PROJECT MANUAL
including Specifications

FILE ROOM REMODEL
FOR

AMERICAN FORK
FAMILY SERVICES

435 South 500 East
American Fork, UT 84003

Property No.
559760916070103

May 2017

Prepared By:

RVA, ARCHITECTS, INC.

32 West Center St. Suite #203
Provo, Utah 84601
(801) 374-2100

PROJECT DIRECTORY

Owner:	Corporation of the Presiding Bishop of the Church of Jesus Christ of Latter-day Saints A Utah Corporation Sole 50 East North Temple Street Salt Lake City, UT 84150
Project Manager:	American Fork PM Group 110 E. Main St. American Fork, UT 84003 801-763-4520
Facilities Manager:	American Fork FM Group 110 E. Main St. American Fork, UT 84003 801-763-2096
Architect:	RVA Architects, Inc. 32 West Center St. #203 Provo, UT 84601 801-374-2100

End of Project Directory

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DIVISI0N 01: GENERAL REQUIREMENTS

INVITATION TO BID (U.S.)

1. GENERAL CONTRACTORS INVITED TO BID THE PROJECT:

Dynamic Construction
Gines Construction
Painter Building Inc.
R4 Construction
RAM Construction
Philipoom
SRFCO

2. PROJECT:

American Fork Family Services Remodel

3. LOCATION:

435 South 500 East
American Fork, UT

4. OWNER:

Corporation of the Presiding Bishop of
The Church of Jesus Christ of Latter-day Saints, a Utah corporation sole
American Fork Project Management Office
110 E. Main St.
American Fork, UT 84003
801-763-4520

5. CONSULTANT:

RVA Architects., Inc.
32 W. Center St. #203
Provo, UT 84601
801-374-2100

6. DESCRIPTION OF PROJECT:

A. Convert existing file storage room into new office space.

B. Products or systems may be provided under a Value Managed Relationship (VMR) the Owner has negotiated with the supplier. VMR products and systems are indicated as such in the Specifications.

7. PRE-BID CONFERENCE: A pre-bid conference will be held on **Thursday, May 11, 2017 @ 2:00 pm** at the job site located at 435 South 500 East American Fork, UT

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

9. TIME OF SUBSTANTIAL COMPLETION: The time limit for substantial completion of this work will be 45 calendar days and will be as noted in the Agreement. Notice to Proceed will be July 5, 2017.

10. BID OPENING: Sealed bids will be received until **9:30 am on Wednesday, May 17, 2017** at the American Fork PM Office located at 110 E. Main St. American Fork, UT. Bids will be publicly opened at that time.

11. BIDDING DOCUMENTS:

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

1) Mountainlands Area Plan Room
3560 South 583 West Suite #4
Salt Lake City, UT 84115

2. McGraw Hill/Dodge Area Plan Room
http://dodgeprojects.construction.com

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

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

END OF DOCUMENT

INSTRUCTIONS TO BIDDERS (U.S.)

1. DOCUMENTS:

A. Bidding Documents include Bidding Requirements and proposed Contract Documents. Proposed Contract Documents consist of:
   1) Contractor Bid Proposal and Project Agreement (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 Contractor Bid Proposal and Project Agreement (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) 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 one week prior to bid opening or by fax no later than 48 hours prior to bid opening.

4. BIDDING PROCEDURES:

A. Form and Style of Bids
   1) Use Owner's Bid Form titled "Contractor Bid Proposal and Project Agreement (U.S.)".
   2) Bid will be complete and executed by authorized representative of Bidder.
   3) Do not delete from or add to the information requested on bid form.

B. Submission of Bids
   1) Submit bid in sealed opaque envelope containing only bid form.
   2) It is bidder's sole responsibility to see that its bid is received at or before the specified time. Bids received after specified bid opening time may be returned to bidders unopened.
   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 by written request or by reclaiming bid envelope.
   3) Prior to bid opening, bidder may mark and sign on the sealed envelope that bidder acknowledges any or all Addenda.

5. CONSIDERATION OF BIDS:

A. Opening Of Bids - See Invitation to Bid.

B. Acceptance Of Bid
   1) No bidder will consider itself under contract after opening and reading of bids until Owner accepts Contractor's Bid Proposal by executing same.
   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 "Contractor Bid Proposal and Project Agreement (U.S.)" provided by Owner.

7. MISCELLANEOUS:

A. Pre-Bid Conference. A pre-bid conference will be held at 2:00 pm on Thursday, May 11, 2017 at the job site.

B. Examination Schedule for Existing Building and Site
   1) Brandon Mortensen @ 801-763-2096.

END OF DOCUMENT

INFORMATION AVAILABLE TO BIDDERS (U.S.)

1. ASBESTOS-CONTAINING MATERIAL (ACM)

A. The building upon which work is being performed has been examined for asbestos-containing material. None was encountered.

END OF DOCUMENT

CONSTRUCTION MATERIAL ASBESTOS STATEMENT (U.S.)

PROJECTS FOR:
CORPORATION OF THE PRESIDING BISHOP OF
THE CHURCH OF JESUS CHRIST OF LATTER-DAY SAINTS

Building Name: American Fork UT Family Services

Building Plan Type: File Room Remodel

Building Address: 435 South 500 East American Fork, UT 84003

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

Project Number: 559760916070103

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 _____

CONTRACTOR BID PROPOSAL AND PROJECT AGREEMENT (U.S.)

Corporation of the Presiding Bishop of The Church of Jesus Christ of Latter-day Saints, a Utah corporation sole, ("Owner") and the undersigned Contractor ("Contractor") enter into this *Contractor Bid Proposal and Project Agreement (U.S.)* ("Agreement") and agree as follows:

1. **Property/Project.**

Property/Project Number:	559760916070103
Property Address ("Project Site"):	435 South 500 East American Fork, UT 84003
Project Type:	File Room Remodel
Project Name ("Project"):	American Fork UT Family Services
Stake Name:	Utah South Area

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

3. **Contract Documents.** Contract Documents consist of:
   a. This Agreement;
   b. Supplementary Conditions for Bid Proposal and Project Agreement (U.S.);
   c. The Specifications (Division 01 and Divisions 02,03,04,05,06,07,08,09,26,27);
   d. Drawings entitled and dated American Fork Family Services Remodel/May 2017;
   e. Addendum No. with date(s) _____; and
   f. 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 ($_____). This is the Contractor's Bid Proposal Amount.
   Alternate Bid. _____ Dollars

5. **Payment.**
   a. If the Contractor's Bid Proposal Amount 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.

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, Contractor's compensation and/or the time of completion will be adjusted to reflect the change. Contractor will not commence work on any change until either: (a) Contractor and Owner have agreed in writing to the amount of the adjustment resulting from the change; 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. **Correction of Work.** 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 Substantial Completion 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 Forty Five (45) 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 other than those delays willfully caused by Owner.

9. **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. Contractor will conform to all ordinances and covenants governing the Project Site and/or Work.

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

11. **Payment of Subcontractors and Materialmen.** Contractor will promptly pay for all labor, materials, and equipment used to perform the Work.

12. **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.
    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 $500,000 or Contractor's actual coverage, whichever is greater; 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.

13. **Independent Contractor Relationship.** The parties expressly agree that Contractor is not an agent or employee of Owner but is an independent contractor solely responsible for all expenses relating to Contractor's business.

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

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

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

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

18. **No Commercial Use of Transaction or Relationship.**
    a. 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 Work or Property, including, without limitation:
        1) By referring to this Agreement, Owner, or the Work or Property 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;

2) By using or allowing the use of any photographs of the Work or any part thereof, or of any service marks, trademarks or trade names or other intellectual property now or which may hereafter be associated with, owned by or licensed by Owner in connection with any service or product; or
3) 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 Work or Property.

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

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

20. **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 and attorneys fees incurred by that party in obtaining the dismissal, including without limitation copy costs, and expert and consultant fees and expenses.

21. **Termination of Agreement 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.

22. **Termination of Agreement by Owner for Cause.** Should Contractor 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, take possession of the premises and all materials, tools, and appliances thereon, and finish the Work by whatever method Owner deems expedient. In such case, 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 attorneys fees, expert fees, copy costs, and other expenses), such excess will be paid to Contractor, less any offsets and recoupment. 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.

23. **Termination of Agreement 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 and recoupment. Contractor will not be entitled to unearned profits or any other compensation as a result of the termination and hereby waives any claim therefor. Contractor will provide to Owner all warranty, as built, inspection, and other close out documents as well as materials that Contractor has in its possession or control at the time of termination. Owner may, in Owner's sole discretion, take legal assignment of subcontracts and other contractual rights of Contractor. Without limitation, Contractor's indemnities and obligations as well as all warranties relative to Work provided through the date of termination survive a termination hereunder.

24. **Assignment of Contract.** The parties hereto will not assign any rights or obligations under this Agreement without the prior written consent of the other party.

25. **Integration Clause.** The Contract Documents reflect the full agreement of the parties with respect to the Project and the Work and supersede all prior discussions, agreements, and representations regarding the subject matter of the Contract Documents. The Contract Documents may be amended only in a written document signed by both parties hereto.

26. **Applicable 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.

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

28. **Bid Proposal/Agreement.** Contractor's submission to Owner of this agreement signed by Contractor will constitute Contractor's offer and bid proposal to perform the Work described in this agreement according to the terms thereof. Owner's signing of this agreement and delivery to Contractor of a signed copy will constitute acceptance of Contractor's offer and will convert this document to a binding agreement.

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

OWNER:	**CONTRACTOR:**
Corporation of the Presiding Bishop of The Church of Jesus Christ of Latter-day Saints, a Utah corporation sole.	(company)
Signature:	Signature:
Print Name:	Print Name:
Title:	Title:
Address: Meetinghouse Project Management Office 50 E. North Temple Street, 4WW Salt Lake City, UT 84150-0304	Address:
Telephone No:	Telephone No:
Facsimile No: 801-240-4956	Facsimile No:
Email:	Email:
Effective Date:	Fed. I.D. or SSN:
	License No:
Reviewed By:	Date Signed:

S U P P L E M E N T A R Y C O N D I T I O N S

FOR CONTRACTOR BID PROPOSAL AND PROJECT AGREEMENT (U.S.)

ITEM 1 - GENERAL

1. Conditions of the Contract 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

Liquidated damages are not part of this agreement.

ITEM 3 - STATE SPECIFIC SUPPLEMENTARY CONDITIONS

Utah

UTAH STATE SALES TAX:

Add the following to the Bid Proposal and Project Agreement:

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 Bid Proposal and Project Agreement:

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 Bid Proposal and Project Agreement:

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 Bid Proposal and Project Agreement with the following:

5. <u>Payment</u>

a. If the Contractor's Bid Proposal Amount is over $100,000.00, 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

DIVISION 01

SECTION 01 0000

GENERAL REQUIREMENTS: R&I PROJECT

SECTION 01 1000 SUMMARY

A. 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.

B. Comply with applicable laws and regulations.

C. 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.

D. Work by Owner: 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.

SECTION 01 1200 MULTIPLE CONTRACT SUMMARY

A. Separate Contracts may be issued by Owner for performance of certain construction operations at Project site. 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. 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:
   1. Confine operations to areas within Contract limits shown on Drawings. Do not disturb portions of site beyond Contract limits.
   2. Do not allow alcoholic beverages, illegal drugs, or persons under their influence on Project Site.
   3. Do not allow use of tobacco in any form on Project Site.
   4. Do not allow pornographic or other indecent materials on site.
   5. Do not allow work on Project Site on Sundays except for emergency work.
   6. Refrain from using profanity or being discourteous or uncivil to others on Project Site or while performing The Work.

7. Wear shirts with sleeves, wear shoes, and refrain from wearing immodest, offensive, or obnoxious clothing, while on Project Site.
8. Do not allow playing of obnoxious and loud music on Project Site. Do not allow playing of any music within existing facilities.
9. Do not build fires on Project Site.
10. Do not allow weapons on Project Site, except those carried by law enforcement officers and/or other uniformed security personnel who have been retained by Owner or Contractor to provide security services.

B. Existing Facilities:
   1. Owner will occupy existing building. Reasonably accommodate use of existing facilities by Owner.

SECTION 01 2300 ALTERNATES

A. Section Includes But is Not Limited To:
   1. Administrative and procedural requirements to prepare and process Alternates.

B. With its bid, Contractor has provided prices for following alternate products, materials, equipment, systems, methods, units of work, or major elements of The Work. Any of these Alternates may, at Owner's option, be selected for The Work in place of corresponding requirements of Contract Documents.
   1. Alternate: Work outlined on Contract Drawings in Reception and Work Rooms.

C. Contractor acknowledges that description for each Alternate is incomplete and abbreviated, but that it implies that each Alternate will be complete for scope of work affected.

D. Contractor will coordinate related work and modify surrounding work as required to properly integrate with work of each Alternate selected by Owner.

SECTION 01 3000 ADMINISTRATIVE REQUIREMENTS

A. Coordinate construction activities to ensure efficient and orderly installation of each part of the Work. Coordinate construction operations that are dependent upon each other for proper installation, connection, and operation. 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. Preconstruction Conference:
   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.

SECTION 01 3300 SUBMITTAL PROCEDURES

A. Coordination preparation and processing of submittals with performance of construction activities. Transmit each submittal sufficiently before performance of related construction activities to avoid delay.

B. Allow sufficient review time so installation will not be delayed by time required to process submittals.

C. Place permanent label or title block on each submittal for identification. Include name of entity that prepared each submittal on label or title block.

D. Package each submittal appropriately for transmittal and handling.

SECTION 01 3500 SPECIAL PROCEDURES

A. Hot Work Permit (Available from Owner's Representative):
   1. Required for doing hot work involving open flames or producing heat or sparks such as:
      a. Brazing.
      b. Cutting.
      c. Grinding.
      d. Soldering.
      e. Thawing pipe.
      f. Torch applied roofing.
      g. Welding.

SECTION 01 4000 QUALITY REQUIREMENTS

A. Conflicting Requirements: If compliance with two or more standards is specified and standards establish different or conflicting requirements for minimum quantities or quality levels, comply with most stringent requirement.

B. Minimum Quantity or Quality Levels: 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.

C. 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.

D. Quality Control Services: Quality Control will be sole responsibility of Contractor. 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. 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. Quality assurance performed by Owner will be used to validate Quality Control performed by Contractor:
   1. 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.

E. Notify Owner immediately if asbestos-containing materials or other hazardous materials are encountered while performing the Work.

F. 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.

G. 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 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 6100 PRODUCT REQUIREMENTS

A. 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. 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. 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.

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

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

G. 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. 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.

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

C. Provide attachment and connection devices and methods necessary for securing the Work:
   1. Secure the Work true to line and level.
   2. Allow for expansion and building movement.

D. Recheck measurements and dimensions before starting each installation.

E. 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.

F. 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.

G. 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. Operations And Maintenance Data: Operations And Maintenance Manual that include:
   1. Project Manual:
      a. Copy of complete Project Manual including Addenda, Modifications as defined in General Conditions, and other interpretations issued during construction:
         (1) Mark these documents to show variations in actual Work performed in comparison with text of specifications and Modifications. Show substitutions, selection of options, and similar information, particularly on elements that are concealed or cannot otherwise be readily discerned later by direct observation.
         (2) Note related record drawing information and Product Data.
   2. Operations and Data:
      a. Operations and maintenance submittals required by Contract Documents.
   3. Warranty Documentation:
      a. Copies of warranties required by Contract Documents.
   4. Record Documentation:
      a. Certifications required by Contract Documents.
      b. Documentation submittals required by Contract Documents.
      c. Testing and Inspection Reports required by Contract Documents.

B. 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.

C. Project Record Documents:
   1. Do not use record documents for construction purposes:
      a. Protect from deterioration and loss in secure, fire-resistive location.
      b. Provide access to record documents for reference during normal Working hours.
   2. 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.
      a. Mark record sets with red erasable pencil. Use other colors to distinguish between variations in separate categories of the Work.
      b. Mark new information that is important to Owner, but was not shown on Contract Drawings.
      c. Note related Change Order numbers where applicable.

END OF SECTION

SECTION 02 4119

SELECTIVE STRUCTURE DEMOLITION

PART 1 - GENERAL

1.1 SUMMARY

A. Includes But Not Limited To:
   1. Demolition and removal of selected portions of building or structure.
   2. Salvage of existing items to be reused.

B. Related Requirements:
   1. Section 26 0501: 'Common Electrical Requirements' for salvage of existing electrical items to be reused.

1.2 REFERENCES

A. Reference Standards:
   1. National Fire Protection Association / American National Standards Institute:
      a. NFPA 241, 'Standard for Safeguarding Construction, Alteration, and Demolition Operations', 2013 Edition.
   2. American Society of Safety Engineers:
      a. ASSE A10.6-2006, 'Safety Requirements for Demolition Operations'.

1.3 ADMINISTRATIVE REQUIREMENTS

A. Coordination:
   1. Storage or sale of removed items or materials will not be permitted on-site.

B. Pre-Installation Conference:
   1. Before beginning Selective Demolition work, in addition to requirements of Section 01 3100, meet on site to confirm work to be demolished, items to be salvaged or reused, and coordination with Owner.

1.4 QUALITY ASSURANCE

A. Regulatory Agency Sustainability Approvals:
   1. Comply with governing EPA notification regulations before beginning selective demolition.
   2. Comply with hauling and disposal regulations of authorities having jurisdiction.
   3. Standards: Comply with ANSI A10.6 and NFPA 241.

1.5 FIELD CONDITIONS

A. Existing Conditions:
   1. Conditions existing at time of inspection for bidding purpose will be maintained by Owner as far as practical.

PART 2 - PRODUCTS: Not Used

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verification Of Conditions:
   1. Survey existing conditions and correlate with requirements indicated to determine extent of selective demolition required.
      a. Notify Architect of discrepancies between existing conditions and Drawings before proceeding with selective demolition.

B. Evaluation And Assessment:
   1. Hazardous Materials:
      a. It is not expected that hazardous materials will be encountered in the Work. Identified hazardous materials will be removed by Owner before start of the Work.
      b. If materials suspected of containing hazardous materials are encountered, do not disturb and immediately notify Architect.
   2. Inventory and record condition of items to be removed and reinstalled and items to be removed and salvaged, and existing items to remain.
   3. When unanticipated mechanical, electrical, or structural elements that conflict with intended function or design are encountered, investigate and measure nature and extent of conflict. Promptly submit written report to Architect.
   4. Engage a professional engineer to survey condition of building to determine whether removing any element might result in structural deficiency or unplanned collapse of any portion of structure or adjacent structures during selective demolition operations.
   5. Perform surveys as the Work progresses to detect hazards resulting from selective demolition activities.

3.2 PREPARATION

A. Temporary Facilities:
   1. Provide temporary barricades and other protection required to prevent injury to people and damage to adjacent buildings and facilities to remain.
   2. Maintain fire-protection facilities in service during selective demolition operations.

B. Temporary Shoring:
   1. Provide and maintain shoring, bracing, and structural supports as required to preserve stability and prevent movement, settlement, or collapse of construction and finishes to remain, and to prevent unexpected or uncontrolled movement or collapse of construction being demolished.
   2. Strengthen or add new supports when required during progress of selective demolition.

C. Utility Services:
   1. Existing Services/Systems: Maintain services/systems indicated to remain and protect them against damage during selective demolition operations.
   2. Service/System Requirements: Locate, identify, disconnect, and seal or cap off indicated utility services and mechanical/electrical systems serving areas to be selectively demolished.
      a. Arrange to shut off indicated utilities with utility companies.
      b. If services/systems are required to be removed, relocated, or abandoned, before proceeding with selective demolition, provide temporary services/systems that bypass area of selective demolition and that maintain continuity of services/systems to other parts of building.

3.3 SELECTIVE DEMOLITION

A. General:

1. Conduct selective demolition and debris-removal operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities or spaces.
2. Demolish and remove existing construction only to extent required by new construction and as indicated. Use methods required to complete the Work within limitations of governing regulations and as follows:
    a. Neatly cut openings and holes plumb, square, and true to dimensions required. Use cutting methods least likely to damage construction to remain or adjoining construction. Use hand tools or small power tools designed for sawing or grinding, not hammering and chopping, to minimize disturbance of adjacent surfaces. Temporarily cover openings to remain.
    b. Cut or drill from the exposed or finished side into concealed surfaces to avoid marring existing finished surfaces.
    c. Do not use cutting torches until work area is cleared of flammable materials. At concealed spaces, such as duct and pipe interiors, verify condition and contents of hidden space before starting flame-cutting operations. Maintain fire watch and portable fire-suppression devices during flame-cutting operations.
    d. Maintain adequate ventilation when using cutting torches.
    e. Remove decayed, vermin-infested, or otherwise dangerous or unsuitable materials and promptly dispose of off-site.
    f. Remove structural framing members and lower to ground by method suitable to avoid free fall and to prevent ground impact or dust generation.
    g. Locate selective demolition equipment and remove debris and materials so as not to impose excessive loads on supporting walls, floors, or framing.
    h. Dispose of demolished items and materials promptly.

B. Selective Demolition Procedures For Specific Materials:
1. Concrete: Demolish in sections. Cut concrete full depth at junctures with construction to remain and at regular intervals, using power-driven saw, then remove concrete between saw cuts.
2. Masonry: Demolish in small sections. Cut masonry at junctures with construction to remain, using power-driven saw, then remove masonry between saw cuts.
3. Concrete Slabs-on-Grade: Saw-cut perimeter of area to be demolished, then break up and remove.

C. Removed and Salvaged Items:
1. Relics, and similar objects including, but not limited to, cornerstones and their contents, commemorative plaques and tablets, antiques, and other items of interest or value to Owner that may be encountered during selective demolition remain Owner's property. Carefully remove and salvage each item or object in a manner to prevent damage and deliver promptly to Owner.
    a. Clean salvaged items as directed by Owner.
    b. Pack or crate items after cleaning. Identify contents of containers.
    c. Store items in a secure area until delivery to Owner.
    d. Transport items to Owner's storage area designated by Owner.
    e. Protect items from damage during transport and storage.

D. Removed and Reinstalled Items:
1. Clean and repair items to functional condition adequate for intended reuse. Paint equipment to match new equipment.
2. Pack or crate items after cleaning and repairing. Identify contents of containers.
3. Protect items from damage during transport and storage.
4. Reinstall items in locations indicated. Comply with installation requirements for new materials and equipment. Provide connections, supports, and miscellaneous materials necessary to make item functional for use indicated.

E. Existing Items to Remain:
1. Protect construction indicated to remain against damage and soiling during selective demolition.
2. When permitted by Architect, items may be removed to a suitable, protected storage location during selective demolition and cleaned and reinstalled in their original locations after selective demolition operations are complete.

3.4 CLEANING

A. General:
   1. Clean adjacent structures and improvements of dust, dirt, and debris caused by selective demolition operations.
   2. Return adjacent areas to condition existing before selective demolition operations began.

B. Waste Management:
   1. Disposal of Demolished Materials:
      a. Remove demolished materials from Project site and legally dispose of them in an EPA-approved landfill. Do not burn demolished materials.
         1) Do not allow demolished materials to accumulate on-site.
         2) Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.
         3) Remove debris from elevated portions of building by chute, hoist, or other device that will convey debris to grade level in a controlled descent.

END OF SECTION

SECTION 03 4800

PRECAST CONCRETE SPECIALTIES

PART 1 - GENERAL

1.1 SUMMARY

A. Includes But Not Limited To:
   1. Furnish and install precast concrete elements as described in Contract Documents.

B. Products Furnished But Not Installed Under This Section:
   1. Precast window sills.

C. Related Requirements:
   1. Section 05 1223: Metal Lintels.
   2. Section 07 9213: 'Elastomeric Joint Sealants'.

1.2 REFERENCES

A. Reference Standards:
   1. ASTM International:
      a. ASTM A615/A615M-14, ‘Standard Specification for Deformed and Plain Steel Bars for Concrete Reinforcement'.
      b. ASTM A1064/A1064M-14, 'Standard Specification for Carbon-Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete'.
      c. ASTM C33/C33M-13, 'Standard Specification for Concrete Aggregates'.
      d. ASTM C150/C150M-12, 'Standard Specification for Portland Cement'.
      e. ASTM C260/C260M-10a, ‘Standard Specification for Air-Entraining Admixtures for Concrete’.
      f. ASTM C494/C494M-13, ‘Standard Specification for Chemical Admixtures for Concrete’.
      g. ASTM C496/C496M-11, ‘Standard Test Method for Splitting Tensile Strength of Cylindrical Concrete Specimens'.
      h. ASTM C672/C672M-12, ‘Standard Test Method for Scaling Resistance of Concrete Surfaces Exposed to Deicing Chemicals'.
      i. ASTM C779/C779M-12, ‘Standard Test Method for Abrasion Resistance of Horizontal Concrete Surfaces'.
      j. ASTM C947-03(2009), ‘Standard Test Method for Flexural Properties of Thin-Section Glass-Fiber-Reinforced Concrete (Using Simple Beam With Third-Point Loading)'.
      k. ASTM C979/C979M-10, ‘Standard Specification for Pigments for Integrally Colored Concrete'.
      l. ASTM C1645/C1645M-11, ‘Standard Test Method for Freeze-thaw and De-icing Salt Durability of Solid Concrete Interlocking Paving Units'.

1.3 SUBMITTALS

A. Action Submittals:
   1. Product Data:
      a. Manufacturer product literature for each type of product indicated.
   2. Shop Drawings:
      a. Precast concrete elements:
         1) Detail fabrication and installation of architectural precast concrete units.
         2) Indicate locations, plans, elevations, dimensions, shapes, and cross sections of each unit.

3) Indicate joints, reveals, and extent and location of each surface finish. Indicate details at building corners.
   a) Indicate separate face and backup mixture locations and thicknesses.
4) Indicate locations, tolerances, and details of anchorage devices to be embedded in or attached to structure or other construction.
5) Indicate locations, extent, and treatment of dry joints if two-stage casting is proposed.
6) Include plans and elevations showing unit location and sequence of erection for special conditions.
7) Indicate relationship of architectural precast concrete units to adjacent materials.
8) Indicate locations and details of anchors and joint widths.

B. Informational Submittals:
1. Certificates:
   a. Precast concrete elements:
      1) Material Certificates: For the following items, signed by manufacturers:
         a) Admixtures.
         b) Cementitious materials.
         c) Reinforcing materials.
2. Design Submittals:
   a. Precast concrete elements:
      1) Design Modifications:
         a) If design modifications are proposed to meet performance requirements and field conditions, submit design calculations and Shop Drawings.
         b) Do not adversely affect the appearance, durability, or strength of units when modifying details or materials and maintain the general design concept.
3. Test And Evaluation Reports:
   a. Material Test Reports:
      1) Precast concrete units:
         a) Aggregates.
4. Source Quality Control Submittals.
   a. Precast concrete units:
      1) Control test reports.
      2) Precast Concrete mix design: Submit compressive strength and water-absorption tests for each precast concrete mix design.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Delivery And Acceptance Requirements:
1. Check, carefully unload, and deliver material to site in such manner as to avoid soiling and damaging.

B. Storage And Handling Requirements:
1. Store material on planks clear of ground and protect from damage.

PART 2 - PRODUCTS

2.1 MANUFACTURED UNITS

A. Materials:
1. Design Criteria:
   a. Precast Concrete:
      1) Air Entrainment: Wet cast mixture maintains 5 to 7 percent air entrainment where surfaces are exposed to freeze-thaw. Admixture conforms to ASTM C260.
      2) Aggregates: ASTM C33/C33M.
      3) Cement: ASTM C150/C150M, Type II.
      4) Compressive Strength: 4500 psi (31.03 MPa) concrete minimum.

5) Water: Potable water free from impurities.

b. Reinforcing:
   1) Bars: ASTM A615/A615M, Grade 60.
   2) Reinforcing Mesh: ASTM A1064/A1064M.

2.2 ACCESSORIES

A. Sealant: As specified in Section 07 9213: 'Elastomeric Joint Sealants'.

2.3 FABRICATION

A. General:
   1. Chamfered edges.
   2. Smooth finish free from pits and rock pockets.

B. Window Sills:
   1. Provide cast-in anti-drip groove.
   2. Provide minimum of two (2) mounting dowels for each sill.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Precast concrete window sills:
   1. Install at windows.
   2. Coordinate all locations as described in Construction Documents.

END OF SECTION

SECTION 04 0513

CEMENT AND LIME MASONRY MORTARING

PART 1 - GENERAL

1.1 SUMMARY

A. Includes But Not Limited To:
   1. Quality of masonry mortar used on Project.

B. Related Requirements:
   1. Section 01 4000: 'Quality Requirements' for administrative and procedural requirements for quality assurance and quality control.
   2. Section 01 4301: 'Quality Assurance – Qualifications' establishes minimum qualification levels required.
   3. Section 01 7800: 'Closeout Submittals'.

1.2 REFERENCES

A. Definitions:
   1. Mortar: Plastic mixture of cementitious materials, fine aggregate and water. See ASTM C270.

B. Reference Standards:
   1. ASTM International:
      a. ASTM C144-11, 'Standard Specification for Aggregate for Masonry Mortar'.
      b. ASTM C150/C150M-16, 'Standard Specification for Portland Cement'.
      c. ASTM C207-06(2011), 'Standard Specification for Hydrated Lime for Masonry Purposes'.
      d. ASTM C270-14a, 'Standard Specification for Mortar for Unit Masonry'.
   2. Masonry Standards Joint Committee (MSJC) - The Masonry Society (TMS) / American Concrete Institute (ACI) / American Society of Civil Engineers (SEI/ASCE):
      a. TMS 402-08/ACI 530-08/ASCE 5-08, 'Building Code Requirements and Specification for Masonry Structures and Commentary'.
      b. TMS 602-08/ACI 530.1-08/ASCE 6-08, 'Specification for Masonry Structures and Commentary'.

PART 2 - PRODUCTS

2.1 SYSTEM

A. Performance:
   1. Minimum Compressive Strength at 28 Days:
      a. Type S: 1800 psi (12.4 MPa).

B. Materials:
   1. Portland Cement:
      a. Meet requirements of ASTM C150/C150M, Type II Low Alkali unless approved otherwise in writing by Architect.
   2. Hydrated Lime:
      a. Meet requirements of ASTM C207, Type S.
   3. Aggregate:
      a. Standard Mortar:
         1) Natural or manufactured sand meeting requirements of ASTM C144 and following:
            a) Fineness modulus: 1.6 to 2.5 percent.

b) Water demand, ratio by weight: 0.65 percent maximum.
c) Grading:

Sieve	Sieve	Percent Passing	
		Natural Sand	Manufactured Sand
No. 4	4.750 mm	100	100
No. 8	2 360 mm	95 to 100	95 to 100
No. 16	1.191 mm	70 to 100	70 to 100
No. 30	0.594 mm	40 to 75	40 to 75
No. 50	0.297 mm	10 to 35	20 to 40
No. 100	0.150 mm	2 to 15	10 to 25
No. 200	0.075 mm	none	0 to 10

4. Water:
   a. Clean and free of acids, alkalis, and organic materials.
5. Admixtures:
   a. Use no admixtures, except for color pigments specified below, without Architect's written permission. Use of any admixture to meet cold weather requirements and admixtures that increase air entrainment are expressly forbidden under all circumstances.

C. Mixes:
1. General:
   a. Heat water and sand to 140 deg F (60 deg C) maximum if temperature is below 40 deg F (4.4 deg C).
2. Unit Masonry Mortar: Type 'N':
   a. Parts by Volume:
      Portland Cement 1
      Hydrated Lime 1/2
      Damp Loose Sand: 2-1/4 minimum to three maximum, times sum of volumes of cement and lime used. Maintain sand piles in damp, loose condition.
3. Unit Masonry Mortar: Type 'S':
   a. Parts by Weight:

Portland Cement	94 lbs	43 kg
Hydrated Lime	20 lbs	9 kg
Dry Sand	360 lbs min. to 480 lbs max.	163 kg min. to 218 kg max.

PART 3 - EXECUTION

3.1 FIELD QUALTY CONTROL

A. Non-Conforming Work:
1. Remove and replace defective material at Architect's direction and at no additional cost to Owner.

END OF SECTION

SECTION 04 0516

MASONRY GROUTING

PART 1 - GENERAL

1.1 SUMMARY

A. Includes But Not Limited To:
   1. Quality of masonry grout used on Project.

B. Related Requirements:
   1. Section 01 4000: 'Quality Requirements' for administrative and procedural requirements for quality assurance and quality control.
   2. Section 01 4301: 'Quality Assurance – Qualifications' establishes minimum qualification levels required.
   3. Section 01 7800: 'Closeout Submittals'.

1.2 REFERENCES

A. Reference Standards:
   1. ASTM International:
      a. ASTM C94/C94M-16, 'Standard Specification for Ready-Mixed Concrete'.
      b. ASTM C150/C150M-16, 'Standard Specification for Portland Cement'.
      c. ASTM C207-06(2011), 'Standard Specification for Hydrated Lime for Masonry Purposes'.
      d. ASTM C404-11, 'Standard Specification for Aggregates for Masonry Grout'.
      e. ASTM C476-16, 'Standard Specification for Grout for Masonry'.
      f. ASTM C1019-16, 'Standard Test Method for Sampling and Testing Grout'.
   2. Masonry Standards Joint Committee (MSJC) - The Masonry Society (TMS) / American Concrete Institute (ACI) / American Society of Civil Engineers (SEI/ASCE):
      a. TMS 402-13/ACI 530-13/ASCE 5-13, 'Building Code Requirements and Specification for Masonry Structures and Commentary'.
      b. TMS 602-13/ACI 530.1-13/ASCE 6-13, 'Specification for Masonry Structures and Commentary'.

PART 2 - PRODUCTS

2.1 SYSTEM

A. Performance
   1. Minimum Compressive Strength for laboratory cured specimens at 28 Days:
      a. 2000 psi (13.8 MPa).

B. Materials:
   1. Portland Cement:
      a. Meet requirements of ASTM C150/C150M.
      b. Use Type II Low Alkali in exterior walls and in walls subject to moisture, unless approved otherwise in writing by Architect.
   2. Hydrated Lime:
      a. Meet requirements of ASTM C207, Type S.
   3. Aggregate:
      a. Meet requirements of ASTM C404, Table 1.

         1) Grading Requirements for Fine Aggregate, Natural, Size 2.

Sieve	Sieve	Percent Passing
No. 4	4.750 mm	100
No. 8	2 360 mm	95 - 100
No. 16	1 191 mm	60 - 100
No. 30	0.595 mm	35 - 70
No. 50	0.297 mm	15 - 35
No. 100	0.150 mm	2 - 15

2) Grading Requirements for Coarse Aggregate, Size 8.

Sieve	Sieve	Percent Passing
1/2 Inch	12 7 mm	100
3/8 Inch	9.5 mm	85 - 100
No. 4	4.750 mm	10 - 30
No. 8	2 360 mm	0 - 10
No. 16	0.150 mm	0 - 5

4. Water:
   a. Clean and free of acids, alkalis, and organic materials.
5. Admixtures:
   a. No additives are allowed which will increase air entrainment. Other additives may be used as approved in writing by Architect before use.

C. Mixes:
1. Procedure:
   a. Use of pre-blended dry grout mix is allowed only with submission of certification that material specification requirements have been complied with.
   b. Use method of measuring and mixing materials that will ensure consistently proportioned grout batches throughout installation of masonry work. No measuring of materials by 'shovels full' is permitted for field mixed grout.
   c. Batch, mix, and deliver transit-mixed grout in accordance with requirements of ASTM C94/C94M.
2. Proportions by Volume:
   a. Water: Enough to give creamy pouring consistency, usually slump of between 8 and 10.

Material	Fine Grout		Coarse Grout	
Portland Cement	One cu ft	0.028 cu m	One cu ft	0.028 cu m
Hydrated Lime (optional)	1/10 cu ft	0.0028 cu m	1/10 cu ft	0.0028 cu m
Damp, Loose Sand	2-1/4 to 3 cu ft	0.063 to 0.084 cu m	2-1/4 to 3 cu ft	0.063 to 0.084 cu m
Pea Gravel	none	none	1 to 2 cu ft	0.028 to 0.056 cu m

PART 3 - EXECUTION

3.1 INSTALLATION

A. Use fine grout for cavities 2 inches (50 mm) and smaller in smallest dimension. Use coarse grout for cavities greater than 2 inches (50 mm) in smallest dimension.

3.2 FIELD QUALTY CONTROL

A. Non-Conforming Work:
   1. Remove and replace defective material at Architect's direction and at no additional cost to Owner.

END OF SECTION

SECTION 05 1223

STRUCTURAL STEEL FOR BUILDINGS

PART 1 - GENERAL

1.1 SUMMARY

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

1.2 REFERENCES

A. Reference Standards:
   1. American Society For Testing And Materials:
      a. ASTM A36/A36M-14, ‘Standard Specification for Carbon Structural Steel'.

PART 2 - PRODUCTS

2.1 COMPONENTS

A. Materials:
   1. Miscellaneous Steel:
      a. Meet requirements of ASTM A36/A36M for the following:
         1) Lintels.

B. Fabrication:
   1. After fabrication and before shop priming, hot-dip or mechanically galvanize lintels to be installed in following:
      a. Exterior walls.
   2. Shop prime steel provided under this Section.

C. Finishes:
   1. Shop Primer:
      a. Exposed Steel To Receive Finish: Primer shall be acceptable to Finish Manufacturer.

PART 3 - EXECUTION: Not Used

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. Chair Rails.
   2. Window Stools.
   3. Miscellaneous as specified elsewhere.

C. Related Requirements:
   1. 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 4512: 'Architectural Woodwork Wood Trim'.
   2. Section 06 6001: 'Miscellaneous Plastic Fabrications' for quality of Window Stools.
   3. Section 07 9213: 'Elastomeric Joint Sealants' for quality of sealants, submittal and installation requirements.

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. Window Stool:
a. Install window stool to structure with silicone sealant as specified in Section 07 9213 'Elastomeric Joint Sealant'.

END OF SECTION

SECTION 06 2024

DOOR, FRAME, AND FINISH HARDWARE INSTALLATION

PART 1 - GENERAL

1.1 SUMMARY

A. Includes But Not Limited To:
   1. Furnish and install sealants for caulking door frames as described in Contract Documents.
   2. Furnish and install insulation in doorframes as described in Contract Documents.

B. Products Installed But Not Furnished Under This Section:
   1. Flush wood doors.
   2. Hollow metal door frames.
   3. Finish hardware.

C. Related Requirements:
   1. Section 07 2116: ' Blanket Insulation' for quality of fiberglass insulation.
   2. Section 07 9213: ' Elastomeric Joint Sealants' for quality of sealants.
   3. Sections under 08 1000 heading: Furnishing of doors and metal frames.
   4. Sections under 08 7000 heading: Furnishing of finish hardware.

1.2 REFERENCES

A. Association Publications:
   1. Door and Hardware Institute (DHI) 14150 Newbrook Drive, Suite 200 Chantilly, VA www.dhi.org, *Installation Guide for Doors & Hardware' by Door & Hardware Institute*.

1.3 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 with specified sealant.

B. Doors:
   1. When Project is completed, doors shall not bind, stick, or be mounted so as to cause future hardware difficulties.
   2. Do not impair utility or structural strength of door in fitting of door, applying hardware, or cutting and altering door louvers, panels, or other special details.

C. Hardware:
   1. General:
      a. Install using set of Manufacturer's installation, adjustment, and maintenance instructions submitted with hardware under Section 08 7101. Follow as closely as possible.
      b. Mount closers on jamb stop side of door in parallel arm configuration where it is physically possible to do so and not damage or hinder operation of door or closer.
   2. Hardware for Wood Doors:
      a. If doors are not factory-machined, use hardware templates furnished by Hardware Manufacturer when mounting hardware.
      b. Set hinges flush with edge surface. Be sure that hinges are set in a straight line to prevent distortion.
      c. Mount door latches high in strike plate opening so when door later settles, latch will not bind.

3.2 FIELD QUALITY CONTROL

A. Field Tests:
   1. Arrange to have keys brought to Project site and, in meeting attended by local representatives and Architect, test every new key and locking mechanism.

B. Non-Conforming Work: Non-conforming work as covered in the General Conditions applies, but is not limited to the following:
   1. Correct any work found defective or not complying with contract document requirements at no additional cost to the Owner.
   2. Door frames:
      a. Door frames damaged by use of crowbar or other prying devices to set door frames shall be repaired or replaced at no additional cost to Owner.

3.3 CLOSEOUT ACTIVITIES

A. Instruction of Owner:
   1. Using Owner's Operations And Maintenance Manual, explain keying systems at same time keys and locking mechanisms are tested.

B. Key Delivery:
   1. Immediately before Final Acceptance Meeting, turn change keys over to Owner properly organized, tagged, and placed in new or existing key cabinet.

END OF SECTION

SECTION 06 2710

SHELVING

PART 1 - GENERAL

1.1 SUMMARY

A. Includes But Not Limited To:
   1. Furnish and install adjustable shelving not part of casework, including mounting hardware, as described in Contract Documents.

B. Related Requirements:
   1. Section 06 4001: 'Common Architectural Woodwork Requirements'.

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.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Shelves:
   1. Design Criteria:
      a. Conform to applicable requirements of Sections 06 4001.
      b. Fabricate the work of this section to AWS 'Custom Grade'.
      c. Species as acceptable for AWS 'Custom Grade'.
   2. Material:
      a. Panel Product:
         1) Glues (adhesives) used in manufacture and fabrication of panel products shall be Type I or II.
         2) Moisture content shall be same as specified for lumber.
         3) Cores:
            a) All Other: Industrial grade particle board with minimum density of 45 lbs per cu ft (721 kg per cu meter).
         4) Facings:
            a) All facings shall be Melamine or Kortron.
         5) 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 (1 050 mm): One inch (25 mm) thick and provide equal center supports.
      b. Edgings:
         1) Use 3/4 inch (19 mm) Kortron or Melamine faced Panel Product with hot glued 3 mm thick PVC with eased edges. Apply banding on all four edges of adjustable shelving and on exposed edges of fixed shelving, with one inch return onto unexposed edges. Edge banding color to match Panel Product.

2.2 ACCESSORIES

A. Manufacturer:
   1. Manufacturer Contact Information:
      a. Knape & Vogt, Grand Rapids, MI www.knapeandvogt.com or Knape & Vogt Canada Inc, Mississuaga, ON (905) 676-8166.

B. Shelf Brackets And Standards:
   1. Brackets:
      a. Size according to shelf width, end of bracket to be within 2 inches (50 mm) of front edge of shelf.
      b. Category Four Approved Product. See Section 01 6200 for definitions of Categories.
         1) 187WH extra heavy duty brackets by Knape & Vogt.
   2. Standards:
      a. Category Four Approved Product. See Section 01 6200 for definitions of Categories.
         1) 87WH extra heavy duty standard by Knape & Vogt.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Attach metal standards by screws into framing members or special blocking. Utilize all available pre-drilled screw holes in standards.

B. Attach wood shelf supports with 16d finish nails through sheathing into framing members or special blocking, two nails minimum into each framing member. Attach shelves to supports with 1-1/2 inch (38 mm) long minimum flathead screws with heads countersunk to be flush or slightly below shelf surface, one screw at each shelf corner minimum.

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 2001: 'Common Finish Carpentry Requirements' for Installation.
   2. Section 06 4512: ‘Architectural Woodwork Wood Trim’.
   3. Section 06 6001: ‘Miscellaneous Plastic Fabrications’.
   4. 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 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.

1.4 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

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 2001: 'Common Finish Carpentry Requirements':
      a. Installation of chair rails.
   2. Section 06 4001: 'Common Architectural Woodwork Requirements':
      a. Approved Fabricators.
      b. General standards for materials and fabrication of Architectural Woodwork.
   3. Section 08 1429: Color of interior flush wood doors.
   4. 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. 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) Match existing.

D. Shelves:
   1. Conform to applicable requirements of Sections 06 4001.
   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

SECTION 06 6001

MISCELLANEOUS PLASTIC FABRICATIONS

PART 1 - GENERAL

1.1 SUMMARY

A. Products Furnished But not Installed Under This Section:
   1. Furnish window stools as described in Contract Documents.

B. Related Requirements:
   1. Section 06 2001: 'Common Finish Carpentry Requirements' for:
      a. Installation of Window Stools.
   2. Section 06 4001: 'Common Architectural Woodwork Requirements' for Approved Fabricators.

1.2 REFERENCES

A. Definitions:
   1. Solid Surface: Solid surface materials are manufactured from polymeric materials. Granules may also be added to enhance the color effects. Solid surface materials are non-porous and homogeneous, with the same composition throughout the thickness of the solid surface material. They are capable of being repaired, renewed to the original finish and fabricated into continuous surfaces with inconspicuous seams.

B. Reference Standards:
   1. American National Standards Institute/International Cast Polymer Alliance:
      a. ANSI/ICPA SS-1-2001, ‘Performance Standard for Solid Surface Materials'.

1.3 SUBMITTALS

A. Action Submittals:
   1. Product Data:
      a. Manufacturer's literature.
      b. Color selections.

PART 2 - PRODUCTS

2.1 ASSEMBLIES

A. Manufacturers:
   1. Acrylic Solid Surface:
      a. Category Four Approved Manufacturers. See Section 01 6200 for definitions of Categories.
         1) Corian by DuPont Co, Wilmington, DE. Contact Steve Finch at (314) 941-5179 or email stephen.m.finch@dupont.com.

B. Materials:
   1. Acrylic Solid Surface Window Stools:
      a. Design Criteria:
         1) Meet requirements of ANSI/ICPS SS-1.
      b. General:
         1) 1/2 inch (12.7 mm) thick 100 percent acrylic polymer.
      c. Approved Color: Match existing by Corian.

PART 3 - EXECUTION: Not Used

END OF SECTION

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 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 C665-12, ‘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 to be in compliance with International Code Council (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.
   2. Spindle Anchors:
      a. Type One Acceptable Products:
         1) Series T TACTOO Insul-hangers, RC150 or SC150 washers, and TACTOO Adhesive by AGM Industries, Brockton, MA www.agmind.com.
         2) Stic-Klip Type N Fasteners and Stic-Klip Type S Adhesive by Eckel Industries of Canada Ltd, Morrisburg, ON www.eckel.ca.
         3) Spindle Anchor, Dome-cap, R-150, or S-150 washer, Clutch-clip, and Tuff Bond Hanger Adhesive by GEMCO, Danville, IL www.gemcoinsulation.com.
         4) 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' factor rather than 'U' factor, rating, or thickness, either 16 or 24 inches (400 or 600 mm) wide according to framing spacing.
c. 'R' Factor Required:
1) Ceilings:
a) Thermally Insulated: R38 Standard.
2) Metal Wall Stud Framing: Unfaced Insulation.
a) R11.
2. Spindle-Type Anchors:
a. Perforated, galvanized carbon-steel plate 0.030 inch (0.762 mm) thick by 2 inches (50 mm) square plate with copper-coated, low carbon steel, fully annealed, 0.105 inch (2.67 mm) diameter spindle, length to suit depth of insulation.
b. Spindle welded to plate and including self-locking washer.

PART 3 - EXECUTION

3.1 INSTALLATION

A. General:
1. Leave no gaps in insulation envelope.
2. If two layers of insulation are used to attain required 'R' factor, only layer towards interior of building shall have facing.
3. Provide minimum clearance around recessed lighting fixtures as approved by local code.

B. In Framing:
1. Install insulation behind plumbing and wiring, around duct and vent line penetrations, and in similar places.
2. Fit ends of batts snug against top and bottom plates.
3. Fit batts snug against stud framing at each side.

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 material and installation requirements.

B. Related Requirements:
   1. Furnishing and installing of sealants is specified in Sections specifying work to receive new sealants.

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.
      b. Federal Specifications:

1) Type:
   a) Type I: Self-leveling, pour grade.
      (1) Compound which has sufficient flow to give smooth level surface when applied in horizontal joint at 40 deg F (4.4 deg C).
   b) Type II: Non-sag, gun grade
      (1) Compound which permits application in joints on vertical surfaces without sagging (slumping) at temperatures 40 deg F (4.4 deg C) and 122 deg. F (50 deg. C).
   c) Type NS: Non-sag, gun grade.
      (1) Non-sag shall be a compound which permits application in joints on vertical surfaces without sagging (slumping) at temperatures between -20 deg F and 122 deg. F (- 29 and 50 deg. C).
2) Class:
   a) Class A: Compounds resistant to 50 percent total joint movement (includes Type I and Type II).
      (1) Capable of resisting compression-extension cycling of plus and minus 25 percent of nominal half inch width.
   b) Class B: Compounds resistant to 25 percent total joint movement (includes Type I and Type II).
      (1) Capable of resisting compression-extension cycling of plus and minus12 1/2 percent of nominal half inch width.

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. American Association of State and Highway Transportation Officials:
   a. AASHTO T 132-87(2013), ‘Standard Method of Test for Tensile Strength of Hydraulic Cement Mortars’.
2. ASTM International:
   a. ASTM C639-15, 'Standard Test Method for Rheological (Flow) Properties of Elastomeric Sealants'.
   b. ASTM C661-15, 'Standard Test Method for Indentation Hardness of Elastomeric-Type Sealants by Means of a Durometer'.
   c. ASTM C679-15, ‘Standard Test Method for Tack-Free Time of Elastomeric Sealants’.
   d. ASTM C719-14, ‘Standard Test Method for Adhesion and Cohesion of Elastomeric Joint Sealants Under Cyclic Movement (Hockman Cycle)’.
   e. ASTM C793-05(2010), 'Standard Test Method for Effects of Laboratory Accelerated Weathering on Elastomeric Joint Sealants’.
   f. ASTM C794-15a, 'Standard Test Method for Adhesion-in-Peel of Elastomeric Joint Sealants'.
   g. ASTM C920-14a, ‘Standard Specification for Elastomeric Joint Sealants’.
   h. ASTM C1135-15, 'Standard Test Method for Determining Tensile Adhesion Properties of Structural Sealants'.
   i. ASTM C1184-14, 'Standard Specification for Structural Silicone Sealants'.
   j. ASTM C1193-16, ‘Standard Guide for Use of Joint Sealants’.
   k. ASTM C1248-08(2012), 'Standard Test Method for Staining of Porous Substrate by Joint Sealants'.
   l. ASTM C1330-02(2013), ‘Standard Specification for Cylindrical Sealant Backing for Use with Cold Liquid Applied Sealants’.
   m. ASTM C1481-12 'Standard Guide for Use of Joint Sealants with Exterior Insulation & Finish Systems (EIFS)'.
   n. ASTM D412-15a, ‘Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers-Tension’.
   o. ASTM D2202-00(2014), 'Standard Test Method for Slump of Sealants'.
   p. ASTM D2240-15, ‘Standard Test Method for Rubber Property-Durometer Hardness’.
   q. ASTM D5893-10, ‘Standard Specification for Cold Applied, Single Component, Chemically Curing Silicone Joint Sealant for Portland Cement Concrete Pavements’.

r. ASTM E119-16a, 'Standard Test Methods for Fire Tests of Building Construction and Materials'.

3. Federal Specifications:
   a. Federal Specification TT-S-001543A (CON-NBS), 'Sealing Compound: Silicone Rubber Base (for Calking, Sealing & Glazing in Buildings and Other Structures)' (9 Jun 1971).
   b. TT-S-00230C (CON-NBS), 'Sealing compound: Elastomeric Type, Single Component (For Calking, Sealing, And Glazing In Buildings And Other Structures.' (2 Feb 1970).
4. Government Services Administration (GSA), Commercial Item Descriptions (CID):
   a. GSA CID A-A-272A, 'Sealing Compound: Silicone Rubber Base (For Caulking, Sealing, and Glazing in Buildings and Other Structures)'.
   b. GSA CID A-A-1556, 'Sealing Compound Elastomeric Type, Single Component (For Caulking, Sealing, and Glazing in Buildings and Other Structures)'.

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 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.

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, 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.

1.6 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.

1.7 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 C639 or ASTM D2202: Flow (sag or slump).
         3) ASTM C661 or ASTM D2240: Durometer hardness (shore A).
         4) ASTM C679 or ASTM C794: Tack free time (peel strength).
         5) ASTM C719: Joint movement capability.
         6) ASTM C793: Effects of accelerated weathering.
         7) ASTM C1135 or ASTM D412: Tensile adhesion strength.
         8) ASTM C1184: Structural silicone sealants.
         9) ASTM C1248: Staining.
         10) ASTM D412: Modulus.
         11) ASTM D5893: Silicone Joint Sealant for Concrete Pavements.
         12) Federal Specification TT-S-001543A.
         13) Federal Specification TT-S-00230C.
         14) GSA CID A-A-272A.
         15) GSA CID A-A-1556.
      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 particular environment prevailing at project location.
      f. Primers (Concrete, stone, masonry, and other nonporous surfaces typically do not require a primer. Aluminum and other nonporous surfaces except glass require use of a primer.

Installer Option to use Adhesion Test to determine if primer is required or use primer called out in related sections):
1) Adhesion Test:
a) Apply silicone sealant to small area and perform adhesion test to determine if primer is required to achieve adequate adhesion. If necessary, apply primer at rate and in accordance with Manufacturer's instructions. See 'Field Quality Control' in Part 3 of this specification for Adhesive Test.
2) If Primer required, shall not stain and shall be compatible with substrates.
3) Allow primer to dry before applying sealant.

2. Sealants At Exterior Building Elements:
a. Description:
1) Weathersealing expansion, contraction, perimeter, and other movement joints which may include all or part of the following for project:
a) Joints and cracks around windows.
b) Masonry.
c) Other joints necessary to seal off building from outside air and moisture.
b. Design Criteria:
1) Meet following standards for Sealant:
a) ASTM C920: Type S, Grade NS, Class 50 Use NT, M, G, A.
2) Limitations:
a) Do not use below-grade applications.
b) Do not use on surfaces that are continuously immersed or in contact with water.
c) Do not use on wet, damp, frozen or contaminated surfaces.
d) Do not use on building materials that bleed oils, plasticizers or solvents, green or partially vulcanized rubber gaskets or tapes.
3) Color:
a) Match building elements instead of window (do not use white that shows dirt easily).
c. Category Four Approved Products. See Section 01 6200 for definitions of Categories:
1) Dow Corning:
a) Primer: 1200 Prime Coat.
b) Sealant: 791 Silicone Weatherproofing Sealant.
2) Momentive Performance Materials (formerly, GE Sealants & Adhesives):
a) Primer: SS4044 Primer.
b) Sealant: GE SCS2000 SilPruf Silicone Sealant & Adhesive.
3) Tremco:
a) Primer:
(1) Metal surface: No. 20 primer.
(2) Porous surfaces: No. 23 primer.
b) Sealant: Spectrum 1 Silicone Sealant.

3. General Interior Sealants:
a. General:
1) Both sides of interior door frames.
2) Inside perimeters of windows.
3) 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.

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 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. Access Door Exit Device: See Exit Device.
   2. Acoustic Seal: Attached to door to reduce external noise. Perimeter seals reduce potential for flanking noise, a term used to describe leakage of a sound across a barrier.
   3. Active Door (or leaf): In paired or double doors, hinged door leaf that opens first and the one to which the lock is applied.
   4. Astragal: Molding or strip whose purpose is to cover or close gap between edges of pair of doors. Astragals provide a weather or sound seal, minimize passage of light or retard passage of smoke or flame.
      a. Overlapping Astragal: One-piece astragal attached to one door only and overlapping other door when in closed position.
      b. Split Astragal: Two-piece astragal, one piece of which is surface mounted on each door and provided with means of adjustment to abut other piece and provide a seal.
   5. 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.
   6. Change Key: Key that operates only one cylinder or one group of keyed alike cylinders in a keying system.
   7. Closer: Device or mechanism to control closing of swing door. May be overhead or floor mounted and either exposed or concealed.

8. Coordinator: Device or mechanism which controls order of closing of pair of swing doors; used with doors equipped with overlapping astragals and certain panic and fire exit hardware which requires inactive leaf to close before active leaf.
9. Cylinder: Cylindrical-shaped assembly (complete operating unit) containing tumbler mechanism and keyway (plug, shell, tumblers, springs and actuating device), into which key is inserted to operate lock and can only be actuated by correct key.
    a. Mortise: Threaded surface which screws directly into a lock case, with a cam engaging lock mechanism.
    b. Rim: Mounted on surface of door independently of lock, usually by screws from reverse sid, and engaging with lock mechanism by means of tailpiece or metal extension.
10. Deadbolt (of a lock): Lock bolt having no spring action nor bevel, and which is operated by key or turn piece.
11. Dummy Trim: Trim only, without lock; usually used on inactive door in pair of doors.
12. Dust-Proof Strike: Strike with spring plunger that completely fills bolt hole when bolt is not projected.
13. Emergency Egress Exit Device: See Exit Device.
14. Exit Device: Latching mechanism for swinging doors designed to be operable in direction of egress travel and to provide exiting for occupants in emergency. Latching mechanism release through pressure on touch or cross bar mortised or mounted on push side of door. There are two classifications: Panic Exit Hardware and Fire Exit Hardware, and three types within each classification:
    a. Mortise Type: Lock mechanism mortised into edge of door or concealed with door.
    b. Rim Type: Lock mechanism mounted on interior face of door.
    c. Vertical Rod: Surface or concealed, having latches in or on top and/or bottom of door and activated by cross bar through rod linkage extending vertically on or in lock stile of door.
15. Fire Exit Hardware: Metal device attached to back of door frame jamb at its base, to secure frame to the floor, may be either fixed or adjustable in height. See Exit Device.
16. Flush Bolt: Rods or bolts that are mounted flush with edge or face of inactive door to lock door to frame at head and/or sill. Flush bolt mounted in edge is operated by means of recessed lever. May be manual or automatic.
17. Grand Master Key: Key that operates locks in several groups, each of which has its own master key.
18. Handleset: Term describing lock trim with handle and thumbpiece on exterior of door, and knob/lever on interior.
19. Hardware: Any mechanism which is designed to perform operable function in use of door and frame.
20. Hinge: Two plates joined together by pin and attached to door and its frame whereby door is supported and is enabled to swing or move.
21. Holder: Device that holds door open at one or more selected positions.
22. Inactive Door (or leaf): Leaf of pair of doors that does not contain lock, but is bolted when closed, and to which strike is fastened to receive latch or bolt of active door.
23. Kick Plate: Protective plate applied on lower rail of door to prevent door from being marred.
24. Latch Bolt: Beveled spring bolt, usually operated when either knob or lever is turned, or when thumbpiece which operates handleset is pushed down.
25. Latchset: Non-locking device which contains only a latch bolt, a means of operating said latch and all required trim.
26. Leaf (of pair of doors): One of two doors forming pair of doors.
27. Lever Handle: Bar-like grip which is rotated about horizontal axis at one of its ends to operate a latch.
28. Lockset: Lock, complete with trim, such as knobs, escutcheons or handles.
29. Low-Energy Swing Door Operators: Device that operates swing door that opens or helps open door automatically, waits then closes it at reduced speed to levels deemed safe for disabled users. Commonly referred to as a Handicap door operator.
30. Master Key: Key that operates all master keyed locks or cylinders in group, each lock or cylinder usually operated by its own change key.
31. Mullion: Fixed or movable post dividing opening vertically.
32. Panic Exit Hardware: Hardware similar to Exit Hardware, but which has been tested and labeled or use only on emergency exit doors which are not fire doors. See Exit Device.
33. Passage Function: Knob or lever set most commonly used in hallways where locking feature is not required.

34. Pivot: Hinging device embodying fixed pin and single joint.
35. Pull: Handle of grip designed for attachment to door to facilitate opening and closing.
36. Push: Plate applied to lock stile to protect door against soiling and wear.
37. Single Cylinder Entrance Handleset: Key operates deadbolt from outside; turnpiece operates deadbolt from the inside.
38. Single Dummy: Knob/lever surface mounted on interior or exterior of door which does not turn any mechanism.
39. Silencer: Small piece of resilient material attached to stop on door frame to cushion closing of door.
40. Smoke Gasket: Brush seal used on doors to reduce passage of smoke and gasses.
41. Stop: Device to limit swing or movement of door at certain point.
42. Threshold: Strip fastened to floor beneath door, usually required to cover joint where two types of floor material meet.
43. Thumbpiece or Thumbturn: Lock trim component which typically is used to lock deadbolt from interior side of door.
44. Turnpiece: Small knob, lever or tee turn with spindle attached for operating deadbolt of lock or mortise bolt. Also termed Thumb Turn. Used only on single cylinder operations.
45. Weatherstrip: Material or device applied to door edges or to inner door frame edges to close clearance opening and minimize or restrict passage of air, moisture, sound, smoke, and/or dirt.

B. Reference Standards:
   1. American National Standards Institute / Builders Hardware Manufacturer's Association:
      a. ANSI/BHMA A156.1, ‘Butts and Hinges’.
      b. ANSI/BHMA A156.12, ‘Interconnected Locks & Latches’.
      c. ANSI/BHMA A156.13, ‘Mortise Locks’.
      d. ANSI/BHMA A156.16, ‘Auxiliary Hardware’.
      e. ANSI/BHMA A156.18, ‘Materials and Finishes’.
      f. ANSI/BHMA A156.2, ‘Bored and Preassembled Locks and Latches’.
      g. ANSI/BHMA A156.21, ‘Thresholds’.
      h. ANSI/BHMA A156.22, ‘Door Gasketing and Edge Seal Systems’.
      i. ANSI/BHMA A156.3, ‘Exit Devices’.
      j. ANSI/BHMA A156.4, ‘Door Controls - Closers’.
      k. ANSI/BHMA A156.5, ‘Cylinders and Input Devices for Locks’.
      l. ANSI/BHMA A156.6, ‘Architectural Trim’.
      m. ANSI/BHMA A156.7, ‘Template Hinge Dimensions’.
      n. ANSI/BHMA A156.8, ‘Door Controls – Overhead Stops and Holders’.

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 INTERIOR DOORS

A. Single Interior Doors:
   1. **Group 26**:
      a. 1 set: Smoke Gaskets.
      b. 1 each: Acoustic Seal.
      c. 3 each: Hinges.
      d. 1 each: Lockset Function F81.
      e. 1 each: Stop.
      f. 1 each: Threshold.

PART 3 - KEYING SCHEDULE for FINISH HARDWARE

3.1 KEYING SCHEDULE

A. Keying Schedules:
   1. Family Services Keying Schedule:
      a. Provided by Owner. Contact Deseret Industries Division Facilities.

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 / Canadian Standards Association:
      a. AAMA/WDMA/CSA 101/I.S.2/A440-11, 'North American Fenestration Standard/Specification for windows, doors, and skylights'.
   2. ASTM International:
      a. ASTM A568/A568M-13a, 'Standard Specification for Steel, Sheet, Carbon, Structural, and High-Strength, Low-Alloy, Hot-Rolled and Cold-Rolled, General Requirements for.
      b. ASTM A653/A653M-13, '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 A250.8-2003(R2008), 'Standard Steel Doors and Frames'.
      b. SDI A250.11-2012, 'Recommended Erection Instructions for Steel Frames'.

PART 2 - PRODUCTS

2.1 MANUFACTURED UNITS

A. Suppliers:
   1. Category One Approved VMR 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.

B. Manufacturers:
   1. Category One 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).
   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. 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. 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.
   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 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. Face Veneer: The outermost exposed wood veneer surface of a veneered wood door, panel, or other component exposed to view when the project is completed.
   6. 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.

7. Flitch: A hewn or sawn log made ready for veneer production or the actual veneer slices of one half log, kept in order, and used for the production of fine plywood panels.
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.
    b. Premium Grade: The highest Grade available in both material and workmanship where the highest level of quality, materials, workmanship, and installation is required.
9. Plain Slicing: Most commonly used for hardwood plywood. The log is cut in half, and one half is placed onto a carriage and moved up and down past a fixed knife to produce the veneers. Veneer is sliced parallel to the pith of the log and approximately tangent to the growth rings to achieve flat-cut veneer. Each piece is generally placed in a stack and kept in order. One half log, sliced this way, is called a "flitch."
10. 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.
11. Stile-and-Rail Construction: A technique often used in the making of doors, wainscoting, and other decorative features for cabinets and furniture. The basic concept is to capture a panel within a frame, and in its most basic form it consists of five members: the panel and the four members that make up the frame. The vertical members of the frame are called stiles, while the horizontal members are known as rails.

D. Reference Standards:
1. American Architectural Manufacturers Association / Window & Door Manufacturers Association / Canadian Standards Association:
    a. AAMA/WDMA/CSA 101/I.S.2/A440-11, 'North American Fenestration Standard/Specification for windows, doors, and skylights'.
2. ASTM International:
    a. ASTM C1036-11, 'Standard Specification for Flat Glass'.
    b. ASTM C1048-12, 'Standard Specification for Heat-Treated Flat Glass—Kind HS, Kind FT Coated and Uncoated Glass'.
3. Hardwood, Plywood, and Veneer Association:
    a. HPVA HP-1-2009 '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 commences.

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 is 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 One Approved VMR 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.

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.

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.
c. Color:
1) Match existing.
d. 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 window systems, including hardware, glazing, and caulking, as described in Contract Documents.

B. Related Requirements:
   1. Section 07 9213: 'Elastomeric Joint Sealant' for quality of sealants.
   2. Section 08 8100: 'Glass Glazing' for quality of glass glazing.

1.2 REFERENCES

A. Association Publications:
   1. American Architectural Manufacturers Association (AAMA):
      a. AAMA SFM 1-14, 'Aluminum Store Front and Entrance Manual'.
      b. AAMA 501-15, 'Methods of Test for Exterior Walls'.
      c. AAMA 609 & 610-15, 'Cleaning and Maintenance Guide for Architecturally Finished Aluminum' (combined documents).
      d. AAMA 611-14, 'Voluntary Standards for Anodized Architectural Aluminum'.
      e. AAMA 2605-13, 'Test Procedures for Superior Performing Organic Coatings on Aluminum Extrusions and Panels'.

B. Definitions:
   1. Glass Surface:
      a. Insulated glass unit:
         1) Surface 1: Exterior surface of outer lite.
         2) Surface 2: Interspace-facing surface of outer lite.
         3) Surface 3: Interspace-facing surface of inner lite.
         4) Surface 4: Interior surface of inner lite.
      b. Monolithic glass:
         1) Surface 1: Exterior surface.
         2) Surface 2: Interior surface.

C. Reference Standards:
   1. ASTM International:
      a. ASTM B221-14, 'Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes'.
      b. ASTM B456-11, '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 C920-14a, 'Standard Specification for Elastomeric Joint Sealants'.
      e. ASTM C1184-14, '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(2009), 'Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform Static Air Pressure Difference'.

2. Builders Hardware Manufacturers Association:
   a. BHMA A156.1, ‘Butts & Hinges'.
   b. BHMA A156.3, ‘Exit Devices'.
   c. BHMA A156.4, ‘Door Controls-Closers'.
   d. BHMA A156.5, ‘Cylinders and Input Devices for Locks'.
   e. BHMA A156.6, ‘Architectural Door Trim'.
   f. BHMA A156.18, ‘Materials and Finishes’.
   g. BHMA A156.21, "American National Standard for Thresholds’.
   h. BHMA A156.36, 'American National Standard for Auxiliary Locks'.
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 100-2014, 'Procedure for Determining Fenestration Product U-factors’.
5. National Fire Protection Association / American National Standards Institute:
   a. NFPA 101–2014, ‘Life Safety Code'.

1.3 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.
         2) Cleaning and maintenance instructions for reflective glazing.
      b. Warranty Documentation:
         1) Final, executed copy of Warranty.
            a) Storefront warranty.
      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.

1.4 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.

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.

1.5 DELIVERY, STORAGE, AND HANDLING

A. 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.

PART 2 - PRODUCTS

2.1 ASSEMBLIES

A. Manufacturers:
1. Category One VMR 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.
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 existing.
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. 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.

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 VMR 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).

C. Install exterior window units with through wall sill flashing.

D. 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.

E. Glazing Characteristics:
   1. Storefront Exterior Windows:
      a. Double pane with reflective surface.

3.4 FIELD QUALITY CONTROL

A. Non-Conforming Work: Non-conforming work as covered in the General Conditions applies, but is not limited to the following:
   1. Correct any work found defective or not complying with contract document requirements including 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 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.

3.6 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

SECTION 08 7101

COMMON FINISH HARDWARE REQUIREMENTS

PART 1 - GENERAL

1.1 SUMMARY

A. Includes But Not Limited To:
   1. General requirements for finish hardware related to architectural wood doors.

B. Related Requirements:
   1. Section 06 2024: 'Door, Frame, And Finish Hardware Installation' for installation of hardware.
   2. Section 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. American National Standards Institute / Builders Hardware Manufacturers Association:
      a. ANSI/BHMA A156.1-2013, 'Butts & Hinges'.
      b. ANSI/BHMA A156.5-2014, 'Cylinders and Input Devices for Locks'.
      c. ANSI/BHMA A156.6-2010, 'Architectural Door Trim'.
      d. ANSI/BHMA A156.12-2013, 'Interconnected Locks & Latches'.
      e. ANSI/BHMA A156.13-2012, 'Mortise Locks & Latches, Series 1000'.
      f. ANSI/BHMA A156.18-2012, 'Materials and Finishes'.
      g. ANSI/BHMA A156.21-2014, ''American National Standard for Thresholds'.
      h. ANSI/BHMA A156.30-2014, 'American National Standard for High Security Cylinders'.
      i. ANSI/BHMA A156.36-2010, 'American National Standard for Auxiliary Locks'.
   2. International Code Council / American National Standards Institute:
      a. ICC / ANSI A117.1-2009, 'Accessible and Usable Buildings and Facilities'.
   3. Underwriters Laboratories (UL):
      a. UL 10B, 'Fire Tests of Door Assemblies'.
      b. UL 10C, 'Positive Pressure Fire Tests of Door Assemblies'.

1.3 ADMINISTRATIVE REQUIREMENTS

A. Coordination:
   1. Hardware Templates:
      a. Provide hardware templates to Sections 08 1213 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. Category One VMR Approved Suppliers. See Section 01 6200 for definitions of Categories:
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.

2.2 FINISHES

A. Hardware Finishes:
1. Finishes for brass or bronze hardware items shall be:
a. ANSI / BHMA Finish Code 626.
1) Description: Satin Chromium Plated.
2) Base Metal: Brass. Bronze.
2. Finishes for flat goods items may be:
a. ANSI / BHMA Finish Code 630.
1) Description: Satin Stainless Steel.
2) Base Metal: Stainless Steel (300 Series).

3. Materials other than steel, brass, or bronze shall be finished to match appearance satin chromium plated, except flat goods which shall be satin stainless steel.

2.3 FASTENERS

A. Fasteners shall be of suitable types, sizes and quantities to properly secure hardware. Fasteners shall be of same material and finish as hardware unless otherwise specified. Fasteners exposed to weather shall be non-ferrous or corrosion resisting steel.

PART 3 - EXECUTION

3.1 PREPARATION

A. Before ordering materials, examine Contract Documents to be assured that material to be ordered is appropriate for thickness and substrate to which it is to be secured and will function as intended.

END OF SECTION

SECTION 08 7102

HANGING DEVICES

PART 1 - GENERAL

1.1 SUMMARY

A. Products Furnished But Not Installed Under This Section:
   1. Hinges for flush wood doors.

B. Related Requirements:
   1. Section 08 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, New Britain, CT www.stanleyworks.com.

B. Hinges:
   1. Sizes:
      a. 1-3/4 inch (45 mm) doors in metal frames:
         1) Standard: 4-1/2 inches by 4-1/2 inches (115 mm by 115 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

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.

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. Best Locks by Stanley, Indianapolis IN www.stanleysecuritysolutions.com.
      b. Marks USA, Amityville, NY www.marksusa.com.
      c. Sargent, New Haven, CT www.sargentlock.com.
      d. Schlage, Colorado Springs, CO www.schlage.com.
      e. 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 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 Facilities 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. Hager, St Louis, MO www.hagerhinge.com.
      b. Ives, Wallingford, CT www.iveshardware.com.
      c. Rockwood Manufacturing Co, Rockwood, PA www.rockwoodmfg.com.

B. Stops:
   1. Use wall type stops.
   2. Provide model appropriate for substrate. Wall stops may be either cast or wrought.
   3. Type Two Acceptable Products:

		Interior Wall
a.		
b.	Hager	236W
c.	Ives	WS407CCV
d.	Rockwood	409

      e. Equal as approved by Architect before Installation. See Section 01 6200.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Interface With Other Work: Coordinate installation with other door hardware.

END OF SECTION

SECTION 08 7109

ACCESSORIES

PART 1 - GENERAL

1.1 SUMMARY

A. Products Furnished But Not Installed Under This Section:
   1. Acoustical seals.
   2. Smoke Gaskets.
   3. Thresholds (metal) where required for wood 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: Match existing.
   2. Type One Acceptable Products:
      a. Door Bottom Shoe for Wood Door:
         1) 13VDkB by NGP.
         2) 211DV by Pemko.
      b. Equal as approved by Architect before bidding. See Section 01 6200.

C. Smoke Gaskets:
   1. Color: Match existing.
   2. Type One Acceptable Products:
      a. 726 by Hager.
      b. 5050 by NGP.
      c. PK55 by Pemko.
      d. Equal as approved by Architect before bidding. See Section 01 6200.

D. Thresholds:
   1. Type One Acceptable Products:
      a. Interior Doors at Acoustic Seals, Approved Products:
         1) (Carpet Separator Threshold) Carpet Both Sides:
            a) 505S-DBA by Hager.
            b) 414DKB by NGP.
            c) 236D by Pemko.
      b. 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 windows.

B. Related Requirements:
   1. Section 08 4113: Furnishing and installing of glazing in aluminum-framed storefront.

1.2 REFERENCES

A. Association Publications:
   1. Glass Association of North America (GANA):
      a. *'Glazing Manual'*.
      b. '*Laminated Glass Design Guide'*.
      c. *'Engineering Standards Manual'*.
   2. The Insulating Glass Manufactures Alliance (IGMA):
      a. IGMA TB-3001 'Sloped Glazing Guidelines.
      b. SIGMA TM-3000 'Glazing Guidelines for Sealed Insulating Glass Units'.

B. Definitions:
   1. Airspace: Space between lites of insulating glass unit that contains dehydrated air or other inert specified gas.
   2. Emissivity: Ability of surface to absorb heat and to reflect it. Lower emissivity, the less room heat is absorbed and more heat is reflected back into the room.
   3. 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.
   4. Insulation 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.
   5. 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.
   6. 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.
   7. Reflective Glass: Transparent metal coating applied to surface of glass to reduce amount of solar energy passing through it.
   8. 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.
   9. Solar Absorptance: Percent of incident solar radiation that is absorbed by window film/glass system. Lower the number, the less solar radiation absorbed.

10. 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.
11. Solar Reflectance (R): Percent of incident solar radiation that is reflected by window film/glass system. Lower the number, the less solar radiation reflected.
12. Solar Transmittance (T): Percent of incident solar radiation that is transmitted through window film/glass system. Lower the number, the less solar radiation transmitted.
13. 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.
14. Tinted Glass: Special type glass with additives, usually metallic particles that reduce passage of sunlight. Tinted glass can be bronze, gray, green or blue as well as other more exotic colors.
15. U-Factor: Overall heat transfer coefficient of glazing system. Measure of heat transfer that occurs through glazing system, and its outer and inner surfaces. This value is a function of temperature, and is expressed in BTU per square foot per hour per degree Fahrenheit (BTU/sq ft/hr deg F). Lower the U-Factor, the better insulation qualities of glazing system.
16. 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.
17. Ultraviolet Transmittance: Percent of ultraviolet light (UV) that is transmitted by window film/glass system. Lower the number, the less ultraviolet transmitted.
18. Visible Light Transmitted (VLT): Percent of total visible light (380-780 nanometers) that passes through glass. Lower the number, the less visible light transmitted.

C. Reference Standards:
1. American Architectural Manufacturers Association / Window & Door Manufacturers Association / Canadian Standards Association:
   a. AAMA 800-10, ‘Voluntary Specifications and Test Methods for Sealants’.
2. American National Standards Institute:
   a. ANSI Z97.1-2009, 'Safety Glazing Materials Used in Buildings - Safety Performance Specifications and Methods of Test’.
3. ASTM International:
   a. ASTM C1036-11, ‘Standard Specification for Flat Glass’.
   b. ASTM C1048-12, '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 C1281-14, ‘Standard Specification for Preformed Tape Sealants for Glazing Applications’.
   e. ASTM C1376-10, ‘Standard Specification for Pyrolytic and Vacuum Deposition Coatings on Flat Glass’.
   f. ASTM E2190-10, ‘Standard Specification for Insulating Glass Unit Performance and Evaluation’.
4. Consumer Products Safety Commission (CPSC):
   a. 16 CFR, Part 1201 CAT 1 and 11, 'Safety Standard for Architectural Glazing Materials'.
5. National Fenestration Rating Council (NFRC):
   a. NFRC 100-2014, "Procedure for Determining Fenestration Product U Properties'.
   b. NFRC 200-2014, 'Procedure for Determining Fenestration Product Solar Heat Gain Coefficient and Visible Transmittance at Normal Incidence'.
   c. NFRC 300-2014, 'Test Method for Determining Solar Optical Properties of Glazing Materials and Systems'.

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.
3. Glazing for Fire-Rated Door and Window Assemblies:
    a. 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.

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. PPG Industries, Pittsburgh, PA www.ppgglass.com or PPG Canada Ltd, Glass Division, Toronto, ON (416) 789-3331.

B. 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 PPG. (Solarban 70 at tinted pane.)
               (2) Equal product by Acceptable Manufacturer as approved by Architect before bidding. See Section 01 6200.
         3) Acceptable Manufacturers:
            a) AGC.
            b) Guardian.
            c) PPG.
            d) Equal as approved by Architect before bidding. See Section 01 6200.
      b. Reflective:
         1) Description:

a) Transparent metal coating applied to surface of glass to reduce amount of solar energy passing through it.

2) Design Criteria:
a) Meet requirements of ASTM C1376.

3) Type Two Acceptable Products:
a) Miiropane T.M Transparent Mirror by Pilkington.
b) Equal as approved by Architect in writing before installation. See Section 01 6200.

c. Glazing Below Door Height:
1) Design Criteria:
a) Tempered.
b) Meet requirements of ASTM C1048, Kind FT, Condition A, Type I, Class I, Quality Q3.

C. Fabrication:
1. Except where glass exceeds 66 inches (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

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 09 2226: 'Metal Suspension System' for furring on suspended ceilings.

1.2 REFERENCES

A. Association Publications:
   1. American Iron and Steel Institute (AISI):
      a. Cold-Formed Steel Design Manual, (2013 Edition) www.steelframing.org.
   2. Architectural Testing Inc. (ATI):
      a. ATI Evaluation Service, Code Compliance Research Report, www.architecturaltesting.com.
   3. International Code Council (ICC):
      a. ICC-ES Evaluation Reports, www.icc-es.org.
   4. Steel Framing Industry Association (SFIA):
      a. SFIA 'Technical Guide for Cold-Formed Steel Framing Products', www.sfia.net.
   5. 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 S220-11, '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 C645-14, 'Standard Specification for Nonstructural Steel Framing Members'.
      d. ASTM C754-15, 'Standard Specification for Installation of Steel Framing Members to Receive Screw-Attached Gypsum Panel Products'.
      e. ASTM C1513-13, 'Standard Specification for Steel Tapping Screws for Cold-Formed Steel Framing Connections'.
      f. ASTM E119-15, 'Standard Test Methods for Fire Tests of Building Construction and Materials'.

1.3 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.

1.4 QUALITY ASSURANCE

A. Regulatory Agency Sustainability Approvals:
1. ICC approved.

PART 2 - PRODUCTS

2.1 SYSTEMS

A. Manufacturers:
1. Manufacturer Contact List:
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. 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

SECTION 09 2226

METAL SUSPENSION SYSTEM: Gypsum Board

PART 1 - GENERAL

1.1 SUMMARY

A. Includes But Not Limited To:
   1. Furnish and install metal suspension system for supporting gypsum drywall in typical ceiling and soffit areas and to support items penetrating ceiling as described in Contract Documents including:
      a. Hanger wires, fasteners, main runners/tees, cross runners/tees, and wall molding/track.

B. Related Requirements:
   1. Section 09 2900: 'Gypsum Board'.
   2. Section 09 5116: 'Acoustical Tile Ceilings'.
   3. Section 26 5100: 'Interior Lighting' for electrical fixtures installed in ceiling.
   4. 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. May accommodate lighting fixtures or air diffusers.
   2. Clips: Designs to suit applications such as fire resistance, wind uplift and impact.
   3. Compression Post (Vertical Strut, Seismic Struts): Rigid member used to provide lateral force bracing of suspension system.
   4. Cross Runner, Cross Tee: Cross runner is secondary or cross beams of mechanical ceiling suspension system, usually supporting only acoustical tile. Cross tee is inserted into main runner to form different module sizes. In some suspension systems, however, cross runners also provide support for lighting fixtures, air diffusers and other cross runners.
   5. Hanger Wires: Wire employed to suspend acoustical ceiling from existing structure. Standard material is 12 gauge (0.105 inch - 2.70 mm) galvanized, soft annealed steel wire, conforming to ASTM A641/A641M. Heavier gauge wire is available for higher load carrying installations, or situations where hanger wire spacing exceeds 4 feet (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.
   6. Heavy-Duty Systems: Primarily used for installations in which the quantities and weights of ceiling fixtures (lights, air diffusers, etc.) are greater than those for ordinary commercial structure.
   7. Main Beam, Main Runner, Main Tee: Primary or main beams of type of ceiling suspension system in which structural members are mechanically locked together. Provide direct support for cross runners and may support lighting fixtures and air diffusers, as well as acoustical tile. Supported by hanger wires attached directly to existing structure; or installed perpendicular to

carrying channels and supported by specially designed sheet metal or wire clips attached to carrying channels.
8. Splay Wires: Wires installed at angle rather than perpendicular to grid.
9. Stiffening Brace: Used to prevent uplift of grid caused by wind pressure in exterior applications.

C. Reference Standards:
1. American Society of Civil Engineers/Structural Engineering Institute:
   a. ASCE/SEI 7-10, 'Minimum Design Loads for Buildings and Other Structures'.
2. ASTM International:
   a. ASTM A641/A641M-09a, 'Standard Specification for Zinc-Coated (Galvanized) Carbon Steel Wire'.
   b. ASTM A653/A653M-13, 'Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process'.
   c. ASTM A1008/A1008M-13, 'Standard Specification for Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, Solution Hardened, and Bake Hardenable'.
   d. ASTM C635/C635M-13a, 'Standard Specification for the Manufacture, Performance, and Testing of Metal Suspension Systems for Acoustical Tile and Lay-in Panel Ceilings'.
   e. ASTM C636/C636M-13, 'Standard Practice for Installation of Metal Ceiling Suspension Systems for Acoustical Tile and Lay-In Panels'.
   f. ASTM C645-13, 'Standard Specification for Nonstructural Steel Framing Members'.
   g. ASTM C754-11, 'Standard Specification for Installation of Steel Framing Members to Receive Screw-Attached Gypsum Panel Products'.
   h. ASTM C841-03(2013), 'Standard Specification for Installation of Interior Lathing and Furring'.
   i. ASTM D610-08(2012), 'Standard Practice for Evaluating Degree of Rusting on Painted Steel Surfaces'.
   j. ASTM E119-12a, 'Standard Test Methods for Fire Tests of Building Construction and Materials'.
   k. ASTM E580/E580M-11b, '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) (2015 edition):
   a. IBC 808.1.1.1, 'Suspended Acoustical Ceiling'.
4. International Code Council Evaluation Services (ICC-ES):
   a. AC156, 'Acceptance Criteria for Seismic Certification by Shake-table Testing of Nonstructural Components' (October 2010).
   b. AC368, 'Acceptance Criteria For Suspended Ceiling Framing Systems' (February 2012).
   c. ICC/ESR-1222, 'Suspended Ceiling System' (Reissued December 1, 2013).
   d. ICC/ESR-1289, 'Fire-Resistance-Rated And Nonfire-Resistance-Rated Suspended Ceiling System' (Reissued July 1, 2013).
   e. ICC/ESR-2631, 'Suspended Ceiling Framing Systems' (Reissued April 1, 2013).
5. Underwriters Laboratories (UL):
   a. UL 263: 'Standard for Fire Test of Building Construction and Materials' (14th Edition).
   b. UL 723, 'Standard for Safety Test for Surface Burning Characteristics of Building Materials' (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 drywall furring, light fixtures, HVAC equipment, and fire-suppression systems.
2. All work above ceiling should be completed prior to installing suspended system. There should be no materials resting against or wrapped around suspension system, hanger wires or ties.

1.4 SUBMITTALS

A. Action Submittals:

1. Product Data:
    a. Provide Manufacturer's technical literature on suspension system including listing dimensions, load carrying capacity and standard compliance.

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. Seismic Standard: Acoustical ceilings shall be designed and installed to withstand effects of earthquake motions according to following requirements:
    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. Manufacturer standard ten (10) years warranty on suspension system including repair or replacement of rusting as defined by ASTM D610.

PART 2 - PRODUCTS

2.1 SYSTEMS

A. Manufacturers:
1. Type One Acceptable Systems:
   a. Drywall Grid by Armstrong World Industries, Lancaster, PA www.armstrong.com.
   b. Drywall Grid System by Chicago Metallic Corporation, Chicago, IL www.chicagometallic.com.
   c. Drywall Suspension System - Flat Ceilings by USG, Chicago, IL www.usg.com.
   d. Equal as approved by Architect before bidding. See Section 01 6200.

B. Components:
1. Main Runners/Tee and Cross Runners/Tee:
   a. Heavy-duty in accordance with ASTM C635/C635M.
   b. Cold-formed from ASTM A653/A653M, CS Type B steel and hot dipped galvanized G-40 coating for interior ceilings.
   c. Double-Web construction.
2. Wall Track/Molding.
3. Fasteners:
   a. Nails are not permitted when subjected to direct tension such as installed vertically into bottom of structural member.
   b. Metal attachment:
      1) Acoustical Eye Lag Screws:
         a) 1/4 inch (6.4 mm) screws zinc coated with self-drilling or self-piercing sharp point.
   c. Wood attachment:
      1) Acoustical Eye Lag Screws:
         a) 3 inch (76 mm) x 1/4 inch (6.4 mm) screws zinc coated for wood joists with Type 17 self-drilling point.
   d. Wire Tie to Metal Structural Member attachment:
      1) Wire wrapped to structural member with pigtail knot with three (3) tight wraps within 3 inch (76 mm) length at top connection.
4. Hanger Wires, Braces, and Ties:
   a. Zinc-Coated, carbon-steel wire meeting requirements of ASTM A641/A641M, Class 1 zinc coating, soft temper.
   b. Size:
      1) Standard size: 12 gauge (0.105 inch) (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.
5. Seismic Joint Clip:
   a. 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.
6. Compression Posts/Struts:
   a. Meet seismic requirements for Project.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verification Of Conditions:
1. Inspect area receiving suspension system to identify conditions which will adversely affect installation.
   a. Work trades work to be thoroughly dry and complete prior to installation.

b. Verify weather tightness of area to receive suspension system prior to installation.
2. Notify Architect of unsuitable conditions in writing.
   a. Do not install suspension system until adverse conditions have been remedied.

3.2 INSTALLATION

A. Interface With Other Work:
1. All work above ceiling should be completed prior to installing suspended ceiling system including related work including: drywall furring work, acoustical tile, light fixtures, mechanical systems, electrical systems, and sprinklers.

B. General:
1. Install suspension system in accordance with Manufacturer's written instructions, and in compliance with ASTM installation standard, and applicable codes as required by AHJ with modifications listed below except where Manufacturer's instructions are more stringent:
   a. Main runners/tees hanger wires 48 inches (1 200 mm) on center maximum.
   b. Cross runners/tees hanger wires 24 inches (600 mm) on center maximum.
   c. Do not kink, twist, or bend hanger wires as a means of leveling assembly.
2. Hanger Wires:
   a. Install hanger wire to structure as required with necessary on center spacing to support expected ceiling load requirements, following local practices, codes and regulations. Attach with pigtail knot with three (3) tight wraps within 3 inch (76 mm) length at each end.
   b. Provide additional wires at light fixtures, grilles, and access doors where necessary by appropriate method in accordance with industry accepted practice.
   c. Additional Hanger Wires: Wrapped tightly three (3) full turns within 3 inch (76 mm) length to structure and component at locations where imposed loads could cause deflection exceeding 1/360 span.

C. Seismic:
1. Installation must be in accordance with ASCE 7.

D. Tolerances:
1. Main Runners/Tees:
   a. Installed and leveled to meet IBC requirements to within 1/4 inch (6.4 mm) in 10 foot (3.05 m) with supporting wire taut to prevent any subsequent downward movement of main runners when ceiling loads are imposed.
2. Cross Runners/Tees:
   a. Main runners, or other cross runners, must support cross runners to within 1/32 inch (0.8 mm) of required center-to-center spacing. This tolerance must be noncumulative beyond 12 feet (3.60 m).
   b. Intersecting runners must be installed to form right angle to supporting members.

3.3 FIELD QUALITY CONTROL

A. Field Inspections:
1. Inspect:
   a. Suspended ceiling system.
   b. Hanger wires, braces, ties, anchors and fasteners.

B. Non-Conforming Work:
1. Remove and replace defective materials at no additional cost to Owner.

END OF SECTION

SECTION 09 2900

GYPSUM BOARD

PART 1 - GENERAL

1.1 SUMMARY

A. Includes But Not Limited To:
   1. Furnish and install gypsum board as described in Contract Documents.

B. Related Requirements:
   1. Section 09 2216: 'Non-Structural Metal Framing'.
   2. Section 09 8114: 'Sound Deadening Board'.
   3. 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 C11-15, '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 C840-13, 'Standard Specification for Application and Finishing of Gypsum Board'.
      d. ASTM C1002-14, '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-14, '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 D5420-10, '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 E84-15, 'Standard Test Method for Surface Burning Characteristics of Building Materials'.
      k. ASTM E119-15, '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-216-10: ‘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’.
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 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.

1.4 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.

1.5 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.
h. Control Joint:
1) Bent zinc sheet with V-shaped slot, perforated flanges, covered with plastic tape meeting requirements of ASTM C1047.
2. 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.
3. Joint Reinforcing:
a. Paper reinforcing tape acceptable to Gypsum Board Manufacturer.
4. 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. 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 Under Acoustical Tile:
         a) GA-214 Level 2: 'All joints and interior angles shall have tape embedded in joint compound and wiped with a joint knife leaving a thin coating of joint compound over all joints and interior angles. Fastener heads and accessories shall be covered with a coat of joint compound. Surface shall be free of excess joint compound. Tool marks and ridges are acceptable. Joint compound applied over the body of the tape at the time of tape embedment shall be considered a separate coat of joint compound and shall satisfy the conditions of this level.
         b) Note: It is critical that gypsum board ceiling be smooth before installing ceiling tile. Drywall joints must be as specified in paragraph above.

2) 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'.

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 5116

ACOUSTICAL TILE CEILINGS

PART 1 - GENERAL

1.1 SUMMARY

A. Includes But Not Limited To:
   1. Furnish and install acoustical tile on backerboard as described in Contract Documents.

B. Related Requirements:
   1. Section 09 2226: 'Metal Suspension System' for Gypsum Board.
   2. Section 09 2900: 'Gypsum Board'.

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 installation.
      b. *'Production Guide'*: Practical reference for ceiling systems and estimating costs.

B. Definitions:
   1. Acoustical Tile: Prefinished material with various surface finishes installed in concealed suspension system or adhered to ceiling surface to provide improved sound absorption qualities.
   2. Acoustical Cement/Adhesive: Special type of adhesive or mastic used to stick up or adhere 12 inch x 12 inch (305 mm x 305 mm) acoustical tile to concrete or gypsum board.
   3. Absorption: Materials that have capacity to absorb sound. Absorption is the opposite of reflection.
   4. Bevel Edge: Acoustical tile is considered bevel edge when face of tile camfered at approximately 45 degree for 1/8 inch (3 mm) to 1/4 inch (6.4 mm) around the perimeter of tile.
   5. 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.
   6. Center Line: Line indicating midpoint of surface in either direction. Used as guide in starting ceiling.
   7. 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.
   8. Flame Spread: The propagation of flame over a surface.
   9. 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.
   10. Interior Finish: Interior finish includes interior wall and ceiling finish and interior floor finish.
   11. Kerf: Slit cut into midpoint of edge of tiles.
   12. Light Reflectance (LR): Percentage of light a surface reflected by ceiling surface expressed in decimal form.
   13. Mineral Base: Ceilings composed principally of mineral materials such as fibers manufactured from rock or slab, with or without binders.
   14. 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.

15. Smoke-Developed Index: Comparative measure, expressed as a dimensionless number, derived from visual measurements of smoke obscuration versus time for a material tested in accordance with ASTM E84 or UL 723.
16. 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).
17. 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.
18. Textured Pattern: Granular or raised (fine, coarse, or a blend), felted or matted surface as an integral part of the basic product or superimposed on the product surface.
19. Tile: Acoustical ceiling board, usually 12 inch x 12 inch (305 mm x 305 mm), which is stapled, cemented, or suspended by concealed grid system. Edges are often kerfed and cut back.

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 D1779-98(2011), 'Standard Specification for Adhesive for Acoustical Materials'.
   b. ASTM E84-15, 'Standard Test Method for Surface Burning Characteristics of Building Materials'.
   c. ASTM E795-05(2012), 'Standard Practices for Mounting Test Specimens During Sound Absorption Tests'.
   d. ASTM E1264-14, 'Standard Classification for Acoustical Ceiling Products'.
   e. ASTM E1414/E1414-11a, 'Standard Test Method for Airborne Sound Attenuation Between Rooms Sharing a Common Ceiling Plenum'.
   f. 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) (2009 and 2012 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).

1.3 SUBMITTALS

A. Action Submittals:
1. Samples:
   a. One (1) sample of each variant of specified tile series.

B. Informational Submittals:
1. Certificates:
   a. Installer(s):
      1) Provide each Installer's 'Certificate of Completion - LDS Duratile' from Manufacture showing Name and completion date with bid to be included in closing documents for project.
         a) Certificate is valid for two (2) years from date printed on Certificate before recertification is required.

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'.
3. Manufacturer Installations:
   a. Published installation recommendations.
4. Qualification Statement:
   a. Installer(s):
      1) Provide Qualification documentation unless waived by Owner.

C. Closeout Submittals:
1. Include following in Operations And Maintenance Manual specified in Section 01 7800:
   a. Warranty Documentation:
      1) Include final, executed copy of warranty.
   b. Record Documentation:
      1) Manufacturers Documentation:
         a) Manufacturer's literature on tile and adhesive.
         b) Color and pattern selection.
      2) Installer(s) ‘Certificate of Completion - LDS Duratile’ submitted at time of bid.

D. Maintenance Material Submittals:
1. Extra Stock Materials:
   a. Provide Owner with one (1) carton of each type of tile with same dye lot code.

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'.

B. Qualifications:
1. Installer: Requirements of Section 01 4301 applies, but not limited to following:
   a. Minimum five (5) years satisfactorily completed projects of comparable quality, similar size, and complexity including a minimum of three (3) years of experience in glue-up ceiling tile installations, and shall have satisfactorily completed glue-up installation(s) within in past three (3) years before bidding.
   b. Review, understand, and comply Installer Qualifications and submitted ‘DuraTile’ published installation recommendations provided by Manufacturer:
      1) Contact Armstrong CSA customer service center at (800) 442-4212 to obtain and review compliance package on DuraTile prior to bidding.
      2) This requirement may be waived by Owner, if Installer has previously complied with Installer Qualification requirements and can document at least two (2) satisfactorily completed projects of comparable size using Armstrong 12 inch x 12 inch (300 mm x 300 mm) ceiling tile for glue-up within past three (3) years prior to bidding.

3) Installer shall note complete compliance with Qualification requirements on submitted bid form.
4) Submit qualification documentation unless waived by Owner.

c. Agree to complete and pass 'LDS Duratile Personal Learning Module' (Certificate required for all Installer(s) for Church projects). Certification valid for two (2) years:
1) Go to http://www.armstrong.com/commceilingsna/#.
2) Click on My Armstrong Upper Right hand Corner.
3) First time users: Click on 'Register' button and provide all appropriate information for username and password (you must register as a contractor to have access to 'ELearning System).
4) Under My Armstrong Functions (left hand side), click on 'ELearning System'.
5) Click on 'LDS Duratile Video'.
6) Watch video and take Quiz (10 questions). Passing grade required for certificate.
7) Print Certificate.
8) Certificate must be submitted with Bid.
9) Submit 'Certificate of Completion LDS - Duratile'. Required for all projects and may not be waived by Owner.

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 acoustic tile 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. Store adhesive on site at installation temperature, between 65 and 90 deg F (18 and 32 deg C), for one week before installation.
4. Handle acoustical ceiling tiles 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. Temperature at time of setting tile shall be 50 deg F (10 deg C) minimum and 100 deg F (38 deg C) maximum.

1.7 WARRANTY

A. Manufacturer Warranty:
1. Provide Manufacturer's ten (10) year limited system warranty for the following:
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 SYSTEM

A. Manufacturers:
1. Manufacturer Contact List:
a. Armstrong World Industries, Strategic Accounts, Lancaster, PA www.ceilings.com.
1) For pricing and ordering of tile, contact Sherry Brunt, Phyllis Miller, or Beth Rinehart at (800) 442-4212, or Armstrongcsa@armstrong.com.
2) For Strategic Account information, contact Deborah Pickens at (480) 695-9053 dlpickens@armstrong.com.
b. Franklin International, Inc., Columbus, OH www.titebond.com.

B. Materials:
1. Description:
a. Size: 3/4 inch (19 mm) thick minimum by 12 inches (300 mm) square.
b. Color: White.
c. Grid Face: Tile glue-up.
d. Surface Finish: Factory-applied.
e. Wet-formed high density mineral fiber.
2. Design Criteria:
a. Meet requirements of ASTM E1264, Type III (mineral base with painted finish), Form 2 (water felted), Pattern CE (perforated, small holes – lightly textured), Fire Class A.
b. Acoustics:
1) Noise Reduction Coefficient (Rating expressed according to ASTM E1284 requirements:
a) NRC rating: 60 minimum.
2) CAC rating: 35 minimum.
c. Anti Mold / Mildew:
1) Resistance against growth of mold/mildew.
d. Durable:
1) Impact-resistant.
2) Scratch-resistant.
e. Tongue and Groove.
f. Finish:
1) Abuse-resistant/durable, factory applied vinyl latex paint.
g. Fire Performance:
1) Panels meet ASTM E84 or UL 723 Type 1 surface burning characteristics.
h. High Recycled Content (HRC): Classified as containing greater than 50 percent total recycled content.
i. Light Reflectance (LR): 0.86 Average (Range of 0.84 to 0.88).
j. Sag Resistance:
1) Resistance to sagging in high humidity conditions up to, but not including, standing water and outdoor applications.
k. Texture: Embossed texture with fine fissuring and small perforations with natural variation in texture and color appearance between tile.
l. VOC Emissions:
1) Low formaldehyde: Contributing less than 13.5 ppb in typical conditions per ASHRAE Standard 62, 'Ventilation for Acceptable Indoor Air Quality'.
3. Acoustic Tile:
a. Category Three National Account Approved Product. See Section 01 6200 for definitions of Categories:
1) DuraTile Item No. MN80377 by Armstrong.

C. Accessories:
1. Adhesive:
a. Description:
1) For use on acoustical ceiling tiles.
b. Design Criteria:

1) Meet requirements of ASTM D1779.
2) Meet NFPA Class A fire rating when tested in accordance with ASTM E84.
3) Fast grab and 'no sag' installation.
4) Water cleanup.
5) Not recommended for use on tiles larger than 12 inch x 12 inch (305 mm x 305 mm).

c. Type Two Acceptable Products:
1) Titebond No. 2704 Solvent Free Acoustical Ceiling Tile Adhesive by Franklin International.
2) Highest quality of adhesive from manufacturer recommended by Tile Manufacturer as approved by Architect before use. See Section 01 6200.

2. Edge Molding:
a. Steel 'U' molding with baked enamel finish.
b. Type Two Acceptable Products:
1) 7843 Series by Armstrong.
2) Equal as approved by Architect before installation. See Section 01 6200.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verification Of Conditions:
1. Inspect for defects in backing and support that are not acceptable.
a. Examine areas around HVAC diffusers and light fixtures for tile installation problems.
b. Examine ceiling for levelness. CISCA *'Code of Practice'* requires ceiling to be free of irregularities and be level to within 1/4 inch (6 mm) in 12 foot (305 mm).
c. Examine substrate for any problems that will compromise adhesion of ceiling tile.
2. Notify Architect in writing of unacceptable conditions.
3. Do not apply ceiling tile until defects in backing and support are corrected.

3.2 PREPARATION

A. Surface Preparation:
1. Follow Manufacturer recommendations for surface preparation:
a. Substrate must be clean, free of grease and dirt, sound, smooth, even and level before applying tile to surface.
b. Painted Surfaces: Avoid applying tile to newly painted ceiling.
c. Materials shall be dry and clean at time of application.

3.3 INSTALLATION

A. Special Techniques:
1. Installation shall be in accordance with Manufacturer's recommendations:
a. Do not install tile when room temperature exceeds or below recommended ambient conditions.
b. Tile is directional tile and must be installed in same direction of pattern running parallel to long dimension of each room.
c. Remove loose dust from back of tile and ceiling where adhesive is to be applied.
d. Prime 3 inch (75 mm) minimum circle near each corner by buttering very thin coat of adhesive.
e. Apply daub of adhesive to each corner. Daubs will be of sufficient size to form a circle 2-1/2 to 3 inches (63 to 75 mm) in diameter and 1/8 to 1/4 inch (3 to 6 mm) thick when tile is pressed firmly in place. Do not apply daubs so far in advance of installation that adhesive skins over.
f. Do not bend tile during installation.
2. Tile Layout:

a. Lay out tile symmetrically about center lines of room.
b. Lay out so tiles at room perimeters are at least 1/2 full tile size.
c. Leave tile in true plane with straight, even joints.
d. Tile joints shall be straight and in alignment, and exposed surface flush and level.
e. Furnish and install specified molding wherever tile has exposed edges or abuts walls, columns, and other vertical surfaces, except at curves of 3 inch (75 mm) radius or smaller.
f. Cut around penetrations that are not to receive moldings cleanly with sharp knife and at a slight angle away from cutout.

3. Ceiling mounted items:
   a. Locate light fixtures, speakers, and mechanical diffusers and grilles symmetrically in room and centered on tile centers or tile joints insofar as possible, unless shown otherwise.
   b. Keep method of locating ceiling mounted items as consistent as possible throughout building.
   c. Ceiling mounted item location method within each room shall always be consistent.

3.4 FIELD QUALITY CONTROL

A. Non-Conforming Work:
   1. Acoustical Tile. The following have been identified by the Manufacturer as tile defects, should not be installed, and will be replaced at no charge to Owner. Manufacturer will replace any material that does not meet product specifications. Installer to call 1 (800) 442-4212 immediately to report any tile discrepancies:
      a. Obvious Tile Defects:
         1) Gross surface defects or damage.
         2) Gross damage to edges and corners.
         3) Bevels without paint.
      b. Size Measurement:
         1) Tiles measure 12 inches (305 mm), plus or minus 1/32 inch (0.8 mm), measured across center of two (2) parallel sides.
      c. Squareness Measurement:
         1) Measure two (2) diagonals of an individual ceiling tile.
         2) Diagonal measurements need to be within 1/16 inch (1.6 mm) of each other. No more than 1/16 inch (1.6 mm) difference.
      d. Warp:
         1) Tiles specification is plus or minus 0.050 inch (1.27 mm) as measured in the center of tile.
   2. Installer:
      a. Substrate preparation and installation of ceiling tile not following CISCA Code of Practice will be unacceptable and considered defective and subject to replacement at no cost to Owner.

3.5 ADJUSTING

A. 'Touch-up' minor abraded surfaces.

3.6 CLEANING

A. Remove from site debris connected with work of this Section.

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 for 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 01 3100: 'Project Management and Control'.
3. Section 01 4000: 'Quality Requirements' for administrative and procedural requirements for quality assurance and quality control.
4. Section 01 4301: 'Quality Assurance – Qualifications' for minimum qualification levels required.
5. Section 01 7800: 'Closeout Submittal'.

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).
2. NSF International:
   a. NSF International, Ann Arbor, MI www.nsf.org.
      1) NSF 140-2015, 'Sustainability Assessment for Carpet'.
3. 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 D1335-12, 'Standard Test Method for Tuft Bind of Pile Yarn Floor Coverings'.
   b. ASTM D2646-11, '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 D3936-12, 'Standard Test Method for Resistance to Delamination of the Secondary Backing of Pile Yarn Floor Covering'.
   e. ASTM D5116-10, '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 D5848-10e1, 'Standard Test Method for Mass Per Unit Area of Pile Yarn Floor Coverings'.
   h. ASTM D6962-12, '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 E648-15, 'Standard Test Method for Critical Radiant Flux of Floor-Covering Systems Using a Radiant Heat Energy Source'.
   k. ASTM E662-15a, '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 ADMINISTRATIVE REQUIREMENTS

A. Coordination:
1. Coordinate completion of carpet installation with other trades.

B. 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. VMR Approved Carpet Manufacturers:
      1) Approval subject to VMR 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.

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, stairs, rostrum and stage ('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) Deseret Industries:
a) Office Areas:
(1) Owner Carpet Program Product: Provide fifteen (15) year minimum or Carpet Manufacturer's better Warranty on carpet system.

PART 2 - PRODUCTS

2.1 OWNER-FURNISHED PRODUCTS

A. Category One VMR 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 Flooring Inc., Dalton, GA www.tandus.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) Deseret Industries:
a) Office Areas:
(1) Antron Lumina and/or Legacy only.
d. Life Expectancy (Sheet Carpeting):
1) Deseret Industries:
a) Office Areas: fifteen (15) years minimum.
e. Modification Ratio:
1) Deseret Industries:

a) Office Areas: 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) Deseret Industries:
(1) Office Areas.

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.

C. Materials:
1. Carpet:
a. Category Four Approved Manufacturer and Color / Patterns. See Section 01 6200 for definitions of Categories:
1) Burgundy Scheme:
a) Tandus (formally CNA): Style 04346 Ensign, color DI 86172.
2. Carpet Base:
a. 4-1/2 inch (115 mm) wide base. Top edge of base serged with 1-1/4 inch (32 mm) polyester binding fabric to coordinate with Owner's color scheme. Roll edges of binding fabric under and sew along top edge of carpet cove base.
b. Category Four Approved Manufacturer, Style, and Color. See Section 01 6200 for definitions of Categories:
1) Burgundy Scheme:
a) Tandus (formally CNA): Style 04346 Ensign, color DI 86172.

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.

2.3 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 APPROVED INSTALLER

A. Category Four 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.

3.2 EXAMINATION

A. 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. Moisture vapor emission tests and alkalinity test of concrete slab has been preformed.
e. 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 Tests:
   1. Carpeting:
      a. See Section 09 0503 'Flooring Substrate Preparation' for Field Testing for Alkalinity and Concrete Moisture of concrete slab.

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.

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

SECTION 09 8114

SOUND DEADENING BOARD

PART 1 - GENERAL

1.1 SUMMARY

A. Includes But Not Limited To:
   1. Furnish and install sound deadening board in acoustically treated walls as described in Contract Documents.

B. Related Requirements:
   1. Section 09 2900: Gypsum Board.

1.2 REFERENCES

A. Reference Standards:
   1. ASTM International:
      a. ASTM C1002-07, '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.'

1.3 DELIVERY, STORAGE, AND HANDLING

A. Delivery And Acceptance Requirements:
   1. Remove from site boards that have been exposed to moisture during delivery.

B. Storage And Handling Requirements:
   1. Do not expose boards to moisture before installation.
   2. Remove from site boards that have been exposed to moisture during storage operations.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturer Contact List:
   1. Homasote Co, West Trenton, NJ www.homasote.com.
   2. Knight-Celotex, Northfield, IL www.aknightcompany.com.

2.2 MATERIALS

A. Sound Deadening Board:
   1. 5/8 inch (15.9 mm) thick with NRC of 0.20 minimum.
   2. Category Four Approved Products. See Section 01 6200 for definitions of Categories.
      a. 440 Sound barrier by Homasote.
      b. SoundStop by Knight-Celotex.

2.3 ACCESSORY PRODUCTS

A. Fasteners:

1. Bugle head screws meeting requirements of ASTM C1002:
   a. Steel Framing: Type S of length to penetrate steel framing 3/8 inch (9.5 mm) minimum.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verification Of Conditions:
   1. Examine substrate and verify framing is suitable for installation of sound deadening board.
   2. Notify Architect of unsuitable conditions in writing.
      a. Do not install board over unsuitable conditions.
   3. Commencement of Work by installer is considered acceptance of substrate.

3.2 PREPARATION

A. Separate boards and allow them to be exposed to Project environmental conditions for 24 hours minimum.

3.3 INSTALLATION

A. Fastening:
   1. Do not apply screws closer than 3/8 inch (9.5 mm) to ends or edges.
      a. Space screws not over 10 inches (255 mm) on center in field and 6 inches (150 mm) at ends and edges.
   2. Adjust power screwdriver to set heads in 1/32 inch (0.8 mm) dimple.
   3. Drive screws with shank perpendicular to face of board.

B. Single Layer Application:
   1. Edge joints to be parallel to and occur over framing members.
   2. Leave gap between boards as recommended by Manufacturer.

3.4 PROTECTION

A. Protect sound deadening board from moisture until completion of Project.

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 07 9213: 'Elastomeric Joint Sealants' for quality of Elastomeric Joint Sealants.
   2. Sections under 09 9000 heading ‘Paints and Coatings’.

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 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.

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.

1.4 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.

1.5 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.

1.6 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 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.

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 9112 'Exterior Painted Ferrous Metal'.
   2. Section 09 9114 'Exterior Painted CMU'.
   3. Section 09 9123 'Interior Painted Gypsum Board-Plaster'.
   4. Section 09 9124 'Interior Painted Metal'.
   5. Section 09 9324 'Interior Clear-Finished Hardwood'.

B. Category Four Colors. See Section 01 6200 for definitions of Categories:
   1. Interior:
      a. Interior Walls (See Section 09 9123):
         1) Match existing.
      b. Interior Door Frames (See Section 09 9124):
         1) Match existing.
      c. Interior Clear Finished Wood (See Section 09 9324):
         1) Match other interior clear finished wood building elements.
   2. Exterior Color Quality Standards:
      a. Exterior Lintels (See Section 09 9112):
         1) Match existing.
      b. Exterior CMU (See Section 09 9114):
         1) Match existing.

SECTION 09 9112

EXTERIOR PAINTED FERROUS METAL

PART 1 - GENERAL

1.1 SUMMARY

A. Includes But Not Limited To:
   1. Preparing and painting new exterior ungalvanized iron and steel surfaces as described in Contract Documents.

B. Related Requirements:
   1. Section 09 9001: 'Common Painting And Coating Requirements':
      a. 'Attachment: Paint Color Schedule' for Deseret Industries Projects.

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.

B. Description:
   1. New Surfaces: Use MPI(a) EXT 5.1M Waterborne Light Industrial Coating system .

C. Design Criteria:
   1. Systems specified are in addition to prime coats provided under other Sections of Project Manual.
   2. Finish Requirements: Use MPI Premium Grade finish requirements for work of this Section.
   3. Gloss / Sheen Level Required: Gloss Level 5.

D. Materials:
   1. All paints and coatings.
      a. Primer Coat: MPI Product 107, ‘Primer, Rust-Inhibitive, Water Based’.
      b. Finish Coats: MPI Product 163, ‘Light Industrial Coating, Exterior, Water Based, Semi-Gloss (MPI Gloss Level 5).

PART 3 - EXECUTION

3.1 APPLICATION

A. General: See appropriate paragraphs of Section 09 9001.

B. New Surfaces: Clean metal to be painted of rust, mill scale, grease, oil, and welding spatters, burrs, flux, slag, and fume. If all traces of rust cannot be removed, apply rust blocker recommended by Paint Manufacturer before applying primer coat.

END OF SECTION

SECTION 09 9114

EXTERIOR PAINTED CMU, CONCRETE, STUCCO

PART 1 - GENERAL

1.1 SUMMARY

A. Includes But Not Limited To:
   1. Preparing and painting new exterior masonry and concrete surfaces as described in Contract Documents.

B. Related Requirements:
   1. Section 09 9001: 'Common Painting And Coating Requirements':
      a. 'Attachment: Paint Color Schedule' for Deseret Industries Projects.

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. Concrete:
      a. New Surfaces: Use MPI(a) EXT 3.1A Latex Finish system.
   2. CMU:
      a. New Surfaces: Use MPI(a) EXT 4.2A Latex Finish system.

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

D. Materials:
   1. Block Filler, New CMU Only: MPI Product 4: ‘Block Filler, Latex, Interior/Exterior’.
   2. Finish Coats: MPI Product 10: ‘Latex, Exterior Flat (MPI Gloss Level 1-2)’.
   3. Accent Stripe: MPI Product 164: 'Light Industrial Coating, Exterior, Water Based, Gloss (MPI Gloss Level 6)'.

PART 3 - EXECUTION

3.1 PREPARATION

A. Except for steam cured products, cure cement type surfaces from 60 to 90 days in accordance with Paint Manufacturer's recommendations before painting.

3.2 APPLICATION

A. General: See appropriate paragraphs of Section 09 9001.

B. New Surfaces:
   1. On highly porous surfaces when weather is exceptionally hot and dry, it may be desirable to dampen surface before applying first coat of an emulsion paint.
   2. Completely cover voids in masonry block.
   3. Roll after spraying if necessary to eliminate pinholing.

END OF SECTION

SECTION 09 9123

INTERIOR PAINTED GYPSUM BOARD, PLASTER

PART 1 - GENERAL

1.1 SUMMARY

A. Includes But Not Limited To:
   1. Preparing, priming, and finish painting new interior gypsum board 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 texturing.
   2. Section 09 9001: 'Common Painting And Coating Requirements':
      a. 'Attachment: Paint Color Schedule' for Deseret Industries Projects.
   3. Section 09 9413: 'Interior Textured Finishing' for textured finishes.

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. 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) Gloss Level 5.

D. Materials:
   1. Primers:
      a. MPI Product 50, 'Primer Sealer, Latex, Interior'.
   2. Finish Coats:
      a. 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 09 9001: 'Common Painting And Coating Requirements':
      a. 'Attachment: Paint Color Schedule' for Deseret Industries Projects.

PART 2 - PRODUCTS

2.1 SYSTEM

A. Manufacturers:
   1. Category Four Approved Products and Manufacturers. See Section 01 6200 for definitions of Categories.
      a. Products listed in edition of MPI Approved Product List current at time of bidding and later are approved, providing they meet VOC requirements in force where Project is located.

B. Description:
   1. Ferrous Metal:
      a. New Surfaces: Use MPI(a) INT 5.1B Waterborne Light Industrial Finish system.
   2. Galvanized Metal:
      a. New Surfaces: Use MPI(a) INT 5.3J Latex Finish system

C. Performance:
   1. Design Requirements:
      a. New Surfaces: MPI Premium Grade finish requirements.
      b. Gloss / Sheen Level Required: 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’.
   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 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 08 1429: 'Interior Flush Wood Doors'.
   2. Section 09 9001: 'Common Painting And Coating Requirements':
      a. 'Attachment: Paint Color Schedule' for Deseret Industries Projects.

1.2 REFERENCES

A. 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), 1st Edition, 2009.

1.3 SUBMITTALS

A. 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. Stain: MPI 90, 'Stain, Semi-Transparent, for Interior Wood'.
   2. 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.

3. Color:
   a. Design Criteria:
      1) Finish to match existing.

B. Performance:
   1. Design Criteria: General: See appropriate paragraphs of Section 09 9001.

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 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:
   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. Light Orange Peel: Sprayed texture leaves light splatter on walls. Resembles peel of orange. If done with fine spray, can be one of the lightest, least noticeable of the texture styles.

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. Light Orange Peel Texture.

B. Finishing:
   1. Light Orange Peel Texture:
      a. After gypsum board is taped, sanded, and primed, apply texture. Closely match existing.

END OF SECTION

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. Make electrical connections to equipment provided under other Sections.

1.2 REFERENCES

A. Reference Standards:
   1. National Fire Protection Association / American National Standards Institute:
      a. NFPA 70, National Electric Code (NEC).
   2. National Electrical Manufacturing Association Standards (NEMA):
      a. NEMA 250, ‘Enclosure for Electrical Equipment (1000 Volts Maximum)’.

1.3 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'.
      c. Do not purchase equipment before approval of product data.

B. Informational Submittals:
   1. 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.

1.4 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 - PRODUCTS: Not Used.

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

3.3 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.

3.4 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.

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 (Fire) 70, 'National Electric Code (NEC)' (2014 Edition 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 and panels, use painted or taped band or color tag color-coded as specified above.

B. Standard Connectors:
1. Conductors No. 8 And Smaller: Steel spring wire connectors.
2. Conductors Larger Than No. 8: Pressure type terminal lugs.

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.

END OF SECTION

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.

B. Related Requirements:
   1. Section 26 0501: 'Common Electrical Requirements' for general electrical requirements'.
   2. Section 27 1501: ‘Communications Horizontal Cabling’ for raceway for telephone and data systems.

1.2 REFERENCES

A. Reference Standards:
   1. National Fire Protection Association:
      a. NFPA (Fire) 70, ‘National Electric Code (NEC)’ (2014 Edition or most recent edition adopted by AHJ including all applicable amendments and supplements).
   2. Telecommunications Industry Association:
      a. TIA-569, 'Telecommunications Pathways And Spaces' (Revision D, 2015).
   3. Underwriters Laboratories:
      a. UL 498, 'Attachment Plugs and Receptacles' (15th Edition, 2012).

1.3 QUALITY ASSURANCE

A. Qualifications:
   1. Manufacturer Qualifications:
      a. Firms regularly engaged in manufacturer of raceway and box distribution products and systems of types and sizes required, whose products have been in satisfactory use in similar service for not less than ten (10) years.

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.
      c. Square D, Palatine, IL www.squared.com.
      d. Thomas & Betts, Memphis, TN www.tnb.com.
      e. Walker Systems Inc, Williamstown, WV (800) 240-2601.
      f. Wiremold Co, West Hartford, CT www.wiremold.com.

B. Materials:
   1. Raceway And Conduit:

a. Sizes:
   1) 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), Flexible Steel Conduit, and Electrical Non-Metallic Tubing (ENT):
      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) Schedule 40 Polyvinyl Chloride (PVC) Conduit:
      a) Allowed only for exterior underground use unless indicated otherwise on drawings for connection to in-slab equipment or boxes.
   4) Listed, Liquid-Tight Flexible Metal Conduit:
      a) Use in outdoor final connections to mechanical equipment, length not to exceed 36 inches (900 mm).
   5) 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. PVC Conduit:
      1) PVC type. Use PVC adapters at all boxes.
      2) PVC components, (conduit, fittings, cement) shall be from same Manufacturer.
   d. Flexible Steel Conduit: Screw-in type.
   e. Liquid-tight Flexible Metal Conduit: Sealtite type.
   f. Expansion fittings shall be equal to OZ Type AX sized to raceway and including bonding jumper.
   g. Prohibited Fitting Materials:
      1) Crimp-on, tap-on, indenter type fittings.
      2) Cast set-screw fittings for EMT.
      3) Spray (aerosol) PVC cement.
3. Non-Metallic Surface Raceway:
   a. Rigid PVC with white finish.
   b. Two-piece, base and snap-on cover, and complete with accessories and fittings necessary for complete installation.
   c. Type One Acceptable Products:
      1) Wiremold 800 Series
      2) Equal as approved by Architect before bidding. See Section 01 6200.
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.
   b. Non-metallic boxes may be used only for control voltage wiring systems.
   c. Telephone / data outlet boxes shall be single device outlet boxes.

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.
2. Examine conditions under which raceways and boxes are to be installed. Do not proceed with installation until substrates have been properly prepared and deviations from Manufacturer's recommended tolerances are corrected.
3. Notify Architect in writing if substrates are not acceptable to install raceways and boxes.
   a. Commencing installation constitutes acceptance of existing conditions.

3.2 PREPARATION

A. Prepare substrates using methods recommended by manufacturer for achieving best result for substrate under project conditions.

3.3 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.
   a. Coordinate location of outlets adjacent to or in millwork with Division 06 before rough-in. Refer conflicts to Architect and locate outlets under his direction.
2. Install pull wires in raceways installed under this Section where conductors or cables are to be installed under other Divisions.

B. Conduit And Raceway:
1. Conceal conduit and raceways within ceilings and walls, except at Contractor's option, conduit and raceways 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. Bend PVC conduit by hot box bender and, for PVC 2 inches (50 mm) in diameter and larger, expanding plugs. Apply PVC adhesive only by brush.
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. Installation of raceway beneath or embedded in concrete, except where explicitly shown on Contract Documents.
   b. Use of wooden plugs inserted in concrete or masonry units for mounting raceway, supports, boxes, cabinets, or other equipment.
   c. Installation of raceway that has been crushed or deformed.
   d. Use of torches for bending PVC.
   e. Spray applied PVC cement.
   f. Boring holes in truss members.
   g. Notching of structural members.
   h. Supporting raceway from ceiling system support wires.
   i. Nail drive straps or tie wire for supporting raceway.

C. Telephone / Data Systems:
   1. Install raceway from terminal board to each telephone and data outlet as indicated on Contract Drawings.
   2. Conduit to stub from each terminal or telephone and data outlet to above accessible ceiling.

D. 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.

3.4 REPAIR

A. Touch-up, repair or replace damaged products before completion of project.

3.5 CLEANING

A. General:
   1. Clean exposed surfaces using non-abrasive materials and methods recommended by manufacturer.

3.6 PROTECTION

A. Protect installed products until completion of project.

END OF SECTION

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.
   2. Label data ports to identify feed point.

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

PART 2 - PRODUCTS

2.1 COMPONENTS

A. Manufacturers:
   1. Manufacturers List:
      a. Cooper Wiring Devices, Peachtree City, NY 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.
      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.
      h. Lightolier Controls, Callas, TX www.lolcontrols.com.
      i. Lutron Electronics Co Inc, Coopersburg, PA www.lutron.com.
      j. Novitas Inc, Peachtree City, GA www.novitas.com.
      k. Paragon Electric Co Inc, Carol Stream, IL www.icca.invensys.com/paragon.
      l. Pass & Seymour, Syracuse, NY www.passandseymour.com.
      m. Red Dot div of Thomas & Betts, Memphis, TN www.tnb.com
      n. Schneider Electric North America, Palatine, IL www.schneider-electric.com (847) 397-2600.
      o. Sensorswitch, Wallingford, CT www.sensorswitch.com.
      p. Square D Co, Palatine, IL www.us.squared.com.
      q. Suttle, Hector, MN www.suttleonline.com.
      r. Tork Inc, Mount Vernon, NY www.tork.com.
      s. 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.

B. Switches:
   1. Standard Style:
      a. Category Four Approved Products. See Section 01 6200 for definitions of Categories:
         1) Two Pole:
            a) Cooper: 2222W.
            b) Hubbell: HBL1222-WA.
            c) Pass & Seymour: PS20AC2-W.
            d) Leviton: 1222-2W.

C. Receptacles:
   1. Standard Style:

a. 15 AMP, specification grade, back and side wired, self grounding.
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: 5252W.
2) Hubbell: HBL5252WA.
3) Leviton: 5252-W.
4) Pass & Seymour: 5252-W.

D. Plates:
1. Standard Cover Plates:
a. Finished Areas:
1) Nylon or high impact resistant thermoplastic.
2) Color shall match wiring device.
b. Unfinished Areas: 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. Wall, Infrared box type:
a. Operable on 120 or 277 V systems.
b. Category Four Approved Products. See Section 01 6200 for definitions of Categories:
1) Cooper Controls: OSW-P-1001-MV-W.
2) Hubbell: LHIRS1W.
3) Leviton: ODS10-IDW.
4) Pass & Seymour: OS300S-W.
5) Schneider Electric: SLSPWS1277CW.
6) Sensorswitch: WSD-V-WH.
7) Watt Stopper: PW-100-W.

PART 3 - EXECUTION

3.1 INSTALLATION

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

END OF SECTION

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'.

C. Reference Standards:
   1. American National Standards Institute (ANSI):
      a. ANSI C78.377-2015, '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. Manufacturer Contact List:
      a. Advance Transformer Co, Rosemont, IL www.advancetransformer.com.
      b. Cooper Wiring Devices by Eaton, Peachtree City, GA www.cooperindustries.com.
      c. General Electric Lighting, Hendersonville, NC or General Electric Lighting Canada Inc, Mississauga, ON www.gelighting.com/na.
      d. Howard Lighting Products, Laurel, MS www.howard-ind.com.
      e. Novitas Inc, Peachtree City, GA www.novitas.com.
      f. Osram Sylvania, Danvers, MA www.sylvania.com or Osram Sylvania Ltd, Mississauga, ON (905) 673-6171.
      g. Philips Lighting Co, Somerset, NJ www.lighting.philips.com/nam or Philips Lighting Canada, Scarborough, ON (416) 292-3000.
      h. Universal Lighting Technologies, Nashville, TN www.universalballast.com.
      i. Venture Lighting International, Solon, OH www.venturelighting.com.
      j. Watt Stopper Inc, Santa Clara, CA www.wattstopper.com.
      k. Westinghouse Lighting Corp, Philadelphia, PA www.westinghouselightbulbs.com.
   2. 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) Equals as approved by Architect before bidding. See Section 01 6200.
   2. Fluorescent Ballasts:

a. Energy saving electronic for T8 lamps:
1) Program rapid start type.
2) Parallel circuit type.
3) Minimum power factor of 95 percent.
4) Maximum total harmonic distortion of 10 percent.
5) Operation of lamps in compliance with Lamp Manufacturer's recommendations.
6) Minimum starting temperature 0 deg F (minus 17.8 deg C) for T8 lamps.
7) Class A sound rating.
8) Transient protection in accordance with IEEE / ANSI C62.41.1, Category A.
9) Comply with FCC 47 CFR Part 18.
10) Ballast factor of 0.78.
11) Maximum crest factor of 1.7.
12) Five year full replacement warranty including labor allowance for replacement.
13) Input voltage to match system voltage.
14) Category Four Approved Products and Manufacturers. See Section 01 6200 for definitions of Categories:
a) IOP2PSP32LWSC by Advance.
b) GE32-MVPS-L by General Electric.
c) QHE-UNV-PSX-SC by Osram / Sylvania.

3. Lamps:
a. T8 Fluorescent Lamps:
1) Minimum initial output of 3100 Lumens.
2) Rated life of 40,000 hrs at 3 hrs per start for lamps operated on instant start ballasts.
3) Minimum CRI 85.
4) Meet Federal TCLP criteria.
5) Category Four approved Manufacturers. See Section 01 6200 for definitions of Categories:
a) General Electric.
b) Howard.
c) North American Philips.
d) Osram / Sylvania.
6) Correlated Color Temperature: 3000k.
b. Other Lamps:
1) Category Four Approved Manufacturers. See Section 01 6200 for definitions of Categories:
a) General Electric.
b) North American Philips.
c) Osram / Sylvania.
d) Westinghouse.
c. 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.

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.

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

C. Fasten lay-in fluorescent fixtures to ceiling suspension system on each side with bolts, screws, rivets, or clips. In addition, connect lay-in fixtures with two (2) No. 12 gauge diagonal wires with three (3) turns each end; two (2) 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 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.

3.2 ADJUSTMENT

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

END OF SECTION

SECTION 27 1501

COMMUNICATIONS HORIZONTAL CABLING

PART 1 - GENERAL

1.1 SUMMARY

A. Includes But Not Limited To:
   1. Furnish, install, and test communications horizontal cabling as described in Contract Documents including following:
      a. Cables and related terminations.
      b. Patch cords and modular connectors.
      c. Surface raceway and outlet poles.
      d. Support and grounding hardware.
      e. UTP Cable.
      f. UTP Patch cords.
      g. UTP Connector Modules.

B. Related Requirements:
   1. Division 26: Raceways and surface boxes.

C. Related Requirements:
   1. Section 01 6400: Owner will provide Network Equipment. Contract Documents establish quality of materials and installation for information of Contractor, Architect, and Owner's Representatives. Design Criteria in PART 2 of this Section identifies Contractor's responsibility for Owner Network Equipment.

1.2 REFERENCES

A. Association Publications:
   1. British Standards Institution (BSI):
      a. BS EN 50310:2006, 'Application of Equipotential Bonding and Earthing in Buildings with Information Technology Equipment'.
   2. Building Industry Consulting Service International (BISCI:
      a. *Information Transport Systems Installation Methods Manual* (ITSIMM) (5th Edition).
      b. *Telecommunications Distribution Methods* Manual (TDMM) (12th Edition).
   3. Institute of Electrical and Electronics Engineers:
      a. IEEE 802.3-2012, *'Standard for Ethernet'*.
      b. IEEE 1100-2005, '*Recommended Practice for Powering and Grounding Electric Equipment*'.
   4. Telecommunications Industry Association:
      a. TSB-162, 'Telecommunication Cabling Guidelines for Wireless Access Points' (March 2006).

B. Reference Standards:
   1. International Electrotechnical Commission:
      a. IEC 60603-7:2011, 'Connectors for electronic equipment – Part 7 'Detail specification for 8-way, unshielded, free and fixed connectors'.
   2. International Organization for Standardization / International Electrotechnical Commission:
      a. ISO/IEC 11801:2002/Amd 2:2010, 'Information Technology-Generic Cabling for Customer Premises'.
   3. National Fire Protection Association:
      a. NFPA 70–2014, 'National Electrical Code'.
   4. Telecommunications Industry Association:
      a. TIA-568-C.2, 'Balanced Twisted-Pair Telecommunications Cabling and Components Standards' (Revision C, 2009).
      b. TIA-569, 'Telecommunications Pathways And Spaces' (Revision D, 2015).
      c. TIA-606, 'Administration Standard for Telecommunications Infrastructure' (Revision B, 2012).

d. TIA-607, 'Telecommunications Bonding and Grounding (Earthling) for Customer Premises' (Revision C, 2015).
e. TIA-758, 'Customer-Owned Outside Plant Telecommunication Infrastructure Standard' (Revision B, 2012).
f. TIA-942, 'Telecommunications Infrastructure Standard for Data Centers' (Revision A, 2014).
g. TIA-1152, 'Requirements for Field Test Instruments and Measurements for Balanced Twisted-Pair Cabling' (2009 Edition).

5. Underwriters Laboratories:
   a. UL 94: The Standard for Safety of Flammability of Plastic Materials for Parts in Devices and Appliances Testing (March 2013 6th Edition).
      1) 94HB, 'Horizontal Burn Test'.

1.3 ADMINISTRATIVE REQUIREMENTS

A. Coordination:
   1. Coordinate with Project Manager and/or Facility Manager well in advance of Substantial Completion for installation of all Owner Furnished Network Equipment.

1.4 SUBMITTALS

A. 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.
      b. Warranty Documentation:
         1) Final, executed copy of Warranty.
      c. Record Documentation:
         1) Manufacturers documentation:
            a) Manufacturer's literature or cut sheet.
            b) Include (3) copies approved shop drawings
         2) Tests and evaluation reports.
         3) As-built Documentation:
            a) Provide record document to include cable routes and outlet locations.
               (1) Sequential number shall identify outlet locations.
               (2) Numbering, icons, and drawing conventions used shall be consistent throughout all documentation.
               (3) Provide labeling system information.

B. Maintenance Material Submittals:
   1. Extra Stock Materials:
      a. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents:
         1) Device Plates: One of each type.

1.5 QUALITY ASSURANCE

A. Regulatory Agency Sustainability Approvals:
   1. System shall meet approval of authority having jurisdiction (AHJ). NEC and State and/or local ordinances and regulations shall govern unless more stringent requirements are specified.
   2. Meet all TIA/EIA commercial building wiring standards.
   3. Meet Telecommunications Distribution Methods Manual (TDMM) (12th Edition) requirements for installation and testing.
   4. All Networks shall be installed per applicable standards and manufacturer's guidelines.
   5. 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.

6. Grounding shall conform to all required Commercial Building Grounding and Bonding Requirements for Telecommunications, Electrical Codes, and Manufacturer's grounding requirements.

B. Qualifications: Requirements of Section 01 4301 applies, but is not limited to following:
   1. Manufacturer Qualifications:
      a. Provide single source for all products of system:
         1) KeyConnect by Belden.
         2) Netkey by Panduit.
         3) System 6 by Siemon.
         4) Uniprise Media 6 by CommScope.
   2. Installers Qualifications:
      a. Approved and Certified by Manufacturer (installation and maintenance trained):
         1) Belden Certified System Vendor (CSV).
            a) Belden Certified LDS Partner.
         2) CommScope Certified Business Partner.
            a) CommScope Certified LDS Partner.
         3) Panduit Certified Installer (PCI).
         4) Siemon Certified Installers (CI).
      b. Three (3) year experience with similar projects. Provide documentation.

1.6 WARRANTY

A. Special Warranty:
   1. Cabling System:
      a. Provide warranty for permanent link cabling system to meet Category 6 standard requirements for structured cabling system for twenty (20) years.
   2. Installer Warranty:
      a. Installer guarantees that all work is in accordance with all express and implied requirements of Contract Documents, that all work is of good quality, and further warrants work and material for period of (1) year from date of substantial completion of project, unless longer period of time is specified in Contract. All work not conforming to these requirements, may be considered defective:
         1) If, within one (1) year after substantial completion of work, or within such longer period of time as may be prescribed by law or by terms of any warranty in Contract, any of work is found to be defective or not in accordance with Contract, Installer shall at Installer cost correct it promptly after receipt of written notice from Owner.
         2) Installer's obligation shall survive termination of Contract.
         3) Owner shall give such notice within reasonable time after discovery of condition.
      b. Installer warrants to Owner that all materials and equipment furnished under this Contract shall be new unless otherwise specified, free from faults and defects and in conformance with Contract Documents:
         1) Contractor shall secure manufacturer's warranties and deliver copies thereof to Owner upon completion of work.
         2) All such warranties shall commence from date of substantial completion, and will not in any way reduce Installer's responsibilities under his Contract.
         3) Whenever guarantees or warranties are required by specifications for longer period than one year, such longer period shall govern.
      c. Installer will provide twenty (20) year minimum end to end manufacturer warranty.

PART 2 - PRODUCTS

2.1 OWNER-FURNISHED PRODUCTS

A. Category Four Products. See Section 01 6200 for definitions of Categories:
   1. Coordination:

a. Coordinate installation of all Owner Furnished Network Equipment including but not limited to:
   1) Installation and configure devices in accordance with LDS requirements.
   2) Proper set-up of network equipment.
   3) Testing of network equipment.

2.2 SYSTEMS

A. Manufacturers:
   1. Category Four Approved Manufacturers and Products. See Section 01 6200 for definitions of Categories:
      a. Belden, St. Louis, MO www.belden.com.
      b. Panduit Corporation, Tinley Park IL www.panduit.com.
      c. Systimax Solutions, a CommScope Company, Hickory, NC www.systimax.com.
      d. The Siemon Company, Watertown, CT www.siemon.com.

B. Design Criteria:
   1. Must install single manufacture as complete permanent link.
      a. Category 6 minimum compliance margin on all parameters beyond category 6 and Power Sum ACR out to 250 MHz.
   2. Entire Category 6 system to be provided by single approved Manufacturer throughout.
   3. Install structured cabling system that will be able to support interconnections to active telecommunications equipment for voice and data applications in multi vendor, multi product environment. Structured cabling system should adhere to TIA-568, TIA-606; TIA-607, and TIA-942 standards with respect to pathways, distribution, administration, and grounding of the system.
   4. Each room drop will consist of two drops each consisting of two terminations can be interoperable to accommodate either voice or data applications. Provide convenience phone drops that will consist of single termination that will be installed in proper faceplate for each location's phone.
   5. Install, terminate, test, and guarantee each drop according to customer all applicable standards and customer preferences.
   6. Horizontal cables will be rated Category 6 (250 MHz) in performance and rated to comply with TIA-568 to connector outlets at Work Area. Horizontal cables will home run back to Technology Room (Entrance Facility / Main Cross Connect) and will terminate on individual Category 6 rated jacks to populate modular 48 port angled patch panel on open or flat patch panel inside enclosures. All cables will be patched at cutover as interconnection into floor serving active equipment using RJ45 modular equipment cables rated to Category 6.
   7. Match additions to horizontal raceway to complete system according to TIA-568 where suspension and protection gaps exist.

C. Components – Work Area Subsystem:
   1. Provide connectivity equipment used to connect horizontal cabling subsystem and equipment in work area. Both copper and fiber media shall be supported. Connectivity equipment shall include following options:
      a. Patch (equipment) cords and modular connectors.
      b. Outlets and surface mount boxes.
      c. Surface raceway and outlet poles.
      d. Consolidation point / MUlO.
   2. Patch Cords and Modular Connectors:
      a. Match horizontal cabling medium and rating. Same Manufacturer shall provide modular connectors and patch cords. Total patch cord length at work area is not to exceed 10 feet (3.0 m).
      b. Copper Connectivity:
         1) Network Cabling System:
            a) Provide for Work Area subsystem, including all modular connectors.
            b) Modular connectors shall support of high-speed networks and applications designed for implementation on copper cabling.
            c) Outlets shall utilize fully interchangeable and individual connector modules that mount side-by-side to facilitate quick and easy moves, adds and changes.
         2) Modular Connections:

a) Data Modules shall be Category 6:
(1) Eight position modules required in all work areas and shall exceed connector requirements of TIA Category 6 standard.
(2) Prove termination cap with strain relief on cable jacket, ensure cable twists are maintained to within 1/8 inch (3 mm) and include wiring scheme label. Wiring scheme label shall be available with TIA-568 wiring schemes.
b) Terminations shall use for TIA-568 wiring scheme.
c) Modules shall terminate 4 pair 23 100-ohm solid unshielded twisted pair cable.
d) Modules shall meet ISO 11801 standard including complying with intermateability standard IEC 60603-7 for backward compatibility.
e) Category 6 modules shall have UL and CSA approval.
f) Modules shall have ETL verified Category 6 performance and ISO 11801 Class E performance in both basic and channel links.
g) Modules shall be universal in design, accepting 2, 3, or 4 pair modular plugs without damage to outer jack contacts.
h) Modules shall be able to be re-terminated minimum of 10 times and be available in 11 standard colors for color-coding purposes.
i) Jack shall snap into all outlets and patch panels.
j) Module shall include black base to signify Category 6 400 MHz performance.

3) Patch Cords:
a) Category 6 patch cords 'shall be factory terminated with modular plugs featuring one-piece, tangle-free latch design and strain-relief boots to support easy moves, adds, and changes.
b) Constructed with Category 6 23-AWG stranded UTP cable.
c) Each patch cord shall be one hundred (100) percent performance tested at factory in channel test to TIA Category 6 standard.
d) Patch cords shall come in standard lengths of 3, 5, 7, 9, 14 and 20 feet (0.90, 1.50, 2.15, 2.75, 4.20 and 6.1 meters) and 6 standard colors of Blue or White.
e) Provide one (1) each 8 feet (2.45 m) patch cord for 50 percent of terminated work station ports.

3. Outlets and Surface Mount Boxes:
a. Outlets and surface mount boxes shall support network system by providing high-density in-wall, surface mount cabling applications.
b. Provide faceplates for flush mount:
1) Outlets faceplates shall be manufactured from high-impact thermoplastic material with UL 94 flammability rating of 94 HB or better.

4. Copper Cable:
a. Design Criteria:
1) Performance exceeds all TIA-568 Category 6 and ISO 11801 for Class E cable requirements.
2) ETL tested and verified for Category 6 component performance.
3) Conductors are twisted in pairs with four pairs contained in flame retardant PVC jacket separated by a spline.
4) Performance tested to 650 MHz.
5) Plenum (CMP) and non-plenum/riser (CMR) flame rated.
6) Maximum installation tension of 25 lbs (110 N).
7) Installation temperature range: 32 deg F (0 deg C) to 140 deg F (60 deg C).
8) Operating temperature range: 14 deg F (minus 10 deg C) to 140 deg F (60 deg C).
9) Cable diameter: Riser – 0.26 inch (6.604 mm) 0.260"; Plenum – 0.25 inch (6.35 mm).
10) Easy payout, reel-in-a-box and descending length markings on cable speed installation.
11) Supports following applications: Ethernet 10BASE-T, 100BASE-T (Fast Ethernet) and 1000BASE-T (Gigabit Ethernet); 1.2Gb/s ATM; Token Ring 4/16; digital video; and broadband/baseband analog video.
12) Color shall be blue.

D. Horizontal Distribution Cabling:
1. General:
a. Horizontal distribution cabling system is portion of telecommunications cabling system that extends from work area telecommunications outlet/connector to horizontal cross-connect in Technology Room (Entrance Facility / Main Cross Connect).

1) Horizontal cabling in office should terminate in Technology Room (Entrance Facility / Main Cross Connect) located on same floor as Work Area being served.
2) Horizontal cabling is installed in star topology (home run).
3) Bridged taps and splices are not permitted as part of copper horizontal cabling.

E. Components – Technology Room (Entrance Facility / Main Cross Connect):
1. General:
   a. Connect networking equipment to horizontal and backbone cabling subsystems:
      1) Termination hardware (connectors and patch cords), racks, cable management products and cable routing products.
      2) Cable termination hardware.
   b. Terminate each horizontal or backbone cabling run using appropriate connectors or connecting blocks depending upon cable type:
      1) Matching patch cords will be used to perform cross-connect activities or to connect into the networking/voice hardware:
         a) Category 6 Enhanced Unshielded Twisted Pair (UTP).
   c. Four-pair Category 6 UTP cabling shall be terminated onto four-pair Category 6 module:
      1) All modules shall be terminated using 568-B wiring scheme.
      2) Eight position module shall exceed connector requirements of TIA Category 6.standard.
      3) Jack termination to 4-pair, 100 ohm solid unshielded twisted pair cable shall be by use of forward motion termination cap and shall not require use of punchdown or insertion tool.
2. Patch Cords:
   a. Provide patch cords between modular patch panels configured as cross-connect or between patch panel and networking hardware when patch is used as interconnect. Provide one (1) each 3 feet (0.90 m) patch cord for each terminated patch panel port.
   b. Provide patch cords as indicated on Drawings and Specifications as shown in Contract Documents. Ensure all devices are fully connected to network equipment.
   c. Provide additional patch cords with appropriate length to connect all Owner provided internet enabled appliances (IEA) as specified on TT (Technology Telecommunication) and TA (Technology Audiovisual) Drawings as shown in Contract Documents.
   d. Patch cords shall be factory terminated with modular plugs featuring one-piece, tangle-free latch design and black strain-relief boots to support easy moves, adds and changes.
   e. Construct patch cords with Category 6 24-AWG stranded UTP cable.
   f. Patch cords shall be one hundred (100) percent performance tested at factory in channel test to Category 6 standard.
3. Patch Panels:
   a. Four-pair Category 6 UTP cabling shall be terminated onto four-pair-punch-down style connecting hardware mounted to rear of integral patch panels and routed to Category 6 modules on front face of patch panel.
   b. Patch panels shall be universal for TIA-568 wiring configurations.
   c. Patch panels shall have removable 6-port design that allows 6-port module to be removed without disrupting other ports.
   d. Integral cable tie mounts shall be included in panel for cable management on back of panel.
   e. Port and panels shall be easy to identify with write-on areas and optional label holder for color-coded labels.
   f. Rack mountable patch panels shall mount to standard 19 inches (480 mm) rack.
4. Grounding and Bonding:
   a. Provide Telecommunications Bonding Backbone:
      1) Ground all telecommunications cable shields, equipment, racks, cabinets, raceways, and other associated hardware that has potential to act as current carrying conductor.
      2) Install telecommunication Bonding Backbone independent of building's electrical and building ground.
      3) Designed in accordance with recommendations contained in TIA-607 Telecommunications Bonding and Grounding Standard.
   b. All wires used for telecommunications grounding purposes shall be identified with green insulation:
      1) Non-insulated wires shall be identified at each termination point with wrap of green tape.
      2) All cables and bus bars shall be identified and labeled as required.

PART 3 - EXECUTION

3.1 INSTALLATION

A. General:
1. Install communications system in accordance with Manufacturer's written instructions, and complying with applicable portions of NEC 'Standard of Installation'.

B. Work Area Outlets:
1. Cables shall be coiled in in-wall or surface-mount boxes if adequate space is present to house cable coil without exceeding Manufacturers bend radius.
   a. No more than 12 inches (300 mm) of UTP slack shall be stored in in-wall box, modular furniture raceway, or insulated walls.
   b. Excess slack shall be loosely configured and stored in ceiling above each drop location when there is not enough space present in outlet box to store slack cable.
2. Cables shall be dressed and terminated in accordance with TIA-568, Manufacturer's recommendations, and best industry practices.
3. Cables shall be bundled using Velcro straps at least 0.25 inch (6.35 mm) wide. Use of plastic wire ties or zip ties is not allowed on project.
4. Pair untwist at termination shall not exceed 0.125 inch (3.175 mm).
5. Bend radius of cable in termination area shall not be less than 4 times outside diameter of cable.
6. Cable jacket shall be maintained to within one inch (25 mm) of termination point.
7. Data / voice jacks, unless otherwise noted in Contract Documents, shall be located on each faceplate.
8. Horizontal Cabling:
   a. Data jacks in horizontally oriented faceplates shall occupy rightmost position(s).
   b. Voice jacks shall occupy the top position(s) on the faceplate. Voice jacks in horizontally oriented faceplates shall occupy the left-most position(s).

C. Horizontal Cross Connect:
1. Cables shall be dressed and terminated in accordance with TIA-568, Manufacturer's recommendations, and best industry practices.
2. Pair untwist at termination shall not exceed 0.125 inch (3.175 mm).
   a. Bend radius of cable in termination area shall not be less than 4 times outside diameter of cable.
3. Cables shall be neatly bundled and dressed to their respective panels or blocks.
   a. Each panel or block shall be fed by individual bundle separated and dressed back to point of cable entrance into rack or frame.
   b. Cables shall be bundled using Velcro straps at least 0.25 inch (6.35 mm) wide. Use of plastic wire ties or zip ties is not allowed on project.
4. Cable jacket shall be maintained as close as possible to termination point.
5. Each cable shall be clearly labeled on cable jacket behind patch panel at location that can be viewed without removing bundle support ties.
   a. Cables labeled within bundle, where label is obscured from view shall not be acceptable.
6. Horizontal Cabling:
   a. A pull cord (nylon; 1/8 inch (3 mm) minimum) shall be co-installed with all cable installed in any conduit.
   b. Cable raceways shall not be filled greater than required by TIA-569 maximum fill for particular raceway type.
   c. Cables shall be installed in continuous lengths from origin to destination (no splices) except for transition points, or consolidation points.
   d. Where transition points or consolidation points are allowed, they shall be located in accessible locations and housed in enclosure intended and suitable for purpose.
   e. Cable's minimum bend radius and maximum pulling tension shall not be exceeded.
   f. If J-hook or trapeze system is used to support cable bundles, all horizontal cables shall be supported at 48 inch (1 200 mm) to 60 inches (1 500 mm) maximum intervals. At no point shall cable(s) rest on acoustic ceiling grids or panels.

g. Horizontal distribution cables shall be bundled in groups of no more than 25 cables. Cable bundle quantities in excess of 25 cables may cause deformation of bottom cables within bundle and degrade cable performance.
h. Cables shall be bundled using Velcro straps at least 0.25 inch (6.35 mm) wide. Use of plastic wire ties or zip ties is not allowed on project.
i. Cable shall be installed above fire-sprinkler systems and shall not be attached to system or any ancillary equipment or hardware. Cable system and support hardware shall be installed so that it does not obscure any valves, fire alarm conduit, boxes, or other control devices.
j. Cables shall not be attached to ceiling grid or lighting fixture wires. Where support for horizontal cable is required, install appropriate carriers to support cabling.
k. Cables shall be identified by self-adhesive label and meet requirements of TIA-606. Cable label shall be applied to cable behind faceplate on section of cable that can be accessed by removing cover plate.
l. Unshielded twisted pair cable shall be installed so that there are no bends smaller than four times the cable outside diameter at any point in run and at termination field.
m. Pulling tension on 4-pair UTP cables shall not exceed 25 lbf (111 N) for a four-pair UTP cable.

D. Vertical Outlet Pole And Surface Raceway:
1. Horizontal Cabling:
a. General:
1) Vertical outlet poles and Surface Raceway refers to surface raceway system used for branch circuit wiring and/or data network, voice, video and other low-voltage cabling. Surface raceway shall be used in solid wall applications or for applications where moves, additions and changes are very typical to workflow.
b. Raceway system shall consist of raceway, appropriate fittings and accessories to complete installation per electrical Contract Documents. Non-metallic surface raceway is to be utilized in dry interior locations only as covered in Article 352, part B of the NEC, as adopted by the NFPA and as approved by the ANSI.

E. Copper Termination Hardware:
1. Cables shall be dressed and terminated in accordance with TIA-568, Manufacturer's recommendations, and best industry practices.
2. Pair untwist at termination shall not exceed 0.125 inch (3.175 mm).
a. Bend radius of cable in termination area shall not be less than 4 times outside diameter of cable.
3. Cables shall be neatly bundled and dressed to their respective panels or blocks.
a. Each panel or block shall be fed by individual bundle separated and dressed back to point of cable entrance into rack or frame.
b. Cables shall be bundled using Velcro straps at least 0.25 inch (6.35 mm) wide. Use of plastic wire ties or zip ties is not allowed on project.
4. Cable jacket shall be maintained as close as possible to termination point.
5. Each cable shall be clearly labeled on cable jacket behind patch panel at location that can be viewed without removing bundle Velcro support straps.
a. Cables labeled within bundle, where label is obscured from view shall not be acceptable.

F. Grounding System:
1. Where required, Telecommunications Bonding Backbone shall be designed and/or approved by qualified Installer.
2. Follow requirements of TIA-607.

G. Seismic Bracing:
1. Comply with IBC and local seismic requirements for all equipment and conduit pathways.

H. Identification and Labeling:
1. Apply machine generated approved labeling for racks, cables, panels and outlets:
a. Designate cables origin and destination and unique identifier for cable by room name and/or number and port count.
b. Racks and patch panels shall be labeled to identify location within cable system infrastructure.

2. Place labeling within view at termination point on each end.
3. Outlet, patch panel and wiring block labels shall be installed on, or in, space provided on device.
4. See Contract Drawings for labeling scheme.
5. Conform to IP addressing assignments as listed in Attachment 'FACILITIES ZONE IP ADDRESS ASSIGNEMENT TABLE'.

    a. See Attachment 'FACILITIES ZONE IP ADDRESS ASSIGNEMENT TABLE' for 'IP Address Assignments.

3.2 FIELD QUALITY CONTROL

A. Field Tests:
    1. Provide testing upon completion of installation.
        a. General:
            1) Testing to be in accordance with TIA standards and Manufacturer's system warranty guidelines and best industry practice.
                a) If any of these are in conflict, discrepancies shall be brought to attention of Architect/Consulting Engineer for clarification and resolution.
        b. Cables and termination hardware:
            1) Test complete system for defects in installation.
            2) Verify cabling system performance under installed conditions according to requirements of TIA-568:
                a) All pairs of each installed cable shall be verified prior to system acceptance.
                b) Any defect in cabling system installation including but not limited to cable, connectors, feed through couplers, patch panels, and connector blocks shall be repaired or replaced in order to ensure one hundred (100) percent useable conductors in all cables installed.
        c. Copper channel testing:
            1) All twisted-pair copper cable links shall be tested for compliance to requirements of TIA-568 for appropriate Category of cabling installed.
            2) Backbone multimode fiber cabling shall be tested at both 850 nm and 1300 nm.
        d. UTP Cables and Links testing:
            1) UTP cabling channel must be tested at swept frequencies up to 250 MHz for internal channel performance parameters as defined in IEEE 802.3 and TIA-568. Certifications shall include following parameters for each pair of each cable installed:
                a) Wire map (pin to pin connectivity).
                b) Length (in feet or millimeters).
                c) Near End Crosstalk (NEXT).
                d) Far End Crosstalk (FEXT).
                e) ELFEXT.
                f) Attenuation/Crosstalk Ration (ACR).
                g) Return Loss.
                h) Propagation Delay.
                i) Delay Skew.
                j) Test equipment shall provide electronic and printed record of these tests.
            2) Test each pair of cable for opens, shorts, grounds, and pair reversal.
                a) Correct short or grounded and reversed pairs.
                b) Examine open and shorted pairs to determine if problem is caused by improper termination.
                c) If termination is proper, tag bad pairs at both ends and note on termination sheets.
                d) If horizontal cable contains bad conductors, remove and replace cable.
        e. Testing Equipment:
            1) Comply with requirements of TIA-568.
                a) Appropriate level III tester shall be used to verify Category 6 cabling systems.
            2) UTP Cables and Links test equipment:
                a) Category Four Approved Testing Equipment. See Section 01 6200 for definitions of Categories:
                    (1) Fluke Networks DTX-1800 with firmware version 2.04 or later.

(a) Test lead to be P/N DTX-PLA001 or PLA002 universal permanent link interface adapter.
(2) Agilent Wirescope Pro N2640A with firmware version 2.1.9 or later.
(a) Test lead to be P/N N2644A-101 universal CAT6A link smart probes.

f. Re-Testing:
1) Consulting Engineer may request ten (10) percent random field re-test to be conducted on cable system, at no additional cost to Owner, to verify documented findings.
a) Tests shall be repeat of those defined above.
b) If findings contradict documentation submitted, additional testing can be requested to extent determined necessary by Consulting Engineer, including one hundred (100) percent re-test at no additional cost to Owner.

g. Tests And Evaluation Reports:
1) Printouts generated for each cable by wire test instrument shall be submitted as part of documentation package. Installer may furnish this information in electronic form.
a) Media shall contain electronic equivalent of test results as defined by the Section along with software necessary to view and evaluate test reports.
2) Submit documentation within ten (10) working days of completion of each testing phase. This is inclusive of all test results and record drawings.
3) Draft drawings may include annotations done by hand. Final copies of all drawings shall be submitted within thirty (30) working days of completion of each testing phase.
4) If requested by Consulting Engineer, provide copies of original test results.

h. Test Documentation:
1) Provide electronic format documentation within three (3) weeks after completion of project.
2) Documentation shall be clearly marked on outside front cover with following:
a) "Project Test Documentation".
b) Project name.
c) Date of completion (month and year).
3) Test results shall include following:
a) Record of test frequencies.
b) Cable type.
c) Conductor pair and cable (or outlet) I.D.
d) Measurement direction.
e) Reference setup.
f) Crew member name(s).
g) Test equipment name, manufacturer, model number, serial number, software version.
h) Last calibration date:
(1) Unless Manufacturer specifies more frequent calibration cycle, annual calibration cycle is required on all test equipment used on project.
(2) Document shall detail test method used and specific settings of equipment during test as well as software version being used in field test equipment.

B. Non-Conforming Work: Non-conforming work as covered in General Conditions applies, but is not limited to following:
1. Any cable damaged or exceeding recommended installation parameters during installation shall be replaced at no additional cost to Owner.
2. Any defect in cabling system installation including but not limited to cable, connectors, feed through couplers, patch panels, and connector blocks shall be repaired or replaced in order to ensure one hundred (100) percent useable conductors in all cables installed at no additional cost to Owner.
3. Correct deviation and repeat applicable testing at no additional cost to Owner.
4. Correct any work found defective or not complying with Association Publications and TDMM requirements at no additional cost to Owner.
a. Document all problems found and corrective action taken.
b. Include both failed and passed test data.

END OF SECTION

ATTACHMENTS

Facilities Zone IP Address Assignments

Installers connecting any equipment to the Facilities Zone shall conform to the IP addressing assignments listed in the Table below.

- For each device listed, the Device must be statically assigned the IP Address that is given by adding the specified offset in the table to the Facility Zone Gateway address.
- IP addresses should follow standard IPv4 Octet form.
- The respective Device installer is responsible for setup of the device.
- Structured Cabling Installer shall post a copy of this list near the Firewall, with the Gateway address filled in.