 102B.
            (2) All Other Doors: Rim Type. Provide type of strike that will allow installation of specified panic devices on storefront system specified.

c) Category Four Approved Products. See Section 01 6200 for definitions of Categories:
(1) Apex Series by Precision.
(2) 80 Series by Sargent.
(3) 98 or 99 Rim Series by Von Duprin.

5) Thresholds:
a) Design Criteria: Meet handicap accessibility requirements.
b) At Vestibule at Retail Area with Floor Mat: Type Two Acceptable Manufacturers:
(1) Half Saddle Model 254A by Pemko, Ventura, CA www.pemko.com.
(2) Equals approved by Architect before installation. See Section 01 6200.
c) All Others: Manufacturer's standard.

6) Sweep Strips:
a) Entrance Manufacturer's standard (cover cap with no exposed fasteners).

7) Push / Pulls:
a) Category Four Approved Products. See Section 01 6200 for definitions of Categories:
(1) PBR and OPR-9 by Arcadia.
(2) Kawneer CP and CO-9, clear anodized.

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.

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 comply with Contract Document requirements.
   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 in writing if framed openings are incorrect.
      a. Do not install storefront entry and window frames until deficiencies in framed openings have been corrected.
      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 (3 mm) in 12 feet (3.6 meters); 1/4 inch (6 mm) over total length.
   2. Offset from Alignment: For surfaces abutting in line, limit offset to 1/16 inch (1.6 mm).
   3. Offset at Corners: For surfaces meeting at corner, limit offset to 1/32 inch (0.8 mm).
   4. Diagonal measurements: Limit difference between diagonal measurements to 1/8 inch (3 mm).
   5. Sidelights: Line up horizontal rail in sidelight with door rail.

C. Install doors without warp or rack. Adjust doors and hardware to provide 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.
   2. At Vestibule at Retail Area with Floor Mat:
      a. Threshold to line up with threshold of 'Sliding Automatic Entrances, Section 08 4229 and 'Entrance Matting' Section 12 4843.

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. Exterior Doors And Storefront:
      a. Clear interior pane and Clear exterior pane with Low E treatment on surface 2.
   2. Interior Doors And Vestibules:
      a. Clear.

H. Signage:
   1. Exterior Doors And Storefront:

a. Provide signage on door glazing of automatic doors to designate ENTRANCE.
2. Interior Doors And Vestibules:
a. Provide signage on door glazing of automatic doors to designate EXIT.

3.4 FIELD QUALITY CONTROL

A. Field Tests And Inspections:
1. Pull test swinging doors to ensure security of openings.
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 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 ANSI/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

B L A N K P A G E

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.
   2. Includes salvage and reinstallation of existing doors and hardware as described in Contract Documents.

B. Related Requirements:
   1. Section 06 2024: 'Door, Frame, And Finish Hardware Installation' for installation of hardware.
   2. Section 08 0601: 'Hardware Group and Keying Schedules'.

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.

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 1213, 08 1313, 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. Existing Projects (Doors and Door Hardware):
1. USA Projects:
a. Category Three Approved Suppliers. See Section 01 6200 for definitions of Categories:
1) Architectural Building Supply, Salt Lake City, UT www.cookandboardman.com:
a) Contact Information: Russ Farley: phone (800) 574-4369, fax 801-484-6817, or e-mail russf@absdoors.com.
2) Beacon Metals Inc, Salt Lake City, UT 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.
3) Midwest D-Vision Solutions, Salt Lake City, UT www.mwdsutah.com.
a) Contact Information: Dan Mercer, office (801) 377-4355, cell (801) 618-9456, e-mail 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

B L A N K P A G E

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 and hollow metal doors.

B. Related Requirements:
   1. 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.
      b. Ives, New Haven, CT www.iveshardware.com.
      c. McKinney, Scranton, PA www.mckinneyhinge.com.
      d. PBB, Ontario, CA www.pbbinc.com.
      e. Stanley (dormakaba Americas), Indianapolis IN www.stanleyhardwarefordoors.com/products/.

B. Hinges:
   1. Doors:
      a. Sizes:
         1) Non-Fire-Rated Doors:
            a) 1-3/4 inch 44.5 mm non-fire-rated wood doors in wood frames: 4 inches by 4 inches (100 mm by 100 mm).
            b) 1-3/8 inch 35 mm wood or metal doors: 3-1/2 inches by 3-1/2 inches (89 mm by 89 mm).
   2. Use non-removable pins on exterior opening doors.
   3. Hinges on exterior doors shall be solid brass, plated to achieve specified finish.
   4. 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.

PART 3 - EXECUTION: Not Used

END OF SECTION

B L A N K P A G E

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 or hollow metal doors.
      a. Cylinders.
      b. Locksets and latchsets.

B. Related Requirements:
   1. Section 08 7101: Common Hardware Requirements.
   2. Miscellaneous padlocks by local Church FM Group.

1.2 REFERENCES

A. Definitions:
   1. 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 (25 mm) 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. Abus by Home Security, Commercial Security and Safety Lockout, Phoenix, AZ www.abus.com.
      b. Best Locks by Stanley, Indianapolis IN www.stanleysecuritysolutions.com.
      c. Hager, St Louis, MO www.hagerhinge.com.
      d. Ives, New Haven, CT www.iveshardware.com.
      e. Marks USA, Amityville, NY www.marksusa.com.
      f. Master Lock, Oak Creek, WI.
      g. Precision Hardware, Romulus, MI www.precisionhardware.com.
      h. Rockwood, Manufacturing Co, Rockwood, PA www.rockwoodmfg.com.
      i. Sargent, New Haven, CT www.sargentlock.com.
      j. Schlage, Colorado Springs, CO www.schlage.com.
      k. Von Duprin, Indianapolis, IN www.vonduprin.com.

l. Yale Commercial Locks, Lenoir City, TN www.yalecommercial.com.

B. General:
1. Backsets shall be 2-3/4 inches (70 mm).
2. Furnish lead shields where required.

C. Keying Cores: Provide standard ASSA 719 cores for keyed locking devices provided under this Section.

D. Locksets And Latchsets:
1. Design Criteria:
a. Grade 2 Standard Duty Key-In Lever Cylindrical Lockset:
1) ANSI/BHMA A156.02 Series 4000 Grade 2.
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 (12.7 mm) or less return to door.
2. Lever Operated:
a. Category Four Approved Products. See Section 01 6200 for definitions of Categories:
1) Grade 2 Standard Duty Key-In Lever Cylindrical Locksets:
a) 7K Series Best Lock with 15D Lever by Stanley standard cylinders - (I/C cores may be used when authorized by AEC).
b) 175 Series with American Lever by Marks USA.
c) 7 Line Series with L Lever by Sargent.
d) AL Series with Saturn (SAT) Lever by Schlage.
e) 5300LN Series with Augusta (AU) Lever by Yale.

PART 3 - EXECUTION

3.1 CLOSE-OUT ACTIVITIES

A. Owner's Instructions:
1. Before Final Acceptance Meeting, send master keys to FM Manager

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. Glynn-Johnson, Indianapolis, IN www.glynn-johnson.com.
      b. Hager, St Louis, MO www.hagerhinge.com.
      c. Ives, Wallingford, CT www.iveshardware.com.
      d. Rockwood Manufacturing Co, Rockwood, PA www.rockwoodmfg.com.
      e. Sargent, New Haven, CT (800) 906-6606 or (203) 562-2151 www.sargentlock.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:

a.		Interior Wall	Exterior Wall	Floor Mount	Overhead.
b.	Hager	236W	255W	243F	- - -
c.	Ives	WS407CCV	WS447	FS438	- - -
d.	Rockwood	409	474 / 475	440 / 441	- - -

   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

B L A N K P A G E

SECTION 08 7109

ACCESSORIES

PART 1 - GENERAL

1.1 SUMMARY

A. Products Furnished But Not Installed Under This Section:
   1. Acoustical seals.
   2. Smoke Gaskets.
   3. Thresholds (metal) where required for wood doors and hollow metal doors.

B. Related Requirements:
   1. Section 08 7101: 'Common Finish Hardware Requirements' for general finish hardware requirements and Approved Suppliers.

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.
      b. NGP - National Guard Products, Memphis, TN www.ngpinc.com.
      c. Pemko Manufacturing, Ventura, CA www.pemko.com.

B. Acoustical Seals:
   1. Color as selected by Architect.
   2. Type One Acceptable Products:
      a. Door Bottom Shoe for Wood Door:
         1) 13VDkB by NGP.
         2) 211DV by Pemko.
      b. Door Bottom Shoe for Metal Door:
         1) 779S-A by Hager.

2) 35EV by NGP.
3) 217AV by Pemko.

c. Equal as approved by Architect before bidding. See Section 01 6200.

C. 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.

D. Sweepstrip (metal door bottom):
1. Clear anodized aluminum with black neoprene insert.
2. Reduce infiltration of air, wind, dust, rain, and snow.
3. Meet UL requirements.
4. For use with saddle thresholds.
5. Type One Acceptable Products:
a. 750S CLR by Hager.
b. 198N A by NGP.
c. 321 CN by Pemko.
d. Equal as approved by Architect before bidding. See Section 01 6200.

E. Thresholds:
1. Type One Acceptable Products:
a. Design Criteria:
1) Meet handicap accessibility requirements (ADA):
b. Interior Doors at Acoustic Seals, Approved Products:
1) Carpet threshold (carpet to carpet):
a) 505S DBA by Hager.
b) 414 DKB by NGP.
c) 236 D by Pemko.
2) Carpet threshold (carpet to concrete, wood, synthetic, or resilient flooring:
a) 417 DKB by NGP.
b) 174 D by Pemko.
3) Saddle threshold:
a) 418S DBA by Hager.
b) 411 DKB by NGP.
c) 151 D by Pemko.
c. Equals as approved by Architect before bidding. See Section 01 6200.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install smoke gaskets and acoustical seals 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.
2. Install acoustical seal with seal under door.

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.

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. Laminated Glass: Two or more sheets with inner layer of transparent plastic to which glass adheres if broken. Used for overhead, safety glazing, and sound reduction.
   4. 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.
   5. 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.
   6. 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.
   7. Solar Reflectance (R): Percent of incident solar radiation that is reflected by window film/glass system. Lower the number, the less solar radiation reflected.
   8. 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.
   9. 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.

10. 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 C1172-14, 'Standard Specification for Laminated Architectural Flat Glass'.
      d. ASTM C1281-16, 'Standard Specification for Preformed Tape Sealants for Glazing Applications'.
      e. 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.
      b. Carlex (subsidiary of Central Glass Co., Ltd., Nashville, TN www.carlex.com.
      c. Guardian Industries Corp., Auburn Hills, MI www.guardian.com.
      d. Oldcastle BuildingEnvelope, Santa Monica, CA www.oldcastlebe.com.
      e. Pilkington North America Inc., Toledo, OH www.pilkington.com.
      f. Vitro Architectural Glass (formerly PPG glass), Cheswick, PA www.ppgglass.com or PPG Canada Ltd, Glass Division, Toronto, ON (416) 789-3331.

B. Design Criteria:
   1. Glazing for Fire-Rated Door and Window Assemblies: Glazing tested per NFPA 252 and NFPA 257, as applicable, for assemblies complying with NFPA 80 and listed and labeled per requirements of authorities having jurisdiction.

C. Storefront Glazing:
   1. Thickness: 1/4 inch (6 mm).

2. Glazing shall have following characteristics:
   a. Low-Emissivity (or Low E):
      1) Design Criteria:
         a) Clear.
         b) Insulated Glass: 1 inch (25 mm) units with 1/2 inch (13 mm) airspace and two (2) 1/4 inch (6 mm) 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 (North and East Elevation Facing Only):
         a) Performance Standard:
            (1) 70 percent Visible Light Transmission (VLT).
            (2) 0.29 U-value winter.
            (3) 0.27 U-value summer.
            (4) 0.38 Solar Heat Gain Coefficent (SHGC).
            (5) 0.44 Shading Coefficient.
            (6) 11 percent Visible Light Reflectance.
         b) Quality Standard:
            (1) Solarban 60 (2) by Vitro Architectural Glass.
            (2) 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. All Storefront Glazing:
      1) Design Criteria:
         a) Tempered.
         b) Meet requirements of ASTM C1048, Kind FT, Condition A, Type I, Class I, Quality Q3.

D. Fabrication:
   1. Except where glass exceeds 66 inches (1 675 mm) 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 windows and exterior aluminum-framed storefront.
      b. Unit Thickness: 5/8 inch (16 mm) minimum, one inch (25 mm) maximum.
      c. Type Seal:
         1) Metal-to-glass bond and separated by 1/2 inch (12.7 mm) dehydrated air space.
         2) Use non-hardening sealants.
      d. 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 09: FINISHES

END OF TABLE OF CONTENTS

B L A N K P A G E

SECTION 09 0503

FLOORING SUBSTRATE PREPARATION

PART 1 - GENERAL

1.1 SUMMARY

A. Includes But Not Limited To:
   1. Coordination and scheduling of Owner Furnished Field Testing for Alkalinity and Concrete Moisture Vapor Emission Rate (MVER) of concrete slab before flooring installation (except carpet) as described in Contract Documents.
   2. 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 01 1200: 'Multiple Contract Summary' for Owner Testing for Alkalinity and Concrete Moisture Vapor Emission Rate (MVER) of concrete before installation of flooring.
   3. Section 01 4523: ‘Testing and Inspecting Services’ for testing and inspection, and testing laboratory services for materials, products, and construction methods.
   4. Section 03 3111: 'Cast-In-Place Structural Concrete' for installation tolerances for concrete slabs.

1.2 REFERENCES

A. Association Publications:
   1. International Concrete Repair Institute: *'ICRI Concrete Slab Moisture Testing Program'* Rosemont, IL www.icri.org.
      a. ICRI Certification: 'Concrete Slab Moisture Testing Technician, Tier 2, Grade 1'.

B. Reference Standards:
   1. ASTM International:
      a. ASTM F710-17, ‘Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring’.
      b. ASTM F1869-16a, ‘Standard Test Method for Measuring Moisture Vapor Emission Rate of Concrete Subfloor Using Anhydrous Calcium Chloride’.
      c. ASTM F2170-18, ‘Standard Test Method for Determining Relative Humidity in Concrete Floor Slabs Using in situ Probes’.

1.3 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 all flooring systems included for Project 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.
      b. Review Testing Agency testing report of Concrete Moisture of concrete:
         1) Installer may verify Concrete Moisture of concrete.
   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.

B. Scheduling:
1. Concrete Moisture Testing:
a. General Contractor Responsibility to provide:
1) Maintain ambient temperatures and relative humidity conditions as specified in Field Conditions in Part 1 of this specification before Moisture Testing Agency will test for concrete moisture.
2) Notify Owner to contact Moisture Testing Agency when building is enclosed and temperature and relative humidity meet requirements for testing.
3) Provide access for and cooperate with Moisture Testing Agency.
b. Owner's Representative Responsibility to provide:
1) Provide following information to Moisture Testing Agency at time of notification:
a) Digital copy of floor plan(s).
b) Indicate different flooring material areas and which rooms on floor plan(s) and finish schedule requiring additional tests if required.
c) Digital copy of Specification Section 09 0503 (this specification) and Section 01 4523 ‘Testing And Inspecting Services’ from Contract Documents for this Project.
2) Carpet Flooring:
a) Carpet Installer at his/her discretion may test concrete slab for Alkalinity and Concrete Moisture Vapor Emission Rate (MVER) before installation of Owner Furnished carpet.
b) If carpet area is tested, Installer to coordinate with Owner’s Representative for following:
(1) Scheduling and coordination for maintain ambient temperatures and relative humidity conditions required before Moisture Testing of concrete moisture.
(2) Access to Building for concrete moisture testing.
c. Testing Agency will provide Moisture Testing for following flooring areas:
1) Resilient Tile Flooring:
a) Moisture Testing for Resilient Tile Flooring required.
b) Moisture Testing and Testing Report requirements specified in Informational Submittals.
c) See individual flooring section for additional scheduling requirements if required.

1.4 SUBMITTALS

A. Informational Submittals:
1. Certificates:
a. Concrete Slab Moisture Technician:
1) Provide current ICRI 'Concrete Slab Moisture Testing Technician, Tier 2, Grade 1' Certification.
b. Certified Standard Moisture Testing Report:
1) Report to include following:
a) Available to Testing Agency from Owner’s Representative:
(1) Project Name.
(2) Property Number.
b) Test date.
c) Executive summary.
d) Certified Moisture and Alkalinity (pH) Test Report.
e) Project floor plan.
f) Project photographs including following information on each photograph:
(1) Site location.
(2) Test hole number.
(3) Serial number probe.
(4) Relative Humidity (RH), Alkalinity (pH) and temperature reading.
(5) Property number.
g) Outlier Test (As specified in Field Quality Control Testing in Part 3 of this specification:
(1) Note test as Outlier Test for which hole number was conducted.
(2) Site location.
(3) Test hole number.

(4) Serial number probe.
(5) Relative Humidity (RH), Alkalinity (pH) and temperature reading.
(6) Property number.
2) At completion of testing, Testing Agency shall submit Concrete Moisture Test Report for each flooring system included for project to following:
a) One (1) copy to Owner's Representative.
2. Special Procedure Submittals:
a. 'Concrete Moisture Testing Request and Proposal':
1) Provided by Owner's Representative for each project to Testing Agency:
a) Testing Agency to fill out form with following information and return as instructed:
(1) Review request information.
(2) Add information as requested.
(3) Sign form.
(4) E-mail form back to Owner's Representative.
b. Certified Moisture Testing Report Distribution:
1) Owner's Representative responsibilities after receiving Concrete Moisture Test Report:
a) Provide copies to following:
(1) One (1) copy to Architect.
(2) One (1) copy to Contractor.
2) General Contractor responsibilities after receiving Concrete Moisture Test Report from Owner's Representative:
a) Provide copies to following:
(1) One (1) copy to Resilient Tile Flooring Manufacturer.
c. Moisture Testing Report Instructions:

B. Qualification Statement:
1. Concrete Slab Moisture Technician:
a. 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) Testing and Inspection Reports:
a) Testing Agency Testing Reports of Alkalinity and Concrete Moisture testing.

1.5 QUALITY ASSURANCE

A. Testing and Inspection.
1. Owner will provide Field Testing for Alkalinity and Concrete Moisture Vapor Emission Rate (MVER) of concrete slab before flooring (except carpet) installation as specified in Field Quality Control in Part 3 of this specifications:
a. See Section 01 1200: 'Multiple Contract Summary'.
b. See Section 01 4523: 'Testing and Inspecting Services' for testing and inspection, and testing laboratory services for materials, products, and construction methods.
2. Type One Acceptable Testing Agency:
a. See 'Agreement Between Owner And Testing Agency For Testing And Inspection Services (U.S.)' or 'Agreement Between Owner And Testing Agency For Testing And Inspection Services (Canada)'.
1) Equal as approved by Architect or Owner's Representative before bidding. See Section 01 6200.
b. Existing Projects.
1) Flooring projects do not need to use Agreement Between Owner And Testing Agency listed in previous paragraph but Owner Testing Agency must:
a) Meet Testing Agency Testing requirements of this specifications including 'Concrete Slab Moisture Technician' Qualifications.

B. Qualifications.
1. Concrete Slab Moisture Technician:
a. ICRI 'Concrete Slab Moisture Testing Technician, Tier 2, Grade 1' Certification:

1) Certification includes three (3) hour education session, written exam, and field testing performance exam based on ASTM standards.
2) Certification valid for period of five (5) years from date of testing completion.

b. Provide documentation if requested by Owner.

1.6 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.

1.7 FIELD CONDITIONS

A. Ambient Conditions:
1. Testing conditions inside building shall be brought to same ambient temperature and relative humidity levels to be normal at occupancy of building (service conditions). Service conditions include normal levels of humidity, lighting, heating, and air conditioning:
a. If service conditions are not possible, test conditions shall be 75 deg F (23.9 deg C) ± 10 deg F (minus 12.2 deg C) maintain relative humidity between forty (40) and sixty (60) percent in spaces to receive testing.
2. Maintain these conditions forty-eight (48) hours prior to, and during testing. Otherwise, results may not accurately reflect amount of moisture which is present in concrete slab or would normally be emitted from or through concrete slab during normal operating conditions.

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.

3.2 FIELD QUALITY CONTROL

A. Field Tests:
1. General:
   a. Owner is responsible for Quality Assurance. Quality assurance performed by Owner will be used to validate Quality Control performed by Contractor.
   b. Quality Control is sole responsibility of Contractor as specified in Section 01 4523 'Testing And Inspection Services'.
2. Concrete Moisture and Alkalinity:
   a. Testing Agency will test interior concrete slabs before installation of floor coverings as directed by Architect and will include following:
      1) Interior concrete slab areas to be tested:
         a) Section 03 3543 'Polished Concrete Finishing'.
      2) Standard Moisture Testing required of interior concrete slabs on grade:
         a) General:
            (1) Testing for concrete moisture shall be taken at concrete slab substrates scheduled to receive flooring as specified in Contract Drawings for complete flooring installation.
            (2) Outlier Test: If one (1) test is abnormally different from other moisture tests, then additional test should be done. Outlier will be defined in this specification as moisture test that is at least fifteen (15) percent higher or lower than other tests at project building completed same day:
               (a) Retesting should be done within 5 feet (1.50 m) feet of original test hole.
               (b) Contact Owner's Representative for the need to outlier test and additional testing fees will apply.
            (3) Include required tests for carpeting and additional tests at each different type of flooring system included for project.
         b) Deseret Industries:
            (1) Test density is required where floor coverings will be installed. Include testing at each type of flooring system included for project. Following are minimum recommended tests required:
               (a) Provide additional testing as directed by Architect if necessary. For existing buildings, adjust tests accordingly.
   b. Approved Concrete Moisture Tests:
      1) Concrete Moisture Test (test used with Standard Moisture and Comprehensive Moisture Testing if included for project). See Section 01 6200:
         a) Relative Humidity (RH) testing using in-situ probes in accordance with ASTM F2170 testing requirements:
            (1) Check calibration of measuring instrument.
            (2) Building ambient conditions are met before testing.
            (3) Drill Hole:
               (a) Drill and prepare test holes as per ASTM F2170 (correct hole-depth and hole diameter are required).
               (b) Drill holes equal to forty (40) percent of slab's thickness for concrete slabs on grade and twenty (20) percent of slab's thickness for suspended concrete slabs (hole must be perpendicular (90 deg) to surface).
            (4) Clean Hole:
               (a) Follow Manufacturer's installation instructions for cleaning holes and inserting sensor.
            (5) Insert Sensor:
               (a) Follow Manufacturer's installation instructions for inserting sensor.
            (6) Readings:
               (a) Follow Manufacturer's installation instructions for taking readings.
               (b) Two (2) hours after installation of sensor, RH reading will be recorded. (Two (2) hour read is in lieu of the seventy-two (72) hour ASTM standard)
            (7) Future Testing:
               (a) For future readings, replace protective cap by snapping it back into sensor.

(8) Test Report shall be submitted as specified in Informational Submittals in Part 1 of this specification.
(a) For future readings, replace protective cap by snapping it back into sensor.

b) Category Four Approved Products. See Section 01 6200 for definitions of Categories:
(1) Concrete moisture testing meter:
(a) Rapid RH 4.0 EX with Touch-n-Sense Technology and Rapid RH EX Smart Sensors by Wagner Meters, Rogue River, OR www.wagnermeters.com.

2) Alkalinity Testing (pH) Test:
a) Testing shall be performed in accordance with ASTM F710.
b) Test with pH meter or pH paper.
c) Testing shall be taken at every location and at each time concrete moisture test is performed at those locations.
d) Clean floor to remove all oil, dirt, dust and any floor coating or sealer.
(1) Lightly grind, sand, or bead blasting. Do not remove more than 1/8 inch (3 mm) of concrete.
(2) Removal of more than 1/8 inch (3 mm) may give high pH reading.
(3) Failure to remove laitance will produce low, inaccurate pH reading.
e) Place several drops of water on clean surface, forming puddle approximately 1 inch (25 mm):
(1) Allow puddle to set for sixty (60) ± five (5) seconds, then dip pH paper or meter into water.
(2) Remove immediately and record test result.
f) Testing to be performed concurrently with concrete moisture testing.
g) Test Report shall be submitted as specified in Informational Submittals in Part 1 of this specification.

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.
   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.
b. ClarkDietrich Building Systems, West Chester, OH 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 galvannealed 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.
d. Type One Acceptable Products:
1) 362DS20P by CEMCO.
2) ProSTUD 20 by ClarkDietrich Building Systems.
3) 20 Ga 3-5/8 SS Series by Steeler Inc.
4) Any member of Steel Framing Industry Association (SFIA).
5) Any member of Steel Stud Manufacturer's Association (SSMA).
6) Equal as approved by Architect before bidding. See Section 01 6200.
2. Firestop Tracks:

a. Top runner manufactured to allow partition heads to expand and contract with movement of structure while maintaining continuity of fire-resistance-rated assembly indicated; in thickness not less than indicated for studs and in width to accommodate depth of studs.

3. Headers and Jambs - Heavy-Duty Stud:
   a. Shape used to form header beams and jambs, columns or posts, of web depths indicated, unpunched, with stiffened flanges.

C. Fasteners:
1. Corrosion resistant coated, self-drilling, self-threading steel drill screws complying with ASTM C1513.

2.2 ACCESSORIES

A. Sill Sealer: Closed-cell polyethylene foam, 1/4 inch (6 mm) thick by width of plate.

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 (6 mm) in 20 feet (6 meters), non-cumulative in length of wall.
2. 1/8 inch (3 mm) in 10 feet (3 meters) with 1/4 inch (6 mm) maximum in height of wall.
3. Distances between parallel walls shall be 1/4 inch (6 mm) 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.
3. Install specified sill sealer under sill plates of exterior walls and of acoustically insulated interior walls.
4. Stiffen metal-framed walls with 3/4 inch (19 mm) 1-1/2 inches (38 mm) cold formed channels placed horizontally approximately 48 inch (1 200 mm) on center and securely attach to each stud.
5. Similarly reinforce door and window openings at headers with reinforcing channel extending 18 inches (450 mm) minimum each side of opening.
6. Apply double framing members at openings. Wrap multiple, adjacent framing members with duct tape or otherwise secure to eliminate 'chattering'.
7. Use grommets at framing penetrations where unsecured items pass through.

END OF SECTION

B L A N K P A G E

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.
4. Section 09 9413: 'Interior Textured Finishing'.

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.
4. Texturing: Regular or irregular patterns typically produced by applying a mixture of joint compound and water, or proprietary texture materials including latex base texture paint, to a gypsum board surface previously coated with drywall primer.

B. Reference Standards:
1. ASTM International:
a. ASTM C11-16, ‘Standard Terminology Relating to Gypsum and Related Building Materials and Systems'.
b. ASTM C475/C475M-15, ‘Standard Specification for Joint Compound and Joint Tape for Finishing Gypsum Board'.
c. ASTM C840-17, 'Standard Specification for Application and Finishing of Gypsum Board'.
d. ASTM C1002-16, '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-13, ‘Standard Specification for Coated Glass Mat Water-Resistant Gypsum Backing Panel'.
g. ASTM C1396/C1396M-14a, ‘Standard Specification for Gypsum Board'.
h. ASTM D4977/D4977M-03(2013), ‘Standard Test Method for Granule Adhesion to Mineral Surfaced Roofing by Abrasion’:
i. ASTM D5420-16, ‘Standard Test Method for Impact Resistance of Flat, Rigid Plastic Specimen by Means of a Striker Impacted by a Falling Weight (Gardner Impact)’.
j. ASTM E84-16, ‘Standard Test Method for Surface Burning Characteristics of Building Materials'.

k. ASTM E119-16a, ‘Standard Test Method for Fire Tests of Building Construction and Materials'.

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-801-07, ‘Handling and Storage of Gypsum Panel Products: A Guide for Distributors, Retailers, and Contractors'.
3. International Building Code (IBC) (2015 or latest approved version):
   a. Chapter 25, ‘Gypsum Board And Plaster’.
   a. 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; (10th 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 (10 deg C) and 95 deg F (35 deg C) 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.
b. CertainTeed Gypsum, Inc; Tampa, FL www.certainteed.com.
c. Georgia Pacific, Atlanta, GA www.gp.com.
d. National Gypsum, Charlotte, NC www.nationalgypsum.com.
e. Pabco Gypsum, Newark, CA www.pabcogypsum.com.
f. United States Gypsum Co, Chicago, IL www.usg.com.

B. Materials:
1. Interior Gypsum Board:
a. Provide maximum lengths and widths available that will minimize joints in each area and that correspond with support system indicated.
b. Impact Resistant:
1) Complies with Type X requirements of ASTM C1396/C1396M (Section 5).
2) Meet requirements of ASTM D4977 (Modified) for Surface Abrasion and ASTM D5420 (Gardner Impact Test) for Surface Indentation.
3) Overall thickness: 5/8 inch (15.9 mm.
4) Minimum 20 gauge (0.912 mm) steel framing.
5) Category Four Approved Products. See Section 01 6200 for definitions of Categories.
a) Hi-Impact XP Gypsum Board by National Gypsum.
b) Fiberock VHI (Very High Impact) Abuse-Resistant by USG.
c. Non-Fire-Rated Construction:
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) Board installed in areas accessible to public shall have the following:
(1) Meet requirements of ASTM C1396/C1396M (Section 5).
(2) Surface paper: Face paper suitable for painting.
(3) Long edges: Tapered edge.

2.2 ACCESSORIES

A. Manufacturers:
1. Manufacturer Contact List:
a. Kinetics Noise Control, Dublin, OH www.kineticsnoise.com.
b. Magnum Products, Lenaxa, KS www.levelcoat.com.
c. National Gypsum, Charlotte, NC www.nationalgypsum.com.
d. Soundproofing Co, San Marcos, CA www.soundproofing.org.
e. United States Gypsum Co, Chicago, IL www.usg.com.
f. Westpac Materials Inc, Orange, CA www.westpacmaterials.com.
g. Wm. Zinsser & Co, Somerset, NJ 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 S: For fastening gypsum board to steel framing and ceiling suspension members, of length to penetrate steel framing 3/8 inch (9.5 mm) minimum.

B. Primer / Surfacer On Surfaces To Receive Texturing:
   1. Type Two Acceptable Products:
      a. Sheetrock First Coat by USG.
      b. Prep Coat by Westpac Materials.
      c. Level Coat by Magnum Products.
      d. Equal as approved by Architect before bidding. See Section 01 6200.

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. Mounting Accessories:
   1. Furring Channels: Apply with screws through flanges into each framing member.

D. 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 (3 mm) 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 (2 700 mm) 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 (200 mm) 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 (9.5 mm) minimum from ends and edges, one inch (25 mm) maximum from edges, and 1/2 inch (13 mm) maximum from ends.
      c. Spacing:
         1) Ends: Screws not over 7 inches (175 mm) on center at edges where blocking or framing occurs.
         2) Wood Framed Walls And Ceilings: Screws 7 inches (175 mm) on center in panel field.
         3) Metal Framed Walls: Screws 12 inches (300 mm) on center in panel field.
      d. Set screw heads 1/32 inch (0.8 mm) below plane of board, but do not break face paper. If face is accidentally broken, apply additional screw 2 inches (50 mm) 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 (100 mm) 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 (3 mm) 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 (88 mm) 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 (150 mm) 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 (425 mm) 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 to Receive: Painted Texturing - Section 09 9413: 'Interior Textured Finishing':
      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'.
   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'.

3.3 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 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.
      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.

C. Reference Standards:
1. American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc. (AASHRA):
   a. ASHRAE Standard 62.1-2013, '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 E84-16, 'Standard Test Method for Surface Burning Characteristics of Building Materials'.
   d. ASTM E119-16a, '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(2013), 'Standard Test Method for Luminous Reflectance Factor of Acoustical Materials by Use of Integrating-Sphere Reflectometers'.
3. International Building Code (IBC) (2015 or latest approved Edition):
   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' (2015 edition).
   b. NFPA 265: 'Standard Methods of Fire Tests for Evaluating Room Fire Growth Contribution of Textile Coverings on Full Height Panels and Walls', (2015 edition).
5. Underwriters Laboratories Inc.:
   a. UL 723, 'Standard for Safety Test for Surface Burning Characteristics of Building Materials; Tenth Edition September 10 2008'. (Revision: September 13, 2010).

1.3 SUBMITTALS

A. Action Submittals:
1. Produce Data: Technical data for each type of acoustical ceiling unit required.
2. Sample: Minimum 6 inch (150 mm) x 6 inch (150 mm) 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 two (2) cartons of each pattern and color used on Project 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 (0 deg C) and 86 deg F (30 deg C).
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 (0 deg C) and 86 deg F (30 deg C) 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.ceilings.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.
2) For Strategic Account information, contact Randy Lay at (303) 775-1409 ralay@armstrong.com.
2. USG Interiors Inc, Chicago, IL www.usg.com.

2.2 MATERIALS

A. Acoustic Ceiling Panels:
1. Description:
a. Color: White (surface factory-applied).
b. Composition: Water-felted mineral panels or cast 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. Antimicrobial Protection: Resistance against growth of mold/mildew.
c. 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).
d. Fire Performance: As specified in Quality Assurance in Part 1 of this specification.
e. Light Reflectance (LR): ASTM E1477; 0.84 minimum.
f. Sag Resistance: Resistance to sagging in high humidity conditions.
g. VOC: Low.
3. Wide Face Design:
a. Design Criteria:
1) Grid Face: 15/16 inch (24 mm).
2) Size: 24 inch x 24 inch x 7/8" (610 mm x 610 mm x 22 mm).
b. Type One Acceptable Products. See Section 01 6200:
1) Field verify to match existing ceiling tile material and finish.
2) Fine Fissured item 1713 by Armstrong:
a) Grid System: Prelude XL Exposed Tee.
b) Edge Profile: Square Lay-in.
3) Radar ClimaPlus Open Plan item 22320 by USG:
a) Grid System: DX/DXL Exposed Tee.
b) Edge Profile: Square.
4) Equal as approved by Architect before bidding. See Section 01 6200.

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

B L A N K P A G E

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.

1.2 REFERENCES

A. Association Publications:
   1. The Ceilings & Interior Systems Construction Association (CISCA), 405 Illinois Avenue, 2B, St Charles IL. 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. Also may 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 (4.9 kg per sq m). 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 (24 mm) or 9/16 inch (14 mm).

7. 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 (1.20 m) 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 7-10, ‘Minimum Design Loads for Buildings and Other Structures' (Section 9, ‘Earthquake Loads).
2. ASTM International:
   a. ASTM A568/A568M-15, ‘Standard Specification for Steel, Sheet, Carbon, Structural, and High-Strength, Low-Alloy, Hot-Rolled and Cold-Rolled, General Requirements for’.
   b. ASTM C635/C635M-13a, ‘Standard Specification for the Manufacture, Performance, and Testing of Metal Suspension Systems for Acoustical Tile and Lay-in Panel Ceilings’.
   c. ASTM C636/C636M-13, ‘Standard Practice for Installation of Metal Ceiling Suspension Systems for Acoustical Tile and Lay-In Panels’.
   d. ASTM A641/A641M-09a(2014), ‘Standard Specification for Zinc-Coated (Galvanized) Carbon Steel Wire’
   e. ASTM A653/A653M-15, ‘Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process’.
   f. ASTM A1008/A1008M-15, ‘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’
   g. ASTM B117-11, 'Standard Practice for Operating Salt Spray (Fog) Apparatus.
   h. ASTM C635/C635M-13a, ‘Standard Specification for the Manufacture, Performance, and Testing of Metal Suspension Systems for Acoustical Tile and Lay-in Panel Ceilings’.
   i. ASTM C636/C636M-13, ‘Standard Practice for Installation of Metal Ceiling Suspension Systems for Acoustical Tile and Lay-In Panels’.
   j. ASTM D610-08(2012), ‘Standard Practice for Evaluating Degree of Rusting on Painted Steel Surfaces’.
   k. ASTM E580/E580M-14, ‘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) (2009, 2012, or 2015 edition):
   a. IBC 808.1.1.1, ‘Suspended Acoustical Ceilings’.
4. International Code Council (ICC):
   a. ICC/ESR-1222 (Reissued December 2013), ‘USG Interiors, Inc'.
   b. ICC/ESR-1308 (Reissued December 2014), ‘Armstrong World Industries'.
5. 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' (10th 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 (200 mm) 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. Type One Acceptable Manufacturers:
a. Grid Face: 15/16 inch:
1) Armstrong World Industries Co, Lancaster, PA www.armstrong.com.
2) USG Interiors Inc, Chicago, IL www.usg.com.
3) Equal as approved by Architect before bidding. See Section 01 6200.

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) Wide-face design - main runners and cross tees shall have one inch (25 mm) exposed face.
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) (2.70 mm) 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) (2.70 mm).
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.

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 (22 mm) 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.
      2) BERC-2 Clip by Armstrong World Industries, Lancaster, PA 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 (1.20 m) 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 particular 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 (15.9 mm).

L. Screws, eyebolts or lag bolts used to support metal acoustical suspended assemblies must have minimum embedment of 5/8 inch (15.9 mm) 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

SECTION 09 6513

RESILIENT BASE AND ACCESSORIES

PART 1 - GENERAL

1.1 SUMMARY

A. Products Furnished But not Installed Under this Section:
   1. Resilient base as described in Contract Documents.

B. Related Requirements:
   1. Section 01 1200: 'Multiple Contract Summary': for resilient base and accessories 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.
   2. Section 09 6519: 'Resilient Tile Flooring' for installation of resilient base and accessories.

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 (12.8 deg C) or more than 85 deg F (29.4 deg C) 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 (21 deg C) for at least twenty four (24) hours before installation.
2. Do not apply in temperatures below 70 deg F (21 deg C).

PART 2 - PRODUCTS

2.1 OWNER-FURNISHED PRODUCTS

A. Manufacturers:
1. Category One Approved Manufacturers:
a. Roppe Corporation, Fostoria, Fostoria, OH www.roppe.com.

B. Materials:
1. Wall Base:
a. General:
1) Size:
a) Minimum body thickness: 1/8 inch by 4 inch (3 mm by 100 mm).
b) Length: not less than normal.
2) Corners:
a) Use preformed, molded external corners for both inside and 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: Coved.
c. Approved Colors:
1) General:
a) Color pigments used shall be highly fade-resistant, insoluble in water, and resistant to light, alkali, and cleaning agents.
2) Wall Base (all areas unless otherwise noted):
a) Dark Gray by Roppe.
d. Category One Approved Products. See Section 01 6200 for definitions of Categories:
1) Rubber Wall Base by Roppe.
2. Adhesive:
a. Use products recommended by Manufacturer for conditions of use.

PART 3 - EXECUTION

3.1 APPROVED INSTALLER

A. Category One VMR Approved Installer. See Section 01 6200 for definitions of Categories:
1. Flooring Services Inc., Sandy, UT www.flooringservices.com.
a. Contact Marie Davis, LDS Account Manager, office (801) 487-3600, cell (801) 631-9152 email marie@flooringservices.com.
2. Same Installer for Section 09 6519 shall install Section 09 6513.

3.2 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.

3.3 PREPARATION

A. Surface Preparation:
1. Remedy cracks and minor irregularities in substrate in accordance with Manufacturer's recommendations.

3.4 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 (300 mm), install no lengths of base shorter than 12 inches (300 mm) long.

3.5 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.

3.6 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.

3.7 PROTECTION

A. Base:
   1. Cover material until Substantial Completion.
   2. Keep traffic away until adhesive has set.

END OF SECTION

SECTION 09 6519

RESILIENT TILE FLOORING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes But Is Not Limited To:
   1. Coordination, sequencing, and scheduling of Owner-Furnished resilient tile flooring installation as described in contract documents.
      a. Coordinate with Section 09 0503 for Testing Agency testing of Alkalinity and Concrete Moisture of concrete slab before Pre-Installation Conference.
      b. Schedule Pre-Installation Conference.
      c. Maintain Building Ambient Conditions including normal levels of humidity, lighting, heating, and air conditioning for acceptability for beginning floor preparation and carpet installation.

B. Related Requirements:
   1. Section 01 1200: 'Multiple Contract Summary' for:
      a. Resilient tile flooring is excluded from Contract and provided by Owner. This specification establishes quality of materials and installation for information of Contractor, Architect, and Owner's Representatives.
      b. Alkalinity and Concrete Moisture of concrete slab.
   2. Section 01 3100: ‘Project Management and Coordination’ for pre-installation conference.
   3. Section 01 4523: ‘Testing and Inspecting Services’ for testing and inspection, and testing laboratory services for materials, products, and construction methods.
   4. Section 03 3111: 'Cast-In-Place Structural Concrete' for provision of acceptable concrete substrate.
   5. Section 07 2616: 'Below Grade Vapor Retarders' for installation of below grade vapor retarder.
   6. Section 09 0503: 'Floor Substrate Preparation'.

C. Products Installed But not Furnished Under this Section:
   1. Owner furnished Resilient Base and accessories as described in Contract Documents.

D. Related Requirements:
   1. Section: 09 6513: ‘Resilient Base And Accessories’ for furnishing of Resilient Base.

1.2 REFERENCES

A. Association Publications:
   1. American Concrete Institute, Farmington Hills, MI www.concrete.org. Abstracts of ACI Periodicals and Publications.
      a. ACI 302.2R-06, *Guide for Concrete Slabs that Receive Moisture-Sensitive Flooring Materials* (August 15, 2006).

B. Reference Standards:
   1. ASTM International:
      a. ASTM F710-17, ‘Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring.’
      b. ASTM F2170-18, ‘Standard Test Method for Determining Relative Humidity in Concrete Floor Slabs Using in situ Probes.’

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 specified in Section 09 0503 and may be held jointly with other flooring systems included in project.
   2. Schedule conference after substrate preparation and ONE (1) week minimum before installation of flooring system.
   3. In addition to agenda items specified in Section 01 3100, review following:
      a. Review Testing Agency testing report of Alkalinity and Concrete Moisture of concrete slab.
         1) Follow Testing Agency report regarding Alkalinity and Concrete Moisture of concrete slab as specified in Section 09 0503 ‘Floor Substrate Preparation’.
   4. Review schedule for installation of resilient tile flooring and coordination with other trades.
   5. Review Flooring Manufacturer's installation conditions verification procedure and requirements.
   6. Review Building Ambient Conditions including normal levels of humidity, lighting, heating, and air conditioning for acceptability for beginning floor preparation and flooring installation.
   7. Review high moisture remediation options when high moisture exists based on moisture testing specified in Section 09 0503 'Flooring Substrate Preparation'.

C. Sequencing:
   1. Testing Agency to provide testing for Alkalinity and Concrete Moisture as specified in Section 09 0503 ‘Floor Substrate Preparation’ before Pre-Installation Conference.
   2. Manufacturer’s high moisture remediation of concrete slab before installation of Resilient Tile Flooring.
   3. Installation of Resilient Tile and Resilient Base.

D. Scheduling:
   1. Testing Agency to provide testing for Alkalinity and Concrete Moisture of concrete slab as specified in Section 09 0503 ‘Floor Substrate Preparation’.
   2. Notify Flooring Installer when Building Ambient Conditions requirements are met before installation of flooring system.

1.4 SUBMITTALS

A. Action Submittals:
   1. Product Data:
      a. Manufacturer's literature or cut sheet on each component of system.
      b. Maintenance instructions.
      c. Color and style selection.

B. Closeout Submittals:
   1. Include following in Operations And Maintenance Manual specified in Section 01 7800:
      a. Record Documentation:
         1) Manufacturers documentation:
            a) Manufacturer’s literature.
            b) Color and style selection.
         2) Testing and Inspection Reports:
            a) Testing Agency Testing Reports of Alkalinity and Concrete Moisture testing.

C. Maintenance Material Submittals:
   1. Extra Stock Materials:
      a. Leave box of twenty (20) extra tile of each pattern and color used on Project with Owner.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Delivery And Acceptance Requirements:
   1. Deliver materials in undamaged and unopened packaging or containers with Manufacturer’s labels intact.

B. Storage And Handling Requirements:
1. Resilient Tile Flooring and Adhesive:
a. Product Acclimation:
1) Materials should be present at jobsite for at least forty-eight (48) hours with ambient temperature between 65 deg F (18.3 deg C) to 85 deg F (29.4 deg C) for at least seventy-two (72) hour prior to installation or recommandations requirements of Manufacturer.

1.6 FIELD CONDITIONS

A. Ambient Conditions:
1. Building Conditions:
a. Conditions inside building shall be brought to levels to be normal at occupancy of building.
b. Conditions include normal levels of humidity, lighting, heating, and air conditioning.
2. Concrete Slab:
a. General:
1) Final determination as to whether or not, concrete slab is dry enough for flooring installation should be based on evaluating both Alkalinity and Concrete Moisture Vapor Emission Rate (MVER) testing as specified in Section 09 0503 'Floor Substrate Preparation'.
b. Alkalinity:
1) Do not install flooring if alkalinity of concrete surface exceeds pH level 9. Corrective procedures are required.
c. Concrete Moisture Vapor Emission Rate (MVER):
1) Testing conditions inside building shall be brought to same ambient temperature and relative humidity levels to be normal at occupancy of building. Conditions include normal levels of humidity, lighting, heating, and air conditioning.
2) Follow requirements specified in Section 09 0503 'Floor Substrate Preparation' before installation of resilient tile flooring.
3. Application:
a. Maintain 65 deg F (18.3 deg C) 85 deg F (29.4 deg C) during installation of flooring or recommandation requirements of Manufacturer.

PART 2 - PRODUCTS

2.1 OWNER-FURNISHED PRODUCTS

A. Manufacturer:
1. Category One Approved Manufactures. See Section 01 6200 for definitions of Categories.
a. Tandus Centiva., Dalton, GA www.tandus-centiva.com.

B. Materials:
1. Luxury Vinyl Tile (LVT):
a. Design Criteria:
1) Classification: ASTM F1700 Class III Type B.
2) Total Thickness: 0.120 inch (3.0 mm).
3) Edge Treatment: Square (SE).
4) Meet Indoor Air Quality standards.
5) Size: 18 inch x 18 inch (45.72 cm x (45.72 cm).
6) Twenty-year Limited Commercial Wear Warranty.
b. Category One Approved Products. See Section 01 6200 for definitions of Categories:
1) Contour Series:
a) Classic Stone #ECL: Color Style: Ash Limestone #7107.
b) Montage #CMT: Color Style: Red Oxide #7424.
2. Adhesives:

a. Testing Results as testing for Alkalinity and Concrete Slab Moisture in Section 09 0503 is ninety (90) percent RH or less:
1) Manufacture approved adhesive
b. Testing Results as testing for Alkalinity and Concrete Slab Moisture in Section 09 0503 is ninety (90) percent RH or more:
1) RollSmart Adhesive must be used.
3. Floor Finish:
a. Category One Approved Products. See Section 01 6200 for definitions of Categories:
1) Carefree Matte Low Gloss Floor Finish by Sealed Air Diversey Care, Sturtevant, WI www.sealedair.com/diversey-care/diversey-care-products/carefree-matte-floor-finish.
2) XL Matte Floor Finish by XL North, Fall River, MA www.xlnorth.com.

PART 3 - EXECUTION

3.1 APPROVED INSTALLER

A. Category One Approved Installer. See Section 01 6200 for definitions of Categories:
1. Flooring Services Inc., Sandy, UT www.flooringservices.com.
a. First Contact: Jason Rowley, LDS Account Manager, office (801) 487-3600 x 108, cell (801) 631-8382 email jason@flooringservices.com.
b. Second Contact: Marie Davis, LDS Account Manager, office (801) 487-3600, cell (801) 631-9152 email marie@flooringservices.com.

3.2 EXAMINATION

A. Verification of Conditions:
1. Resilient Tile Flooring:
a. Verify concrete surfaces are sufficiently cured and moisture content is within acceptable levels before beginning installation.
b. Verify ventilation requirements as specified in Field Conditions in Part 1 of this specification have been maintained before proceeding with applying flooring.
2. Resilient Base And Accessories:
a. 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.
b. Notify Architect of unsuitable conditions in writing:
1) Do not start work until defects are corrected.
c. Commencement of Work by installer is considered acceptance of substrate.

3.3 PREPARATION

A. Surface Preparation:
1. Resilient Tile Flooring:
a. Floor substrate prepared as specified in Section 09 0503.
b. Moisture vapor emission tests and alkalinity test of concrete slab has been performed.
c. Remedy cracks and minor irregularities in substrate in accordance with Manufacturer's recommendations.

3.4 INSTALLATION

A. Resilient Tile Flooring:
1. Lay tile symmetrically about center line of spaces to insure even borders, unless shown differently on Contract Drawings.
2. Installation Method:
a. Lay tile quarter-turned.

b. Shuffling:
1) Shuffling tiles from same carton.
2) Shuffling tiles from multiple cartons.

3. Adhesive:
a. High moisture vapor emission testing results:
1) RollSmart Adhesive is required. Apply Adhesive as per Manufacturer's written instructions.

4. Floor Finish:
a. Follow Manufacturers written instructions for floor preparation and application.

B. Resilient Base And Accessories:
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 (300 mm), install no lengths of base shorter than 12 inches (300 mm) long.

3.5 FIELD QUALITY CONTROL

A. Field Tests:
1. Resilient Tile Flooring:
a. See Section 09 0503 ‘Flooring Substrate Preparation’ for Field Testing for Alkalinity and Concrete Moisture of concrete slab.

B. 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.

3.6 ADJUSTING

A. Resilient Base And Accessories:
1. Inspect and make necessary adjustments within one (1) month after mechanical heat or other heat has been supplied continuously in finished areas.

3.7 CLEANING

A. General:
1. Adjacent Work:
a. Clean all exposed surfaces of adjoining areas of adhesive spatter before it sets.

B. Resilient Tile Flooring:
1. Adhesive:
a. Any excess adhesive must be removed from tile surface.
b. Do not allow epoxy adhesive to dry on tile surface.

C. Resilient Base And Accessories:
1. Clean all exposed surfaces of base of adhesive spatter before it sets in accordance with Manufacturer’s cleaning instructions.
2. Damp-mop surfaces to remove marks and soil.

3.1 PROTECTION

A. Resilient Tile Flooring:
   1. Keep installation from heavy foot traffic or rolling loads for at least twenty-four (24) hours.
   2. Do not wash or apply finish to floor for minimum of forty-eight (48) hours after installation.

B. Resilient Base And Accessories:
   1. Cover material.
   2. Keep traffic away until adhesive has set.

END OF SECTION

SECTION 09 6816

SHEET CARPETING: Back Cushion, Direct Glue

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes But Is Not Limited To:
   1. Coordination, sequencing, and scheduling installation of Owner-Furnished carpet, carpet base, carpet accessories, leveling compounds as described in Contract Documents and including following:
      a. Maintain Building Ambient Conditions including normal levels of humidity, lighting, heating, and air conditioning for acceptability for beginning floor preparation and carpet installation.
      b. Protection of carpet after installation of carpeting as required.

B. Related Requirements:
   1. Section 01 1200: 'Multiple Contract Summary' for carpet and carpet 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.
   2. Section 03 3111: 'Cast-In-Place Structural Concrete' for provision of acceptable concrete substrate.
   3. Section 09 0503: 'Flooring Substrate Preparation' for:
      a. Floor substrate preparation.
      b. Pre-installation conference for Sections under 09 6000 heading ‘Flooring.
   4. Section 09 6513: 'Resilient Base And Accessories' for resilient base.

1.2 REFERENCES

A. Association Publications:
   1. The Carpet and Rug Institute (CRI), Dalton, GA www.carpet-rug.org. Standard for Installation Specification of Commercial Carpet:
      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 carpet installation with other trades.

B. Pre-Installation Conference:
   1. Participate in MANDATORY pre-installation conference as specified in Section 09 0503.
   2. Schedule pre-installation conference 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 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 Preinstallation 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 piece of carpet consisting of 12 sq yds (10 sq m), and 25 lineal feet (7.62 meters) minimum of carpet cove base.
b. Roll up and tie securely.

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 Installer Qualifications:
a. Certified CFI Master or Contract II grade installer or FCIB certified.
b. Not less than five (5) years of experience in installation of commercial carpet tile of type, quantity and installation methods similar to work of this section.
c. Qualified and approved by Carpet Manufacturer.
2. 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. General:
1. Comply with instructions and recommendations of Manufacturer for special delivery, storage, and handling requirements.

B. 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.
3. Transport carpet in manner that prevents damage and distortion. Bending or folding individual carpet rolls or cuts from rolls is not recommended. When bending or folding is unavoidable for delivery purposes, carpet is required to be unrolled and allowed to lie flat immediately upon arrival at installation site.

C. 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 and store on a flat surface.
3. Stacking heavy objects on top of carpet rolls or stacking more than three rolls is prohibited.

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. (HVAC must be in operation thru out carpet installation):
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 65º - 95º F (18º - 35º C) with maximum relative humidity of 65%.
b) Substrate surface temperature should not be less than 65º F (18º C) at time of installation.
c) Do not allow temperature of indoor carpeted areas to fall below 50º F (10º C), 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. Carpet defect or installation defect:

1) Carpet Manufacturer may use any reasonable means to cure first three (3) breaches of warranty affecting an area of carpeting bounded by natural breaks such as doorways, ('affected carpet area'). Such cure must preserve as uniform a blended appearance, acceptable to Carpet Manufacturer and Owner, as exists throughout Installation Site at time of breach.
2) If carpet defect or installation defect continues to appear after three (3) 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. Sheet Carpeting:
1) General:
a) Appearance Retention to be provided with Special Warranty requirements if not already included in Standard Warranty.
2) Bishop's Storehouse, Deseret Industries:
a) Office Areas:
(1) Owner Carpet Program Product: Provide fifteen (15) year minimum or Carpet Manufacturer's better Warranty on carpet system.
b) Retail Space:
(1) Owner Carpet Program Product: Provide ten (10) 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. Materials supplied for carpet installation shall be complete package from specified Carpet Manufacturer:
a. Tandus Centiva., Dalton, GA www.tandus-centiva.com.
1) Contact Information: Tracy Riddle - cell (801) 580-5147 fax (866) 861-7522 Tracy.Riddle@Tarkett.com.

B. Materials:
1. Carpet:
a. Category One Approved Manufacturer and Color / Patterns. See Section 01 6200 for definitions of Categories:
1) Tandus Centiva: Style: 04346 Ensign II, Color: DI 86172.
2) Field verify to match existing and current DI Standard
2. Carpet Base:
a. 4-1/2 inch (115 mm) wide base without cushion backing:
1) Top edge of base serged with 1-1/4 inch (32 mm) polyester binding fabric.
2) Roll edges of binding fabric under and sew along top edge of carpet cove base.
b. Category One Approved Products, Style, and Color. See Section 01 6200 for definitions of Categories:
1) Tandus Centiva: Style: 04346 Ensign II, Color: DI 86172.
2) Field verify to match existing and current DI Standard

2.2 ACCESSORIES

A. Carpet Accessories: Snap-in vinyl reducer strips and vinyl track.

B. Floor Leveling Compound, Floor Patching Compound, And Latex Underlayment: As recommended and approved by Carpet Manufacturer.

PART 3 - EXECUTION

3.1 APPROVED INSTALLER

A. Category One Approved Installer. See Section 01 6200 for definitions of Categories:
   1. Flooring Services Inc., Sandy, UT www.flooringservices.com.
      a. Contact Marie Davis, Account Manager, office (801) 487-3600, cell (801) 631-9152 email marie@flooringservices.com.

3.2 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. Carpet Areas:
      a. Variation In Grade:
         1) Plus or minus 1/8 inch (3 mm) in any 10 foot (3 meter) of floor slab and distance between high point and low point of slab of 1/2 inch (13 mm).
      b. Testing Procedure:
         1) Place ends of straightedge on 3/8 inch (10 mm) high shims.
         2) Floor is satisfactory if 1/4 inch (6 mm) diameter steel rod rolled under straightedge will not touch anywhere along 10 foot (3 meter) length and 1/2 inch (13 mm) diameter steel rod will not fit under straightedge anywhere along 10 foot (3 meter) length.
      c. Notify Owner's Representative in writing if floor surface is not acceptable to install carpet:
         1) Do not lay carpet over unsuitable surface. Commencing installation constitutes acceptance of floor and approval of existing conditions.

3.3 PREPARATION

A. Carpet Areas:
   1. Flooring Preparation:
      a. Owner-Furnished Product Supplier's Responsibility:
         1) Prepare floor substrate in accordance with 'CRI Carpet Installation Standard' best practices to receive carpet installation and to provide installation that meets warranty requirements.
         2) Verify concrete surface cured, clean, dry, and free of foreign substances that will compromise carpet and/or installation.
      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 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).
      d. Vacuum and damp mop floor areas to receive flooring before flooring installation.
   2. Relaxing / Conditioning Carpet:
      a. Highly recommended that carpet be unrolled and allowed to relax in installation area for time period that conforms to requirements of manufacturer of product being installed:
      b. Protect carpet adequately from soil, dust, moisture and other contaminants.
      c. Sundry items, such as adhesives, should also be conditioned.
   3. Carpet Accessories:
      a. Owner-Furnished Product's Responsibility:

1) Sundry items, such as adhesives, shall be conditioned to building ambient conditions before use.

3.4 INSTALLATION

A. Carpet:
1. General:
   a. Install carpet and carpet base in accordance with 'CRI Carpet Installation Standard' and Manufacturer's written instructions supplied with product.
   b. Adhesion of carpet cushion (or secondary backing) to floor substrate and adhesion of carpet primary and secondary backings shall be continuous on floor surface so there are no bubble, ridges, or any separation of carpet from backings or backing from floor substrate caused by failure of carpet, backings or cushion, and adhesives as a system.
   c. Install carpet under edge of metal thresholds where possible. Use specified carpet accessories at exposed edges.
2. Seaming Requirements:
   a. Seal seams in accordance with Carpet Manufacturer's instructions and according to CRI Carpet Installation Standard (2009) as applicable. Seam carpet base only at inside corners.
   b. No seam separation in carpet and no more observable seams from any standing position than that which is unavoidable using best seaming materials and practices available at time of installation.
   c. Lay rooms parallel to respective Corridors. Seam to permit best use of available carpet.
   d. Quarter turning allowed only at cross-Corridors longer than 24 feet (7.315 m).
   e. Use single or double seams at doorways (single seams preferred). Run nap of pieced carpet in same direction.

B. Carpet Base:
1. Precut base so seams occur only at inside corners.
2. Scribe base to floor.
3. Spread adhesive over back side of base up to bottom of serging on edge or apply three 3/16 inch (4.76 mm) minimum diameter beads of adhesive placed one inch apart on back of base with top bead placed 2 inch (50 mm) down from serged edge of base and spread adhesive over back surface of base up to bottom edge of serging.
   a. Bird's mouth finish should only be required when door frame is flush with wall.
   b. If bird's mouth is required, terminate at door frames or vertical trim with 45 degree angle, bird mouth cut so serged edge turns down to contact frame or trim.
4. Do not allow adhesive beyond edge of base. Remove excess adhesive.
5. Do not use staples, nails, screws or other mechanical fasteners.

3.5 FIELD QUALITY CONTROL

A. Field Inspections:
1. Carpeting:
   a. Unacceptable carpet after installation shall include but not be limited to:
      1) Delaminating carpet from backings.
      2) Fiber loss less than specified.
      3) Edge raveling.
      4) Fuzzing of carpet fibers.
      5) Pilling of carpet fibers.
      6) Appearance retention less than control samples attached to Agreement.
      7) Dye bleeding.
      8) Zippering fibers in carpet.
      9) Color streaking.
      10) Irregular tufts of fiber.
   b. Unacceptable workmanship shall include but not be limited to:
      1) Improper floor preparation before installation.

2) Failure of adhesive to completely adhere carpet to floor resulting in bubbles, ridges, or ripples where carpet has separated from floor.
3) Seams that do not comply with specified requirements:
   a) Raveled or untrimmed seams.
   b) Seams not sealed, level, straight, or even.
   c) Open seams.
   d) Seams visibly open when viewed by Project Manager from standing position.
4) Sequence rolls, commercial match issues created by rolls being installed out of sequence will require correction or replacement.
5) Failure to properly install carpet next to walls and door frames to eliminate gaps or puckering of carpet.
6) Use of unspecified carpet.
7) Carpet base ends not finished to terminate at door frames or vertical trim shall have 45 degree angle 'birdsmouth' finish.
8) Adhesive exposed on carpet, on carpet base, beyond edges of carpet base, and on other surfaces of building.
9) Carpet base that is not scribed to fit against floor with no gaps.
10) Carpet base attached by means other than acceptable carpet base adhesive.

B. Non-Conforming Work:
   1. Carpeting:
      a. Basis of Acceptable Carpeting: Source Quality Control Testing:
         1) Carpet products not meeting Design Criteria and Source Quality Control Testing of this specification will be considered unacceptable carpeting.
      b. Unacceptable Carpeting:
         1) 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. Minimum replacement size shall be:
            a) Between nearest existing seams.
            b) Between natural transition points or 12 feet (3.6 meters) of running length.

3.6 ADJUSTING

A. Inspect and make necessary adjustments within one (1) month after mechanical heat or other heat has been supplied continuously in finished areas.

3.7 CLEANING

A. General:
   1. Carpeting:
      a. Carpet Installer's Responsibility:
         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) Carpet Installer responsible for cleaning and repair of all damaged surfaces to their original condition from carpet installation.

C. Waste Management:
   1. Contractor's Responsibility:
      a. Provide adequate waste receptacles (dumpsters) and dispose of Owner Furnished materials from building and property as specified in Section 01 7400.
   2. Carpet Installer's Responsibility:
      a. All work areas are to be kept clean, clear and free of debris at all times.

b. Disposal of rubbish, wrapping paper, scraps, and trimmings in provided dumpster(s).

3.8 PROTECTION

A. Protection of Carpeting:
   1. Contractor'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 adequately from soil, dust, moisture and other contaminants after carpet installation.
      d. Protect carpet from abuse, vandalism, or damage occurring after installation is complete.

END OF SECTION

SHEET CARPETING DESIGN CRITERIA (Back Cushion, Direct Glue)

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
1. Design Criteria Requirements of Owner-Furnished carpet and carpet base as specified in Section 09 6816: 'Sheet Carpeting' in contract documents of Church Specifications:
   a. Design Criteria Requirements are not included in Project Manual Specifications for site adapted Church Projects.

B. Related Requirements:
1. Section 09 6813: 'Tile Carpeting'.
2. Section 09 6816: 'Sheet Carpeting'.

1.2 REFERENCES

A. Association Publications:
1. The Carpet and Rug Institute (CRI), Dalton, GA www.carpet-rug.org. Standard for Installation Specification of Commercial Carpet:
   a. CRI Indoor Air Quality (IAQ):
      1) CRI Green Label Plus Certification.

B. Definitions:
1. Adhesive: Substance that dries to film capable of holding materials together by surface attachment.
2. Antimicrobial: Chemical treatment added to carpet or reduce growth of common bacteria, fungi, yeast, mold and mildew.
3. Appearance Retention: Ability of a fabric to retain its original aesthetics, color, and construction integrity.
4. Backing: Materials comprising back of carpet as opposed to carpet pile or face.
   a. Tufted carpets: (1) Primary backing, woven or nonwoven fabric in which pile yarn is inserted by tufting needles. (2) Secondary backing, Fabric laminated to back of carpet to reinforce and increase dimensional stability.
   b. Woven carpets: Backings are 'construction yarns' comprising chain warp, stuffer warp, and shot or fill, which are interwoven with face yarn during carpet fabric formation.
5. Backing Fabric: Fabric into which pile yarn is inserted or reinforcing layer that is adhered to reverse side of fabric.
6. Bonding Agent (Backcoating): Application of latex or adhesive to back of carpet to anchor tufts usually followed immediately by addition of secondary backing material such as nonwoven polypropylene or poly-urethane attached cushion.
7. Carpet: Heavy fabric used to cover floor and made from variety of fibers.
8. Change In Surface Appearance: Cumulative change in surface appearance between unexposed and exposed specimens due to crushing, loss of tuft definition, and matting.
9. Colorfastness: Ability of fiber or carpet to retain color when exposed to (1) ultraviolet light, (2) crocking (wet or dry) and (3) atmospheric conditions.
10. Commercial Match: Matching of colors with acceptable tolerance, or with color variation that is barely detectable to naked eye.
11. Crockfastness: Resistance of transfer of colorant from surface of colored yarn or fabric to another surface, or to an adjacent area of same fabric, principally by rubbing.
12. Crushing: Collapsing of pile yarns, resulting in carpet matting and loss of resilience due to traffic.
13. Delamination: Form of deterioration of tufted carpet in which primary back and face yarns separate from secondary back.

14. Density: Amount of pile yarn per area of carpet or closeness of tufts. Higher density carpet improves resistance to crushing and matting.
15. Dimensional Stability: Ability of carpet to retain its size and shape once installed.
16. Face Weight: Total weight of face (above backing) yarns in carpet.
17. Fiber: Fundamental unit of carpet made from nylon, polyester, cotton, acrylics, wool, and recycled material.
18. Flammability: Procedures that have been developed for assessing flame resistance of carpets.
19. Foot Traffic Classification: Process that classifies areas of intended use and minimum carpeting texture appearance for particular areas of use established for each application based on level of expected foot traffic in specific areas. Classifications are Moderate, Heavy and Severe.
20. Fuzzing: Fluffy particles appear on carpet surfaces caused by fibers that loosen because of weak twist or snags.
21. Lightfastness: Degree of resistance of dyed textile materials to color destroying influence of sunlight.
22. Loss of Tuft Definition: Bursting, opening, and untwisting of pile yarn and/or decrimping of fibers in surface pile of pile yarn floor covering.
23. Matting: Loss of pile definition of a textile floor covering due to entanglement and compression of pile fibers.
24. Modification Ratio: Ratio between circumference of inner core of multi lobal fiber's cross section, and circumference of circle drawn around outer edges of fibers cross sections' outer lobes or tips.
25. Pile: Visible surface of carpet, consisting of yarn tufts in loop and/or cut configuration. Sometimes called face or nap.
26. Relative Humidity (RH) Testing: Testing of concrete slabs is defined as ratio of actual amount of water vapor present in volume of air at given temperature to maximum amount that air could hold at that temperature, expressed as percentage.
    a. Relative Humidity test method covers quantitative determination of percent relative humidity in concrete slabs for field or laboratory tests.
    b. Moisture test results indicate moisture condition of slab only at time of test.
27. Resilience: Ability of carpet to spring back to its original texture and thickness after being walked on or compressed weight of furniture.
28. Soil Resistance: Ability of carpet fiber to resist dry soil and maintain its original appearance after intermittent or restorative cleanings.
29. Soiling: Occurs when dirt particles build up in carpet fibers.
30. Stain Resistance: Ability of carpet fiber to resist absorption of stain and maintain its original appearance.
31. Texture: Visual and tactile surface characteristics of carpet pile, including such aesthetic and structural elements.
32. Tile: Carpet module usually 18 inch x 18 inch or 24 inch x 24 inch (450 mm x 450 mm or 600 mm x 600 mm) in size. Extremely dense construction with heavy reinforced backing.
33. Tuft: Cluster of yarns drawn through fabric and projecting from surface in form of cut yarns or loops.
34. Tuft Bind: Force (usually measured in pounds) required to pull tuft from carpet backing.
35. Tufted Carpet: Carpet produced by tufting machine instead of loam.
36. Twist: Winding of yarn around itself. More twist improves carpet performance (especially in cut pile).
37. Woven Carpet: Carpet produced on a loom through weaving process by which lengthwise (warp) yarns and widthwise (weft or filling) yarns are interlaced to form fabric.
38. Woven: Interlacing strands of fiber into yarn forms woven carpet.
39. Yarn: Fibers that are twisted together to form a continuous strand.

C. Reference Standards:
    1. American Association of Textile Chemists and Colorists (AATCC):
        a. Test Method:
            1) AATCC 16.3-2014, 'Colorfastness to Light: Xenon-Arc'.
            2) AATCC 107-2013, 'Colorfastness to Water'.
            3) AATCC 134-2011, 'Electrostatic Propensity of Carpets'.
            4) AATCC 165- 2013, 'Colorfastness to Crocking: Textile Floor Coverings--Crockmeter Method'.
            5) AATCC 174-2011, 'Antimicrobial Activity Assessment of Carpets'.
            6) AATCC 175-2013, 'Stain Resistance: Pile Floor Coverings'.

2. ASTM International:
    a. ASTM D1335-17, ‘Standard Test Method for Tuft Bind of Pile Yarn Floor Coverings’.
    b. ASTM D2646-18, ‘Standard Test Methods for Backing Fabric Characteristics of Pile Yarn Floor Coverings’.
    c. ASTM D3676-13, ‘Standard Specification for Rubber Cellular Cushion Used for Carpet or Rug Underlay’.
    d. ASTM D3936-17, ‘Standard Test Method for Resistance to Delamination of the Secondary Backing of Pile Yarn Floor Covering’.
    e. ASTM D5116-17, ‘Standard Guide for Small-Scale Environmental Chamber Determinations of Organic Emissions From Indoor Materials/Products’.
    f. ASTM D5252-15, ‘Standard Practice for the Operation of the Hexapod Drum Tester’.
    g. ASTM D5848-10, ‘Standard Test Method for Mass Per Unit Area of Pile Yarn Floor Coverings’.
    h. ASTM D6962-17, ‘Standard Practice for Operation of a Roller Chair Tester for Pile Yarn Floor Coverings’.
    i. ASTM D7330-15, ‘Standard Test Method for Assessment of Surface Appearance Change in Pile Floor Coverings Using Standard Reference Scales’.
    j. ASTM E648-17a, ‘Standard Test Method for Critical Radiant Flux of Floor-Covering Systems Using a Radiant Heat Energy Source’.
    k. ASTM E662-17a, ‘Standard Test Method for Specific Optical Density of Smoke Generated by Solid Materials’.
3. British Spill Test:
    a. Test with protocol but not standardized test (Developed several years ago by West End Medical Association in Great Britain and since has been adopted by several U.S. Manufactures).
4. International Organization for Standardization (ISO).
    a. ISO 2551:1981, ‘Machine-made textile floor coverings - Determination of dimensional changes due to the effects of varied water and heat conditions’.
5. National Fire Protection Association (NFPA):
    a. NFPA (Fire) 253, ‘Standard Method of Test for Critical Radiant Flux of Floor Covering Systems using a Radiant Heat Energy Source’ (2015 Edition).
6. The Carpet and Rug Institute (CRI):
    a. CRI 104, 'Standard For Installation of Commercial Carpet' (Sept 2015).
    b. CRI TM-101, ‘Assessment of Carpet Surface Appearance Change using the CRI Reference Scales’.
    c. CRI TM-102, ‘School Carpet Minimum Average Specifications’.

1.3 SUBMITTALS

A. Informational Submittals:
1. Test And Evaluation Reports:
    a. Provide Source Quality Control testing as specified in this specification if requested by Owner.
2. Sustainable Design Submittals:
    a. Provide documentation for compliance of Product Data for Credit EQ 4.3 if requested by Owner:
        1) For carpet and cushion, documentation indicating compliance with testing and product requirements of CRI's "Green Label Plus" program.

1.4 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.

PART 2 - PRODUCTS

2.1 OWNER-FURNISHED PRODUCTS

A. Category One Approved Manufacturers. See Section 01 6200 for definitions of Categories:
   1. Materials supplied for carpet installation shall be complete package from specified Carpet Manufacturer:
      a. Lees, Division of Mohawk Carpets, Glasgow, VA:
         1) Contact Information: Help Line (800) 523-5555 or (801) 397-5626.
      b. Mannington Commercial Carpets, Calhoun, GA:
         1) Contact Information: Help Line Voice Mail (800) 241-2262, ext 8045 or Mannington Installation Services, email lds@mannington.com or (855) 466-2664.
      c. Tandus Centiva: Dalton, GA www.tandus-centiva.com.
         1) Contact Information: Tracy Riddle - cell (801) 580-5147 fax (866) 861-7522 Tracy.Riddle@Tarkett.com.

B. Design Criteria:
   1. General:
      a. Commercial Match:
         1) Colors, texture and pile of any product selected as carpet standard or custom designed specifically for Owner needs to be consistent in appearance.
         2) When new carpet is installed next to existing carpet, two pieces need to be within tolerance acceptable as commercial match (Two shade variations maximum).
         3) Regardless of reason, if commercial match is not achievable, existing carpet needs to be replaced to acceptable breaking point approved by Owner's Representative.
         4) If changes in supply chains or unforeseen circumstances require standard pattern to be re-engineered, new carpet must be made close to original as possible.
         5) New product must be approved by Owner.
      b. Compatibility:
         1) Materials supplied for carpet installation shall be complete package from specified Carpet Manufacturer. Do not mix items from material packages of different carpet Manufacturers.
         2) Provide carpet, seam sealers, adhesives, and other related materials that are compatible with one another and with substrates under conditions of service and application.
      c. Tested Products:
         1) New technology and products not allowed unless pre-approved by Owner.
   2. Carpet Material Requirements:
      a. Carpet Backing:
         1) Broadloom - Attached Cushion.
            a) Manufacturer's preference that meets or exceeds specification and life cycle warranty expectation.
      b. Cushion Thickness:
         1) Attached cushion thickness shall be 0.10 inch minimum when tested in accordance with ASTM D3676.
      c. Fiber:
         1) Meetinghouse, Mission Office, and O&M / R&I:
            a) Antron Lumina and/or Legacy only.
         2) CES, S&I Module, and O&M / R&I:
            a) Institute:
               (1) Antron Lumina and/or Legacy only.
            b) Seminary:
               (1) Antron Lumina and/or Legacy only.
            c) Antron Lumina and/or Legacy only.
         3) Bishop's Storehouse, Deseret Industries:
            a) Office Areas:
               (1) Antron Lumina and/or Legacy only.
            b) Retail Space:
               (1) Antron Lumina and/or Legacy only.

d. Life Expectancy (Sheet Carpeting):
    1) Meetinghouse, Mission Office, and O&M / R&I: twenty (20) years minimum.
    2) CES, S&I Module, and O&M / R&I:
        a) Institute: twenty-five (25) years minimum.
        b) Seminary: twenty-five (25) years minimum.
    3) Bishop's Storehouse, Deseret Industries:
        a) Office Areas: fifteen (15) years minimum.
        b) Retail Space: ten (10) years minimum.
e. Modification Ratio:
    1) Meetinghouse, Mission Office, and O&M / R&I: 1.5 or less.
    2) CES, S&I Module, and O&M / R&I:
        a) Institute: 1.5 or less.
        b) Seminary: 1.5 or less.
    3) Bishop's Storehouse, Deseret Industries:
        a) Office Areas: 1.5 or less.
        b) Retail Space: 1.5 or less.
f. Pile Yarn Floor Construction:
    1) Meet standard for average pile yarn weight tested under ASTM D5848.
        a) Carpet will retain eighty-five (85) percent of these amounts at end of the warranty period.

3. Carpet Physical Performance:
a. Appearance Retention Requirements:
    1) Foot Traffic Classification and Testing Requirements:
        a) Severe Traffic Criteria:
            (1) Carpet is to be tested in accordance to ASTM D5252 with an Actionbac secondary backing meeting short term cycles (4000) grading scale of 3.5 and long-term cycles (12000) grading scale of 3.5 with appearance retention measured according.
            (2) Carpet needs to be able to maintain 3.5 rating for eighty-five (85) percent of its warranty expected life cycle in accordance to ASTM D7330.
    2) Severe Traffic:
        a) Meetinghouse, Mission Office, and O&M / R&I.
        b) CES, S&I Module, and O&M / R&I.
        c) Bishop's Storehouse, Deseret Industries:
            (1) Office Areas.
            (2) Retail Space.
b. British Spill Test:
    1) Carpet must past British Spill Test (formally known as the National Health Service Patient Area Requirement for the United Kingdom, Method E: Part 2):
        a) Test involves controlled spilling of blue dyed liquid from 1-meter (39 inches) height onto carpet product.
        b) Spill is allowed to stand for period of twenty-four (24) hours, after which cuts are made through carpet in area of spill to establish whether there was penetration into or through carpet composite.
c. Colorfastness:
    1) Colorfastness to Crocking: AATCC 165:
        a) Color transfer Class 4 minimum, wet and dry, when tested as specified.
    2) Colorfastness to Light: AATCC 16.3:
        a) Not less than 4 after 40 AFU (AATCC fading units). Colorfastness to Light, Xenon-Arc (60 AFU) (AATCC Fading Unit).
    3) Colorfastness to Water: AATCC 107:
        a) Color transfer Class 4 minimum, AATCC Transference Scale (only yarn dyed carpets) (grade change in color and staining).
d. Compression Resistance and Compression Set Attached Cushion:
    1) Minimum CLD of 7 lb per cu in (0.194 kg per cu cm) at 25 percent deflection, and maximum compression set of 10 percent after 50 percent constant compression when tested in accordance with ASTM D3676 with modification to allow recovery at 158 deg F (70 deg C) instead of room temperature for thirty (30) minutes.
e. Critical Radiant Flux (CRF):

1) Meet requirements of ASTM E648 Standard Test Method - Minimum Class 1 Critical Radiant Flux (CRF) of 0.45 watts/cm2 or greater when tested in accordance with flooring radiant panel test using ASTM E648 Standard Test Method for Critical Radiant Flux of Floor Covering Systems Using a Radiant Heat Energy Source as the test method.

f. Delamination:
   1) Resistance to Delamination (Actionbac secondary backing): Not less than 3.5 lbf/in (15 N/mm) when tested in accordance with ASTM D3936.
   2) Resistance to Delamination (Attached Cushion): Not less than 15,000 cycles when tested in accordance with ASTM D6963.

g. Dimensional Stability:
   1) 0.2 percent or less when tested in accordance with ISO 2551, 'Dimensional Stability (Aachen Test)'.

h. Dry Breaking Strength:
   1) Not less than 100 lbs (445 N) when tested in accordance with ASTM D2646.

i. Electrostatic Propensity of Carpets:
   1) Electrostatic shock propensity with maximum 3.5 kV when tested in accordance with AATCC 134, 'Step Method'.

j. Flammability and Smoke Resistant:
   1) Smoke Density:
      a) Smoke density generated from carpet and backing must not exceed 450 when tested in the flaming mode using ASTM E662, 'Standard Test Method for Specific Optical Density of Smoke Generated by Solid Materials'.
      or
      b) NFPA 258, 'Standard Research Test Method for Determining Smoke Generation of Solid Materials as test methods'.

k. Indoor Air Quality (IAQ):
   1) CRI Test Program ASTM D5116.
   2) Method for determination of VOC emitted from carpet using specific sorbent tube and thermal desorption/gas chromatography as per ASTM 7339.
   3) Carpet, adhesives, and seam sealers shall be VOC compliant as certified with CRI Indoor Air Quality Carpet Testing Program Green Label Plus or tested for compliance to meet the CRI IAQ Carpet Testing Program requirements and criteria as per ASTM D5116 CRI Test Program.

l. Soil Resist Treatment:
   1) Minimum average of 350 ppm fluorine on the pile fiber when 3 separate tests are conducted in accordance with CRI TM-102 test method.
   2) Installed carpet shall exhibit stain resisting ability equal to or exceeding that of any other premium carpet available at time of manufacture allowing removal of most foreign substances using generally accepted cleaning procedures and more aggressive cleaning procedures for stubborn stains without leaving any more visible stain and/or change in color than the most stain resistant premium carpet available at time of manufacture.

m. Stain Resistance:
   1) Minimum stain resistance rating of 8 when tested in accordance with AATCC 175, 'Stain Resistance: Pile Floor Coverings.

n. Tuff Bind (dry):
   1) Not less than 10 lbs (45 N) when tested in accordance with ASTM D1335.

2.2 SOURCE QUALITY CONTROL

A. Tests:
   1. Carpet:
      a. Appearance Retention Rating:
         1) Hexapod Test Method: ASTM D5252.
         2) Grading: ASTM D7330.
      b. Antimicrobial Activity: AATCC 174.
      c. British Spill Test: Test Protocol.
      d. Colorfastness:

1) Crocking: AATCC 165.
2) Light: AATCC 16.3.
3) Water: AATCC 107.

e. Delamination: ASTM D3936 and ASTM D6962.
f. Dimensional Stability: ISO 2551.
g. Dry Breaking Strength: ASTM 2646.
h. Electrostatic Propensity of Carpets: AATCC 134.
i. Flame and Smoke Resistant. Provide carpet complying with ratings as indicated for following:
1) Flooring Radiant Panel Test (Critical Radiant Flux), ASTM E648, NFPA 253.
2) Smoke Density Test: ASTM E662.
j. Indoor Air Quality:
1) ASTM 7339.
2) Indoor Air Quality: CRI Test Program ASTM D5116.
k. Pile Yarn Weight: ASTM D5848.
l. Soil Resist Treatment: CRI TM-102.
m. Stain Resistance: AATCC 175.
n. Turf Bind: ASTM D1335.

2. Attached Backing:
a. Carpet Backing: ASTM D3676.
b. Compression Resistance (constant deflection): ASTM D3676.
c. Compression Set (constant force): ASTM D3676.
d. Cushion Density: ASTM D3676.
e. Cushion Thickness: ASTM D3676.

PART 3 - EXECUTION

3.1 FIELD QUALITY CONTROL

A. Field Tests:
1. Carpet Manufacturer is responsible that concrete slab Alkalinity and Concrete Moisture Vapor Emission Rate (MVER) Testing for each Project is within Carpet Manufacturer's acceptable levels.

B. Field Inspections:
1. Carpeting:
a. Unacceptable carpet after installation shall include but not be limited to:
1) Delaminating carpet from backings.
2) Fiber loss less than specified.
3) Edge raveling.
4) Fuzzing of carpet fibers.
5) Pilling of carpet fibers.
6) Appearance retention less than control samples attached to Agreement.
7) Dye bleeding.
8) Zippering fibers in carpet.
9) Color streaking.
10) Irregular tufts of fiber.
b. Unacceptable workmanship shall include but not be limited to:
1) Improper floor preparation before installation.
2) Failure of adhesive to completely adhere carpet to floor resulting in bubbles, ridges, or ripples where carpet has separated from floor.
3) Seams that do not comply with specified requirements:
a) Raveled or untrimmed seams.
b) Seams not sealed, level, straight, or even.
c) Open seams.
d) Seams visibly open when viewed by Project Manager from standing position.
4) Sequence rolls, commercial match issues created by rolls being installed out of sequence will require correction or replacement.

5) Failure to properly install carpet next to walls and door frames to eliminate gaps or puckering of carpet.
6) Use of unspecified carpet.
7) Carpet base ends not finished to terminate at door frames or vertical trim shall have 45 degree angle 'birdsmouth' finish.
8) Adhesive exposed on carpet, on carpet base, beyond edges of carpet base, and on other surfaces of building.
9) Carpet base that is not scribed to fit against floor with no gaps.
10) Carpet base attached by means other than acceptable carpet base adhesive.

C. Non-Conforming Work:
1. Carpeting:
a. Basis of Acceptable Carpeting: Source Quality Control Testing:
1) Carpet products not meeting Design Criteria and Source Quality Control Testing of this specification will be considered unacceptable carpeting.
b. Unacceptable Carpeting:
1) 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. Minimum replacement size shall be:
a) Between nearest existing seams.
b) Between natural transition points or 12 feet (3.6 meters) of running length.

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.

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 (1.50 m) 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 (100 mm by 150 mm) 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.

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 (13 deg C) 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.
h. Color Levels:
1) Color Level II:
a) Number and placement of interior and exterior paint colors and gloss levels shall be as defined by Color Level II from MPI Manual, PDCA P3-93 as modified in following paragraph.
b) No more than one paint color or gloss level 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. 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:
3. Metal reveals at ceiling access doors.
4. Paint inside of chases in occupied spaces flat black for 18 inches (450 mm) or beyond sightline, whichever is greater.

C. Apply sealant in gaps 3/16 inch (5 mm) 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

ATTACHMENTS

PART 4 - PAINT COLOR SCHEDULE

A. Related Requirements:
   1. Section 09 9123 'Interior Painted Gypsum Board-Plaster'.
   2. Section 09 9124 'Interior Painted Metal'.
   3. Section 09 9125 'Interior Wood Paint'.
   4. Section 09 9324 'Interior Clear-Finished Hardwood'.

B. Category Four Colors. See Section 01 6200 for definitions of Categories:
   1. Interior:
      a. Interior Walls in all other rooms except listed above: Color '1': SW 7005 Pure White by Sherwin Williams. (See Section 09 9122 for CMU walls and Section 09 9123 for Gypsum Board, Plaster).
      b. Interior Door Frames, Railings, and Bale Bollards: SW 7065 Argos by Sherwin Williams. (See Section 09 9124'):
      c. Interior Clear Finished Wood (See Section 09 9324):
         1) Match other interior clear finished wood building elements.

B L A N K P A G E

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’.
      b. 'Attachment: Paint Color Schedule' for Deseret Industries Projects.
   3. Section 09 9413: 'Interior Textured Finishing' for textured finishes.

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: Gloss Level 6.

2) Remaining Painted Surfaces: Gloss Level 5.

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, Gloss (MPI Gloss Level 6)'.
b. Remaining Painted Surfaces:
1) MPI Product 141, 'Latex, Interior, High Performance Architectural, 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. 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’.
      b. 'Attachment: Paint Color Schedule' for Deseret Industries Projects.
   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
   3. Aluminum:
      a. New Surfaces: Use MPI(a) INT 5.4E Waterborne Light Industrial Finish system.

C. Performance:
   1. Design Requirements:
      a. New Surfaces: MPI Premium Grade finish requirements.
      b. Gloss / Sheen Level Required: Gloss Level 5.

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’.

c. Aluminum: MPI Product 95: 'Primer, Quick Dry, for Aluminum'.

2. 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:
   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’.
      b. 'Attachment: Paint Color Schedule' for Deseret Industries Projects.

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. 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: Gloss Level 5.

D. Materials:
   1. Wood Floors:
      a. Moderate to heavy traffic: MPI Product 77, ‘Epoxy, 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 2210: ‘Miscellaneous Wood Trim’.
   2. Section 06 4512: ‘Architectural Woodwork Wood Trim’.
   3. Section 09 9001: 'Common Painting And Coating Requirements':
      a. Pre-installation conference for Sections under 09 9000 heading ‘Paints and Coatings’.
      b. 'Attachment’: Paint Color Schedule' for Deseret Industries Projects.

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 Owner selected sample.
   b. LDS 110.
      1) Performance standard: Owner provided sample.
         a) Contact Information: Nancy Black (801) 240-2431 BlackNL@ldschurch.org, Meetinghouse Facilities Department.
      2) Field verify to match existing wood stain on project.

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-stearated 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-stearated 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.

END OF SECTION

SECTION 09 9413

INTERIOR TEXTURED FINISHING

PART 1 - GENERAL

1.1 SUMMARY

A. Includes But Not Limited To:
   1. Furnish and apply texturing on walls and ceilings as described in Contract Documents.

B. Related Requirements:
   1. Section 09 2900: 'Gypsum Board' for priming.
   2. Section 09 9001: 'Common Painting And Coating Requirements' for:
      a. Pre-installation conference for Sections under 09 9000 heading ‘Paints and Coatings’.
   3. Section 09 9123: 'Interior Painted Gypsum Board, Plaster' for finish painting.

1.2 REFERENCES

A. Definitions:
   1. Drywall Texture: Compound rolled, sprayed, or troweled onto sheetrock after taping and floating of joints is complete. Uses same material as joint compound, but thinned down with water and applied to wall surface:
      a. Smooth - Smooth application of texture over sheetrock wall that feathers out sheetrock joints, and creates even, non-textured wall.

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 samples.

1.4 QUALITY ASSURANCE

A. Field Samples:
   1. Before performing work of this Section, prepare control samples.
   2. Architect will inspect control sample at pre-installation conference following preparation of control sample. When sample is approved, work of this Section may proceed. Approved samples will be kept at site at all times work of this section is being performed.

PART 2 - PRODUCTS

2.1 SYSTEM

A. Manufacturers:
   1. Manufacturer Contact List:
      a. National Gypsum, Charlotte, NC www.nationalgypsum.com.
      b. U S Gypsum Co, Chicago, IL www.usg.com.

B. Materials:
   1. Class Two Quality Standards: See Section 01 6200.

a. ProForm Perfect Spray EM/HF by National Gypsum.
b. Sheetrock Wall & Ceiling Texture by U S Gypsum.

PART 3 - EXECUTION

3.1 APPLICATION

A. Location:
1. Walls:
a. Smooth Texture. [Field verify to match existing]
2. Ceilings:
a. Smooth Texture. [Field verify to match existing]

END OF SECTION

DIVISION 10: SPECIALTIES

END OF TABLE OF CONTENTS

B L A N K P A G E

SECTION 10 1495

MISCELLANEOUS INTERIOR SIGNAGE

PART 1 - GENERAL

1.1 SUMMARY

A. Includes But Not Limited To:
   1. Salvage and reinstall existing interior signs as described in Contract Documents.

B. Products Installed But Not Furnished Under This Section:
   1. Owner-furnished interior signs.

C. 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.
      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: Welfare Gray.
         2) Lettering: White.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install interior signs square and plumb:
   1. Room Signs:
      a. Install bracket using two screws. Use proper anchor for substrate.
      b. Attach sign to bracket using set-screw.
      c. Mount signs as described in Contract Drawings.

END OF SECTION

B L A N K P A G E

SECTION 10 4400

FIRE PROTECTION SPECIALTIES

PART 1 - GENERAL

1.1 SUMMARY

A. Products Furnished But Not Installed Under This Section:
   1. Extinguishers with cabinets.

B. Related Requirements:
   1. Section 06 2001: 'Common Finish Carpentry Requirements' for installation.
   2. Section 09 2216: 'Non-Structural Metal Framing' for blocking in metal-framed walls.

1.2 SUBMITTALS

A. Action Submittals:
   1. Product Data:
      a. Manufacturer's literature or cut sheets for cabinets and extinguishers.

B. Closeout Submittals:
   1. Include following in Operations And Maintenance Manual specified in Section 01 7800:
      a. Warranty Documentation:
         1) Include copy of final, executed warranty.
      b. Record Documentation:
         1) Testing and Inspection Reports:
            a) Testing Agency Inspecting Reports of Drilled-In Mechanical Anchors / Adhesive Anchors / Screw Anchors.

1.3 QUALITY ASSURANCE

A. Regulatory Agency Sustainability Approvals:
   1. Fire extinguishers shall be inspected and have annual inspection tag attached before Substantial Completion.

1.4 WARRANTY

A. Manufacturer Warranty:
   1. Manufacturer's standard, written warranty on fire extinguisher.

PART 2 - PRODUCTS

2.1 EQUIPMENT

A. Manufacturers:
   1. Fire Extinguishers:
      a. Category Four Approved Manufacturers. See Section 01 6200 for definitions of Categories.
         1) Amerex Corp, Trussville, AL www.amerex-fire.com.
         2) Ansul Incorporated, Marinette, WI www.ansul.com.
         3) Buckeye Fire Equipment, Kings Mountain, NC www.buckeyef.com.

4) Extinguishers private-labeled by manufacturers approved above are approved, with appropriate documentation.

2. Cabinets And Brackets:
   a. Type One Acceptable Manufacturers:
      1) J L Industries, Bloomington, MN www.jlindustries.com.
      2) Larsen's Manufacturing Co, Minneapolis, MN www.larsensmfg.com.
      3) Modern Metal Products / Technico, Owatonna, MN www.modern-metal.com.
      4) National Fire Equipment Ltd, Scarborough, ON www.nationalfire.com.
      5) Potter-Roemer, Cerritos, CA www.potterroemer.com.
      6) Samson Products Inc, City of Commerce, CA www.samsonproducts.com.
      7) Seton Inc, Richmond Hill, ON (905) 764-1122.
      8) Equal as approved by Architect before bidding. See Section 01 6200.

B. Type One Acceptable Distributors:
   1. W.W. Grainger, Inc., Lake Forest, IL www.grainger.com.
   2. Equal as approved by Architect before bidding. See Section 01 6200.

C. Fire Extinguishers:
   1. Design Criteria:
      a. Ten pound dry chemical ABC stored pressurized type equipped with pressure gauge and which does not need recharging except after use.
      b. Instructions for repairs, maintenance, and recharging shall be attached.
      c. Unit shall be tested and approved by UL and have minimum 4A:60-B:C UL rating. UL rating shall appear on extinguisher labels and be attached to and a part of fire extinguisher units.

D. Fire Extinguisher Cabinets:
   1. Design Criteria:
      a. Two-piece, semi-recessed or flush type depending on wall thickness, and have white baked enameled steel tubs with white baked enamel return trim and doors, clear acrylic glazing, ‘Safe-T-Lock,’ and cylinder locks.
      b. Supply each cabinet with one specified fire extinguisher.
   2. Type One Acceptable Manufacturers:
      a. Basis of Design Product: Ambassador 1017 G10 by J L Industries.
      b. Equal as approved by Architect before bidding from Acceptable Manufacturer’s equivalent product. See Section 01 6200.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Special Techniques:
   1. Securely mount cabinets and hangers plumb with wall surfaces.
   2. Trim for cabinets shall be neat in appearance.

END OF SECTION

DIVISION 21: FIRE SUPPRESSION

B L A N K P A G E

SECTION 21 1313

WET-PIPE SPRINKLER SYSTEMS

PART 1 - GENERAL

1.1 SUMMARY

A. Includes But Not Limited To:
   1. Modify existing complete wet-pipe fire sprinkler system to provide full coverage of modified areas as described in Contract Documents.

1.2 REFERENCES

A. Association Publications:
   1. Underwriters Laboratories, Inc.:
      a. UL Directory B, 'Fire Protection Equipment, Directory B' (2011).

B. Reference Standards:
   1. American Society of Mechanical Engineers:
      a. ASME B1.20.1-2013, ‘Pipe Threads, General Purpose (Inch)’.
      b. ASME B1.20.1M-2006 (R2011), ‘Pipe Threads, General Purpose (Metric)’.
      c. ASME B16.1-2015, ‘Grey Iron Pipe Flanges and Flanged Fittings: Classes 25, 125, and 250’.
      d. ASME B16.3-2011, ‘Malleable Iron Threaded Fittings: Classes 150 and 300’.
      e. ASME B16.4-2011, ‘Gray Iron Threaded Fittings, Classes 125 and 250’.
      f. ASME B16.5-2013, ‘Pipe Flanges and Flanged Fittings: NPS 1/2 through NPS 24 Metric/Inch Standard’.
   2. American Water Works Association:
      a. AWWA C606-15, ‘Grooved and Shouldered Joints’.
   3. American Welding Society:
      a. AWA B2.1/B2.1M-2014, ‘Specification for Welding Procedure and Performance Qualification', (5th Edition).
   4. ASTM International:
      a. ASTM A53/A53M-12, ‘Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless’.
      b. ASTM A135/A135M-09(2014), ‘Standard Specification for Electric-Resistance-Welded Steel Pipe’.
      c. ASTM A234/A234M-15, ‘Standard Specification for Piping Fittings of Wrought Carbon Steel and Alloy Steel for Moderate and High Temperature Service’.
      d. ASTM A395/A395M-99(2014), ‘Standard Specification for Ferritic Ductile Iron Pressure-Retaining Castings for Use at Elevated Temperatures’.
      e. ASTM A536-84(2014), ‘Standard Specification for Ductile Iron Castings’.
      f. ASTM A795/A795M-13, ‘Standard Specification for Black and Hot-Dipped Zinc-Coated (Galvanized) Welded and Seamless Steel Pipe for Fire Protection Use’.
   5. National Fire Protection Association / American National Standards Institute:
      a. NFPA 13: ‘Standard for the Installation of Sprinkler Systems’, (2016 Edition or latest AHJ approved edition).
      b. NFPA 24: 'Standard for the Installation of Private Fire Service Mains and their Appurtenances' (2016 Edition).
      c. NFPA 25: ‘Standard for the Inspection, Testing, and Maintenance of Water-Based Fire Protection Systems’, (2014 Edition).
      d. NFPA 101: ‘Life Safety Code’, (2015 Edition).

1.3 SUBMITTALS

A. Action Submittals:
1. Shop Drawings:
a. Size sprinkler system using NFPA 13 hydraulic calculation design method based on water supply evaluation performed at building site:
1) On submittals, refer to sprinkler heads by sprinkler identification or model number published in appropriate agency listing or approval. Trade names and other abbreviated designations are not acceptable.
b. Submittal Procedure:
1) After award of Contract and before purchase of equipment, submit seven sets of shop drawings with specifications and hydraulic calculations to Fire Sprinkler Consultant and two (2) sets to local jurisdiction having authority for fire prevention for review. If pipe schedule method is used, submit copies of schedules in NFPA 13 used in sizing pipe.
2) After integrating Fire Sprinkler Consultant's and AHJ's comments into drawings, licensed certified fire protection engineer of record who designed fire protection system shall stamp, sign, and date each sheet of shop drawings and first page of specifications and calculations.
3) Submit stamped documents to Owner and to AHJ for fire prevention for final approval.
4) After final approval, submit four copies of approved stamped documents to Fire Sprinkler Consultant.
5) Failure of system to meet requirements of authority having jurisdiction and/or approved stamped construction documents shall be corrected at no additional cost to Owner.

B. Informational Submittals:
1. Certificates:
a. Provide one (1) copy of completed NFPA 13 'Contractor's Material and Test Certification for Aboveground Piping' as specified in 'Field Quality Control' in Part 3 of this specification:
2. Qualification Statement:
a. Licensed fire protection engineer or fire protection system designer:
1) Licensed for area of Project.
2) Certified by NICET to level three minimum.
3) Provide Qualification documentation if requested by Fire Sprinkler Consultant or Owner’s Representative.
b. Installer:
1) Provide Qualification documentation if requested by Fire Sprinkler Consultant or Owner’s Representative.

C. Closeout Submittals:
1. Include following in Operations And Maintenance Manual specified in Section 01 7800:
a. Operations and Maintenance Data:
1) Maintenance and instructions.
a) List of system components used indicating name and model of each item.
b) Manufacturer's maintenance instructions for each component installed in Project.
c) Instructions shall include installation instructions, parts numbers and lists, operation instructions of equipment, and maintenance and lubrication instructions.
b. Warranty Documentation:
1) Include copies of required warranties.
c. Record Documentation:
1) Include copies of approved shop drawings.
2) Provide master index showing items included.
3) Provide name, address, and phone number of Architect, Fire Sprinkler Consultant, General Contractor, and Fire Protection subcontractor.
4) Provide operating instructions to include:
a) General description of fire protection system.
b) Step by step procedure to follow for shutting down system or putting system into operation.

5) Provide signed copy of NFPA 13 'Contractor's Material and Test Certification for Aboveground Piping'.

2. Instruction of Owner (as specified in Part 3 of this specification):
   a. Provide Owner with latest version of NFPA 25.

D. Maintenance Material Submittals:
   1. Extra Stock Materials:
      a. Spare sprinkler heads in the quantity recommended by NFPA 13 selected in representative proportion to quantity used in Project and in accordance with NFPA 13 (Six (6) spare sprinkler heads minimum). Do not include dry barrel Pendent and dry barrel Sidewall sprinkler heads.
      b. Provide spare heads in cabinet with sprinkler head wrench for each type of head used. After approval of cabinet and contents, mount cabinet in convenient location in Riser Room.

1.4 QUALITY ASSURANCE

A. Requirements of Regulatory Agencies:
   1. Unless noted otherwise, system shall conform to:
      a. NFPA 13, 'Light & Ordinary Hazard Occupancies'.
      b. NFPA 24, 'Service Mains and Their Appurtenances, Private'.
      c. NFPA 25, 'Inspection, Testing, and Maintenance.
      d. NFPA 101, 'Life Safety Code'.
      e. Requirements of local water department and local authority having jurisdiction for fire protection.
      f. Underwriters Laboratories Publication, UL Directory B, 'Fire Protection Equipment Directory', current edition at time of Pre-Bid Meeting.
      g. Comply with backflow prevention requirements and, if required, include device in hydraulic calculations.
      h. Applicable rules, regulations, laws, and ordinances.

B. Qualifications:
   1. Licensed fire protection engineer or fire protection system designer certified by NICET to level three minimum and engaged in design of fire protection systems. Engineer / designer shall:
      a. Licensed for area of Project.
      b. Minimum five (5) years experience in fire protection system installations.
      c. Minimum five (5) satisfactorily completed installations in past three (3) years of projects similar in size, scope, and complexity required for this project before bidding.
      d. Be responsible for overseeing preparation of shop drawings, hydraulic calculations where applicable, and system installation.
      e. Make complete inspection of installation.
      f. Provide corrected record drawings to Owner with letter of acceptance.
      g. Certify that installation is in accordance with Contract Documents.
      h. Upon request, submit documentation.
   2. Installer:
      a. Licensed for area of Project.
      b. Minimum five (5) years experience in fire protection system installations.
      c. Minimum five (5) satisfactorily completed installations in past three (3) years of projects similar in size, scope, and complexity required for this project before bidding.
      d. Upon request, submit documentation.

PART 2 - PRODUCTS

2.1 SYSTEM

A. Manufacturers:
   1. Manufacturer Contact List:

a. Croker Corp, Elmsford, NY www.croker.com.
b. Gruvlock by Anvil International, Portsmouth, NH www.anvilintl.com.
c. HO Trerice Company, Oak Park, MI www.hotco.com.
d. Kennedy Valve, Elmira, NY www.kennedyvalve.com.
e. Milwaukee Valve Co, New Berlin, WI www.milwaukeevalve.com.
f. Mueller Company, Decatur, IL www.muellerflo.com.
g. Nibco Inc, Elkhart, IN www.nibco.com.
h. Notifier by Honeywell, Northford, CT www.notifier.com.
i. Potter Electric Signal Company, St. Louis, MO www.pottersignal.com.
j. Potter-Roemer, Cerritos, CA www.potterroemer.com.
k. Reliable Automatic Sprinkler Co, Mount Vernon, NY www.reliablesprinkler.com.
l. System Sensor, St Charles, IL www.systemsensor.com.
m. TYCO Fire & Building Products, Lansdale, PA www.tyco-fire.com.
n. Victualic Company of America, Easton, PA or Victualic Company of Canada, Rexdale, ON www.victaulic.com.
o. Viking Corp, Hastings, MI www.vikingcorp.com.

B. Description:
1. Automatic wet-pipe fire sprinkler system starting at flange in Fire Riser Room and extending throughout heated portions of building.
2. Cold attic areas and roof overbuild areas over Entry Lobbies and Vestibules protected with auxiliary anti-freeze system(s).
3. Sprinklers not required in areas with fire-retardant treated wood.
4. Dry sprinkler heads preferred over and into Vestibules.

C. Performance:
1. Design Criteria:
a. Area of Application and Corresponding Design Density:
1) Serving Area and Mechanical, Electrical, and Janitorial Areas:
a) Ordinary Hazard Group 1.
b) Design density = 0.15 gpm per sq ft over 1,500 sq ft (140 sq m).
2) Storage Areas:
a) Ordinary Hazard Group 2.
b) Design density = 0.20 gpm per sq ft over 1,500 sq ft (140 sq m).
3) All Other Areas:
a) Light Hazard.
b) Design density = 0.10 gpm per sq ft over 1,500 sq ft (140 sq m).
4) Increase remote areas by 30 percent where ceiling / roof is sloped more than 2 inches (50 mm) per ft.
5) Remote areas may be reduced within parameters indicated in NFPA 13 for use of quick response sprinklers throughout.
b. Maximum Coverage per Sprinkler Head:
1) Ordinary Hazard Areas: 130 sq ft (12.1 sq meters).
2) Attic Areas: 120 sq ft (11.2 sq meters).
3) Light Hazard Areas: 225 sq ft (20.1 sq meters).
c. Design Area shall be hydraulically most remote area in accordance with NFPA 13.
1) Provide a 10% safety allowance under adjusted water flow supply curve.
d. Maximum velocity of water flow within piping: 20 feet (6.1 m) per sec.

D. Components:
1. General: Use only domestically manufactured cast iron pipe fittings, valves, sprinkler heads, and other components.
a. Pipe of foreign manufacture that meets ASTM Standards is acceptable.
b. Ductile iron fittings of foreign manufacture are acceptable.
2. Pipe:
a. Schedule 40 Welded Steel:
1) Exterior, Above Ground: Schedule 40 hot-dip galvanized welded steel meeting requirements of ASTM A53/A53M, ASTM A135/A135M or ASTM A795/A795M.
2) Interior, Above Ground: Schedule 40 black welded steel meeting requirements of ASTM A53/A53M, ASTM A135/A135M or ASTM A795/A795M.

3) Connections:
   a) 2 inches (50 mm) And Smaller: Screwed, flanged, or roll grooved coupling system.
   b) 2-1/2 inches (64 mm) And Larger: Flanged or roll grooved coupling system.

3. Fittings:
   a. Usage:
      1) 2 inches (50 mm) And Smaller: Welded, screwed, flanged, or roll grooved coupling system. For use with schedule 40 carbon steel pipe.
      2) 2-1/2 inches (64 mm) And Larger: Welded, flanged, or roll grooved coupling system.
   b. Types And Quality:
      1) Screwed:
         a) Cast iron meeting requirements of ANSI B16.4 or ductile iron meeting requirements of ANSI B16.3 and ASTM A536, Grade 65-45-12.
         b) Threaded fittings and pipe shall have threads cut to ANSI B1.20.1.
         c) Do not extend pipe into fittings to reduce waterway.
         d) Ream pipe after cutting to remove burrs and fins.
      2) Flanged: Steel meeting requirements of ANSI B16.5.
      3) Welded:
         a) Carbon steel meeting requirements of ASTM A234/A234M.
         b) Weld pipe using methods complying with AWS B2.1, level AR-3. Welding procedures and performance of welders shall comply with AWS B2.1, level AR3.
      4) Roll Grooved Pipe Coupling System:
         a) Ductile iron meeting requirements of ASTM A395/A395M and ASTM A536, and UL listed.
         b) Grooved products used on Project shall be from same manufacturer. Grooving tools shall be as recommended by manufacturer of grooved products.
         c) Category Four Approved Products: See Section 01 6200 for definition of Categories:

	Gruvlok	Tyco (Grinnell)	Victaulic
Rigid Couplings	7401	772	Style 005
Flexible Couplings [1]	7000	705	Style 75
Flange Adaptors [2]	7012	71	Style 744
Grooved Coupling Gaskets [3]	'E' EPDM	Grade 'E' EPDM	'E' EPDM [4]

[1] Use in locations where vibration attenuation, stress relief, thermal expansion, or seismic design is required / needed.
[2] Class 125 or 150.
[3] Temperature rated 30 to 150 deg F (minus one to plus 65 deg C). NSF-61 certified.
[4] Grade 'A'.

   c. Use of saddle or hole cut type mechanical tees is **NOT APPROVED**.

4. Sprinkler Heads:
   a. Concealed Pendant:
      1) Design Criteria:
         a) Adjustable cover.
         b) UL / CASA listed and approved.
         c) Coordinate concealed cover finish with Fire Sprinkler Consultant.
      2) Type One Acceptable Products:
         a) Wet Pendant, Flat Profile:
            (1) Reliable: F4FR.
            (2) Victaulic: Model 3802.
            (3) Viking: Model VK462.
            (4) Tyco (Grinnell): Model RF11.
            (5) Equal as approved by Fire Sprinkler Consultant before bidding. See Section 01 6200.
         b) Dry Pendant:

(1) Flat Profile:
(a) Tyco (Grinnell): DS-C.
(b) Victaulic: V3618.
(2) Equal as approved by Fire Sprinkler Consultant before bidding. See Section 01 6200.

b. Pendant Sprinklers:
1) Design Criteria:
a) UL / CASA listed and approved.
b) Where guards or escutcheons are required, use chrome plated sprinkler guards and escutcheons that are listed, that are approved by Sprinkler Manufacturer for use with head, and that are supplied by Sprinkler Manufacturer.
2) Type One Acceptable Products:
a) Reliable: F1FR.
b) Tyco: TY-FRB.
c) Victaulic: Model V2704.
d) Viking: VK302.
e) Equal as approved by Fire Sprinkler Consultant before bidding. See Section 01 6200.

2.2 ACCESSORIES

A. Manufacturers:
1. Manufacturer Contact List:
a. Anvil International, Portsmouth, NH www.anvilintl.com.
b. Eaton, Highland, IL www.cooperbline.com.

B. Hangers, Rods, And Clamps:
1. Design Criteria:
a. Galvanized, unless specified otherwise, and UL/CASA listed and labeled for service intended.
b. Hanger supports for sprinkler piping to conformance with NFPA 13.
2. Class One Quality Standard:
a. Hangers and accessories shall be Anvil numbers specified or equals by B-Line by Eaton.
b. Pipe Ring Hangers: Equal to Anvil Fig 69.
c. Riser Clamps: Equal to Anvil Fig. 261.

PART 3 - EXECUTION

3.1 INSTALLERS

A. Acceptable Installers. See Section 01 4301:
1. Meet Quality Assurance Installer Qualifications as specified in Part 1 of this specification.

3.2 EXAMINATION

A. Drawings:
1. Fire Protection Drawings show general arrangement of piping. Follow as closely as actual building construction and work of other trades will permit. Install system so it drains.
2. Consider Architectural and Structural Drawings part of this work insofar as these drawings furnish information relating to design and construction of building. These Drawings take precedence over Fire Protection Drawings.
3. Because of small scale of Drawings, it is not possible to indicate all offsets, fittings, and accessories that may be required. Investigate structural and finish conditions affecting this work

and arrange work accordingly, providing such fittings, valves, and accessories required to meet conditions and to enable system to drain.

3.3 INSTALLATION

A. Install sprinkler systems in accordance with requirements of latest edition of NFPA 13 and as specified below:
   1. Provide maintenance access to equipment.
   2. Conceal sprinkler lines installed in occupied areas.
   3. Install piping system, except for dry heads, so it will not be exposed to freezing temperatures.
   4. Do not use dropped, damaged, or used sprinkler heads.
   5. Brace and support system to meet seismic zone requirements for building site.

END OF SECTION

B L A N K P A G E

DIVISION 23: HEATING, VENTILATING, AND AIR–CONDITIONING

23 0000 HEATING, VENTILATING, AND AIR-CONDITIONING

23 3000 HVAC AIR DISTRIBUTION

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SECTION 23 0501

COMMON HVAC REQUIREMENTS

PART 1 - GENERAL

1.1 SUMMARY

A. Includes But Not Limited To:
   1. Common requirements and procedures for HVAC systems.
   2. Responsibility for proper operation of electrically powered equipment furnished under this Division.
   3. Interface with Testing And Balancing Agency.
   4. Furnish and install sealants relating to installation of systems installed under this Division.
   5. Furnish and install Firestop Penetration Systems for HVAC system penetrations as described in Contract Documents.
   6. Furnish and install sound, vibration, and seismic control elements.

B. Products Furnished But Not Installed Under This Section:
   1. Sleeves, inserts, and equipment for mechanical systems installed under other Sections.

C. Related Requirements:
   1. Section 03 3111: 'Cast-In-Place Structural Concrete' for exterior concrete pads and bases for mechanical equipment.
   2. Section 05 0523: 'Metal Fastening' for quality and requirements for welding.
   3. Section 07 8400: 'Firestopping' for quality of Penetration Firestop Systems to be used on Project and submittal requirements.
   4. Section 07 9213: 'Elastometric Joint Sealant' for quality of sealants used at building exterior.
   5. Section 07 9219: 'Acoustical Joint Sealants' for quality of acoustical sealants.
   6. Sections Under 09 9000 Heading: Painting of mechanical items requiring field painting.
   7. Section 26 2913: 'Enclosed Controllers' for magnetic starters and thermal protective devices (heaters) not factory mounted integral part of mechanical equipment.
   8. Division 26: Raceway and conduit, unless specified otherwise, line voltage wiring, outlets, and disconnect switches.
   9. Slots and openings through floors, walls, ceilings, and roofs provided under other Divisions in their respective materials.
   10. Sections Under 33 5000 Heading: Fuel Distribution Utilities.

1.2 MECHANICAL DEMOLITION

A. Disconnect, demolish, and remove mechanical systems, equipment, and components indicated to be removed.
   1. Ducts to be Removed: Remove portion of ducts indicated to be removed and plug remaining ducts with same or compatible ductwork material.
   2. Ducts to be Abandoned in Place: Cap or plug ducts with same or compatible ductwork material.
   3. Equipment to be Removed: Disconnect and cap services and remove equipment.
   4. Equipment to be Removed and Reinstalled: Disconnect and cap services and remove, clean and store equipment; when appropriate, reinstall, reconnect and make equipment operational.
   5. Equipment to be Removed and Salvaged: Disconnect and cap services and remove equipment and deliver to Owner.

B. If pipe, insulation, or equipment to remain is damaged in appearance or is unserviceable, remove damaged or unserviceable portions and replace with new products of equal capacity and quality.

1.3 SUBMITTALS

A. Action Submittals:
   1. Product Data:

a. Manufacturer's catalog data for each manufactured item.
   1) Provide section in submittal for each type of item of equipment. Include Manufacturer's catalog data of each manufactured item and enough information to show compliance with Contract Document requirements. Literature shall show capacities and size of equipment used and be marked indicating each specific item with applicable data underlined.
   2) Include name, address, and phone number of each supplier.
b. The mechanical contractor shall verify motor voltages with the electrical drawings before ordering motorized equipment and controls. Motor name plate voltage shall be NEMA standard 200 volt for 208 volt three phase or single phase system. Starter heaters installed shall be coordinated with the name plate data.

2. Shop Drawings:
   a. Schematic control diagrams for each separate fan system, heating system, control panel, etc. Each diagram shall show locations of all control and operational components and devices. Mark correct operating settings for each control device on these diagrams.
   b. Diagram for electrical control system showing wiring of related electrical control items such as firestats, fuses, interlocks, electrical switches, and relays. Include drawings showing electrical power requirements and connection locations.
   c. Drawing of each temperature control panel identifying components in panels and their function.
   d. Other shop drawings required by Division 23 trade Sections.

B. Closeout Submittals:
1. Include following in Operations And Maintenance Manual specified in Section 01 7800:
   a. Operations and Maintenance Data (Modify and add to requirements of Section 01 7800):
      1) At beginning of HVAC section of Operations And Maintenance Manual, provide master index showing items included.
         a) Provide name, address, and phone number of Architect, Architect's Mechanical Engineer, General Contractor, and HVAC, Sheet Metal, Refrigeration, and Temperature Control subcontractors.
         b) Identify maintenance instructions by using same equipment identification used in Contract Drawings. Maintenance instructions shall include:
            (1) List of HVAC equipment used indicating name, model, serial number, and nameplate data of each item together with number and name associated with each system item.
            (2) Manufacturer's maintenance instructions for each piece of HVAC equipment installed in Project. Instructions shall include name of vendor, installation instructions, parts numbers and lists, operation instructions of equipment, and maintenance and lubrication instructions.
            (3) Summary list of mechanical equipment requiring lubrication showing name of equipment, location, and type and frequency of lubrication.
            (4) Manual for Honeywell Prestige thermostat published by Honeywell.
         c) Provide operating instructions to include:
            (1) General description of each HVAC system.
            (2) Step by step procedure to follow in putting each piece of HVAC equipment into operation.
            (3) Provide diagrams for electrical control system showing wiring of items such as smoke detectors, fuses, interlocks, electrical switches, and relays.
   b. Warranty Documentation:
      1) Include copies of warranties required in individual Sections of Division 23.
   c. Record Documentation:
      1) Manufacturers documentation:
         a) Copies of approved shop drawings.

1.4 QUALITY ASSURANCE

A. Regulatory Agency Sustainability Approvals:
1. Perform work in accordance with applicable provisions of Gas Ordinances applicable to Project. Provide materials and labor necessary to comply with rules, regulations, and ordinances.

2. In case of differences between building codes, laws, local ordinances, utility company regulations, and Contract Documents, the most stringent shall govern. Notify Architect in writing of such differences before performing work affected by such differences.
3. Identification:
   a. Motor and equipment name plates as well as applicable UL / ULC and AGA / CGA labels shall be in place when Project is turned over to Owner.

B. Qualifications: Requirements of Section 01 4301 applies, but not limited to following:
1. Company:
   a. Company specializing in performing work of this section.
      1) Minimum five (5) years experience in HVAC installations.
      2) Minimum five (5) satisfactorily completed installations in past three (3) years of projects similar in size, scope, and complexity required for this project before bidding.
   b. Upon request, submit documentation.
2. Installer:
   a. Licensed for area of Project.
   b. Designate one (1) individual as project foremen who shall be on site at all times during installation and experienced with installation procedures required for this project.
   c. Upon request, submit documentation.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Delivery And Acceptance Requirements:
1. Accept valves on site in shipping containers with labeling in place.

B. Storage And Handling Requirements:
1. In addition to requirements specified in Division 01:
   a. Stored material shall be readily accessible for inspection by Architect until installed.
   b. Store items subject to moisture damage, such as controls, in dry, heated spaces.
   c. Provide temporary protective coating on cast iron and steel valves.
   d. Provide temporary end caps and closures on piping and fittings. Maintain in place until installation.
2. Protect bearings during installation. Thoroughly grease steel shafts to prevent corrosion.

1.6 WARRANTY

A. Manufacturer Warranty:
1. Provide certificates of warranty for each piece of equipment made out in favor of Owner. Clearly record 'start-up' date of each piece of equipment on certificate.

B. Special Warranty:
1. Guarantee HVAC systems to be free from noise in operation that may develop from failure to construct system in accordance with Contract Documents.
2. If HVAC sub-contractor with offices located more than 150 miles from Project site is used, provide service / warranty work agreement for warranty period with local HVAC sub-contractor approved by Architect. Include copy of service / warranty agreement in warranty section of Operation And Maintenance Manual.

PART 2 - PRODUCTS

2.1 COMPONENTS

A. Components shall bear Manufacturer's name and trade name. Equipment and materials of same general type shall be of same make throughout work to provide uniform appearance, operation, and maintenance.

PART 3 - EXECUTION

3.1 INSTALLERS

A. Acceptable Installers:
   1. Meet Quality Assurance Installer Qualifications as specified in Part 1 of this specification.

3.2 EXAMINATION

A. Drawings:
   1. HVAC Drawings show general arrangement of piping, ductwork, equipment, etc. Follow as closely as actual building construction and work of other trades will permit.
   2. Consider Architectural and Structural Drawings part of this work insofar as these drawings furnish information relating to design and construction of building. These drawings take precedence over HVAC Drawings.
   3. Because of small scale of Drawings, it is not possible to indicate all offsets, fittings, and accessories that may be required. Investigate structural and finish conditions affecting this work and arrange work accordingly, providing such fittings, valves, and accessories required to meet conditions.

B. Verification Of Conditions:
   1. Examine premises to understand conditions that may affect performance of work of this Division before submitting proposals for this work. Examine adjoining work on which mechanical work is dependent for efficiency and report work that requires correction.
   2. No subsequent allowance for time or money will be considered for any consequence related to failure to examine site conditions.
   3. Ensure that items to be furnished fit space available. Make necessary field measurements to ascertain space requirements including those for connections and furnish and install equipment of size and shape so final installation shall suit true intent and meaning of Contract Documents. If approval is received by Addendum or Change Order to use other than originally specified items, be responsible for specified capacities and for ensuring that items to be furnished will fit space available.
   4. Check that slots and openings provided under other Divisions through floors, walls, ceilings, and roofs are properly located. Perform cutting and patching caused by neglecting to coordinate with Divisions providing slots and openings at no additional cost to Owner.

C. Electrical Coordination:
   1. The contractor shall verify motor voltages with the electrical drawings before ordering motorized equipment and controls. Motor name plate voltage shall be NEMA standard 200 volt for 208 volt three phase system and shall be NEMA standard 200 volt for 208 volt three phase or single phase. Starter heaters installed shall be coordinated with the name plate data.

3.3 PREPARATION

A. Changes Due To Equipment Selection:
   1. Where equipment specified or otherwise approved requires different arrangement or connections from that shown in Contract Documents, submit drawings, if requested by Architect, showing proposed installations.
   2. If proposed changes are approved, install equipment to operate properly and in harmony with intent of Contract Documents. Make incidental changes in piping, ductwork, supports, installation, wiring, heaters, panelboards, and as otherwise necessary.
   3. Provide any additional motors, valves, controllers, fittings, and other additional equipment required for proper operation of system resulting from selection of equipment.
   4. Be responsible for the proper location of roughing-in and connections provided under other Divisions.

3.4 INSTALLATION

A. Interface With Other Work:

1. Furnish sleeves, inserts, supports, and equipment that are to be installed by others in sufficient time to be incorporated into construction as work proceeds. Locate these items and see they are properly installed.
2. Electrical: Furnish exact location of electrical connections and complete information on motor controls to installer of electrical system.
3. Testing And Balancing:
   a. Put HVAC systems into full operation and continue their operation during each working day of testing and balancing.
   b. Make changes in pulleys, belts, fan speeds, and dampers or add dampers as required for correct balance as recommended by Testing And Balancing Agency and at no additional cost to Owner.

B. Cut carefully to minimize necessity for repairs to previously installed or existing work. Do not cut beams, columns, or trusses.

C. Locating Equipment:
1. Arrange pipes, ducts, and equipment to permit ready access to valves, cocks, unions, traps, filters, starters, motors, control components, and to clear openings of doors and access panels.
2. Adjust locations of pipes, ducts, switches, panels, and equipment to accommodate work to interferences anticipated and encountered.
3. Install HVAC work to permit removal of equipment and parts of equipment requiring periodic replacement or maintenance without damage to or interference with other parts of equipment or structure.
4. Determine exact route and location of each pipe and duct before fabrication.
   a. Right-Of-Way:
      1) Lines that pitch shall have right-of-way over those that do not pitch. For example, steam, steam condensate, and drains shall normally have right-of-way.
      2) Lines whose elevations cannot be changed shall have right-of-way over lines whose elevations can be changed.
   b. Offsets, Transitions, and Changes in Direction:
      1) Make offsets, transitions, and changes in direction in pipes and ducts as required to maintain proper head room and pitch of sloping lines whether or not indicated on Drawings.
      2) Furnish and install all traps, air vents, sanitary vents, and devices as required to effect these offsets, transitions, and changes in direction.

D. Penetration Firestops: Install Penetration Firestop System appropriate for penetration at HVAC system penetrations through walls, ceilings, roofs, and top plates of walls.

E. Sealants:
1. Seal openings through building exterior caused by penetrations of elements of HVAC systems.
2. Furnish and install acoustical sealant to seal penetrations through acoustically insulated walls and ceilings.

3.5 REPAIR / RESTORATION

A. Each Section of this Division shall bear expense of cutting, patching, repairing, and replacing of work of other Sections required because of its fault, error, tardiness, or because of damage done by it.
1. Patch and repair walls, floors, ceilings, and roofs with materials of same quality and appearance as adjacent surfaces unless otherwise shown.
2. Surface finishes shall exactly match existing finishes of same materials.

3.6 FIELD QUALITY CONTROL

A. Non-Conforming Work:
1. Replace material or workmanship proven defective with sound material at no additional cost to Owner.
2. Repeat tests on new material, if requested.

3.7 SYSTEM START-UP

A. Off-Season Start-up:
   1. If Substantial Completion inspection occurs during heating season, schedule spring start-up of cooling systems. If inspection occurs during cooling season, schedule autumn start-up for heating systems.
   2. Notify Owner seven days minimum before scheduled start-up.
   3. Time will be allowed to completely service, test, check, and off-season start systems. During allowed time, train Owner's representatives in operation and maintenance of system.
   4. At end of off-season start-up, furnish Owner with letter confirming that above work has been satisfactorily completed.

B. Preparations that are to be completed before start up and operation include, but are not limited to, following:
   1. Dry out electric motors and other equipment to develop and properly maintain constant insulation resistance.
   2. Make adjustments to insure that:
      a. Equipment alignments and clearances are adjusted to allowable tolerances.
      b. Nuts and bolts and other types of anchors and fasteners are properly and securely fastened.
      c. Packed, gasketed, and other types of joints are properly made up and are tight and free from leakage.
      d. Miscellaneous alignings, tightenings, and adjustings are completed so systems are tight and free from leakage and equipment performs as intended.
   3. Motors and accessories are completely operable.
   4. Inspect and test electrical circuitry, connections, and voltages to be properly connected and free from shorts.
   5. Adjust drives for proper alignment and tension.
   6. Make certain filters in equipment for moving air are new and of specified type.
   7. Properly lubricate and run-in bearings in accordance with Manufacturer's directions and recommendations.

3.8 CLEANING

A. Clean exposed piping, ductwork, and equipment.

B. No more than one week before Final Inspection, flush out bearings and clean other lubricated surfaces with flushing oil. Provide best quality and grade of lubricant specified by Equipment Manufacturer.

C. Replace filters in equipment for moving air with new filters of specified type no more than one week before Final Inspection.

3.9 CLOSEOUT ACTIVITIES

A. Instruction Of Owner:
   1. Instruct building maintenance personnel and Stake Physical Facilities Representative in operation and maintenance of mechanical systems utilizing Operation And Maintenance Manual when so doing:
      a. Minimum Instruction Periods:
         1) HVAC: Eight (8) hours.
         2) Temperature Control: Six (6) hours.
         3) Refrigeration: Four (4) hours.
      b. Minimum Instruction Periods:
         1) HVAC and Refrigeration: Four (4) hours.
         2) Temperature Control: Four (4) hours.
      c. Conduct instruction periods after Substantial Completion inspection when systems are properly working and before final payment is made. None of these instructional periods shall overlap another.

3.10 PROTECTION

A. Do not operate pieces of equipment used for moving supply air without proper air filters installed properly in system.

B. After start-up, continue necessary lubrication and be responsible for damage to bearings while equipment is being operated up to Substantial Completion.

END OF SECTION

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SECTION 23 0713

DUCT INSULATION

PART 1 - GENERAL

1.1 SUMMARY

A. Includes But Not Limited To:
   1. Furnish and install thermal wrap duct insulation as described in Contract Documents.

B. Related Requirements:
   1. Section 23 3114: 'Low-Pressure Metal Ducts'.
   2. Section 23 3300: 'Acoustic Duct Accessories' for duct liner.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturer Contact List:
   1. Certainteed St Gobain, Valley Forge, PA www.certainteed.com.
   2. Johns-Manville, Denver, CO www.jm.com.
   3. Knauf Fiber Glass, Shelbyville, IN www.knauffiberglass.com or Toronto, ON (416) 593-4322.
   4. Manson Insulation Inc, Brossard, QB www.isolationmanson.com.
   5. Owens-Corning, Toledo, OH or Owens-Corning Canada Inc, Willowdale, ON www.owenscorning.com.

2.2 MATERIALS

A. Thermal Wrap Duct Insulation:
   1. 1-1/2 inch or 3 inch thick fiberglass with factory-laminated, reinforced aluminum foil scrim kraft facing and density of 0.75 lb / per cu ft.
   2. Thermal Conductivity: 0.27 BTU in/HR SF deg F at 75 deg F maximum.
   3. Type One Acceptable Products:
      a. Type 75 standard duct insulation by Certainteed St Gobain.
      b. Microlite FSK by Johns-Manville.
      c. Duct Wrap FSK by Knauf Fiber Glass.
      d. Alley Wrap FSK by Manson Insulation Inc.
      e. FRK by Owens-Corning.
      f. Equal as approved by Architect before bidding. See Section 01 6200.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Thermal Wrap Duct Insulation:
   1. Install insulation as follows:
      a. On all supply and return ducts outside building insulation envelope.
      b. On all round ducts.
      c. Within Building Insulation Envelope:
         1) 1-1/2 inches thick on rectangular outside air ducts and combustion air ducts.
         2) 1-1/2 inches thick on all round ducts.
      d. Outside Building Insulation Envelope:
         1) 3 inch thick on round supply and return air ducts.
         2) 1-1/2 inch thick on rectangular, acoustically lined, supply and return air ducts.
   2. Wrap insulation tightly on ductwork with circumferential joints butted and longitudinal joints overlapped minimum 2 inches.

a. Do not compress insulation except in areas of structural interference. Minimum thickness at corners shall be one inch thick.
b. Remove insulation from lap before stapling.
c. Staple seams at approximately 16 inches on center with outward clenching staples.
d. Seal seams with foil vapor barrier tape or vapor barrier mastic. Seal penetrations of facing to provide vapor tight system.

END OF SECTION

SECTION 23 3001

COMMON DUCT REQUIREMENTS

PART 1 - GENERAL

1.1 SUMMARY

A. Includes But Not Limited To:
   1. General procedures and requirements for ductwork.
   2. Repair leaks in ductwork, as identified by duct testing, at no additional cost to Owner.

B. Related Requirements:
   1. Section 01 4546: 'Duct Testing, Adjusting, and Balancing' for ductwork.
   2. Section 07 9219: 'Acoustical Joint Sealants' for quality of acoustic sealant.
   3. Section 23 0501: 'Common HVAC Requirements'.

1.2 REFERENCES

A. Reference Standards:
   1. Sheet Metal And Air Conditioning Contractors' National Association / American National Standards Institute:
      a. SMACNA, 'HVAC Duct Construction Standards - Metal and Flexible' (4th Edition).

1.3 ADMINISTRATIVE REQUIREMENTS

A. Pre-Installation Conference: Schedule conference immediately before installation of ductwork.

1.4 SUBMITTALS

A. Action Submittals:
   1. Product Data: Specification data on sealer and gauze proposed for sealing ductwork.
   2. Samples: Sealer and gauze proposed for sealing ductwork.

B. Informational Submittals:
   1. Manufacturer Instructions:
      a. Installation manuals providing detailed instructions on assembly, joint sealing, and system pressure testing for leaks.

PART 2 - PRODUCTS

2.1 ASSEMBLIES

A. Performance:
   1. Design Criteria:
      a. Standard Ducts: Construction details not specifically called out in Contract Documents shall conform to applicable requirements of SMACNA, 'HVAC Duct Construction Standards - Metal and Flexible'.

B. Materials:
   1. Duct Hangers:
      a. One inch by 18 ga galvanized steel straps or steel rods as shown on Drawings, and spaced not more than 96 inches apart. Do not use wire hangers.
      b. Attaching screws at trusses shall be 2 inch No. 10 hex head screws. Nails not allowed.
      c. Attach threaded rod to steel joist with Anvil Steel washer plate Fig. 60. Double nut connection.

PART 3 - EXECUTION

3.1 INSTALLATION

A. During installation, protect open ends of ducts by covering with plastic sheet tied in place to prevent entrance of debris and dirt.

B. Make necessary allowances and provisions in installation of sheet metal ducts for structural conditions of building. Revisions in layout and configuration may be allowed, with prior written approval of Architect. Maintain required airflows in suggesting revisions.

C. Hangers And Supports:
1. Install pair of hangers as required by spacing indicated in table on Drawings.
2. Install upper ends of hanger securely to floor or roof construction above by method shown on Drawings.
3. Attach strap hangers to ducts with cadmium-plated screws. Use of pop rivets or other means will not be accepted.
4. Where hangers are secured to forms before concrete slabs are poured, cut off flush all nails, strap ends, and other projections after forms are removed.
5. Secure vertical ducts passing through floors by extending bracing angles to rest firmly on floors without loose blocking or shimming. Support vertical ducts, which do not pass through floors, by using bands bolted to walls, columns, etc. Size, spacing, and method of attachment to vertical ducts shall be same as specified for hanger bands on horizontal ducts.

3.2 CLEANING

A. Clean interior of duct systems before final completion.

END OF SECTION

SECTION 23 3114

LOW-PRESSURE METAL DUCTS

PART 1 - GENERAL

1.1 SUMMARY

A. Includes But Not Limited To:
   1. Furnish and install above-grade low-pressure steel ducts and related items as described in Contract Documents.

B. Related Requirements:
   1. Section 01 4546: 'Duct Testing, Adjusting, And Balancing' for duct test, balance, and adjust air duct systems services provided by Owner.
   2. Section 23 0713: 'Duct Insulation' for thermal Insulation for ducts, plenum chambers, and casings.
   3. Section 23 3001: 'Common Duct Requirements'.

1.2 REFERENCES

A. Association Publications:
   1. Sheet Metal And Air Conditioning Contractors' National Association / American National Standards Institute:
   2. SMACNA, ‘HVAC Duct Construction Standards - Metal and Flexible' (4th edition).
   3. SMACNA, “IAQ Guidelines for Occupied Buildings Under Construction”.

B. 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 E84-18b, ‘Standard Test Method for Surface Burning Characteristics of Building Materials'.
   2. Underwriters Laboratories, Inc.:
      a. UL 723: ‘Standard for Safety Test for Surface Burning Characteristics of Building Materials'; (11th Edition - 2018).

1.3 QUALITY ASSURANCE

A. Regulatory Agency Sustainability Approvals:
   1. Duct Sealer:
      a. Meet Class A flame spread rating in accordance with ASTM E84 or UL 723.
      b. Meet Class A flame spread rating in accordance with ULC-S102.2.
      c. Handle, store, and apply materials in compliance with applicable regulations and material safety data sheets (MSDS).

1.4 DELIVERY, STORAGE, AND HANDLING

A. Storage and Handling Requirements:
   1. Duct Sealer:
      a. Handle, store, and apply materials in compliance with applicable regulations and material safety data sheets (MSDS).
      b. Handle to prevent inclusion of foreign matter, damage by water, or breakage.
      c. Store in a cool dry location, but never under 35 deg F or subjected to sustained temperatures exceeding 110 deg F or as per Manufacturer's written recommendations.
      d. Do use sealants that have exceeded shelf life of product.

1.5 FIELD CONDITIONS

A. Ambient Conditions:
1. Duct Sealer:
a. Do not apply under 35 deg F or subjected to sustained temperatures exceeding 110 deg F or as per Manufacturer's written recommendations.
b. Do not apply when rain or freezing temperatures will occur within seventy two (72) hours.

PART 2 - PRODUCTS

2.1 SYSTEM

A. Materials:
1. Sheet Metal:
a. Fabricate ducts, plenum chambers and casings of zinc-coated, lock-forming quality steel sheets meeting requirements A653/A653M, with G 60 coating.
2. Duct Sealer For Interior Ducts:
a. Category Four Approved Products. See Section 01 6200 for definitions of Categories:
1) Duct Butter or ButterTak by Cain Manufacturing Co Inc, Pelham, AL www.cainmfg.com.
2) DP 1010, DP 1030 or DP 1015 by Design Polymerics, Fountain Valley, CA www.designpoly.com.
3) PROseal, FIBERseal, EVERseal, or EZ-seal by Ductmate Industries, Inc., Charleroi, PA www.ductmate.com.
4) SAS by Duro Dyne, Bay Shore, NY or Duro Dyne Canada, Lachine, QB www.durodyne.com.
5) Iron Grip 601 by Hardcast Inc, Wylie, TX www.hardcast.com.
6) MTS100 or MTS 200 by Hercules Mighty Tough, Denver CO, www.herculesindustries.com.
7) 15-325 by Miracle / Kingco, Div ITW TACC, Rockland, MA www.taccint.com.
8) 44-39 by Mon-Eco Industries Inc, East Brunswick, NJ www.mon-ecoindustries.com.
9) Airseal Zero by Polymer Adhesive Sealant Systems Inc, Weatherford, TX www.polymeradhesives.com.
10) Airseal #22 Water Base Duct Sealer by Polymer Adhesive Sealant Systems Inc, Weatherford, TX www.polymeradhesives.com.

B. Fabrication:
1. General:
a. Straight and smooth on inside with joints neatly finished.
b. Duct drops to diffusers shall be round, square, or rectangular to accommodate diffuser neck. Drops shall be same gauge as branch duct. Seal joints air tight.
2. Standard Ducts:
a. General:
1) Ducts shall be large enough to accommodate inside acoustic duct liner. Dimensions shown on Drawings are net clear inside dimensions after duct liner has been installed.
b. Rectangular Duct:
1) Duct panels through 48 inch dimension having acoustic duct liner need not be cross-broken or beaded. Cross-break unlined ducts, duct panels larger than 48 inch vertical and horizontal sheet metal barriers, duct offsets, and elbows, or bead 12 inches on center.
a) Apply cross-breaking to sheet metal between standing seams or reinforcing angles.
b) Center of cross-break shall be of required height to assure surfaces being rigid.
c) Internally line square and rectangular drops. Externally insulate round drops.
2) Duct with height or width over 36 inches shall be fabricated using SMACNA T-24 flange joints or of pre-fabricated systems as follows:
a) Ducts with sides over 36 inches up to 48 inches: Transverse duct joint system by Ductmate **/** 25, Elgen, Ward, or WDCI (SMACNA Class 'F' joint).
b) Ducts 48 inch And Larger: Ductmate **/** 35, Elgen, or WDCI (SMACNA Class 'J' transverse joint).

c) Category Four Approved Products. See Section 01 6200 for definitions of Categories:
(1) Ductmate Industries Inc, Charleroi, PA www.ductmate.com or Ductmate Canada Ltd, Burlington, ON (905) 332-7678.
(2) Ward Industries Inc, Bensonville, IL www.wardind.com.
(3) Elgen Manufacturing Company, Inc., East Ruterford, NJ www.elgenmfg.com.

c. Round Duct:
1) Spiral Seam:
a) 28 ga minimum for ducts up to and including 14 inches in diameter.
b) 26 ga minimum for ducts over 14 inches and up to and including 26 inches in diameter.
2) Longitudinal Seam:
a) 28 ga minimum for ducts up to and including 8 inches in diameter.
b) 26 ga minimum for ducts over 8 inches and up to 14 inches in diameter.
c) 24 ga minimum for ducts over 14 inches up to and including 26 inches in diameter.

PART 3 - EXECUTION

3.1 PREPARATION

A. Metal duct surface must be clean and free of moisture, contamination and foreign matter before applying duct sealer for interior and exterior ducts.

3.2 INSTALLATION

A. Install internal ends of slip joints in direction of flow. Seal transverse and longitudinal joints air tight using specified duct sealer as per Manufacturer's written instructions. Cover horizontal and longitudinal joints on exterior ducts with two layers of specified tape installed with specified adhesive.

B. Securely anchor ducts and plenums to building structure with specified duct hangers attached with screws. Do not hang more than one duct from a duct hanger. Brace and install ducts so they shall be free of vibration under all conditions of operation.

C. Ducts shall not bear on top of structural members.

D. Paint ductwork visible through registers, grilles, and diffusers flat black.

E. Properly flash where ducts protrude above roof.

F. Under no conditions will pipes, rods, or wires be allowed to penetrate ducts.

G. Where ducts are shown connecting to concrete or masonry openings and along edges of plenums at floors and walls, provide continuous 2 by 2 by 1/4 inches galvanized angle iron.
1. Bolt angle iron to structure and make airtight by applying sealant between angle and structure.
2. Bolt or weld sheet metal at these locations to angle and caulk airtight.
3. Apply two coats of aluminum paint to angles after installation.

3.3 FIELD QUALITY CONTROL

A. Field Tests:
1. Air Test and Balance Testing as specified in Section 01 4546: 'Duct Testing, Adjusting, and Balancing'.

B. Non-Conforming Work:
1. Reseal transverse joint duct leaks and seal longitudinal duct joint leaks discovered during air test and balance procedures at no additional cost to Owner.

END OF SECTION

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SECTION 23 3300

AIR DUCT ACCESSORIES

PART 1 - GENERAL

1.1 SUMMARY

A. Includes But Not Limited To:
   1. Furnish and install duct accessories in specified ductwork as described in Contract Documents.

B. Related Requirements:
   1. Section 23 3001: 'Common Duct Requirements'.

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 C1071-16, 'Standard Specification for Fibrous Glass Duct Lining Insulation (Thermal and Sound Absorbing Material)'.
      c. ASTM C1338-14, ‘Standard Test Method for Determining Fungi Resistance of Insulation Materials and Facings'.

PART 2 - PRODUCTS

2.1 ACCESSORIES

A. Manufacturers:
   1. Manufacturer Contact List:
      a. AGM Industries, Brockton, MA www.agmind.com.
      b. Air Balance Inc, Holland, OH www.airbalance.com.
      c. Air Filters Inc, Baltimore, MD www.afinc.com.
      d. Air-Rite Manufacturing, Bountiful, UT (801) 295-2529.
      e. American Warming & Ventilating, Holland, OH www.american-warming.com.
      f. Arrow United Industries, Wyalusing, PA www.arrowunited.com.
      g. Cain Manufacturing Company Inc, Pelham, AL www.cainmfg.com.
      h. C & S Air Products, Fort Worth, TX www.csairproducts.com.
      i. CertainTeed Corp, Valley Forge, PA www.certainteed.com.
      j. Cesco Products, Florence, KY www.cescoproducts.com.
      k. Daniel Manufacturing, Ogden, UT (801) 622-5924.
      l. Design Polymerics, Fountain Valley, CA www.designpoly.com.
      m. Ductmate Industries Inc, East Charleroi, PA www.ductmate.com.
      n. Duro Dyne, Bay Shore, NY www.durodyne.com.
      o. Dyn Air Inc. Lachine, QB www.dynair.ca
      p. Elgen Manufacturing Company, Inc. East Rutherford, NJ www.elgenmfg.com
      q. Flexmaster USA Inc, Houston, TX www.flexmasterusa.com.
      r. Greenheck Corp, Schofield, WI www.greenheck.com.
      s. Gripnail Corp, East Providence, RI www.gripnail.com.
      t. Hardcast Inc, Wylie, TX www.hardcast.com.
      u. Hercules Industries, Denver, CO, www.herculesindustries.com.
      v. Honeywell Inc, Minneapolis, MN www.honeywell.com.
      w. Industrial Acoustics Co, Bronx, NY www.industrialacoustics.com.
      x. Johns-Manville, Denver, CO www.jm.com.
      y. Kees Inc, Elkhart Lake, WI www.kees.com.
      z. Knauf Fiber Glass, Shelbyville, IN www.knauffiberglass.com.
      aa. Manson Insulation Inc, Brossard, QB www.isolationmanson.com.

bb. Metco Inc, Salt Lake City, UT (801) 467-1572 www.metcospiral.com.
cc. Miracle / Kingco, Rockland, MA www.taccint.com.
dd. Mon-Eco Industries Inc, East Brunswick, NJ www.mon-ecoindustries.com.
ee. Nailor Industries Inc, Houston, TX www.nailor.com.
ff. Owens Corning, Toledo, OH www.owenscorning.com.
gg. Polymer Adhesive Sealant Systems Inc, Irving, TX www.polymeradhesives.com.
hh. Pottorff Company, Fort Worth, TX www.pottorff.com.
ii. Ruskin Manufacturing, Kansas City, MO www.ruskin.com.
jj. Sheet Metal Connectors Inc, Minneapolis, MN www.smconnectors.com.
kk. Tamco, Stittsville, ON www.tamco.ca.
ll. Techno Adhesive, Cincinnati, OH www.technoadhesives.com.
mm. Titus, Richardson, TX (972) 699-1030. www.titus-hvac.com
nn. McGill AirSeal, Columbus, OH www.mcgillairseal.com.
oo. United Enertech Corp, Chattanooga, TN www.unitedenertech.com.
pp. Utemp Inc, Salt Lake City, UT (801) 978-9265.
qq. Ventfabrics Inc, Chicago, IL www.ventfabrics.com.
rr. Ward Industries, Grand Rapids MI www.wardind.com.
ss. Young Regulator Co, Cleveland, OH www.youngregulator.com.

B. Materials:
1. Acoustical Liner System:
a. Duct Liner:
1) One inch thick, 1-1/2 lb density fiberglass conforming to requirements of ASTM C1071. Liner will not support microbial growth when tested in accordance with ASTM C1338.
2) Category Four Approved Products. See Section 01 6200 for definitions of Categories:
a) ToughGard by CertainTeed.
b) Duct Liner E-M by Knauf Fiber Glass.
c) Akousti-Liner by Manson Insulation.
d) Quiet R by Owens Corning.
e) Linacoustic RC by Johns-Manville.
b. Adhesive:
1) Category Four Approved Water-Based Products. See Section 01 6200 for definitions of Categories:
a) Cain: Hydrotak.
b) Design Polymerics: DP2501 or DP2502 (CMCL-2501).
c) Duro Dyne: WSA.
d) Elgen: A-410-WB.
e) Hardcast: Coil-Tack.
f) Hercules: Mighty Tough Adhesives MTA500 or MTA600.
g) Miracle / Kingco: PF-101.
h) Mon-Eco: 22-67 or 22-76.
i) Polymer Adhesive: Glasstack #35.
j) Techno Adhesive: 133.
k) McGill AirSeal: Uni-tack.
2) Category Four Approved Solvent-Based (non-flammable) Products. See Section 01 6200 for definitions of Categories:
a) Cain: Safetak.
b) Duro Dyne: FPG.
c) Hardcast: Glas-Grip 648-NFSE.
d) Miracle / Kingco: PF-91.
e) Mon-Eco: 22-24.
f) Polymer Adhesive: Q-Tack.
g) Techno Adhesive: 'Non-Flam' 106.
3) Category Four Approved Solvent-Based (flammable) Products. See Section 01 6200 for definitions of Categories:
a) Cain: HV200.
b) Duro Dyne: MPG.
c) Hardcast: Glas-Grip 636-SE.
d) Miracle / Kingco: PF-96.
e) Mon-Eco: 22-22.

f) Polymer Adhesive: R-Tack.
g) Techno Adhesive: 'Flammable' 106.

c. Fasteners:
1) Adhesively secured fasteners not allowed.
2) Category Four Approved Products. See Section 01 6200 for definitions of Categories:
a) AGM Industries: 'DynaPoint' Series RP-9 pin.
b) Cain.
c) Duro Dyne.
d) Gripnail: May be used if each nail is installed by 'Grip Nail Air Hammer' or by 'Automatic Fastener Equipment' in accordance with Manufacturer's recommendations.

2. Dampers And Damper Accessories:
a. Locking Quadrant Damper Regulators:
1) Category Four Approved Products. See Section 01 6200 for definitions of Categories:
a) Duro Dyne: KS-385.
b) Dyn Air: QPS-385.
c) Elgen: EQR-4.
d) Ventfabrics: Ventline 555.
e) Young: No. 1.
b. Concealed Ceiling Damper Regulators:
1) Category Four Approved Products. See Section 01 6200 for definitions of Categories:
a) Cain.
b) Duro Dyne.
c) Elgen.
d) Metco Inc.
e) Ventfabrics: 666 Ventlok.
f) Young: 301.
c. Volume Dampers:
1) Rectangular Duct:
a) Factory-manufactured 16 ga galvanized steel, single blade and opposed blade type with 3/8 inch axles and end bearings. Blade width 8 inches maximum. Blades shall have 1/8 inch clearance all around.
b) Damper shall operate within acoustical duct liner.
c) Provide channel spacer equal to thickness of duct liner.
d) Dampers above removable ceiling and in Mechanical Rooms shall have locking quadrant on bottom or side of duct. Otherwise, furnish with concealed ceiling damper regulator and cover plate.
e) Category Four Approved Products. See Section 01 6200 for definitions of Categories:
(1) Air-Rite: Model CD-2.
(2) American Warming: VC-2-AA.
(3) Arrow: OBDAF-207.
(4) C & S: AC40.
(5) Cesco: AGO.
(6) Daniel: CD-OB.
(7) Greenheck: VCD-20.
(8) Nailor: 1810 or 1820.
(9) Pottorff: CD-42.
(10) Ruskin: MD-35.
(11) United Enertech: MD-115.
(12) Utemp: CD-OB.
2) Round Duct:
a) Factory-manufactured 20 ga galvanized steel, single blade with 3/8 inch axles and end bearings.
b) For use in outside air ducts.
c) Category Four Approved Products. See Section 01 6200 for definitions of Categories:
(1) Air Balance: Model AC-22.
(2) Air-Rite: Model CD-8.
(3) American Warming: V-22.

(4) Arrow: Type-70.
(5) C & S: AC21R.
(6) Cesco: MGG.
(7) Nailor: 1890.
(8) Pottorff: CD-21R.
(9) Ruskin: MDRS-25.
(10) United Enertech: RD.

3. Air Turns:
   a. Single thickness vanes. Double thickness vanes not acceptable.
   b. 4-1/2 inch wide vane rail. Junior vane rail not acceptable.
4. Branch Tap for Round or Flexible Ductwork:
   a. Factory-manufactured rectangular-to-round 45 degree leading tap fabricated of 24 ga zinc-coated lock-forming quality steel sheets meeting requirements of ASTM A653, with G-90 coating.
   b. One inch wide mounting flange with die formed corner clips, pre-punched mounting holes, and adhesive coated gasket.
   c. Manual Volume Damper:
      1) Single blade, 22 ga minimum
      2) 3/8 inch minimum square rod with brass damper bearings at each end.
      3) Heavy-duty locking quadrant on 1-1/2 inch high stand-off mounting bracket attached to side of round duct.
   d. Category Four Approved Products. See Section 01 6200 for definitions of Categories:
      1) ST-1HD by Air-Rite:
         a) Nylon damper bearings approved for Air-Rite.
      2) STO by Flexmaster.
      3) HET by Sheet Metal Connectors.

C. Fabrication:
1. Duct Liner:
   a. Install mat finish surface on airstream side. Secure insulation to cleaned sheet metal duct with continuous 100 percent coat of adhesive and with 3/4 inch long mechanical fasteners 12 inches on center maximum unless detailed otherwise on Drawings. Pin all duct liner.
   b. Accurately cut liner and thoroughly coat ends with adhesive. Butt joints tightly. Top and bottom sections of insulation shall overlap sides. If liner is all one piece, folded corners shall be tight against metal. Ends shall butt tightly together.
   c. Coat longitudinal and transverse edges of liner with adhesive.
2. Air Turns:
   a. Permanently install vanes arranged to permit air to make abrupt turn without appreciable turbulence, in 90 degree elbows of above ground supply and return ductwork.
   b. Quiet and free from vibration when system is in operation.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Duct Liner:
1. Furnish and install acoustic lining in following types of rectangular ducts unless noted otherwise on Contract Documents:
   a. Supply air.
   b. Return air.
   c. Mixed air.
   d. Transfer air.
   e. Relief air.
   f. Exhaust air.
   g. Elbows, fittings, and diffuser drops greater than 12 inches in length.
   h. Concrete underfloor boxes.
2. Do not install acoustic lining in round ducts.

B. Dampers And Damper Accessories:
1. Install concealed ceiling damper regulators.

a. Paint cover plates to match ceiling tile.
b. Do not install damper regulators for dampers located directly above removable ceilings or in Mechanical Rooms.

2. Provide each take-off with an adjustable volume damper to balance that branch.
   a. Anchor dampers securely to duct.
   b. Install dampers in main ducts within insulation.
   c. Dampers in branch ducts shall fit against sheet metal walls, bottom and top of duct, and be securely fastened. Cut duct liner to allow damper to fit against sheet metal.
   d. Where concealed ceiling damper regulators are installed, provide cover plate.

END OF SECTION

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SECTION 23 3346

FLEXIBLE DUCTS

PART 1 - GENERAL

1.1 SUMMARY

A. Includes But Not Limited To:
   1. Furnish and install supply air branch duct runouts to diffusers as described in Contract Documents.

B. Related Requirements:
   1. Section 23 3001: Common Duct Requirements.

1.2 REFERENCES

A. Reference Standards:
   1. National Fire Protection Association / American National Standards Institute:
      a. NFPA 90A: 'Installation of Air-Conditioning and Ventilating Systems' (2018 or most recent edition adopted by AHJ).
   2. Underwriters Laboratories:
      a. UL 181, 'Factory-Made Ducts and Air Connectors' (11th Edition).
      b. UL 181B, 'Closure Systems for Use With Flexible Air Ducts and Air Connectors' (3rd Edition).

PART 2 - PRODUCTS

2.1 SYSTEM

A. Manufacturers:
   1. Manufacturer Contact List:
      a. JP Lamborn Co., Fresno CA www.jplflex.com.
      b. Flexmaster USA Inc, Houston, TX www.flexmasterusa.com or Flexmaster Canada Ltd, Richmond Hill, ON (905) 731-9411.
      c. Thermaflex by Flexible Technologies, Abbeville, SC or Mississauga, ON www.thermaflex.net.

B. Materials:
   1. Ducts:
      a. Formable, flexible, circular duct which shall retain its cross-section, shape, rigidity, and shall not restrict airflow after bending.
      b. Insulation:
         1) Nominal 1-1/2 inches, 3/4 lb per cu ft density fiberglass insulation with air-tight, polyethylene or polyester core, sheathed in seamless vapor barrier jacket factory installed over flexible assembly.
      c. Assembly, including insulation and vapor barrier, shall meet Class I requirement of NFPA 90A and be UL 181 rated, with flame spread of 25 or less and smoke developed rating of 50 or under.
      d. Category Four Approved Products. See Section 01 6200 for definitions of Categories:
         1) PR-25 by JP Lambornes.
         2) Flex-Vent KP by Thermaflex by Flexible Technologies.
         3) Type 1B Insulated by Flexmaster.
   2. Cinch Bands: Nylon, 3/8 inch removable and reusable type.
      a. Listed and labeled in accordance with Standard UL 181B and labeled 'UL 181 B-C'.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install duct in fully extended condition free of sags and kinks, using 72 inch maximum lengths.

B. Make duct connections by coating exterior of duct collar for 3 inches with duct sealer and securing duct in place over sheet metal collar with specified cinch bands.

END OF SECTION

SECTION 23 3713

DIFFUSERS, REGISTERS, AND GRILLES

PART 1 - GENERAL

1.1 SUMMARY

A. Includes But Not Limited To:
   1. Furnish and install diffusers, registers, and grilles connected to ductwork as described in Contract Documents.

B. Related Requirements:
   1. Section 23 3001: 'General Duct Requirements'.

1.2 SUBMITTALS

A. Maintenance Material Submittals:
   1. Tools: Leave tool for removing core of each different type of grille for building custodian.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturer Contact List:
   1. Carnes Co, Verona, MI www.carnes.com.
   2. J & J Register, Grand Rapids, MI www.jandjreg.com.
   3. Krueger Air System Components, Richardson, TX www.krueger-hvac.com.
   4. Metal*Aire by Metal Industries Inc, Clearwater, FL www.metalaire.com.
   5. Nailor Industries Inc, Houston, TX or Weston, ON www.nailor.com.
   6. Price Industries Inc, Suwanee, GA www.price-hvac.com or E H Price Ltd, Winnipeg, MB (204) 669-4220.
   7. Titus, Richardson, TX www.titus-hvac.com.
   8. Tuttle & Bailey, Richardson, TX www.tuttleandbailey.com.

2.2 MANUFACTURED UNITS

A. Lay-In Ceiling Diffusers:
   1. Finish: Off-white baked enamel.
   2. Removable inner core assembly.
   3. Performance Standard: Titus TMSA Border Type 3.
   4. Category Four Approved Products. See Section 01 6200 for definitions of Categories:
      a. Carnes.
      b. Krueger.
      c. Metal*Aire.
      d. Nailor.
      e. Price.
      f. Titus.
      g. Tuttle & Bailey.

B. Ceiling Return Grilles:
   1. Finish: Off-white baked enamel.
   2. 1/2 inch spacing.
   3. See Contract Documents for location of filter grilles.
   4. Category Four Approved Products. See Section 01 6200 for definitions of Categories:
      a. Carnes: RSLA.
      b. J & J: S90H.
      c. Krueger: S85H.

d. Metal*Aire: SRH.
e. Nailor: 6155H.
f. Price: 535.
g. Titus: 355RL or 355 RS.
h. Tuttle & Bailey: T75D.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Anchor securely into openings. Secure frames to ductwork by using four sheet metal screws, one per side.

END OF SECTION

DIVISION 26: ELECTRICAL

END OF TABLE OF CONTENTS

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SECTION 26 0501

COMMON ELECTRICAL REQUIREMENTS

PART 1 - GENERAL

1.1 SUMMARY

A. Includes But Not Limited To:
   1. General electrical system requirements and procedures.
   2. Perform excavating and backfilling work required by work of this Division as described in Contract Documents.
   3. Make electrical connections to equipment provided under other Sections.

B. Products Furnished But Not Installed Under This Section:
   1. Anchor bolts and templates for exterior lighting equipment bases.

C. Related Requirements:
   1. Section 01 3200: ‘Construction Process Documentation’ for scheduling of equipment and materials removed by Owner.
   2. Section 02 4119: ‘Selective Structure Demolition’ for salvage of existing electrical items to be reused or recycled.

1.2 REFERENCES

A. Reference Standards:
   1. National Fire Protection Association / American National Standards Institute:
      a. NFPA 70, ‘National Electrical Code (NEC)' (2017 or most recent edition adopted by AHJ).
   2. National Electrical Manufacturing Association Standards (NEMA):
      a. NEMA 250-2018, ‘Enclosure for Electrical Equipment (1000 Volts Maximum)’.

1.3 ADMINISTRATIVE REQUIREMENTS

A. Coordination:
   1. Coordinate with Owner for equipment and materials to be removed by Owner.

B. Sequencing:
   1. Include detailed sequence of individual electrical demolition operations on Construction Schedule specified in Section 01 3200.

1.4 SUBMITTALS

A. Action Submittals:
   1. Product Data:
      a. Provide following information for each item of equipment:
         1) Catalog Sheets.
         2) Assembly details or dimension drawings.
         3) Installation instructions.
         4) Manufacturer's name and catalog number.
         5) Name of local supplier.
      b. Furnish such information for following equipment:
         1) Section 26 5100: 'Interior Lighting Fixtures'.
         2) Section 26 5200: 'Emergency Lighting' for battery units.
      c. Do not purchase equipment before approval of product data.

2. Shop Drawings:
    a. Submit on following equipment:
        1) Low voltage relay switching system for lighting.
    b. Indicate precise equipment to be used, including all options specified. Indicate wording and format of nameplates where applicable. Submit in three-ring binder with hard cover.

B. Informational Submittals:
1. Test And Evaluation Reports:
    a. Report of site tests, before Substantial Completion.
2. Qualification Statement:
    a. Electrical Subcontractor:
        1) Provide Qualification documentation if requested by Architect or Owner.
    b. 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) Provide operating and maintenance instructions for each item of equipment submitted under Product Data.
    b. Record Documentation:
        1) Manufacturers documentation:
            a) Manufacturer's literature.
            b) Include copy of approved shop drawings.

1.5 QUALITY ASSURANCE

A. Regulatory Agency Sustainability Approvals:
1. NEC and local ordinances and regulations shall govern unless more stringent requirements are specified.
2. Material and equipment provided shall meet standards of NEMA or UL and bear their label wherever standards have been established and label service is available.

B. Qualifications: Requirements of Section 01 4301 applies, but not limited to following:
1. Electrical Subcontractor:
    a. Company specializing in performing work of this section.
        1) Minimum five (5) years experience in electrical installations.
        2) Minimum five (5) satisfactorily completed installations in past three (3) years of projects similar in size, scope, and complexity required for this project before bidding.
    b. Upon request, submit documentation.
2. Installer:
    a. Licensed for area of Project.
    b. Designate one (1) individual as project foremen who shall be on site at all times during installation and experienced with installation procedures required for this project.
    c. Upon request, submit documentation.

PART 2 - NOT USED

PART 3 - EXECUTION

3.1 INSTALLERS

A. Acceptable Installers:
1. Meet Quality Assurance Installer Qualifications as specified in Part 1 of this specification.

3.2 EXAMINATION

A. Verification Of Conditions:
   1. Confirm dimensions, ratings, and specifications of equipment to be installed and coordinate these with site dimensions and with other Sections.

B. Evaluation And Assessment:
   1. All relocations, reconnections, and removals are not necessarily indicated on Drawings. Include such work without additional cost to Owner.

3.3 PREPARATION

A. Disconnect equipment that is to be removed or relocated. Carefully remove, disassemble, or dismantle as required, and store in approved location on site, existing items to be reused in completed work.

B. Where affected by demolition or new construction, relocate, extend, or repair raceways, conductors, outlets, and apparatus to allow continued use of electrical system. Use methods and materials as specified for new construction.

C. Perform drilling, cutting, block-offs, and demolition work required for removal of necessary portions of electrical system. Do not cut joists, beams, girders, trusses, or columns without prior written permission from Architect.

D. Remove concealed wiring abandoned due to demolition or new construction. Remove circuits, conduits, and conductors that are not to be re-used back to next active fixture, device, or junction box.

E. Patch, repair, and finish surfaces affected by electrical demolition work, unless work is specifically specified to be performed under other Sections of the specifications.

3.4 INSTALLATION

A. General:
   1. Locations of electrical equipment shown on Drawings are approximate only. Field verify actual locations for proper installation.
   2. Coordinate electrical equipment locations and conduit runs with those providing equipment to be served before installation or rough in.
      a. Notify Architect of conflicts before beginning work.
      b. Coordinate locations of power and lighting outlets in mechanical rooms and other areas with mechanical equipment, piping, ductwork, cabinets, etc, so they will be readily accessible and functional.
   3. Work related to other trades which is required under this Division, such as cutting and patching, trenching, and backfilling, shall be performed according to standards specified in applicable Sections.

3.5 FIELD QUALITY CONTROL

A. Field Tests:
   1. Test systems and demonstrate equipment as working and operating properly. Notify Architect before test. Rectify defects at no additional cost to Owner.
   2. Measure current for each phase of each motor under actual final load operation, i.e. after air balance is completed for fan units, etc. Record this information along with full-load nameplate current rating and size of thermal overload unit installed for each motor.

3.6 CLEANING

A. Remove obsolete raceways, conductors, apparatus, and lighting fixtures promptly from site and dispose of legally.

3.7 CLOSEOUT ACTIVITIES

A. Training:
   1. Provide competent instructor for three (3) days to train Owner's maintenance personnel in operation and maintenance of electrical equipment and systems. Factory representatives shall assist this instruction as necessary. Schedule instruction period at time of final inspection.

END OF SECTION

SECTION 26 0519

LINE-VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES

PART 1 - GENERAL

1.1 SUMMARY

A. Includes But Not Limited To:
   1. Quality of conductors used on Project except as excluded below.

B. Related Requirements:
   1. Section 26 0501: 'Common Electrical Requirements'.

1.2 REFERENCES

A. Definitions:
   1. Line Voltage: Over 70 Volts.

B. Reference Standards:
   1. National Fire Protection Association:
      a. NFPA 70, 'National Electric Code (NEC)' (2017 or most recent edition adopted by AHJ including all applicable amendments and supplements).

PART 2 - PRODUCTS

2.1 SYSTEMS

A. Line Voltage Conductors:
   1. Copper with AWG sizes as shown:
      a. Minimum size shall be No. 12 except where specified otherwise.
      b. Conductor size No. 8 and larger shall be stranded.
   2. Insulation:
      a. Standard Conductor Size No. 10 And Smaller: 600V type THWN or XHHW (75 deg F (24 deg C)).
      b. Standard Conductor Size No. 8 And Larger: 600V Type THW, THWN, or XHHW (75 deg F (24 deg C)).
      c. Higher temperature insulation as required by NFPA 70 or local codes.
   3. Colors:
      a. 208Y / 120 V System:
         1) Black: Phase A.
         2) Red: Phase B.
         3) Blue: Phase C.
         4) Green: Ground.
         5) White: Neutral.
      b. 480Y / 277 Volt System:
         1) Brown: Phase A.
         2) Orange: Phase B.
         3) Yellow: Phase C.
         4) Gray: Neutral.
         5) Green: Ground.
      c. Conductors size No. 10 and smaller shall be colored full length. Tagging or other methods for coding of conductors size No. 10 and smaller not allowed.

d. For feeder conductors larger than No. 10 at pull boxes, gutters, and panels, use painted or taped band or color tag color-coded as specified above.

B. Line Voltage Cables:
1. Metal Clad Cable (MC) may be used as restricted below:
a. Copper conductors.
b. Sizes #12 through #8.
c. Use only in indoor dry locations where:
1) Not subject to damage.
2) Not in contact with earth.
3) Not in concrete.

C. Standard Connectors:
1. Conductors No. 8 And Smaller: Steel spring wire connectors.
2. Conductors Larger Than No. 8: Pressure type terminal lugs.
3. Connections Outside Building: Watertight steel spring wire connections with waterproof, non-hardening sealant.

PART 3 - EXECUTION

3.1 INSTALLATION

A. General:
1. Conductors and cables shall be continuous from outlet to outlet.
2. Do not use direct burial cable.

B. Line Voltage Conductors:
1. Install conductors in raceway where indicated on Contract Drawings. Run conductors of different voltage systems in separate conduits.
2. Route circuits at own discretion, however, circuiting shall be as shown in Panel Schedules. Group circuit homeruns to panels as shown on Contract Drawings.
3. Neutrals:
a. On three-phase, 4-wire systems, do not use common neutral for more than three circuits.
b. On single-phase, 3-wire systems, do not use common neutral for more than two circuits.
c. Run separate neutrals for each circuit where specifically noted on Contract Drawings.
d. Where common neutral is run for two or three home run circuits, connect phase conductors to breakers in panel which are attached to separate phase legs:
1) Provide breaker tie so that all circuits that share common neutral are simultaneously disconnected.
2) Neutral conductors shall be of same size as phase conductors unless specifically noted otherwise.
4. Pulling Conductors:
a. Do not pull conductors into conduit until raceway system is complete and cabinets and outlet boxes are free of foreign matter and moisture.
b. Do not use heavy mechanical means for pulling conductors.
c. Use only listed wire pulling lubricants.

C. Line Voltage Cables:
1. Route circuits at own discretion, however, circuiting and numbering shall be as shown in Panel Schedules.
2. Support cables using approved staples, cable ties, straps, hangers, or similar fittings, spaced as required.
3. Where installing in framing, do not bore holes in joists or beams outside center 1/3 of member depth or within 24 inches (600 mm) of bearing points. Do not bore holes in vertical framing members outside center 1/3 of member width. Holes shall be one inch diameter maximum.

4. Conceal cables within ceilings and walls of finished areas. Cables may be exposed in unfinished areas but not run on floors of mechanical equipment spaces or in such a way that they obstruct access to, operation of, or servicing of equipment.
5. Install exposed cables parallel to or at right angles to building structure lines.
6. Keep cables 6 inches (150 mm) minimum from hot water pipes.
7. Do not support cables from mechanical ducts or duct supports without Architect's written approval.
8. Prohibited procedures:
   a. Boring holes for installation of cables in vertical truss members.
   b. Notching of structural members for installation of cables.

END OF SECTION

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SECTION 26 0526

GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 SUMMARY

A. Includes But Not Limited To:
   1. Furnish and install grounding for electrical installation as described in Contract Documents except as excluded below.

B. Related Requirements:
   1. Section 26 0501: 'Common Electrical Requirements'.

1.2 REFERENCES

A. Reference Standards:
   1. Institute of Electrical and. Electronics Engineers (IEEE):
      a. IEEE 837-2014, ‘Standard for Qualifying Permanent Connections Used in Substation Grounding'.
   2. National Fire Protection Association:
      a. NFPA 70, ‘National Electric Code (NEC)’ (2017 or most recent edition adopted by AHJ including all applicable amendments and supplements).
      b. NFPA 780, 'Standard for the Installation of Lightning Protection Systems' (2014 or latest approved edition).
   3. Telecommunications Industry Association:
      a. TIA-942 A, 'Telecommunications Infrastructure Standard for Data Centers' (2014).
   4. Section 27 1116: ‘Communications Cabinets, Racks, Frames, and Enclosures’.
   5. Section 27 1501: 'Communications Horizontal Cabling' for cables for Telephone and Data Systems.

1.3 QUALITY ASSURANCE

A. Regulatory Agency Sustainability Approvals:
   1. Requirements of Section 27 1501 applies, but is not limited to following:
      a. Cable assemblies shall be UL / CE Listed and CSA Certified. Cables shall be a distinctive green or green/yellow in color, and all jackets shall be UL, VW-1 flame rated.
      b. Grounding shall conform to all required Commercial Building Grounding and Bonding Requirements for Telecommunications, Electrical Codes, and Manufacturer’s grounding requirements.
   2. Systems shall be installed per NFPA 780 and NFPA 70.
   3. All Bonds shall comply with most current version of IEEE 837 Standard.

B. Qualifications: Requirements of Section 01 4301 applies, but is not limited to following:
   1. Installers Qualifications:
      a. Grounding and Bonding:
         1) Licensed electrical contractor shall perform installation and termination of main bonding conductor to building service entrance ground.
         2) Licensed in State that Work is to be performed.

PART 2 - PRODUCTS

2.1 SYSTEM

A. Manufacturers:
   1. Type One Acceptable Products:
      a. 'Cadweld' by Erico International, Solon, OH www.erico.com.
      b. 'ThermOweld' by Continental Industries, Tulsa, NE www.conind.com.
      c. Equal as approved by Architect before bidding. See Section 01 6200.

B. Performance:
   1. Design Criteria:
      a. Size materials as shown on Drawings and in accordance with applicable codes.
      b. Bonding System Workmanship:
         1) The ground/earthing system shall be designed for high reliability and shall meet following criteria:
            a) Local electrical codes shall be adhered to.
            b) All grounding/earthing conductors shall be copper.
            c) Regulatory Agency Sustainability Approvals requirements are required.

C. Materials:
   1. Grounding And Bonding Jumper Conductors: Bare copper or with green insulation.
   2. Make grounding conductor connections to ground rods and foundation ground loop using approved bolted clamps listed for such use.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Grounding conductors and bonding jumper conductors shall be continuous from terminal to terminal without splice. Provide grounding for following.
   1. Conduits and other conductor enclosures.
   2. Neutral or identified conductor of interior wiring system.
   3. Non-current-carrying metal parts of fixed equipment such as lighting fixtures.

B. Pull grounding conductors in non-metallic raceways, in flexible steel conduit exceeding 72 inches (1 800 mm) in length, and in flexible conduit connecting to mechanical equipment.

C. Provide grounding bushings on all feeder conduit entrances into panelboards and equipment enclosures.

D. Bond conduit grounding bushings to enclosures with minimum #10 AWG conductor.

E. Connect equipment grounds to building system ground.
   1. Use same size equipment grounding conductors as Phased conductors up through #10 AWG.
   2. Use NEC Table 250-95 for others unless noted otherwise in Drawings.

3.2 FIELD QUALITY CONTROL

A. Field Inspections:
   1. Notify Architect for inspection two (2) days minimum before placing concrete over grounding conductor.
   2. Grounding Well integrity shall be tested separately and together with Lightning Protection System integrity.

END OF SECTION

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SECTION 26 0533

RACEWAY AND BOXES FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 SUMMARY

A. Includes But Not Limited To:
1. Quality of material and installation procedures for raceway, boxes, and fittings used on Project but furnished under other Divisions.
2. Furnish and install raceway, conduit, and boxes used on Project not specified to be installed under other Divisions.
3. Furnish and install air-vapor barrier boxes as described in Contract Documents.
4. Furnish and install main electrical service raceway as described in Contract Documents and comply with electrical utility company requirements.
5. Furnish and install main telephone service raceway as described in Contract Documents and comply with telephone company requirements.

B. Related Requirements:
1. Section 26 0501: 'Common Electrical Requirements' for general electrical requirements'.

1.2 REFERENCES

A. Reference Standards:
1. National Fire Protection Association:
a. NFPA 70, 'National Electric Code (NEC)' (2017 or most recent edition adopted by AHJ including all applicable amendments and supplements).

PART 2 - PRODUCTS

2.1 SYSTEM

A. Manufacturers:
1. Manufacturer Contact List:
a. Cooper B-Line, Highland, IL www.b-line.com.
b. Hubbell Incorporated, Milford, CT www.hubbell-wiring.com or Hubbell Canada Inc, Pickering, ON (905) 839-4332.
c. Square D, Palatine, IL www.squared.com.
d. Thomas & Betts, Memphis, TN www.tnb.com or Thomas & Betts Ltd, Iberville, PQ (450) 347-5318.
e. Walker Systems Inc, Williamstown, WV (800) 240-2601 or Walker Systems Inc / Wiremold Canada Inc, Fergus, ON (519) 843-4332.
f. Wiremold Co, West Hartford, CT www.wiremold.com.

B. Materials:
1. Raceway And Conduit:
a. Sizes:
1) 3/4 inch (19 mm) for exterior use, unless indicated otherwise.
2) 1/2 inch (13 mm) for interior use, unless indicated otherwise.
b. Types: Usage of each type is restricted as specified below by product.
1) Galvanized rigid steel or galvanized intermediate metal conduit (IMC) is allowed for use in all areas. Where in contact with earth or concrete, wrap buried galvanized rigid steel and galvanized IMC conduit and fittings completely with vinyl tape.

2) Galvanized Electrical Metallic Tubing (EMT) and Flexible Steel Conduit:
a) Allowed for use only in indoor dry locations where it is:
(1) Not subject to damage.
(2) Not in contact with earth.
(3) Not in concrete.
b) For metal conduit systems, flexible steel conduit is required for final connections to indoor mechanical equipment.
3) Listed, Liquid-Tight Flexible Metal Conduit:
a) Use in outdoor final connections to mechanical equipment, length not to exceed 36 inches (900 mm).
4) Pre-wired 3/8 Inch (9.5 mm) Flexible Fixture Whips: Allowed only for connection to recessed lighting fixtures, lengths not to exceed 72 inches (1 800 mm).
c. Prohibited Raceway Materials:
1) Aluminum conduit.
2) Armored cable type AC (BX) cable.
2. Raceway And Conduit Fittings:
a. Rigid Steel Conduit And IMC: Threaded and designed for conduit use.
b. EMT:
1) Compression type.
2) Steel set screw housing type.
c. Flexible Steel Conduit: Screw-in type.
d. Liquid-tight Flexible Metal Conduit: Sealtite type.
e. Expansion fittings shall be equal to OZ Type AX sized to raceway and including bonding jumper.
f. Prohibited Fitting Materials:
1) Crimp-on, tap-on, indenter type fittings.
2) Cast set-screw fittings for EMT.
3) Spray (aerosol) PVC cement.
3. Seal Devices: OZ Type WSK.
4. Outlet Boxes:
a. Galvanized steel of proper size and shape are acceptable for all systems. Where metal boxes are used, provide following:
1) Provide metal supports and other accessories for installation of each box.
2) Equip ceiling and bracket fixture boxes with fixture studs where required.
3) Equip outlets in plastered, paneled, and furred finishes with plaster rings and extensions to bring box flush with finish surface.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verification Of Conditions:
1. Confirm dimensions, ratings, and specifications of materials to be installed and coordinate these with site dimensions and with other Sections.

3.2 INSTALLATION

A. Interface With Other Work:
1. Before rough-in, verify locations of boxes with work of other trades to insure that they are properly located for purpose intended.

B. Conduit And Raceway:
1. Conceal raceways within ceilings, walls, and floors, except at Contractor's option, conduit may be exposed on walls or ceilings of mechanical equipment areas and above acoustical panel suspension ceiling systems. Install exposed raceway runs parallel to or at right angles to building structure lines.

2. Seal all raceways penetrating fire rated walls, ceilings and barriers. See Section 07 8400.
3. Keep raceway runs 6 inches (150 mm) minimum from hot water pipes.
4. Make no more than four quarter bends, 360 degrees total, in any conduit run between outlet and outlet, fitting and fitting, or outlet and fitting.
   a. Make bends and offsets so conduit is not injured and internal diameter of conduit is not effectively reduced.
   b. Radius of curve shall be at least minimum indicated by NFPA 70.
5. Cut conduit smooth and square with run and ream to remove rough edges. Cap raceway ends during construction. Clean or replace raceway in which water or foreign matter have accumulated.
6. Installation in Concrete:
   a. Install no conduit in concrete unless outside diameter is less than 1/3 of slab, wall, or beam thickness in which it is embedded.
   b. Position conduits in center of concrete below reinforcing steel, and separated by minimum lateral spacing of three diameters.
   c. Elbows embedded in concrete shall be rigid steel or IMC and stubouts from concrete slabs shall extend 3 inches (75 mm) minimum before making connection to EMT.
   d. Separate conduits penetrating structural slabs in buildings by 2 inches (50 mm) minimum.
   e. Install seal device where underground raceways penetrate concrete building wall.
7. Installation In Framing:
   a. Do not bore holes in joists or beams outside center 1/3 of member depth or within 24 inches (600 mm) of bearing points. Do not bore holes in vertical framing members outside center 1/3 of member width.
   b. Holes shall be one inch (25 mm) diameter maximum.
8. Conduit And Raceway Support:
   a. Securely support raceway with approved straps, clamps, or hangers, spaced as required.
   b. Do not support from mechanical ducts or duct supports without Architect's written approval. Securely mount raceway supports, boxes, and cabinets in an approved manner by:
      1) Expansion shields in concrete or solid masonry.
      2) Toggle bolts on hollow masonry units.
      3) Wood screws on wood.
      4) Metal screws on metal.
9. Prohibited Procedures:
   a. Use of wooden plugs inserted in concrete or masonry units for mounting raceway, supports, boxes, cabinets, or other equipment.
   b. Installation of raceway that has been crushed or deformed.
   c. Use of torches for bending PVC.
   d. Spray applied PVC cement.
   e. Boring holes in truss members.
   f. Notching of structural members.
   g. Supporting raceway from ceiling system support wires.
   h. Nail drive straps or tie wire for supporting raceway.

C. Boxes:
1. Boxes shall be accessible and installed with approved cover.
2. Do not locate device boxes that are on opposite sides of framed walls in the same stud space. In other wall construction, do not install boxes back to back.
3. Locate boxes so pipes, ducts, or other items do not obstruct outlets.
4. Install outlets flush with finished surface and level and plumb.
5. Support switch boxes larger than two-gang with side brackets and steel bar hangers in framed walls.
6. At time of substantial completion, install blank plates on uncovered outlet boxes that are for future use.
7. Location:
   a. Install boxes at door locations on latch side of door, unless explicitly shown otherwise on Contract Drawings. Verify door swings shown on electrical drawings with architectural drawings, and report discrepancies to Architect before rough-in. Distance of box from jamb shall be 6 inches (150 mm) from door jamb.

b. Properly center boxes located in walls with respect to doors, panels, furring, trim and consistent with architectural details. Where two or more outlets occur, space them uniformly and in straight lines with each other, if possible.
c. Center ceramic tile boxes in tile.

END OF SECTION

SECTION 26 0613

ELECTRICAL EQUIPMENT MOUNTING HEIGHT SCHEDULE

PART 1 - GENERAL: Not Used

PART 2 - PRODUCTS: Not Used

PART 3 - EXECUTION

3.1 INSTALLATION

A. Unless otherwise indicated, mount center of outlets or boxes at following heights above finish floor. Refer special conditions to Architect before rough-in and locate outlet under his direction.

B. Mounting Heights:

1. HVAC:
   - a. Temperature Control Junction Boxes: As indicated on Drawings.
   - b. Thermostats not mounted in occupied space: As indicated on Drawings.
   - c. Remote Temperature Sensors and thermostats mounted in occupied space:
     - 1) Wall-Mounted 50 inches (1 270 mm) to top.
   - d. Indoor Motor Disconnects: 60 inches (1 525 mm).
   - e. Outdoor Motor Disconnects: As indicated on Drawings.
   - f. Motor Controls: 60 inches (1 525 mm).
2. Plumbing:
   - a. Electric Water Cooler Outlets: Mount so outlet and cord are hidden by water cooler and outlet is accessible for resetting for GFCI trip.
3. Electrical:
   - a. Distribution Panels: 72 inches (1 830 mm) to top.
   - b. Receptacles: 18 inches (450 mm).
   - c. Wall Switches: 42 inches (1 065 mm).
   - d. Wall-Mounted Exit Lights: 90 inches (2 285 mm).
   - e. Emergency Lighting Units: 60 inches (1 525 mm).
4. Communications
   - a. Sound Distribution System Components: As indicated on Drawings.
   - b. Satellite Distribution System Components: As indicated on Drawings.
   - c. TV Distribution System Components: As indicated on Drawings.
   - d. Computer and TV: 18 inches (450 mm).
   - e. Telephone / Data Terminal Boards: 72 inches (1 800 mm) to top.
   - f. Telephones (wall type): 60 inches (1 500 mm).
   - g. Telephones (desk type): 18 inches (450 mm).
   - h. Telephone / Data (desk type): 18 inches (450 mm).
   - i. Data (desk type): 18 inches (450 mm).

END OF SECTION

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SECTION 26 0924

LIGHTING CONTROL SYSTEM

PART 1 - GENERAL

1.1 SUMMARY

A. Includes But Not Limited To:
   1. Furnish and install complete lighting control system as described in Contract Documents consisting of the following:
      a. Programmable Digital Control Switches.

B. Related Requirements:
   1. Section 26 0501: 'Common Electrical Requirements'.

1.2 REFERENCES

A. Definitions:
   1. Class A: Equipment has been tested and found to comply with limits for Class A digital device, pursuant to part 15 of FCC Rules. These limits provide reasonable protection against harmful interference when equipment is operated in commercial environment.

B. Reference Standards:
   1. Federal Communications Commission (FCC):
      a. Emission requirements for Class A applications.
   2. Underwriters Laboratories:
      a. UL 916, 'Energy Management Equipment' (2015).

1.3 SUBMITTALS

A. Informational Submittals:
   1. Certifications:
      a. Technician Certification that equipment has been installed, adjusted and tested in accordance with Manufacturer's recommendations.

B. Closeout Submittals:
   1. Include following in Operations And Maintenance Manual specified in Section 01 7800:
      a. Operations and Maintenance Data:
         1) Equipment operation and maintenance manual(s).

1.4 QUALITY ASSURANCE

A. Regulatory Agency Sustainability Approvals:
   1. All control equipment shall be in compliance with FCC emissions' standards in Part 15 Subpart J for Class A application.
   2. Programmable panelboards shall be UL listed under UL 916 Energy Management Equipment.

B. Qualifications:
   1. Manufacturer Qualifications:
      a. Manufacturer of assembly shall be manufacturer of major components with assembly.
      b. Manufacturer of this equipment shall have minimum of five (5) years manufacturing experience.
   2. Technician Qualifications:

a. Authorized by Manufacturer and trained.
b. Have thorough knowledge of software, hardware and system programming.

C. Certifications:
1. Provide Technician Certification that equipment has been installed, adjusted and tested in accordance with Manufacturer's recommendations.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Delivery And Acceptance Requirements:
1. Equipment shall be delivered, handled and stored in accordance with manufacturer's instructions.

PART 2 - PRODUCTS

2.1 ASSEMBLIES

A. Manufacturers:
1. Type One Acceptable Manufacturer:
a. Watt Stopper Inc., Santa Clara, CA www.wattstopper.com.

B. Design Criteria:
1. Lighting Control System shall meet or exceed following capabilities:
a. Capable of switching for specific lighting zone for following:
1) Time-of-day scheduling
2) Daylight savings time adjustments.
3) Light level sensors.

C. Components:
1. Programmable Digital Control Switches:
a. Programmable digital control switches shall be provided with number of control buttons as indicated on Contract Drawings.
1) Each button shall be capable of individual programming without use of computer or other programming device.
2) Each button shall be able to control individual relay or group of relays.
3) Individual buttons shall allow for permanent labeling.
b. Switches shall be illuminated for ease of location in dark.

PART 3 - EXECUTION

3.1 INSTALLATION

A. General:
1. Install switches flush with wall, straight and level.
2. Permanently label switches as shown on drawing schedule in Contract Drawings.

B. Interface With Other Work:
1. Coordinate with appropriate Sections of Divisions 26.
2. Program system to meet the local energy code.

C. Space Control Requirements:
1. Unless relevant provisions of applicable local Energy codes are more stringent, provide minimum application of lighting controls as follows:
a. Provide occupancy/vacancy sensors with Manual-ON/OFF functionality in all.

b. Provide Manual-ON occupancy/vacancy sensors for any enclosed office, conference room, meeting room or classroom. For spaces with multiple occupants, or where line-of-sight may be obscured, provide ceiling-mounted sensors and Manual-ON switches, if necessary.

3.2 FIELD QUALITY CONTROL

A. Field Testing:
1. Manufacturer shall provide Manufacturer's authorized Technician to adequately test supplied equipment and software to ensure system performs as intended including the following:
a. Test start-up system and confirm proper installation, operation, and adjustment of all system components.
2. Submit Certification in writing that equipment has been installed, adjusted and tested in accordance with Manufacturer's recommendations.

B. Non-Conforming Work: Non-conforming work as covered in the General Conditions applies, but is not limited to following:
1. Correct any work found defective or not complying with Contract Document requirements at no additional cost to the Owner.

3.3 CLOSE-OUT ACTIVITIES

A. Instruction of Owner:
1. Provide Manufacturer's authorized Technician training session for Owner's Representative(s) for demonstrating operation and programming of completed system.
a. Training program shall include instructions on control system, programming, and other major components. Provide Manufacturer Manual(s) to be submitted to Owner to assist training.
b. Training program shall include:
1) System review of all system components and their function.
2) System review of all management software and its function.
3) Operator training to develop experience with control applications.

END OF SECTION

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SECTION 26 2726

WIRING DEVICES

PART 1 - GENERAL

1.1 SUMMARY

A. Includes But Not Limited To:
   1. Furnish and install wiring devices complete with plates as described in Contract Documents.

B. Related Requirements:
   1. Section 26 0501: 'Common Electrical Requirements'.

PART 2 - PRODUCTS

2.1 COMPONENTS

A. Manufacturers:
   1. Manufacturer Contact List:
      a. Cooper Wiring Devices, Peachtree City, GA www.cooperwiringdevices.com.
      b. General Electric Industrial Systems, Charlotte, NC www.geindustrial.com.
      c. Hubbell Building Automation, Austin, TX www.hubbell-automation.com.
      d. Hubbell Inc, Milford, CT www.hubbell-wiring.com or Hubbell Canada Inc, Pickering, ON (800) 263-4622 or (905) 839-4332.
      e. Hunt Control Systems Inc, Fort Collins, CO www.huntdimming.com.
      f. Intermatic Inc, Spring Grove, IL www.intermatic.com.
      g. Leviton Manufacturing Co, Little Neck, NY www.leviton.com or Leviton Manufacturing of Canada Ltd, Pointe-Claire, QB (800) 461-2002 or (514) 954-1840.
      h. Legrand, West Hartford, CT www.legrand.us.com or Vaughan, ON www.legrand.ca.com.
      i. Lutron Electronics Co Inc, Coopersburg, PA www.lutron.com.
      j. Ortronics, New London, CT www.ortronics.com.
      k. Paragon Electric Co Inc, Carol Stream, IL www.icca.invensys.com/paragon or Paragon Electric, Mississauga, ON (800) 951-5526 or (905) 890-5956.
      l. Pass & Seymour, Syracuse, NY www.passandseymour.com or Pass & Seymour Canada Inc, Concord, ON (905) 738-9195.
      m. Philips Lighting Co, Somerset, NJ www.lighting.philips.com/nam or Philips Lighting Canada, Scarborough, ON (416) 292-3000.
      n. Red Dot div of Thomas & Betts, Memphis, TN www.tnbcom.
      o. Schneider Electric North America, Palatine, IL www.schneider-electric.com (847) 397-2600.
      p. Sensorswitch, Wallingford, CT www.sensorswitch.com.
      q. Siemon Company, Watertown, CT www.siemon.com.
      r. Square D Co, Palatine, IL www.squared.com.
      s. Suttle, Hector, MN www.suttleonline.com.
      t. Tork Inc, Mount Vernon, NY www.tork.com.
      u. Watt Stopper Inc, Santa Clara, CA www.wattstopper.com.
   2. Product Options:
      a. Faces shall be nylon where available.
      b. Devices of single type shall be from same Manufacturer.
      c. Devices are listed as white. Use white devices on light colored walls, brown on dark colored walls, and black on black walls.

B. Switches:
   1. Standard Style:

a. Category Four Approved Products. See Section 01 6200 for definitions of Categories:
1) 20 AMP, single pole:
a) Cooper: 2221V.
b) Hubbell: HBL1221-I.
c) Pass & Seymour: 20AC1-I.
d) Leviton: 1221-2I.
2) Two Pole:
a) Cooper: 2222V.
b) Hubbell: HBL1222-I.
c) Pass & Seymour: 20AC2-I.
d) Leviton: 1222-2I.
3) Three Way:
a) Cooper: 2223V.
b) Hubbell: HBL1223-I.
c) Pass & Seymour: 20AC3-I.
d) Leviton: 1223-2I.
4) Four Way:
a) Cooper: 2224V.
b) Hubbell: HBL1224-I.
c) Pass & Seymour: 20AC4-I.
d) Leviton: 1224-2I.
5) Pilot Switch:
a) Hubbell: HBL1221-PL.
b) Pass & Seymour: 20AC1-RPL.
c) Leviton: 1221-PLR.
6) Lighted Toggle Switch:
a) Single Pole:
(1) Cooper: 2221-LTV.
(2) Hubbell: HBL1221-IL.
(3) Pass & Seymour: 20AC1-ISL.
(4) Leviton: 1221-LHI.
b) Three Way:
(1) Cooper: 2223-LTV.
(2) Hubbell: HBL1223-IL.
(3) Pass & Seymour: 20AC3-ISL.
(4) Leviton: 1223-7LC.

C. Receptacles:
1. Standard Style:
a. 15 AMP, specification grade, back and side wired, self grounding, tamper resistant.
b. Verified by UL to meet Fed Spec WC-596F.
c. Category Four Approved Products. See Section 01 6200 for definitions of Categories:
1) Cooper: TR5262.
2) Hubbell: BR20.
3) Leviton: TBR20.
4) Pass & Seymour: TR20.
2. Ground Fault Circuit Interrupter (GFCI):
a. 15 AMP, specification grade.
b. Category Four Approved Products. See Section 01 6200 for definitions of Categories:
1) Cooper: GF15W.
2) Hubbell: GF5252WA.
3) Leviton: 8599-W.
4) Pass & Seymour: 1594-W.

D. Plates:
1. Standard Cover Plates:
a. Office / Occupied Areas:
1) Nylon or high impact resistant thermoplastic.
2) Color shall match wiring device.
b. All Other: Steel.

c. Ganged switches shall have gang plates.
d. Category Four Approved Manufacturers. See Section 01 6200 for definitions of Categories:
1) Cooper.
2) Hubbell.
3) Leviton.
4) Pass & Seymour.

E. Occupancy Sensors:
1. Ceiling, ultrasonic type.
a. Complete with sensor and combined relay / control transformer.
b. Category Four Approved Products. See Section 01 6200 for definitions of Categories:
1) Watt Stopper:
a) Sensor: W-500A.
b) Relay / Transformer: BZ-150.
c. Provide manual ON and OFF momentary override switches. Refer to Contract Drawings for number of switches.
2. Ceiling, dual technology type.
a. Complete with sensor and relay / transformer.
b. Category Four Approved Products. See Section 01 6200 for definitions of Categories:
1) Watt Stopper:
a) Sensor: DT-305.
b) Relay / Transformer: BZ-150.
c. Provide manual ON and OFF momentary override switches. Refer to Contract Drawings for number of switches.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install devices flush with walls, straight, and solid to box.

END OF SECTION

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SECTION 26 5100

INTERIOR LIGHTING

PART 1 - GENERAL

1.1 SUMMARY

A. Includes But Not Limited To:
   1. Furnish and install lighting system as described in Contract Documents, complete with lamps.

B. Related Requirements:
   1. Section 26 0501: 'Common Electrical Requirements'.
   2. Section 26 5121: 'Interior Lighting: LED Dimming Drivers'.

1.2 REFERENCES

A. Reference Standards:
   1. American National Standards Institute (ANSI):
      a. ANSI C78.377-2017, ‘American National Standard for Electric Lamps: Specification for the Chromaticity of Solid State Lighting Products'.
   2. Federal Communications Commission (FCC):
      a. Code of Federal Regulations (CFR):
         1) FCC 47 CFR Part 18, ‘Industrial, Scientific, and Medical Equipment'.
   3. Institute of Electrical and. Electronics Engineers (IEEE):
      a. IEEE C62.41.1-2002, ‘Guide on the Surge Environment in Low-Voltage (1000 V and Less) AC Power Circuits'.

PART 2 - PRODUCTS

2.1 ASSEMBLIES

A. Manufacturers:
   1. Product Options: When several lighting fixtures are specified by name for one use on Drawings, select any one of those specified. Do not mix fixtures from different manufacturers specified for one use.

B. Materials
   1. Lighting Fixtures:
      a. Type One Acceptable Products:
         1) See Fixture Schedule on Drawings for acceptable manufacturers and models.
   2. Lamps:
      a. LED Lamps and Fixtures:
         1) Replacement Lamps shall have minimum efficiency of 70 lm / W per LM 79.
         2) Integral LED Lamps shall have minimum efficiency of 90 lm / W per LM 79.
         3) Provide minimum rated life of 50,000 per LM 80 and LM 70 standards.
         4) Color Temperature: 3000k.
         5) Provide full spectrum color index of 65.
         6)

C. Factory Assembly:
   1. Fixtures shall be fully assembled complete with necessary wiring, sockets, lamps, reflectors, ballasts, auxiliaries, plaster frames, recessing boxes, hangers, supports, lenses, diffusers, and other accessories essential for complete working installation.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Interface With Other Work:
   1. Coordinate with Sections under 09 5000 heading to obtain symmetrical arrangement of fixtures in acoustic tile ceiling as shown on Reflected Ceiling Plan in Contract.
   2. In mechanical equipment rooms, coordinate locations of light fixtures with equipment locations to provide proper room illumination without obstruction. Suspend fixtures that must be mounted below pipes, ducts, etc, with chains or other Architect approved method.

B. Securely mount fixtures. Support fixtures weighing 50 lbs (23 kg) or more from building framing or structural members.

C. Fasten lay-in fixtures to ceiling suspension system on each side with bolts, screws, rivets, or clips. In addition, connect lay-in fixtures with four (4) No. 12 gauge diagonal wires with three (3) turns each end per fixture minimum to building framing or structural members. Connect to opposing corners of fixture. Wires may be slightly slack. Make final conduit connections to lay-in fluorescent fixtures with specified flexible conduit or flexible fixture whips.

D. Where fixtures are shown installed end to end, provide suitable connectors or collars to connect adjoining units to appear as a continuous unit.

E. Where recessed fixtures are to be installed, provide openings, plaster rings, etc, of exact dimensions for such fixtures to be properly installed. Coordinate fixture installation with ceiling type and thickness. Terminate circuits for recessed fixtures in an extension outlet box near fixture and connect with specified flexible conduit.

F. Do not locate fixtures in closet or storage areas within 18 inches (450 mm) and fluorescent fixtures within 6 inches (150 mm) of shelves.

3.2 ADJUSTMENT

A. Repair scratches or nicks on exposed surfaces of fixtures to match original undamaged conditions.

END OF SECTION

SECTION 26 5121

INTERIOR LIGHTING: LED Dimming Drivers

PART 1 - GENERAL

1.1 SUMMARY

A. Includes But Not Limited To:
   1. Furnish and install Interior Lighting LED Dimming Drivers as described in Contract Documents, complete with lamps.

B. Related Requirements:
   1. Section 26 0501: 'Common Electrical Requirements'.
   2. Section 26 0924, 'Lighting Control System'.
   3. Section 26 2726: 'Wiring Devices'.
   4. Section 26 5100: 'Interior Lighting'.

C. Reference Standards:
   1. American National Standards Institute (ANSI) / American National Standard Lighting Group (ANSLG):
      a. ANSI/ANSLG C78.377-2017, ‘American National Standard for Electric Lamps: Specification for the Chromaticity of Solid State Lighting Products'.
      b. ANSI/ANSLG C82.11-2017, 'High-Frequency Fluorescent Lamp Ballasts'.
   2. American National Standards Institute (ANSI) / Illuminating Engineering Society (IES):
      a. ANSI/IES RP-16-10, 'Nomenclature and Definitions for Illuminating Engineering'.
   3. Federal Communications Commission (FCC):
      a. Code of Federal Regulations (CFR):
         1) FCC 47 CFR Part 15, 'Class B: Radio Frequency Devices'.
   4. Institute of Electrical and. Electronics Engineers (IEEE) / American National Standards Institute (ANSI):
      a. IEEE/ANSI C62.41.1-2002, ‘Guide on the Surge Environment in Low-Voltage (1000 V and Less) AC Power Circuits'.
   5. International Electrotechnical Commission (IEC):
      a. IEC 60929 ED. 4.0 B:2011. 'AC and/or DC Supplied Electronic Control Gear for Tubular Fluorescent Lamps - Performance Requirements'.
      b. IEC 61000-3-2 ED. 5.0 B:2018, 'Electromagnetic Compatibility (EMC) - Part 3-2: Limits for Harmonic Current Emissions (Equipment Input Current <= 16 A per phase)'.
      c. IEC 61347-1 ED. 3.1 B:2017, 'Lamp Controlgear - Part 1: General and Safety Requirements'.
      d. IEC 61347-2-13 ED. 2.1 B:2016, 'Lamp Controlgear - Part 2-13: Particular Requirements for d.c. or a.c. Supplied Electronic Controlgear for LED modules'.
      e. IEC 61547 ED. 2.0 B:2009, 'Equipment for General Lighting Purposes - EMC Immunity Requirements'.
      f. IEC 62384 ED. 1.0 B:2006, 'D.C. or A.C. Supplied Electronic Control Gear for LED Modules - Performance Requirements'.
      g. IEC 62386-101 ED. 2.1 B:2018, 'Digital Addressable Lighting Interface - Part 101: General Requirements - System'.
   6. National Electrical Manufacturers Association (NEMA):
      a. NEMA 410-2015, 'Performance Testing for Lighting Controls and Switching Devices with Electronic Drivers and Discharge Ballasts'.
   7. Underwriters Laboratories (UL):
      a. UL 1310: 'Class 2 Power Units' (2018).
   8. Underwriters Laboratories (UL) / Underwriters Laboratories of Canada (ULC):
      a. UL 8750: 'Standard for Light Emitting Diode (LED) Equipment for Use in Lighting Products' (2015).

1.2 SUBMITTALS

A. Action Submittals:
   1. Product Data:
      a. Manufacturer's published product data on dimensions, ratings, catalog numbers and identification of products and accessories for products included for project. Include performance data.
   2. Shop Drawings:
      a. Provide fixture type(s) list for each specific driver.
      b. Provide wiring diagrams as needed for special operation or interaction with other system(s).

B. Informational Submittals:
   1. Qualification Statements:
      a. Manufacturer: Provide experience compliance documentation.
      b. Products: Provide compliance documentation with UL / ULC requirements.

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 on drivers.

1.3 QUALITY ASSURANCE

A. Regulatory Agency Sustainability Approvals:
   1. Meet UL / ULC requirements.

B. Qualifications. Requirements of Section 01 4301 applies but not limited to following:
   1. Manufacturer:
      a. Manufacture with five (5) years experience in manufacture of dimmable electronic lighting drivers.
      b. Provide experience documentation.

1.4 FIELD CONDITIONS

A. Ambient Conditions:
   1. General:
      a. Proceed with installation only when following ambient conditions can be maintained:
         1) Install when the temperature is between minus 4 deg F (minus 20 deg C) minimum and 122 deg. F (50 deg. C) maximum and relative humidity is ninety (90) percent, non-condensing.
         2) Protect from dust and excess moisture during installation.

1.5 WARRANTY

A. Manufacturer Warranty:
   1. Provide five (5) year warranty on drivers to operate driver at or below required driver warranty temperature.

PART 2 - PRODUCTS

2.1 ASSEMBLIES

A. Manufacturers:
   1. Category Four Approved Manufacturers. See Section 01 6200 for definitions of Categories:

a. eldoLED America, San Jose, CA www.eldoled.com.
b. General Electric Lighting, Hendersonville, NC or General Electric Lighting Canada Inc, Mississauga, ON www.gelighting.com/na.
c. Howard Lighting Products, Laurel, MS www.howard-ind.com.
d. OSRAM Sylvania, Danvers, MA or OSRAM Sylvania LTD, Mississauga, Ontario Canada www.Sylvania.com.
e. Philips Lighting Co, Somerset, NJ www.lighting.philips.com/nam or Philips Lighting Canada, Scarborough, ON (416) 292-3000.

B. LED Dimming Driver:
1. Description:
a. LED Dimming Driver:
1) 4 wire (010V DC Voltage Controlled) Dimming Drivers.
2) Digital (DALI Low Voltage Controlled) Dimming Drivers.
3) Integral Diming Driver for replacement lamp.
2. Design Criteria:
a. Driver:
1) Driver must be able to operate for (+/- 10 percent) supply voltage of 120V through 277VAC at 60Hz.
2) Driver to be UL / ULC recognized under component program and shall be modular for simple field replacement. Drivers that are not UL / ULC recognized or not suited for field replacement will not be used.
3) Driver shall have ability to provide no light output when analog control signal drops below 0.5 V, or DALI digital signal calls for light to be extinguised and shall consume 0.5 watts or less in this standby. Control deadband between 0.5V and 0.65V shall be included to allow for voltage variation of incoming signal without causing noticeable variation in fixture to fixture output.
b. Range and Quality:
1) LED dimming to be equal in range and quality to commercial grade incandescent dimmer:
a) Quality of dimming to be defined by dimming range, freedom from perceived flicker or visible stroboscopic flicker, smooth and continuous change in level (no visible steps in transitions), natural square law response to control input, and stable when input voltage conditions fluctuate over what is typically experience in commercial environment.
2) Ten-year expected life while operating at maximum case temperature and 90 percent non-condensing relative humidity.
c. Inrush Current:
1) Driver must limit inrush current as followings:
a) Minimum Requirement: Meet or exceed NEMA 410 driver inrush standard of 430 amps per 10 amps load with maximum of 370 amps^2 per second.
b) Preferred Requirement: Meet or exceed 30mA^{2}s at 277VAC for up to 50 watts of load and 75A at 240us at 277VAC for 100 watts of load.
d. Withstand up to 1,000 volt surge without impairment of performance as defined by IEEE/ANSI C62.41.1 Category A.
e. Light Output:
1) No visible change in light output with variation of plus/minus 10 percent line voltage input.
f. Harmonic Distortion:
1) Total Harmonic Distortion less than 20 percent and meet ANSI/ANSLG C82.11 maximum allowable THD requirements at full output.
2) THD shall at no point in dimming curve allow imbalance current to exceed full output THD.
g. Automatic Adaptation:
1) Driver must support automatic adaptation, allowing for future luminaire upgrades and enhancements and deliver improved performance.
a) Adjustment of forward LED voltage, supporting 3V through 55V.
b) Adjustment of LED current from 200mA to 1.05A at the 100 percent control input point in increments of 1 mA.

c) Adjustment for operating hours to maintain constant lumens (within 5 percent) over 50,000 hour design life of system, and deliver up to 20 percent energy savings early in life cycle.

h. Light Quality:
1) Over entire range of available drive currents, driver shall provide step-free, continuous dimming to black from 100 - 1 percent light output and step to 0 percent where indicated. Driver shall respond similarly when raising from 0 percent to 100 percent.
2) Drivers to track evenly across multiple fixtures at all light levels, and shall have input signal to output light level that allows smooth adjustment over entire dimming range.
3) Driver and luminaire electronics shall deliver illumination that is free from objectionable flicker as measured by flicker index (ANSI/IES RP-16-10). At all points within dimming range from 100-0.1 percent luminaire shall have:
a) LED dimming driver shall provide continuous step-free, flicker free dimming similar to incandescent source.
b) Minimum Requirement: Flicker index shall less that 5 percent at all frequencies below 1000 Hz.
c) Preferred specification: Flicker index shall be equal to incandescent, less that 1 percent at all frequencies below 1000 Hz.

i. Control Input:
1) 4-Wire (0-10V DC Voltage Controlled) Dimming Drivers:
a) Must meet IEC 60929 ED. 4.0 B Annex E for General White Lighting LED drivers.
b) Connect to devices compatible with 0 to 1 OV Analog Control Protocol, Class 2, capable of sinking 0.6 ma per driver at low end of 0.3V. Limit number of drivers on each 0-1 OV control output based on voltage drop and control capacity.
c) Control relays or contactors and transformers for up to six circuits
d) Sensor controller with HIGH, LOW, and DEADBAND adjustments.
2) Digital (DALI Low Voltage Controlled) Dimming Drivers:
a) Must meet requirements of IEC 62386-101 ED.1.0 B.
3) Integral Dimmer Driver for replacement lamps:
a) LED Driver shall not cause shadows.
b) LED Driver shall be line voltage controlled and shall be compatible with any universal dimmer.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Installation of driver to meet Manufacturer's prescribed methods and instructions.

B. Meet Ambient Conditions requirements for installation.

C. Driver may be remote mounted up to 300 ft (90 m) depending on power level and wire gauge.

D. 0-10V input shall be protected from line voltage miswire, and immune and output unresponsive to induced AC voltage on control leads.

END OF SECTION

SECTION 26 5200

EMERGENCY LIGHTING

PART 1 - GENERAL

1.1 SUMMARY

A. Includes But Not Limited To:
   1. Furnish and install emergency battery units as described in Contract Documents.

B. Related Requirements:
   1. Section 26 0501: 'Common Electrical Requirements'.

PART 2 - PRODUCTS

2.1 SYSTEMS

A. Manufacturers:
   1. Manufacturer Contact List:
      a. Beghelli, Miramar, FL www.beghelliusa.com.
      b. Bodine Emergency Lighting, Collierville, TN www.bodine.com
      c. Dual-Lite, Cheshire, CT www.dual-lite.com.
      d. Iota Engineering Co, Tucson, AZ www.iotaengineering.com
      e. Lightolier, Fall River, MA www.lightolier.com.
      f. Lithonia Lighting, Conyers, GA www.lithonia.com.
      g. McPhilben / Day-Brite Lighting, Tupelo, MS www.mcphilben.com.
      h. Sure-Lites / Cooper Lighting, Elk Grove, IL www.cooperlighting.com.

B. Materials:
   1. Battery Packs:
      a. Design Criteria:
         1) Batteries shall be long life nickel cadmium type.
         2) Complete with charging indicator light and test switch.
         3) Components shall be fully concealed and easily accessible for maintenance or replacement.
         4) Factory installed in lighting fixture, or field installed to same standards.
      b. Lighting Fixtures:
         1) Battery pack shall operate one (1) lamp at approximately 600 lumens initially and 60 percent minimum of initial lumens after ninety (90) minutes.
         2) Charger shall be capable of full recharge in twenty four (24) hours.
      c. Class Two Quality Products: See Section 01 4301 for Manufacturer Qualifications and Section 01 6200:
         1) Any Manufacturer that conforms to Contract Documents requirements.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Battery Packs:
   1. General:
      a. Wire so unit can be tested with lights on.

b. Wire so lamps in normal mode are switched off with other lighting in area. Connect unit to unswitched conductor of normal lighting circuit.

2. Linear Lighting Fixtures:
   a. Install in ballast channel of fixture with charging indicator light and test switch mounted on fixture end, or visible and accessible through lens.

END OF SECTION

DIVISION 28: ELECTRONIC SAFETY AND SECURITY

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SECTION 28 3101

FIRE DETECTION AND ALARM SYSTEM

PART 1 - GENERAL

1.1 SUMMARY

A. Includes But Not Limited To:
   1. Furnish and install fire alarm and detection system as described in Contract Documents.
   2. Furnish and install raceway, cable and conductors, boxes, and miscellaneous items necessary for complete system.

B. Products Furnished But Not Installed Under This Section:
   1. Door Plates for door hold / release devices.

C. Related Requirements:
   1. Division 26: Quality of and installation standards for wiring, raceway, conduit, and boxes.

1.2 REFERENCES

A. Reference Standards:
   1. National Fire Protection Association:
      a. NFPA 72, ‘National Fire Alarm and Signaling Code’ (2019 or most recent edition adopted by AHJ).
   2. Underwriters Laboratories:
      a. UL 268, ‘Smoke Detectors for Fire Alarm Systems’.
      b. UL 464, ‘Audible Signal Appliances’.
      c. UL 521, ‘Heat Detectors for Fire Protective Signaling Systems’.
      d. UL 864, ‘Control Units and Accessories for Fire Alarm Systems’.
      e. UL 1480, ‘Speakers for Fire Alarm, Emergency, and Commercial and Professional’.
      f. UL 1481, ‘Power Supplies for Fire-Protective Signaling Systems’.
      g. UL 1971, 'Standard for Signaling Devices for the Hearing Impaired’.

1.3 SUBMITTALS

A. Action Submittals:
   1. Shop Drawings:
      a. Prepared by authorized factory representative and including:
         1) Single line diagram of actual system. Typical riser diagrams are not acceptable.
         2) Complete wiring diagrams.
         3) Manufacturer's original catalog data and descriptive information on each piece of equipment to be used.

B. Informational Submittals:
   1. Certificates:
      a. Certificate of completion, from Manufacturer's Representative, in accordance with NFPA 72 requirements.
   2. Qualification Statement:
      a. Installer:
         1) Provide NICET Certification documentation.

C. Closeout Submittals:
   1. Include following information in Operations And Maintenance Manual specified in Section 01 7800:

a. Operations and Maintenance Data:
   1) Provide operating and maintenance instructions for each item of equipment submitted under Product Data.
   2) Provide instruction manual from Manufacturer that explains what is to be done in event of various indications.
b. Record Documentation:
   1) Include copy of approved shop drawings.

1.4 QUALITY ASSURANCE

A. Regulatory Agency Sustainability Approvals:
   1. System shall meet approval of authority having jurisdiction (AHJ). NEC and local ordinances and regulations shall govern unless more stringent requirements are specified.
   2. Equipment, devices, and cable shall be UL or Factory Mutual listed for use in fire alarm systems.

B. Qualifications:
   1. Installer:
      a. Project Forman or Person in Charge at all times to be NICET Level III Certified for work performed by this Section.
      b. Provide Certificate documentation before installation.

PART 2 - PRODUCTS

2.1 SYSTEMS

A. Manufacturers:
   1. Type One Acceptable Manufacturers:
      a. Fire-Lite Alarms, Northford, CT www.firelite.com.

B. Performance:
   1. Design Criteria:
      a. Automatic fire alarm system consisting of control panel, power supplies, alarm initiating devices, notification appliances, and off-site communicating devices. System shall be non-coded and addressable, and monitored for integrity of conductors.
      b. Class B initiating device circuits and Class B notification appliance circuits including end-of-line devices.
      c. Equipment and accessories furnished under this Specification shall be standard products of single manufacturer, or include written statement by Control Panel Manufacturer confirming compatibility of components and inclusion of these components under system warranty.

C. Operation:
   1. Operation Sequences:
      a. Operation of manual station or automatic activation of any smoke detector, heat detector, or sprinkler flow device shall:
         1) Cause system notification appliances to operate.
         2) Indicate zone in alarm on control panel.
         3) Initiate off-site alarm notification system.
      b. System shall return to normal when operated device is returned to normal and control panel is manually reset, except alarms may be silenced as specified below.
      c. Alarm may be silenced by switch in control panel.
         1) Ring Back Feature: When silenced, this shall not prevent the resounding of subsequent alarms if another zone should alarm.
      d. When alarms are silenced, zone indicating red LEDs on control panel and remote annunciator shall remain indicated until operated device is returned to normal and control panel is manually reset.

e. Green pilot LED, or other visual annunciation, shall normally be on indicating that system is receiving normal power. In addition, failure of normal power shall be annunciated.
f. Trouble alarm and annunciation, operating together, shall signal trouble condition. Following conditions shall signal trouble condition:
1) Failure of normal power.
2) Opens or short circuits on indicating circuits.
3) Disarrangements in system wiring.
4) Control panel circuit board removal.
5) Ground faults.
6) Trouble silencing switch shall silence trouble alarm, but visual annunciation shall remain on until system is restored to normal. As ring-back feature, trouble alarm shall resound as reminder to return silencing switch to normal position.
g. Supervisory LED, separate from trouble LED, and alarm, operating together, shall signal operation of supervisory device, such as control valve tamper, low air pressure, and low temperature switches. Alarm silence switch shall operate in same manner as trouble alarm.

D. Components:
1. Control Panel:
a. Control panel is existing.
b. Audible Horn Alarm Annunciation:
1) Provide separate and distinct alarm signals for alarm and trouble conditions.
2) Alarm signal shall also operate strobe lights, if specified.
3) Provide alarm silence switches at control panel.
4) Trouble alarm shall be horn integral to control panel.
5) Supervisory alarm may be same audible alarm as trouble alarm, but with separate visual annunciation.
2. Off-Site Alarm Notification System:
a. Provide one (1) analog telephone lines to fire alarm control panel.
b. Install, program and connect cellular communication device furnished by Owner. Coordinate with Owner at least four (4) weeks in advance for equipment delivery.
c. Provide dialer system equipment and programming compatible with Owner selected monitoring service (refer to alarm.ldschurch.org for details).
d. Owner will arrange for monitoring connection contract.
e. Communicator device shall transmit all zone identification, device identification alarm identification, and all other signals available at panel to Owner's Central Station using standard contact ID codes.
f. Phone Dialer device shall be of same manufacturer as Fire Alarm Panel or shall be supplied, approved and tested by Fire Alarm Panel Manufacturer.
3. Alarm Initiating Devices:
a. Smoke Detectors:
1) Photoelectric type.
2) Listed under UL Standard 268.
3) Provide visual indication of alarm on unit.
b. Strobe Only:
1) Wall mounted flush or semi-flush.
2) Integrally mounted flashing light unit with block letters 'FIRE.' Adjustable light intensity of 15-110 candela and flash rate between one and three Hertz.
3) Listed under UL Standard 1971.
c. Combination Horn / Strobe:
1) Wall mounted flush or semi-flush.
2) Non-coded audible output of 90 dB minimum at 10 feet (3 meters).
3) Integrally mounted flashing light unit with block letters 'FIRE.' Minimum light intensity of 15 candela and flash rate between one and three Hertz.
4) Listed under UL Standard 464 and UL Standard 1971.
4. Cables And Wiring:
a. Comply with NEC Article 760.
b. Jacket and insulation color shall be red.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install fire alarm and detection systems as indicated, in accordance with Equipment Manufacturer's written instructions, and complying with applicable portions of NEC, NFPA, and NECA's 'Standard of Installation'.
   1. Mounting Heights:
      a. Unless otherwise indicated, mount center of outlets or boxes at following heights above finish floor:
         1) Control Panel: 72 inches (1 800 mm) to top.
         2) Wall-Mounted Horn / Strobe: 80 inches (2 1032 mm). 6 inches (150 mm) below ceiling, whenever ceiling is below 80 inches (2 1032 mm).
         3) Wall-Mounted Strobe: 80 inches (2 1032 mm). 6 inches (150 mm) below ceiling, whenever ceiling is below 80 inches (2 1032 mm).
         4) Manual pull stations: 48 inches (1 200 mm).
         5) Remote annunciator panel: 60 inches (1 500 mm).
   2. Locate fire alarm manual stations 24 inches (600 mm) minimum away from any light switch.

B. Identification:
   1. Label zone indicators on control unit indicating location and type of initiating device, i.e., CORRIDOR SMOKE, VALVE TAMPER, AIR SYSTEM SMOKE, etc. Labels shall be engraved plastic laminate, or other permanent labeling system as supplied by Control Unit Manufacturer.
   2. Post copy of wire identification list inside fire alarm panel door or other area accessible to fire alarm service personnel.
   3. Print location of circuit disconnecting means inside panel.

C. Conductors:
   1. Install conductors in conduit per NEC requirements.
   2. Fire alarm system conductors from different zones may be combined in common conduit. Make certain that raceway size and wire quantity, size, and type is suitable for equipment supplied and is within NEC standards. Label pull and junction boxes 'FIRE ALARM.'
   3. Loop wires through each device on zone for proper supervision. Tee-taps not permitted.
   4. Minimum conductor size shall be 14 AWG unless otherwise specified.

D. Do not install ceiling mounted detectors within 36 inches (900 mm) of air discharge grilles. Do not install manual fire alarm boxes within 24 inches (610 mm) of light switches. Coordinate with other trades as required.

3.2 FIELD QUALITY CONTROL

A. Field Tests:
   1. Provide factory-trained representative to perform complete system testing in presence of Owner's representative and local fire department personnel upon completion of installation.
      a. Test each initiating and annunciating device for proper operation, except fixed temperature heat detectors.
      b. Test operation of trouble annunciation on each circuit.
      c. Perform complete testing of control panel functions including off-site monitoring.

3.3 CLOSEOUT ACTIVITIES

A. Instruction Of Owner:
   1. Instruct Owner's Representative in proper operation and maintenance procedures.

3.4 PROTECTION

A. Provide dust protection for installed smoke detectors until finish work is completed and building is ready for occupancy.

B. Protect conductors from cuts, abrasion and other damage during construction.

END OF SECTION

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