PROJECT MANUAL

including Specifications

FOR REMODEL/ADDITION

OF THE

Peteetneet Museum Restrooms

10 South 600 East
Payson, Utah

Date of Issue:

April, 2022

Prepared By:

150 ARCHITECTURE INC.

150 South Main
Salem, Utah 84653
(801) 374-2100

SET NO.

SECTION 00 0110
TABLE OF CONTENTS

END OF SECTION

GENERAL CONDITIONS FOR CONSTRUCTION

ARTICLE 1 GENERAL PROVISIONS

1.1 CORRELATION AND INTENT OF THE CONTRACT DOCUMENTS:

The intent of the contract documents is to include all items necessary for the proper execution and completion of the work by the contractor. The contract documents are complementary, and what is required by one shall be as binding as if required by all; performance by the contractor shall be required only to the extent consistent with the contract documents and reasonably inferable from them as being necessary to produce the indicated results.

1.2 EXECUTION OF CONTRACT DOCUMENTS:

Execution of the contract by the contractor is a representation that the contractor has visited the site, become generally familiar with local conditions under which the work is to be performed and correlated personal observations with requirements of the contract documents.

1.3 OWNERSHIP AND USE OF DRAWINGS, SPECIFICATIONS AND OTHER INSTRUMENTS OF SERVICE:

The drawings, specifications and other documents, including those in electronic form, prepared by the Architect and the Architect's consultants are instruments of service through which the work to be executed by the contractor is described. The contractor may retain one record set. Neither the contractor nor any subcontractor, sub-subcontractor or material or equipment supplier shall own or claim a copyright in the drawings, specifications and other documents prepared by the architect or the architect's consultants, and unless otherwise indicated the architect and the architect's consultants shall be deemed the authors of them and will retain all common law, statutory and other reserved rights, in addition to the copyrights. All copies of instruments of service, except the contractor's record set, shall be returned or suitably accounted for to the architect, on request, upon completion of the work. The drawings, specifications and other documents prepared by the architect and the architect's consultants, and copies thereof furnished to the contractor, are for use solely with respect to this project. They are not to be used by the contractor or any subcontractor, sub-subcontractor or material or equipment supplier on other projects or for additions to this project outside the scope of the work without the specific written consent of the owner, architect and the architect's consultants. The contractor, subcontractors, sub-contractors and material or equipment suppliers are authorized to use and reproduce applicable portions of the drawings, specifications and other documents prepared by the architect and the architect's consultant appropriate to and for use in the execution of their work under the contract documents. All copies made under this authorization shall bear the statutory copyright notice, if any, shown on the drawings, specifications and other documents prepared by the architect and the architect's consultants. Submittal or distribution to meet official regulatory requirements or for other purposes in connection with this project is not to be construed as publication in derogation of the architect's or architect's consultants' copyrights or other reserved rights.

ARTICLE 2 CONTRACTOR

2.1 The contractor shall perform the work in accordance with the contract documents.

2.2 The contractor shall not be relieved of obligations to perform the work in accordance with the contract documents either by activities or duties of the architect in the architect's administration of the contract, or by tests, inspections or approvals required or performed by persons other than the contractor.

2.2 Since the contract documents are complementary, before starting each portion of the work, the contractor shall carefully study and compare the various drawings and other contract documents relative to that portion of the work, as well as the information furnished by the owner, shall take field measurements of any existing conditions related to that portion of the work and shall observe any conditions at the site affecting it. These obligations are for the purpose of facilitating construction by the contractor and are not for the purpose of discovering errors, omissions, or inconsistencies in the contractor documents; however any errors, inconsistencies or omissions discovered by the contractor shall be reported promptly to the architect as a request for information in such form as the architect may require.

2.3 Any design errors or omissions noted by the contractor during this review shall be reported promptly to the architect, but it is recognized that the contractor's review is made in the contractor' capacity as a contractor and not as a licensed design professional unless otherwise specifically provided in the contract documents. The contractor is not required to ascertain that the contract documents are in accordance with applicable laws, statutes, ordinances, building codes and rules and regulations, but any nonconformity discovered by or made known to the contractor shall be reported promptly to the architect.

2.4 If the contractor believes that additional cost or time is involved because of clarifications or instructions issued by the architect in response to the contractor's notices or requests for information, the contractor shall make a claim. If the contractor fails to perform this obligation, the contractor shall pay such costs and damages to the owner as would have been avoided if the contractor had performed such obligations. The contractor shall not be liable to the owner or architect for damages resulting from errors, inconsistencies or omissions in the contract documents or for differences between field measurements or conditions and the contract documents unless the contractor recognized such error, inconsistency, omission or difference and knowingly failed to report it to the architect.

2.5 PERMITS, FEES AND NOTICES

2.5.1 Unless otherwise provided in the contract documents, the contractor shall secure and pay for the building permit and other permits and governmental fees, licenses and inspections necessary for proper execution and completion of the work which are customarily secured after execution of the contract and which are legally required when bids are received or negotiations concluded.

2.5.2 It is not the contractor's responsibility to ascertain that the contract documents are in accordance with applicable laws, statutes, ordinances, building codes, and rules and regulations. However, if the contractor observes that portions of the contract documents are at variance therewith, the contractor shall promptly notify the architect and owner in writing, and necessary changes shall be accomplished by appropriate modification.

2.5.3 If the contractor performs work knowing it to be contrary to laws, statutes, ordinances, building codes, and rules and regulations without such notice to the architect and owner, the contractor shall assume appropriate responsibility for such work and shall bear the costs attributable to correction.

2.6 CONTRACTOR'S CONSTRUCTION SCHEDULES

2.6.1 The contractor, promptly after being awarded the contract, shall prepare and submit for the owner's and architect's information a contractor's construction schedule for the work. The schedule shall not exceed time limits current under the contract documents, shall be revised at appropriate intervals as required by the conditions of the work and project, shall be related to the entire project to the extent required by the contract documents, and shall provide for expeditious and practicable execution of the work.

2.7 SHOP DRAWINGS, PRODUCT DATA AND SAMPLES

2.7.1 Shop drawings, product data, samples and similar submittals are not contract documents. The purpose of their submittal is to demonstrate for those portions of the work for which submittals are required by the contract documents the way by which the contractor proposes to conform to the information given and the design concept expressed in the contract documents. Review by the Architect is subject to the limitations as indicated. Informational submittals upon which the architect is not expected to take responsive action may be so identified in the contract documents. Submittals which are not required by the contract documents may be returned by the architect without action.

2.7.2 The contractor shall review for compliance with the contract documents, approve and submit to the architect shop drawings, product data, samples and similar submittals required by the contract documents with reasonable promptness and in such sequence as to cause no delay in the work or in the activities of the owner or of separate contractors. Submittals which are not marked as reviewed for compliance with the contract documents and approved by the contractor may be returned by the architect without action.

2.7.3 By approving and submitting shop drawings, product data, samples and similar submittals, the contractor represents that the contractor has determined and verified materials, field measurements and field construction criteria related thereto, or will do so, and has checked and coordinated the information contained within such submittals with the requirements of the work and of the contract documents.

ARTICLE 3 ARCHITECT

3.1 ARCHITECT'S ADMINISTRATION OF THE CONTRACT

3.1.1 The architect, as a representative of the owner, will visit the site at intervals appropriate to the state of the contractor's operations (1) to become generally familiar with and to keep the owner informed about the progress and quality of the portion of the work completed, (2) to endeavor to guard the owner against defects and deficiencies in the work, and (3) to determine in general if the work is being performed in a manner indicating that the work, when fully completed, will be in accordance with the contract documents. However, the architect will not be required to make exhaustive or continuous on-site inspections to check the quality or quantity of the work. The architect will neither have control over or charge of, nor be responsible for, the construction means, methods, techniques, sequences or procedures, or for the safety

precautions and programs in connection with the work, since these are solely the contractor's rights and responsibilities under the contract documents.

3.1.2 The architect will not be responsible for the contractor's failure to perform the work in accordance with the requirements of the contract documents. The architect will not have control over or charge of and will not be responsible for acts or omissions of the contractor, subcontractors, or their agents or employees, or any other persons or entities performing portions of the work.

3.1.3 The architect will have authority to reject work that does not conform to the contract documents, wherever the architect considers it necessary or advisable, the architect will have authority to require inspection or testing of the work, the architect will have authority to require inspection or testing of the work, whether or not such work is fabricated, installed or completed. However, neither this authority of the architect nor a decision made in good faith either to exercise or not to exercise such authority shall give rise to a duty or responsibility of the architect to the contractor, subcontractors, material and equipment suppliers, their agents or employees, or other persons or entities performing portions of the work.

3.2 RESOLUTION OF CLAIMS AND DISPUTES

3.2.1 Decision of architect, claims, including those alleging an error or omission by the architect but excluding hazardous materials shall be referred initially to the architect for decision.

3.2.2 In evaluating claims, the architect may, but shall not be obligated to, consult with or seek information from either party or from persons with special knowledge or expertise who may assist the architect in rendering a decision. The architect may request the owner to authorize retention of such persons at the owner's expense.

3.3 CONSTRUCTION CHANGE DIRECTIVES

3.3.1 A construction change directive is a written order prepared by the architect and signed by the owner and architect, directing a change in the work prior to agreement on adjustment, if any, in the contract sum or contract time, or both. The owner may by construction change directive, without invalidating the contract, order changes in the work within the general scope of the contract consisting of additions, deletions or other revisions, the contract sum and contract time being adjusted accordingly.

3.3.2 If the construction change directive provides for an adjustment to the contract sum, the adjustment shall be based on one of the following methods:

1. Mutual acceptance of a lump sum properly itemized and supported by sufficient substantiating data to permit evaluation;
2. Unit prices stated in the contract documents or subsequently agreed upon;
3. Cost to be determined in a manner agreed upon by the parties and a mutually acceptable fixed or percentage fee.
4. Upon receipt of a construction change directive, the contractor shall promptly proceed with the change in the work involved and advise the architect of the contractor's agreement or disagreement with the method, if any, provided in the contraction change directive for determining the proposed adjustment in the contract sum or contract time.
5. A construction change directive signed by the contractor indicates the agreement of the contractor therewith, including adjustment in contract sum and contract time or the method for determining them. Such agreement shall be effective immediately and shall be recorded as a change order.

MINOR CHANGES IN THE WORK:

A. The architect will have authority to order minor changes in the work not involving adjustment in the contract sum or extension of the contract time and not inconsistent with the intent of the contract documents. Such changes shall be effected by written order and shall be binding on the owner and contractor. The contractor shall carry out such written orders promptly.

SUBSTANTIAL COMPLETION

A. Substantial completion is the stage in the progress of the work when the work or designated portion thereof is sufficiently complete in accordance with the contract documents so that the owner can occupy or utilize the work for its intended use.
B. When the contractor considers that the work, or a portion thereof which the owner agrees to accept separately, is substantially complete, the contractor shall prepare and submit to the architect a comprehensive list of items to be completed or corrected prior to final payment. Failure to include an item on such list does not alter the responsibility of the contractor to complete all work in accordance with the contract documents.
C. Upon receipt of the contractors list, the architect will make an inspection to determine whether the work or designated portion thereof is substantially complete. If the architect's inspection discloses any item, whether or not included on the contractor's

list, which is not sufficiently complete in accordance with the contract documents so that the owner can occupy or utilize the work or designated portion thereof for its intended use, the contractor shall, before issuance of the certificate of substantial completion, complete or correct such item upon notification by the architect. In such case, the contractor shall then submit a request for another inspection by the architect to determine substantial completion.

D. When the work or designated portion thereof is substantially complete, the architect will prepare a certificate of substantial completion which shall establish the date of substantial completion, shall establish responsibilities of the owner and contractor for security, maintenance, heat, utilities, damage to the work and insurance, and shall fix the time within which the contractor shall finish all items on the list accompanying the certificate. Warranties required by the contract documents shall commence on the date of substantial completion of the work or designated portion thereof unless otherwise provided in the certificate of substantial completion.
E. The certificate of substantial completion shall be submitted to the owner and contractor for their written acceptance of responsibilities assigned to them in such certificate. Upon such acceptance and consent of surety, if any, the owner shall make payment of retainage applying to such work or designated portion thereof. Such payment shall be adjusted for work that is incomplete or not in accordance with the requirements of the contract documents.

UNCOVERING AND CORRECTION OF WORK:

A. If a portion of the work is covered contrary to the architect's request or to requirements specifically expressed in the contract documents, it must if required in writing by the architect, be uncovered for the architect's examination and be replaced at the contractor's expense without change in the contract time.
B. If a portion of the work has been covered which the architect has not specifically requested to examine prior to it's being covered, the architect may request to see such work and it shall be uncovered by the contractor. If such work is in accordance with the contract documents, correction shall be at the contractor's expense unless the condition was caused by the owner or a separate contractor in which event the owner shall be responsible for payment of such costs.
C. The contractor shall promptly correct work rejected by the architect or failing to conform to the requirements of the contract documents, whether discovered before or after substantial completion and whether or not fabricated, installed or completed. Costs of correcting such rejected work, including additional testing and inspections and compensation for the architect's services and expenses made necessary thereby, shall be at the contractor's expense.
D. In addition to the contractor's obligations, if, within one year after the date of substantial completion of the work or designated portion thereof or after the date for commencement of warranties established, or by terms of an applicable special warranty required by the contract documents, any of the work is found to be not in accordance with the requirements of the contract documents, the contractor shall correct it promptly after receipt of written notice from the owner to do so unless the owner has previously given the contractor a written acceptance of such condition. The owner shall give such notice promptly after receipt of written notice from the owner to do so unless the owner has previously given the contractor a written acceptance of such condition. The owner shall give such notice promptly after discovery of the condition. During the one-year period for correction of work, if the owner fails to notify the contractor and give the contractor an opportunity to make the correction, the owner waives the rights to require correction by the contract and to make a claim for breach of warranty. If the contractor fails to correct nonconforming work within a reasonable time during that period after receipt of notice from the owner or architect, the owner may correct it, in such case an appropriate change order shall be issued deducting from payments then or thereafter due the contractor the reasonable cost of correcting such deficiencies, including owner's expenses and compensation for the architect's additional services made necessary by such default, neglect or failure. Such action by the owner and amounts charged to the contractor are both subject to prior approval of the architect. If payments then or thereafter due the contractor are not sufficient to cover such amounts, the contractor shall pay the difference to the owner.

GENERAL REQUIREMENTS:

OWNER PROVIDED EQUIPMENT:

A. Owner will furnish products indicated. The work includes providing support systems to receive owner's equipment and making plumbing, mechanical, and electrical connections.
    1. Owner will arrange for and deliver shop drawings, product data, and samples to contractor.
    2. Owner will arrange and pay for delivery of owner-furnished items according to contractor's construction schedule.

3. After delivery, owner will inspect delivered items for damage. Contractor shall be present for and assist in owner's inspection.
4. If owner-furnished items are damaged, defective, or missing, owner will arrange for replacement.
5. Owner will arrange for manufacturer's field services and for delivery of manufacturer's warranties to contractor.
6. Owner will furnish contractor the earliest possible delivery date for owner-furnished products. Using owner-furnished earliest possible delivery dates, contractor shall designate delivery dates of owner-furnished items in contractor's construction schedule.
7. Contractor shall review shop drawings, product data, and samples and return them to architect noting discrepancies or anticipated problems in use of project.
8. Contractor is responsible for receiving, unloading, and handling owner-furnished items at project site.
9. Contractor is responsible for protecting owner-furnished items from damage during storage and handling, including damage from exposure to the elements.
10. If owner-furnished items are damaged as a result of contractor's operations, contractor shall repair or replace them.
11. Contractor shall install and otherwise incorporate owner-furnished items into the work.

B. Owner-Furnished Products:
   1. As dictated by architectural drawings.

ALTERNATES:

Substitution Request: Submit three copies of each request for consideration. Identify product or fabrication or installation method to be replaced.

A. Coordination: Modify or adjust affected adjacent work as necessary to completely integrate work of the alternate into project.
   1. Include as part of each alternate, miscellaneous devices, accessory objects, and similar items identical to or required for a complete installation whether or not indicated as part of alternate.
B. Notification: Immediately following award of the contract, notify each party involved, in writing, of the status of each alternate. Indicate if alternates have been accepted, rejected, or deferred for later consideration. Include a complete description of negotiated modifications to alternates.
C. Execute accepted alternates under the same conditions as other work of the contract.

COMPARABLE PRODUCTS:

A. Conditions: Architect will consider contractor's request for comparable product when the following conditions are satisfied. If the following conditions are not satisfied, architect will return requests without action, except to record noncompliance with these requirements.
   1. Evidence that the proposed product does not require extensive revisions to the contract documents that it is consistent with the contract documents and will produce the indicated results, and that it is compatible with other portions of the work.
   2. Detailed comparison of significant qualities of proposed product with those named in the specifications. Significant qualities include attributes such as performance, weight, size, durability, visual effect, and specific features and requirements indicated.
   3. Evidence that proposed product provides specified warranty.
   4. List of similar installations for completed projects with project names and addresses and names and address of architects and owners, if requested.
   5. Samples, if requested.

SUBMITTALS

A. Coordination Drawings: Prepare coordination drawings if limited space availability necessitates maximum utilization of space for efficient installation of different components or if coordination is required for installation of products and materials fabricated by separate entities. Electronic copies of CAD drawings of the contract drawings will not be provided by architect for contractor's use in preparing submittals.
B. Content: Project-specific information, drawn accurately to scale. Do not base coordination drawings on reproductions of the contract documents or standard printed data. Include the following information, as applicable:

C. Indicate functional and spatial relationships of components of architectural, structural, civil, mechanical, and electrical systems.
D. Indicate required installation sequences.
E. Indicate dimensions shown on the contract drawings and make specific note of dimensions that appear to be in conflict with submitted equipment and minimum clearance requirements. Provide alternate sketches to architect for resolution of such conflicts, Minor dimension changes and difficult installations will not be considered changes to the contract.
F. Sheet Size: At 8 ½" by 11 inches but no larger than 30 by 40 inches.
G. Number of copies: submit three (3) opaque copies of each submittal. Architect will return two (2) copies. If electronic copies are not available.
H. Processing Time: Allow enough time for submittal review, including time for resubmittals, as follows. Time for review shall commence on architect's receipt of submittal. No extension of the contract time will be authorize because of failure to transmit submittals enough in advance of the work to permit processing, including resubmittals.
I. Initial Review: Allow Five (5) days for initial review of each submittal. Allow additional time if coordination with subsequent submittals is required. Architect will advise contractor when a submittal being processed must be delayed for coordination.
J. Contractor to review all submittals thoroughly & provide submittal review stamp indicating the project manager has reviewed and found them to be in compliance with the construction documents.

RECORD DRAWINGS:

A. Record prints: Maintain one set of blue – or black-line white prints of the contract drawings and shop drawings.
B. Preparation: Mark record prints to show the actual installation where installation varies from that shown originally. Require individual or entity who obtained record data, whether individual or entity is installer, subcontractor, or similar entity, to prepare the marked-up record prints.
C. Give particular attention to information on concealed elements that would be difficult to identify or measure and record later.
D. Accurately record information in an understandable drawing technique.
E. Record data as soon as possible after obtaining it. Record and check the markup before enclosing concealed installation.
F. Content: Types of items requiring marking include, but are not limited to, the following.
    a. Dimensional Changes to Drawings
    b. Revisions to details shown on drawings.
    c. Depths of foundations below first floor.
    d. Locations and Depths of underground utilities.
    e. Revisions to routing of piping and conduits.
    f. Revisions to electrical circuitry.
    g. Actual equipment locations.
    h. Duct size and routing.
    i. Locations of concealed internal utilities.
    j. Changes made by change order or construction change directive.
    k. Changes made following architect's written orders.
    l. Details not on the original contract drawings.
    m. Field records for variable and concealed conditions.
    n. Record information on the work that is shown on schematically.

AIA® Document A101® – 2017

Standard Form of Agreement Between Owner and Contractor where the basis of payment is a Stipulated Sum

AGREEMENT made as of the _____ day of _____ in the year _____
(In words, indicate day, month and year.)

BETWEEN the Owner:
(Name, legal status, address and other information)

and the Contractor:
(Name, legal status, address and other information)

for the following Project:
(Name, location and detailed description)

The Architect:
(Name, legal status, address and other information)

This document has important legal consequences. Consultation with an attorney is encouraged with respect to its completion or modification.

The parties should complete A101®–2017, Exhibit A, Insurance and Bonds, contemporaneously with this Agreement.

AIA Document A201®–2017, General Conditions of the Contract for Construction, is adopted in this document by reference. Do not use with other general conditions unless this document is modified.

Sample

The Owner and Contractor agree as follows.

AIA Document A101® – 2017. Copyright © 1915, 1918, 1925, 1937, 1951, 1958, 1961, 1963, 1967, 1974, 1977, 1987, 1991, 1997, 2007 and 2017 by The American Institute of Architects. All rights reserved. The "American Institute of Architects," "AIA," the AIA Logo, "A101," and "AIA Contract Documents" are registered trademarks and may not be used without permission. To report copyright violations, e-mail copyright@aia.org.

TABLE OF ARTICLES

ARTICLE 1 THE CONTRACT DOCUMENTS

The Contract Documents consist of this Agreement, Conditions of the Contract (General, Supplementary, and other Conditions), Drawings, Specifications, Addenda issued prior to execution of this Agreement, other documents listed in this Agreement, and Modifications issued after execution of this Agreement, all of which form the Contract, and are as fully a part of the Contract as if attached to this Agreement or repeated herein. The Contract represents the entire and integrated agreement between the parties hereto and supersedes prior negotiations, representations, or agreements, either written or oral. An enumeration of the Contract Documents, other than a Modification, appears in Article 9.

ARTICLE 2 THE WORK OF THIS CONTRACT

The Contractor shall fully execute the Work described in the Contract Documents, except as specifically indicated in the Contract Documents to be the responsibility of others.

ARTICLE 3 DATE OF COMMENCEMENT AND SUBSTANTIAL COMPLETION

§ 3.1 The date of commencement of the Work shall be:
(Check one of the following boxes.)

☐ The date of this Agreement.

☐ A date set forth in a notice to proceed issued by the Owner.

☐ Established as follows:
(Insert a date or a means to determine the date of commencement of the Work.)

If a date of commencement of the Work is not selected, then the date of commencement shall be the date of this Agreement.

§ 3.2 The Contract Time shall be measured from the date of commencement of the Work.

§ 3.3 Substantial Completion

§ 3.3.1 Subject to adjustments of the Contract Time as provided in the Contract Documents, the Contractor shall achieve Substantial Completion of the entire Work:
(Check one of the following boxes and complete the necessary information.)

☐ Not later than ( ) calendar days from the date of commencement of the Work.

Sample

AIA Document A101® – 2017. Copyright © 1915, 1918, 1925, 1937, 1951, 1958, 1961, 1963, 1967, 1974, 1977, 1987, 1991, 1997, 2007 and 2017 by The American Institute of Architects. All rights reserved. The "American Institute of Architects," "AIA," the AIA Logo, "A101," and "AIA Contract Documents" are registered trademarks and may not be used without permission. To report copyright violations, e-mail copyright@aia.org.

☐ By the following date:

§ 3.3.2 Subject to adjustments of the Contract Time as provided in the Contract Documents, if portions of the Work are to be completed prior to Substantial Completion of the entire Work, the Contractor shall achieve Substantial Completion of such portions by the following dates:

Portion of Work	Substantial Completion Date

§ 3.3.3 If the Contractor fails to achieve Substantial Completion as provided in this Section 3.3, liquidated damages, if any, shall be assessed as set forth in Section 4.5.

ARTICLE 4 CONTRACT SUM

§ 4.1 The Owner shall pay the Contractor the Contract Sum in current funds for the Contractor's performance of the Contract. The Contract Sum shall be ($), subject to additions and deductions as provided in the Contract Documents.

§ 4.2 Alternates

§ 4.2.1 Alternates, if any, included in the Contract Sum:

Item	Price

§ 4.2.2 Subject to the conditions noted below, the following alternates may be accepted by the Owner following execution of this Agreement. Upon acceptance, the Owner shall issue a Modification to this Agreement.
(Insert below each alternate and the conditions that must be met for the Owner to accept the alternate.)

Item	Price	Conditions for Acceptance

§ 4.3 Allowances, if any, included in the Contract Sum:
(Identify each allowance.)

Item	Price

§ 4.4 Unit prices, if any:
(Identify the item and state the unit price and quantity limitations, if any, to which the unit price will be applicable.)

Item	Units and Limitations	Price per Unit ($0.00)

§ 4.5 Liquidated damages, if any:
(Insert terms and conditions for liquidated damages, if any.)

§ 4.6 Other:
(Insert provisions for bonus or other incentives, if any, that might result in a change to the Contract Sum.)

Sample

AIA Document A101® – 2017. Copyright © 1915, 1918, 1925, 1937, 1951, 1958, 1961, 1963, 1967, 1974, 1977, 1987, 1991, 1997, 2007 and 2017 by The American Institute of Architects. All rights reserved. The "American Institute of Architects," "AIA," the AIA Logo, "A101," and "AIA Contract Documents" are registered trademarks and may not be used without permission. To report copyright violations, e-mail copyright@aia.org.

ARTICLE 5 PAYMENTS

§ 5.1 Progress Payments

§ 5.1.1 Based upon Applications for Payment submitted to the Architect by the Contractor and Certificates for Payment issued by the Architect, the Owner shall make progress payments on account of the Contract Sum to the Contractor as provided below and elsewhere in the Contract Documents.

§ 5.1.2 The period covered by each Application for Payment shall be one calendar month ending on the last day of the month, or as follows:

§ 5.1.3 Provided that an Application for Payment is received by the Architect not later than the day of a month, the Owner shall make payment of the amount certified to the Contractor not later than the day of the month. If an Application for Payment is received by the Architect after the application date fixed above, payment of the amount certified shall be made by the Owner not later than ( ) days after the Architect receives the Application for Payment.
(Federal, state or local laws may require payment within a certain period of time.)

§ 5.1.4 Each Application for Payment shall be based on the most recent schedule of values submitted by the Contractor in accordance with the Contract Documents. The schedule of values shall allocate the entire Contract Sum among the various portions of the Work. The schedule of values shall be prepared in such form, and supported by such data to substantiate its accuracy, as the Architect may require. This schedule of values shall be used as a basis for reviewing the Contractor's Applications for Payment.

§ 5.1.5 Applications for Payment shall show the percentage of completion of each portion of the Work as of the end of the period covered by the Application for Payment.

§ 5.1.6 In accordance with AIA Document A201™–2017, General Conditions of the Contract for Construction, and subject to other provisions of the Contract Documents, the amount of each progress payment shall be computed as follows:

§ 5.1.6.1 The amount of each progress payment shall first include:

.1 That portion of the Contract Sum properly allocable to completed Work;

.2 That portion of the Contract Sum properly allocable to materials and equipment delivered and suitably stored at the site for subsequent incorporation in the completed construction, or, if approved in advance by the Owner, suitably stored off the site at a location agreed upon in writing; and

.3 That portion of Construction Change Directives that the Architect determines, in the Architect's professional judgment, to be reasonably justified.

§ 5.1.6.2 The amount of each progress payment shall then be reduced by:

.1 The aggregate of any amounts previously paid by the Owner;

.2 The amount, if any, for Work that remains uncorrected and for which the Architect has previously withheld a Certificate for Payment as provided in Article 9 of AIA Document A201–2017;

.3 Any amount for which the Contractor does not intend to pay a Subcontractor or material supplier, unless the Work has been performed by others the Contractor intends to pay;

.4 For Work performed or defects discovered since the last payment application, any amount for which the Architect may withhold payment, or nullify a Certificate of Payment in whole or in part, as provided in Article 9 of AIA Document A201–2017; and

.5 Retainage withheld pursuant to Section 5.1.7.

§ 5.1.7 Retainage

§ 5.1.7.1 For each progress payment made prior to Substantial Completion of the Work, the Owner may withhold the following amount, as retainage, from the payment otherwise due:
(Insert a percentage or amount to be withheld as retainage from each Application for Payment. The amount of retainage may be limited by governing law.)

Sample

AIA Document A101® – 2017. Copyright © 1915, 1918, 1925, 1937, 1951, 1958, 1961, 1963, 1967, 1974, 1977, 1987, 1991, 1997, 2007 and 2017 by The American Institute of Architects. All rights reserved. The "American Institute of Architects," "AIA," the AIA Logo, "A101," and "AIA Contract Documents" are registered trademarks and may not be used without permission. To report copyright violations, e-mail copyright@aia.org.

§ 5.1.7.1.1 The following items are not subject to retainage:
(Insert any items not subject to the withholding of retainage, such as general conditions, insurance, etc.)

§ 5.1.7.2 Reduction or limitation of retainage, if any, shall be as follows:
(If the retainage established in Section 5.1.7.1 is to be modified prior to Substantial Completion of the entire Work, including modifications for Substantial Completion of portions of the Work as provided in Section 3.3.2, insert provisions for such modifications.)

§ 5.1.7.3 Except as set forth in this Section 5.1.7.3, upon Substantial Completion of the Work, the Contractor may submit an Application for Payment that includes the retainage withheld from prior Applications for Payment pursuant to this Section 5.1.7. The Application for Payment submitted at Substantial Completion shall not include retainage as follows:
(Insert any other conditions for release of retainage upon Substantial Completion.)

§ 5.1.8 If final completion of the Work is materially delayed through no fault of the Contractor, the Owner shall pay the Contractor any additional amounts in accordance with Article 9 of AIA Document A201–2017.

§ 5.1.9 Except with the Owner's prior approval, the Contractor shall not make advance payments to suppliers for materials or equipment which have not been delivered and stored at the site.

§ 5.2 Final Payment

§ 5.2.1 Final payment, constituting the entire unpaid balance of the Contract Sum, shall be made by the Owner to the Contractor when

.1 the Contractor has fully performed the Contract except for the Contractor's responsibility to correct Work as provided in Article 12 of AIA Document A201–2017, and to satisfy other requirements, if any, which extend beyond final payment; and

.2 a final Certificate for Payment has been issued by the Architect.

§ 5.2.2 The Owner's final payment to the Contractor shall be made no later than 30 days after the issuance of the Architect's final Certificate for Payment, or as follows:

§ 5.3 Interest

Payments due and unpaid under the Contract shall bear interest from the date payment is due at the rate stated below, or in the absence thereof, at the legal rate prevailing from time to time at the place where the Project is located.
(Insert rate of interest agreed upon, if any.)

_____ % _____

ARTICLE 6 DISPUTE RESOLUTION

§ 6.1 Initial Decision Maker

The Architect will serve as the Initial Decision Maker pursuant to Article 15 of AIA Document A201–2017, unless the parties appoint below another individual, not a party to this Agreement, to serve as the Initial Decision Maker.
(If the parties mutually agree, insert the name, address and other contact information of the Initial Decision Maker, if other than the Architect.)

Sample

AIA Document A101® – 2017. Copyright © 1915, 1918, 1925, 1937, 1951, 1958, 1961, 1963, 1967, 1974, 1977, 1987, 1991, 1997, 2007 and 2017 by The American Institute of Architects. All rights reserved. The "American Institute of Architects," "AIA," the AIA Logo, "A101," and "AIA Contract Documents" are registered trademarks and may not be used without permission. To report copyright violations, e-mail copyright@aia.org.

§ 6.2 Binding Dispute Resolution

For any Claim subject to, but not resolved by, mediation pursuant to Article 15 of AIA Document A201–2017, the method of binding dispute resolution shall be as follows:
(Check the appropriate box.)

☐ Arbitration pursuant to Section 15.4 of AIA Document A201–2017

☐ Litigation in a court of competent jurisdiction

☐ Other *(Specify)*

If the Owner and Contractor do not select a method of binding dispute resolution, or do not subsequently agree in writing to a binding dispute resolution method other than litigation, Claims will be resolved by litigation in a court of competent jurisdiction.

ARTICLE 7 TERMINATION OR SUSPENSION

§ 7.1 The Contract may be terminated by the Owner or the Contractor as provided in Article 14 of AIA Document A201–2017.

§ 7.1.1 If the Contract is terminated for the Owner's convenience in accordance with Article 14 of AIA Document A201–2017, then the Owner shall pay the Contractor a termination fee as follows:
(Insert the amount of, or method for determining, the fee, if any, payable to the Contractor following a termination for the Owner's convenience.)

§ 7.2 The Work may be suspended by the Owner as provided in Article 14 of AIA Document A201–2017.

ARTICLE 8 MISCELLANEOUS PROVISIONS

§ 8.1 Where reference is made in this Agreement to a provision of AIA Document A201–2017 or another Contract Document, the reference refers to that provision as amended or supplemented by other provisions of the Contract Documents.

§ 8.2 The Owner's representative:
(Name, address, email address, and other information)

§ 8.3 The Contractor's representative:
(Name, address, email address, and other information)

§ 8.4 Neither the Owner's nor the Contractor's representative shall be changed without ten days' prior notice to the other party.

Sample

AIA Document A101® – 2017. Copyright © 1915, 1918, 1925, 1937, 1951, 1958, 1961, 1963, 1967, 1974, 1977, 1987, 1991, 1997, 2007 and 2017 by The American Institute of Architects. All rights reserved. The "American Institute of Architects," "AIA," the AIA Logo, "A101," and "AIA Contract Documents" are registered trademarks and may not be used without permission. To report copyright violations, e-mail copyright@aia.org.

§ 8.5 Insurance and Bonds

§ 8.5.1 The Owner and the Contractor shall purchase and maintain insurance as set forth in AIA Document A101™–2017, Standard Form of Agreement Between Owner and Contractor where the basis of payment is a Stipulated Sum, Exhibit A, Insurance and Bonds, and elsewhere in the Contract Documents.

§ 8.5.2 The Contractor shall provide bonds as set forth in AIA Document A101™–2017 Exhibit A, and elsewhere in the Contract Documents.

§ 8.6 Notice in electronic format, pursuant to Article 1 of AIA Document A201–2017, may be given in accordance with AIA Document E203™–2013, Building Information Modeling and Digital Data Exhibit, if completed, or as otherwise set forth below:
(If other than in accordance with AIA Document E203–2013, insert requirements for delivering notice in electronic format such as name, title, and email address of the recipient and whether and how the system will be required to generate a read receipt for the transmission.)

§ 8.7 Other provisions:

ARTICLE 9 ENUMERATION OF CONTRACT DOCUMENTS

§ 9.1 This Agreement is comprised of the following documents:

.1 AIA Document A101™–2017, Standard Form of Agreement Between Owner and Contractor

.2 AIA Document A101™–2017, Exhibit A, Insurance and Bonds

.3 AIA Document A201™–2017, General Conditions of the Contract for Construction

.4 AIA Document E203™–2013, Building Information Modeling and Digital Data Exhibit, dated as indicated below:
(Insert the date of the E203-2013 incorporated into this Agreement.)

.5 Drawings

Number	Title	Date

.6 Specifications

Section	Title	Date	Pages

.7 Addenda, if any:

Number	Date	Pages

Portions of Addenda relating to bidding or proposal requirements are not part of the Contract Documents unless the bidding or proposal requirements are also enumerated in this Article 9.

.8 Other Exhibits:
(Check all boxes that apply and include appropriate information identifying the exhibit where required.)

☐ AIA Document E204™–2017, Sustainable Projects Exhibit, dated as indicated below:
(Insert the date of the E204-2017 incorporated into this Agreement.)

Sample

AIA Document A101® – 2017. Copyright © 1915, 1918, 1925, 1937, 1951, 1958, 1961, 1963, 1967, 1974, 1977, 1987, 1991, 1997, 2007 and 2017 by The American Institute of Architects. All rights reserved. The "American Institute of Architects," "AIA," the AIA Logo, "A101," and "AIA Contract Documents" are registered trademarks and may not be used without permission. To report copyright violations, e-mail copyright@aia.org.

☐ The Sustainability Plan:

Title	Date	Pages

☐ Supplementary and other Conditions of the Contract:

Document	Title	Date	Pages

.9 Other documents, if any, listed below:
(List here any additional documents that are intended to form part of the Contract Documents. AIA Document A201™–2017 provides that the advertisement or invitation to bid, Instructions to Bidders, sample forms, the Contractor's bid or proposal, portions of Addenda relating to bidding or proposal requirements, and other information furnished by the Owner in anticipation of receiving bids or proposals, are not part of the Contract Documents unless enumerated in this Agreement. Any such documents should be listed here only if intended to be part of the Contract Documents.)

This Agreement entered into as of the day and year first written above.

OWNER *(Signature)*	**CONTRACTOR** *(Signature)*
(Printed name and title)	*(Printed name and title)*

Sample

AIA Document A101® – 2017. Copyright © 1915, 1918, 1925, 1937, 1951, 1958, 1961, 1963, 1967, 1974, 1977, 1987, 1991, 1997, 2007 and 2017 by The American Institute of Architects. All rights reserved. The "American Institute of Architects," "AIA," the AIA Logo, "A101," and "AIA Contract Documents" are registered trademarks and may not be used without permission. To report copyright violations, e-mail copyright@aia.org.

SECTION 01 1000
SUMMARY

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Summary of Work.

B. Work restrictions.

1.02 PROJECT

A. Project Name: **Restroom Remodel for The Peteetneet Academy**

B. Owner's Name: **Payson City**

C. Architect's Name: **Lester Van Nosdol**

D. The Project consists of the construction of the removal of the existing restrooms and enlarging the existing building and providing larger restrooms facilities.

1.03 WORK COVERED BY CONTRACT DOCUMENTS

A. Provisions contained in Division 01 apply to Sections of Divisions 02 through 49 of Specifications. Instructions contained in Specifications are directed to Contractor. Unless specifically provided otherwise, obligations set forth in Contract Documents are obligations of Contractor.

B. Contractor shall furnish total labor, materials, equipment, and services necessary to perform The Work in accordance with Contract Documents.

1.04 CONTRACT DESCRIPTION

A. Contract Type: A single prime contract based on a Stipulated Price.

1.05 WORK BY CONTRACTOR

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

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

C. Review 'Contractor Notice of Owner Furnished Materials' notice listing Owner-furnished products to be delivered for Project:
   1. Review due (delivery) dates and vendor lead times for each item and coordinate with construction schedule. Immediately report recommended changes to Owner's Purchasing Coordinator listed in 'Contractor Notice of Owner Furnished Materials'. Contact vendors directly if changes to delivery dates become necessary during construction.
   2. Report problems in coordinating due (delivery) dates with construction schedule to Architect and Owner's Purchasing Coordinator.

D. Receive unload, store and properly protect Owner-furnished materials and products.
   1. Provide labor and equipment necessary to receive, unload, and store materials and products.
   2. Count number of pieces received and note any discrepancies on Delivery Receipt before driver leaves:
   3. Include Project Name and Project Number on Delivery Receipt.
   4. Check for visible evidence of damage such as holes, tears, or crushed portions of cartons and note on Delivery Receipt before driver leaves:
      a. If you are unsure if carton is damaged, take photo of cartons and share it with Owner's Purchasing Coordinator.

E. Within forty-eight (48) hours of delivery:

1. Open and inspect each piece of freight delivered. Take picture of any concealed damage not reported at time of delivery and report it to Owner's Purchasing Coordinator.
2. Compare 'Contractor Notice of Owner Furnished Materials' with packing slips. Note discrepancies in number, size, color, model numbers, etc.
3. Deliver copy of Delivery Receipt (bill of lading) on which you have noted any loss or damage to Owner's Purchasing Coordinator. Include in your submission any report of concealed damage, discrepancies or photos.

F. Failure to strictly follow above procedures will result in Contractor's assumption of all financial responsibility for this shipment. All replacement and reorders must be made through Owner's Purchasing Coordinator and must allow Owner's vendor sufficient lead time to produce and ship new product.

G. When above procedures are strictly followed, shortages and damaged items will be replaced by Owner at Owner's cost.

1.06 OWNER OCCUPANCY

A. Owner intends to occupy the Project during construction.

B. Cooperate with Owner to minimize conflict and to facilitate Owner's operations.

C. Schedule the Work to accommodate Owner occupancy.

1.07 CONTRACTOR USE OF SITE AND PREMISES

A. Construction Operations:
1. Locate and conduct construction activities in ways that will limit disturbance to site.

B. Contractor will ensure that Contractor, its employees, subcontractors, and their employees comply with following requirements:
1. Do not use or consume alcohol or cannabis, or illegal use drugs, on the Project Site or enter on or perform any Work on the Project Site while under their influence.
2. Do not smoke or vape anything on the Project Site. Do not use tobacco in any form on the Project Site.
3. Do not perform Work on the Project Site on weekends except for emergency work.
4. Refrain from using profanity or being discourteous or uncivil to others on the Project Site or while performing Work under this Agreement.
5. Do not view or allow pornographic or other indecent materials on the Project Site.
6. Do not play obnoxious and/or loud music on the Project Site. Do not play any music within existing facilities.
7. Refrain from wearing immodest, offensive, or obnoxious clothing, while on the Project Site.
8. Do not bring weapons on the Project Site.

C. Existing building spaces may not be used for storage, unless approval given by Owner.

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

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

SECTION 01 2000
PRICE AND PAYMENT PROCEDURES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Procedures for preparation and submittal of applications for progress payments.

B. Procedures for preparation and submittal of application for final payment.

1.02 APPLICATIONS FOR PROGRESS PAYMENTS

A. Payment Period: Submit at intervals stipulated in the Agreement.

B. Use AIA Payment Request Form G702s (sample attached) or equivalent.

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

D. Electronic media printout including equivalent information will be considered in lieu of standard form specified; submit sample to Architect for approval.

E. Forms filled out by hand will not be accepted.

F. Execute certification by signature of authorized officer.

G. List each authorized Change Order as a separate line item, listing Change Order number and dollar amount as for an original item of work.

H. Submit copy of each Application for Payment.

1.03 APPLICATION FOR FINAL PAYMENT

A. Prepare Application for Final Payment as specified for progress payments, identifying total adjusted Contract Sum, previous payments, and sum remaining due.

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

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

SECTION 01 3000
ADMINISTRATIVE REQUIREMENTS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. General administrative requirements.

B. Progress meetings.

C. Submittals for review, information, and project closeout.

D. Submittal procedures.

1.02 GENERAL ADMINISTRATIVE REQUIREMENTS

A. Comply with requirements of Section 01 7000 - Execution and Closeout Requirements for coordination of execution of administrative tasks with timing of construction activities.

B. Project designation for this Project is **Peteetneet Academy Remodel**. This Project designation will be included on documents generated for Project by Contractor and Subcontractors, or be present on a cover letter accompanying such documents.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.01 PROGRESS MEETINGS

A. Architect will make arrangements for meetings, prepare agenda with copies for participants, preside at meetings.

B. Progress meetings will be open to Owner, Architect, Subcontractors, and anyone invited by Owner, Architect, and Contractor.

C. Architect will record minutes and distribute copies within three working days after meeting to participants and those affected by decisions made.

3.02 SUBMITTAL SCHEDULE

A. Submit to Architect for review a schedule for submittals in tabular format, listing items specified to be furnished for review to Architect including product data, shop drawings, samples, and Informational Submittals.
   1. Submit at the same time as the preliminary schedule or 20 days after receipt of Notice to Proceed.
   2. Coordinate with Contractor's construction schedule.
   3. Format schedule to allow tracking of status of submittals throughout duration of construction.
   4. Enclose the following information for each item:
      a. Scheduled date for first submittal.
      b. Related Section number.
      c. Submittal category.
      d. Name of Subcontractor.
      e. Description of part of the Work covered.
      f. Scheduled date for resubmittal.
      g. Scheduled date for Architect's final release or approval.
   5. Account for time required for preparation, review, manufacturing, fabrication and delivery when establishing submittal delivery and review deadline dates.
      a. For assemblies, equipment, systems comprised of multiple components and/or requiring detailed coordination with other work, allow for additional time to make corrections or revisions to initial submittals, and time for their review.
      b. Print and distribute copies to Architect and Owner and post copy in field office. When revisions are made, distribute to same parties and post in same location.

3.03 SUBMITTALS FOR REVIEW

A. When the following are specified in individual sections, submit them for review:
   1. Product data.
   2. Shop drawings.
   3. Samples for selection.
   4. Samples for verification.

B. Submit to Architect for review for the limited purpose of checking for compliance with information given and the design concept expressed in Contract Documents.

C. Samples will be reviewed for aesthetic, color, or finish selection.

D. After review, provide copies and distribute in accordance with SUBMITTAL PROCEDURES article below and for record documents purposes described in Section 01 7800 - Closeout Submittals.

3.04 SUBMITTALS FOR INFORMATION

A. When the following are specified in individual sections, submit them for information:
   1. Design data.
   2. Certificates.
   3. Test reports.
   4. Inspection reports.
   5. Manufacturer's instructions.
   6. Manufacturer's field reports.
   7. Field engineering daily reports.
   8. Special Procedure Submittals: Describe submittals intended to document special procedures. An example would be construction staging or phasing for remodeling an existing facility while keeping it in operation. While the Contractor would normally be responsible for managing this, submittal of his plan as documentation could be specified.
   9. Qualification Statements: Describe submittals intended to document qualification of entities employed by Contractor.
   10. Other types indicated.

B. Submit for Architect's knowledge as contract administrator or for Owner.

3.05 SUBMITTALS FOR PROJECT CLOSEOUT

A. Submit Correction Punch List for Substantial Completion.

B. Submit Final Correction Punch List for Substantial Completion.

C. When the following are specified in individual sections, submit them at project closeout in compliance with requirements of Section 01 7800 - Closeout Submittals:
   1. Project record documents.
   2. Operation and maintenance data.
   3. Warranties.
   4. Project Manual: Complete Project Manual including Addenda and Modifications as defined in General Conditions.
   5. Record Documentation: Describe submittal of record documentation specific to the Section.

D. Submit for Owner's benefit during and after project completion.

3.06 MAINTENANCE MATERIAL SUBMITTALS

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

3. Tools:
    a. Describe tools to be provided for Owner's use in facility operation and maintenance. Tools are generally understood to be wrenches, gauges, circuit setters, etc, required for proper operation or maintenance of a system.

3.07 NUMBER OF COPIES OF SUBMITTALS

A. Electronic Documents: Submit one electronic copy in PDF format; an electronically-marked up file will be returned. Create PDFs at native size and right-side up; illegible files will be rejected.

3.08 SUBMITTAL PROCEDURES

A. General Requirements:
    1. Identification:
        a. Place permanent label or title block on each submittal for identification. Include name of entity that prepared each submittal on label or title block.
            1) Provide space approximately 4 by 5 inches on label or beside title block on Shop Drawings to record Contractor's review and approval markings and action taken.
            2) Include following information on label for processing and recording action taken:
                (a) Project name.
                (b) Date.
                (c) Name and address of Architect.
                (d) Name and address of Contractor.
                (e) Name and address of Subcontractor.
                (f) Name and address of supplier.
                (g) Name of manufacturer.
                (h) Number and title of appropriate Specification Section.
                (i) Drawing number and detail references, as appropriate.
    2. Use a single transmittal for related items.
    3. Submit separate packages of submittals for review and submittals for information, when included in the same specification section.
    4. Sequentially identify each item. For revised submittals use original number and a sequential "R" suffix.
    5. Identify: Project; Contractor; subcontractor or supplier; pertinent drawing and detail number; and specification section number and article/paragraph, as appropriate on each copy.
    6. Apply Contractor's stamp, signed or initialed certifying that review, approval, verification of products required, field dimensions, adjacent construction work, and coordination of information is in accordance with the requirements of the work and Contract Documents.
        a. Submittals from sources other than the Contractor, or without Contractor's stamp will not be acknowledged, reviewed, or returned.
    7. Deliver each submittal on date noted in submittal schedule, unless an earlier date has been agreed to by all affected parties, and is of the benefit to the project.
        a. Deliver submittals to Architect at business address.
        b. Send submittals in electronic format via email to Architect.
    8. Schedule submittals to expedite the Project, and coordinate submission of related items.
        a. For each submittal for review, allow 21 days excluding delivery time to and from the Contractor.
        b. For sequential reviews involving Architect's consultants, Owner, or another affected party, allow an additional 10 days.
        c. For sequential reviews involving approval from authorities having jurisdiction (AHJ), in addition to Architect's approval, allow an additional 30 days.
    9. No extension of Contract Time will be authorized because of failure to transmit submittals to Architect in sufficient time before work is to be performed to allow processing.

B. Product Data Procedures:

1. Mark each copy of each set of submittals to show choices and options used on Project. Where printed Product Data includes information on products that are not required for Project, mark copies to indicate information relating to Project.
2. Certify that proposed product complies with requirements of Contract Documents. List any deviations from those requirements on form or separate sheet.
3. Submit only information required by individual specification sections.
4. Collect required information into a single submittal.
5. Submit concurrently with related shop drawing submittal.
6. Do not submit (Material) Safety Data Sheets for materials or products.

C. Shop Drawing Procedures:
1. Prepare accurate, drawn-to-scale, original shop drawing documentation by interpreting Contract Documents and coordinating related work.
2. Do not reproduce Contract Documents to create shop drawings.
3. Except for templates, patterns, and similar full-size Drawings, submit Shop Drawings on sheets at least 8-1/2 by 11 inches but no larger than 36 by 48 inches. Highlight, encircle, or otherwise show deviations from Contract Documents. Include following information as a minimum:
   a. Dimensions.
   b. Identification of products and materials included.
   c. Compliance with specified standards.
   d. Notation of coordination requirements.
   e. Notation of dimensions established by field measurement.
4. Review and designate (stamp) approval of shop drawings. Unless otherwise specified, submit to Architect six copies of shop drawings required by Contract Documents. Shop drawings not required by Contract Documents, but requested by Contractor or supplied by Subcontractor, need not be submitted to Architect for review.

D. Samples Procedures:
1. Transmit related items together as single package.
2. Identify each item to allow review for applicability in relation to shop drawings showing installation locations.
3. Include with transmittal high-resolution image files of samples to facilitate electronic review and approval. Provide separate submittal page for each item image.
4. Submit full-size, fully fabricated Samples cured and finished as specified and physically identical with material or product proposed. Samples include partial sections of manufactured or fabricated components, cuts or containers of materials, color range sets, and swatches showing color, texture, and pattern.
   a. Mount, display, or package Samples to ease review of qualities specified. Prepare Samples to match samples provided by Architect, if applicable. Include following:
      1) Generic description of Sample.
      2) Sample source.
      3) Product name or name of manufacturer.
      4) Compliance with recognized standards.
      5) Availability and delivery time.
5. Submit Samples for review of kind, color, pattern, and texture, for final check of these characteristics with other elements, and for a comparison of these characteristics between final submittal and actual component as delivered and installed.
   a. Where variations in color, pattern, texture or other characteristics are inherent in material or product represented, submit set of three samples minimum that show approximate limits of variations.
   b. Refer to other specification Sections for requirements for Samples that illustrate workmanship, fabrication techniques, details of assembly, connections, operation and similar construction characteristics.

c. Refer to other Sections for Samples to be returned to Contractor for incorporation into The Work. Such Samples shall be undamaged at time of use. On transmittal, indicate special requests regarding disposition of Sample submittals.

6. Where Samples are for selection of color, pattern, texture, or similar characteristics from a range of standard choices, submit full set of choices for material or product. Preliminary submittals will be reviewed and returned with Architect's mark indicating selection and other action.
7. Except for Samples illustrating assembly details, workmanship, fabrication techniques, connections, operation, and similar characteristics, submit three sets. One will be returned marked with action taken.
8. Samples, as accepted and returned by Architect, will be used for quality comparisons throughout course of construction.
   a. Unless noncompliance with Contract Documents is observed, submittal may serve as final submittal.
   b. Sample sets may be used to obtain final acceptance of construction associated with each set.

END OF SECTION

SECTION 01 4219
REFERENCE STANDARDS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Requirements relating to referenced standards.

1.02 QUALITY ASSURANCE

A. For products or workmanship specified by reference to a document or documents not included in the Project Manual, also referred to as reference standards, comply with requirements of the standard, except when more rigid requirements are specified or are required by applicable codes.

B. Comply with the reference standard of date of issue specified in this section, except where a specific date is established by applicable code.

C. Obtain copies of standards when required by Contract Documents.

D. Maintain copy at project site during submittals, planning, and progress of the specific work, until Date of Substantial Completion.

E. Should specified reference standards conflict with Contract Documents, request clarification from the Architect before proceeding.

F. Neither the contractual relationships, duties, or responsibilities of the parties in Contract nor those of the Architect shall be altered by Contract Documents by mention or inference otherwise in any reference document.

G. Minimum Quantity or Quality Levels:
   1. Quantity or quality level shown or specified shall be minimum provided or performed.
   2. Actual installation may comply exactly with minimum quantity or quality specified, or it may exceed minimum within reasonable limits.
   3. To comply with these requirements, indicated numeric values are minimum or maximum, as appropriate, for context of requirements.

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

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

1.03 INDUSTRY STANDARDS

A. Except where Contract Documents specify otherwise, construction industry standards will apply and are made a part of Contract Documents by reference.

B. Where compliance with two or more standards is specified and standards apparently establish different or conflicting requirements for minimum quantities or quality levels, refer to Architect for decision before proceeding. Quantity or quality level shown or specified will be minimum provided or performed. Actual installation may comply exactly with minimum quantity or quality specified, or it may exceed minimum within reasonable limits. In complying with these requirements, indicated numeric values are minimum or maximum, as appropriate for context of requirements. Refer uncertainties to Architect for decision before proceeding.

C. Each entity engaged in construction on Project is required to be familiar with industry standards applicable to that entity's construction activity. Copies of applicable standards are not bound with Contract Documents. Where copies of standards are needed for performance of a required construction activity, Contractor will obtain copies directly from publication source.

D. Industry Organizations: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities indicated in

Thomson Gale's "Encyclopedia of Associations" or in Columbia Books' "National Trade & Professional Associations of the U.S."

1.04 GOVERNING REGULATIONS

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

1.05 ABMA -- AMERICAN BEARING MANUFACTURERS ASSOCIATION, INC.

A. ABMA STD 9 - Load Ratings and Fatigue Life for Ball Bearings 2015.

1.06 AHRI -- AIR-CONDITIONING, HEATING, AND REFRIGERATION INSTITUTE

A. AHRI 410 - Forced-Circulation Air-Cooling and Air-Heating Coils 2001, with Addendum (2011).

B. AHRI 430 (I-P) - Performance Rating of Central Station Air-Handling Units 2014.

C. AHRI 610 (I-P) - Performance Rating Of Central System Humidifiers for Residential Applications 2014.

D. AHRI 851 (SI) - Performance Rating of Commercial and Industrial Air Filter Equipment 2013.

1.07 AISC -- AMERICAN INSTITUTE OF STEEL CONSTRUCTION, INC.

1.08 AITC -- AMERICAN INSTITUTE OF TIMBER CONSTRUCTION

1.09 ALI -- AMERICAN LADDER INSTITUTE

A. ALI A14.3 - Ladders - Fixed - Safety Requirements 2008.

1.10 AMCA -- AIR MOVEMENT AND CONTROL ASSOCIATION INTERNATIONAL, INC.

A. AMCA (DIR) - (Directory of) Products Licensed Under AMCA International Certified Ratings Program 2015.

B. AMCA 99 - Standards Handbook 2016.

C. AMCA 204 - Balance Quality and Vibration Levels for Fans 2005 (Reaffirmed 2012).

D. AMCA 210 - Laboratory Methods of Testing Fans for Certified Aerodynamic Performance Rating 2016.

E. AMCA 300 - Reverberant Room Method for Sound Testing of Fans 2014.

F. AMCA 301 - Methods for Calculating Fan Sound Ratings from Laboratory Test Data 2014.

G. AMCA 500-D - Laboratory Methods of Testing Dampers for Rating 2018.

H. AMCA 500-L - Laboratory Methods of Testing Louvers for Rating 2015.

1.11 ASHRAE -- AMERICAN SOCIETY OF HEATING, REFRIGERATING AND AIR-CONDITIONING ENGINEERS, INC.

A. ASHRAE (FUND) - ASHRAE Handbook - Fundamentals Most Recent Edition Cited by Referring Code or Reference Standard.

B. ASHRAE Std 52.2 - Method of Testing General Ventilation Air-Cleaning Devices for Removal Efficiency by Particle Size 2017, with Addendum (2020).

C. ASHRAE Std 62.1 - Ventilation for Acceptable Indoor Air Quality Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

D. ASHRAE Std 90.1 I-P - Energy Standard for Buildings Except Low-Rise Residential Buildings Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

E. ASHRAE Std 103 - Methods of Testing for Annual Fuel Utilization Efficiency of Residential Central Furnaces and Boilers 2017, with Errata (2019).

1.12 ASSE -- AMERICAN SOCIETY OF SANITARY ENGINEERING

1.13 ASTM A SERIES -- ASTM INTERNATIONAL

A. ASTM A36/A36M - Standard Specification for Carbon Structural Steel 2014.

B. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process 2020.

1.14 ASTM B SERIES -- ASTM INTERNATIONAL

A. ASTM B177/B177M - Standard Guide for Engineering Chromium Electroplating 2011 (Reapproved 2017).

B. ASTM B209 - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate 2014.

C. ASTM B209M - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate (Metric) 2014.

D. ASTM B633 - Standard Specification for Electrodeposited Coatings of Zinc on Iron and Steel 2019.

1.15 ASTM C SERIES -- ASTM INTERNATIONAL

A. ASTM C1184 - Standard Specification for Structural Silicone Sealants 2018, with Editorial Revision.

1.16 ASTM D SERIES -- ASTM INTERNATIONAL

A. ASTM D16 - Standard Terminology for Paint, Related Coatings, Materials, and Applications 2016.

B. ASTM D635 - Standard Test Method for Rate of Burning and/or Extent and Time of Burning of Plastics in a Horizontal Position 2018.

C. ASTM D882 - Standard Test Method for Tensile Properties of Thin Plastic Sheeting 2018.

D. ASTM D4442 - Standard Test Methods for Direct Moisture Content Measurement of Wood and Wood-Based Materials 2020.

1.17 ASTM E SERIES -- ASTM INTERNATIONAL

A. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials 2020.

B. ASTM E2273 - Standard Test Method for Determining the Drainage Efficiency of Exterior Insulation and Finish Systems (EIFS) Clad Wall Assemblies 2018.

C. ASTM E2486/E2486M - Standard Test Method for Impact Resistance of Class PB and PI Exterior Insulation and Finish Systems (EIFS) 2013 (Reapproved 2018).

1.18 AWI/AWMAC/WI -- JOINT PUBLICATION OF ARCHITECTURAL WOODWORK INSTITUTE/ARCHITECTURAL WOODWORK MANUFACTURERS ASSOCIATION OF CANADA/WOODWORK INSTITUTE

1.19 BIA -- BRICK INDUSTRY ASSOCIATION

1.20 HPVA -- HARDWOOD PLYWOOD VENEER ASSOCIATION

1.21 ICC-ES -- ICC EVALUATION SERVICE, INC.

A. ICC-ES AC235 - Acceptance Criteria for EIFS Clad Drainage Wall Assemblies 2009, with Editorial Revision (2012).

1.22 ISO -- INTERNATIONAL STANDARDS ORGANIZATION

1.23 MFMA -- MAPLE FLOORING MANUFACTURERS ASSOCIATION

1.24 MFMA -- METAL FRAMING MANUFACTURERS ASSOCIATION

A. MFMA-4 - Metal Framing Standards Publication 2004.

1.25 MPI -- MASTER PAINTERS INSTITUTE (MASTER PAINTERS AND DECORATORS ASSOCIATION)

A. MPI (APL) - Master Painters Institute Approved Products List; Master Painters and Decorators Association Current Edition.

B. MPI (APSM) - Master Painters Institute Architectural Painting Specification Manual Current Edition.

1.26 MSS -- MANUFACTURERS STANDARDIZATION SOCIETY OF THE VALVE AND FITTINGS INDUSTRY, INC.

A. MSS SP-58 - Pipe Hangers and Supports - Materials, Design, Manufacture, Selection, Application, and Installation 2018.

1.27 NAAMM -- THE NATIONAL ASSOCIATION OF ARCHITECTURAL METAL MANUFACTURERS

A. NAAMM AMP 510 - Metal Stairs Manual 1992.

1.28 NEMA -- NATIONAL ELECTRICAL MANUFACTURERS ASSOCIATION

A. NEMA MG 1 - Motors and Generators 2018.

1.29 NFPA -- NATIONAL FIRE PROTECTION ASSOCIATION

A. NFPA 13 - Standard for the Installation of Sprinkler Systems Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

B. NFPA 54 - National Fuel Gas Code 2018.

C. NFPA 70 - National Electrical Code Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

D. NFPA 90A - Standard for the Installation of Air-Conditioning and Ventilating Systems 2018.

E. NFPA 90B - Standard for the Installation of Warm Air Heating and Air-Conditioning Systems 2018.

F. NFPA 211 - Standard for Chimneys, Fireplaces, Vents, and Solid Fuel-Burning Appliances 2019.

G. NFPA 1963 - Standard for Fire Hose Connections 2019.

1.30 NSF -- NSF INTERNATIONAL (THE PUBLIC HEALTH AND SAFETY ORGANIZATION)

1.31 RCSC -- RESEARCH COUNCIL ON STRUCTURAL CONNECTIONS

1.32 RIS -- REDWOOD INSPECTION SERVICE

1.33 SMACNA -- SHEET METAL AND AIR CONDITIONING CONTRACTORS' NATIONAL ASSOCIATION, INC.

A. SMACNA (DCS) - HVAC Duct Construction Standards Metal and Flexible 2005 (Revised 2009).

1.34 TMS -- THE MASONRY SOCIETY

1.35 TPI -- TRUSS PLATE INSTITUTE

1.36 UL -- UNDERWRITERS LABORATORIES INC.

A. UL (DIR) - Online Certifications Directory Current Edition.

B. UL 181 - Standard for Factory-Made Air Ducts and Air Connectors current edition, including all revisions.

C. UL 405 - Fire Department Connection Devices Current Edition; Including All Revisions.

D. UL 705 - Power Ventilators Current Edition, Including All Revisions.

E. UL 723 - Standard for Test for Surface Burning Characteristics of Building Materials Current Edition, Including All Revisions.

F. UL 900 - Standard for Air Filter Units Current Edition, Including All Revisions.

END OF SECTION

SECTION 01 4546
DUCT TESTING, ADJUSTING, AND BALANCING

PART 1 GENERAL

1.01 SUMMARY

A. Includes But Is Not Limited To:
   1. Test, balance, and adjust air duct systems services provided by Owner as described in Contract Documents.

B. Related Requirements:
   1. Division 01: 'General Requirements':
      a. Section 01 1000 - Summary: Owner will provide test, balance, and adjust air duct systems. PART 3 of this Section establishes requirements for field tests of 'Testing Agency'.
      b. Section 01 4000 - Quality Requirements: for testing and inspection, and testing laboratory services for materials, products, and construction methods.
   2. Division 23:
      a. Completing installation and start-up of mechanical systems, and changing sheaves, belts, and dampers as required for correct balance.
      b. Maintain HVAC system and equipment in full operation each working day of testing, balancing, and adjusting.

1.02 ADMINISTRATIVE REQUIREMENTS

A. Coordination:
   1. Contractor to assist Testing Agency in testing and balancing of mechanical system.
   2. Assisting Testing Agency in testing and balancing of mechanical system.

B. Scheduling:
   1. Contractor to schedule this work in cooperation with other Sections involved and to comply with completion date for test, balance, and adjust air duct systems as described in Contract Documents.
   2. Contact Testing Agency and coordinate (Owner's Representative to provide 'Testing Agency' contact information):
      a. One inspection when 60 percent of ductwork is installed.
      b. One inspection when 90 percent of equipment and ductwork is installed.
   3. Contact Testing Agency and coordinate date(s) for test and balance work when following is completed:
      a. HVAC and exhaust systems including installation of specialties, devices, and new filters.
      b. Proper function of control system components including electrical interlocks, damper sequences, air and water reset, and fire and freeze stats has been verified.
      c. Automatic temperature controls have been calibrated and set for design operating conditions.
      d. Verification of proper thermostat calibration and setting of control components such as static pressure controllers and other devices that may need set points changed during process of balancing system.
   4. If, in opinion of Testing Agency, systems are not ready for test and balance, reschedule as required.

1.03 SUBMITTALS

A. Informational Submittals:
   1. Test and Evaluation Reports:
      a. Preliminary Report(s):
         1) Copy to be given to Owner's Representative.
      b. Final Report:
         1) Copy to be given to Owner's Representative.

B. Closeout Submittals:
1. Include following in Operations And Maintenance Manual specified in Section 01 7800:
a. Record Documentation:
1) Testing and Inspection Reports:
(a) Testing Agency Testing and Evaluation Final Report of testing, balancing, and adjusting air duct systems. Bind approved copy of Testing and Evaluation Report in Operations And Maintenance Manual for Division 23.

1.04 QUALITY ASSURANCE

A. Qualifications:
1. Approved Testing Agency. Section 01 4000 applies, but is not limited to following:
a. Testing Agency shall specialize in testing and balancing of heating, ventilating, and cooling systems to balance, adjust, and test air moving equipment, air distribution, and exhaust systems.
b. Testing Agency shall provide proof of having successfully completed at least five years of specialized experience in air and hydronic system balancing.
c. Testing Agency shall provide testing under direct supervision of qualified heating and ventilating engineer.
d. Neither Architect's engineering consultant nor anyone performing work on this Project under other Sections of Division 23 shall be permitted to do this work.

PART 2 PRODUCTS: NOT USED

PART 3 EXECUTION

3.01 CONTRACTOR-FURNISHED TESTING AND INSPECTION

A. Contractor to provide Testing and Inspection for testing, balancing, and adjusting air duct systems:

3.02 FIELD QUALITY CONTROL

A. Field Tests
1. Air System Testing, Adjusting, And Balance:
a. Inspections and site visits. (For paragraph a thru c, note deficiencies, if any, that needs to be corrected and report this to Owner’s Representative, Architect, and Mechanical Engineer):
1) One inspection when ductwork installation is 60 percent complete.
2) One inspection when ductwork is installation is 90 percent complete.
3) One inspection when potable hot and cold water system is 90 percent complete.
4) Site visit for test and balance. Before commencing test and balance, perform an inspection to verify 100 percent completion of system. Confirm completion of work, correction of previously noted deficiencies, and look for new deficiencies not noted in previous inspections. If the work is complete, then proceed with test and balance. If the work is not complete and ready for test and balance, inform Contractor and submit an invoice to Owner’s Representative for compensation for travel time, expenses, and time on site. Report deficiencies or incomplete work to Owner’s Representative, Architect, and Mechanical Engineer.
5) Additional site visits (beyond those set forth above) to complete the work after issues are resolved may be needed and will be paid for separately from compensation for services set forth in this Agreement, pursuant to hourly rates and conditions set forth in Attachment “A”.
b. Checklist for Inspections and site visits:
1) Pre-Startup Inspection - use for inspections and site visits a thru d in paragraph 1 above. All pertinent items shall be checked, including but not limited to following:
(a) Removal of shipping blocks and stops.
(b) Vibration isolators’ alignment and adjustment.

(c) Flexible connections properly installed and aligned.
(d) Safety controls, safety valves and high or low limits in operation.
(e) All systems properly filled.
(f) Filters in place and seal provided around edges.
(g) Filters and strainers are clean.
(h) Fire damper installation and operation, and access door installation.
(i) Installation of all gauges on equipment.
(j) Control system is operating.
(k) All dampers, valves, and operators are properly installed and operating.
(l) All ductwork is installed and sealed.
(m) Voltage to unit matches nameplate voltage.

2) First Run Inspection - use for inspections and site visits d and e in paragraph 1 above. Recheck items in Pre-Startup list, and check for following items:
(a) Excessive vibration or noise.
(b) Loose components.
(c) Initial control settings.
(d) Motor amperages.
(e) Heat buildup in motors.
(f) Control system is calibrated and functioning as required.

3) System Operation Inspection - use for inspections and site visits d and e in paragraph 1 above. Observe mechanical systems under operation for sufficient amount of time to ensure proper operation in all running modes. Check following items periodically.
(a) Filters and strainers.
(b) Filters and strainers.
(c) Check for system leaks at seals and valves.

c. Performance Requirements:
1) Testing and balancing in complete accordance with Associated Air Balance Council (AABC) Standards for Field Measurement & Instructions.
2) Noise level in chapel and / or cultural hall shall not exceed NC 35 with all HVAC equipment operating in full or second stage cooling mode.

d. Site tests: Air Test and Balancing Procedure:
1) Instruments used by Consultant shall be accurately calibrated and maintained in good working order.
2) All supply air and return air fans in all HVAC zone systems, energy recovery ventilators, and exhaust fans in building shall be operating when final setup of all units is performed.
3) Perform tests at high and low speeds of multi-speed systems and single speed systems.
4) Perform following testing and balancing functions in accordance with Associated Air Balance Council National Standards.
(a) Fan Speeds - Air handling units (with variable pitch pulleys and sheaves): Test and adjust fan RPM to achieve design CFM requirements.
(b) Fan Speeds - Furnaces (with direct drive motors): Set fan speed to lowest possible setting that will achieve design CFM requirements. Adjust down from Contractor setting, if necessary. Adjust low voltage fan speed jumpers (provided and installed by installing contractor) as necessary to achieve design cooling air flow at lowest possible setting. An exception to this would be when furnace is variable speed blower for dehumidification applications.
(c) Current And Voltage: Measure and record motor current and voltage.
(d) Pitot-Tube Traverse Method:

(1) Make measurements in duct where velocity is uniform, 7-1/2 duct diameters downstream and 2 duct diameters minimum upstream from any turbulence, i.e., elbow, damper, take-off, etc.
(2) Perform pitot-tube traverse of outdoor ventilation air duct serving each piece of air moving equipment.
(3) Where single outdoor ventilation air trunk duct serves multiple pieces of equipment, perform pitot-tube traverse of duct branch serving each piece of equipment as well as pitot-tube traverse of total air flow in trunk with all pieces of equipment operating.

(e) Where pitot-tube traverse is not possible or if pitot-tube traverse is unreliable, flow hood measurement over exterior intake louver or grille is acceptable for measuring outdoor ventilation air.
(f) Use proportionate method of air balance leaving fan at lowest possible speed and at least one branch balance damper fully open.

5) Static Pressure: Test and record system static pressures, including suction and discharge static pressure of each fan.
6) Air Temperature: Take dry bulb air temperatures on entering and leaving side of each cooling coil. Dry bulb temperatures shall be taken on entering and leaving side of each heating unit.
7) Zone Ducts: Adjust zone ducts to within design CFM requirements. At least one zone balancing damper shall be completely open.
8) Branch Ducts: Adjust branch ducts to within design CFM requirements. Multi-diffuser branch ducts shall have at least one outlet or inlet volume damper completely open.
9) Tolerances: Test and balance all fans, zone ducts, registers, diffusers etc. to + or - 10 percent of design CFM.
10) Identification: Identify location and area of each grille, diffuser, register, and terminal box. Record on air outlet data sheets.
11) Description: Record size, type, and manufacturer of each diffuser, grille, and register on air outlet data sheets.
12) Drafts: Adjust diffusers, grilles, and registers to minimize drafts. For high sidewall supply air diffusers install horizontal blade core to direct air flow upward 15 degree and set adjustable vertical blades to spread air flow horizontally and evenly in fan pattern.
13) Permanently mark all outside air, supply air, and return air damper positions after balancing has been completed.
14) Smoke testing: Smoke testing, or some other approved means, may be required to determine leak locations if air balance report indicates that any system's CFM total is less than 90 percent of design CFM. Prior to test, verify that system's duct joints have been sealed as specified and that air moving device in question is supplying required design system air flow. Mechanical Engineer will approve test method required. If smoke test is selected, use following procedure. Provide necessary precautions to protect those performing or observing test from being exposed to smoke.
(a) Use zinc chloride smoke candles, titanium tetrachloride ampules or sticks, or other devices acceptable to Mechanical engineer to generate smoke.
(b) Close openings in duct except for one opening at farthest end of duct run.
(c) Circulate smoke at pressurized condition of 1/2 inch (13 mm) minimum water gauge static pressure.
(d) Report findings to mechanical engineer in writing.

e. Air System Test and Evaluation Report:
1) Record test data on AABC standard forms or facsimile.
2) Preliminary Report: Provide and deliver four copies of complete data for evaluation and approval to Owner.

3) Final report: Provide and deliver complete four copies of final report to Owner prior to project Substantial Completion date.
4) Complete with logs, data, and records as required herein. Print logs, data, and records on white bond paper bound together in report form.
5) Certified accurate and complete by Consultant's certified test and balance engineer.
6) Contain following general data in format selected by Consultant:
   (a) Project Number.
   (b) Project Title.
   (c) Project Location.
   (d) Project Architect and Mechanical Engineer.
   (e) Consultant and Certified Engineer.
   (f) Contractor and mechanical sub-contractor.
   (g) Dates tests were performed.
   (h) Certification Document.
   (i) Report Forms similar to AABC Standard format.
7) Report shall include following:
   (a) Instrumentation List including type, model, manufacturer, serial number, and calibration dates.
   (b) HVAC zone identification to include reduced ductwork floor plan from project documents with outlets and inlets numbered to match written test and balance report. This page may be oversized but it should fold up neatly within standard 81/2 x 11 report paper size.
   (c) Record following for each piece of air handling equipment:
      (1) Manufacturer, model number, and serial number.
      (2) Design and manufacture rated data.
      (3) Actual CFM.
      (4) Suction and discharge static pressure of each fan.
      (5) Outdoor-ventilation-air and return-air total CFM.
      (6) Final RPM of each motor or speed tap.
      (7) Actual operating current and voltage of each fan motor.
      (8) Fan and motor sheave manufacturer, model, size, number of grooves and center distance.
      (9) Belt size and quantity.

3.03 PREPARATION

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

END OF SECTION

SECTION 01 6000
PRODUCT REQUIREMENTS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. General product requirements.

B. Re-use of existing products.

C. Transportation, handling, storage and protection.

D. Product option requirements.

E. Substitution limitations.

1.02 SUBMITTALS

A. As indicated in technical sections in accordance with Section 01 3000.

PART 2 PRODUCTS

2.01 EXISTING PRODUCTS

A. Do not use materials and equipment removed from existing premises unless specifically required or permitted by Contract Documents.

B. Unforeseen historic items encountered remain the property of the Owner; notify Owner promptly upon discovery; protect, remove, handle, and store as directed by Owner.

C. Existing materials and equipment indicated to be removed, but not to be re-used, relocated, reinstalled, delivered to the Owner, or otherwise indicated as to remain the property of the Owner, become the property of the Contractor; remove from site.

2.02 NEW PRODUCTS

A. Provide new products unless specifically required or permitted by Contract Documents.

B. Provide products complete with accessories, trim, finish, safety guards, and other devices and details needed for complete installation and for intended use and effect.

C. Provide interchangeable components of the same manufacturer for components being replaced.

D. Except for required labels and operating data, do not attach or imprint manufacturer's or producer's nameplates or trademarks on surfaces of products that will be exposed to view in occupied spaces or on building exterior.
   1. Locate required product labels and stamps on concealed surface or, where required for observation after installation, on accessible surface that is not conspicuous.
   2. Provide permanent nameplates on items of service-connected or power-operated equipment. Locate on easily accessible surface that is inconspicuous in occupied spaces. Nameplate will contain following information and other essential operating data:
      a. Name of product and manufacturer.
      b. Model and serial number.
      c. Capacity.
      d. Speed.
      e. Ratings.

2.03 PRODUCT OPTIONS

A. Products Specified by Reference Standards or by Description Only: Use any product meeting those standards or description.

B. Where Specifications require compliance with performance requirements, provide products that comply with these requirements and are recommended by manufacturer for application described. General overall performance of product is implied where product is specified for specific application. Manufacturer's recommendations may be contained in published product literature, or by manufacturer's certification of performance.

C. Where specifications only require compliance with an imposed code, standard, or regulation, select product that complies with standards, codes or regulations specified.

D. Where Specifications require matching an established Sample, Architect's decision will be final on whether proposed product matches satisfactorily. Where no product available within specified category matches satisfactorily nor complies with other specified requirements, refer to Architect.

E. Where specified product requirements include phrase "...as selected from manufacturer's standard colors, patterns, textures..." or similar phrase, select product and manufacturer that comply with other specified requirements. Architect will select color, pattern, and texture from product line selected.

F. Remove and replace products and materials not specified in Contract Documents but installed in the Work with specified products and materials at no additional cost to Owner and for no increase in Contract time.

G. Products Specified by Naming One or More Manufacturers: Use a product of one of the manufacturers named and meeting specifications, no options or substitutions allowed.

H. Products Specified by Naming One or More Manufacturers with a Provision for Substitutions: Submit a request for substitution for any manufacturer not named.

PART 3 EXECUTION

3.01 SUBSTITUTION LIMITATIONS

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. Substitutions for specified products and systems, as defined in the Uniform Commercial Code, are not acceptable. However, equal products may be approved upon compliance with Contract Document requirements.
      b. Approved Products / Manufacturers / Suppliers / Distributors / Fabricators / Installers:
   2. Acceptable Products / Manufacturers / Suppliers / Installers:
      a. 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.
   3. Quality / Performance Standard Products / Manufacturers:
      a. Products / manufacturers used shall conform to Contract Document requirements.
   4. Comparable Product Requests:
      a. Submit request for consideration of each comparable product. Identify product or fabrication or installation method to be replaced. Include Specification Section number and title and Drawing numbers and titles:
         1) Include data to indicate compliance with the requirements specified in "Comparable Products" Article.
         2) Architect's Action: If necessary, Architect will request additional information or documentation for evaluation within one week of receipt of a comparable product request. Architect will notify Contractor of approval or rejection of proposed comparable product request within 15 days of receipt of request, or seven days of receipt of additional information or documentation, whichever is later.
            (a) Form of Approval: As specified in Division 01 Section "Submittal Procedures."
            (b) Use product specified if Architect does not issue a decision on use of a comparable product request within time allocated.
         3) Submit five copies of each required submittal unless otherwise required. Architect will return three copies marked with action taken and with corrections or modifications required.

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

3.02 TRANSPORTATION AND HANDLING

A. Package products for shipment in manner to prevent damage or theft; for equipment, package to avoid loss of factory calibration.

B. If special precautions are required, attach instructions prominently and legibly on outside of packaging.

C. Coordinate schedule of product delivery to designated prepared areas in order to minimize site storage time and potential damage to stored materials.

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

E. 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.

F. Transport and handle products in accordance with manufacturer's instructions.

G. Transport materials in covered trucks to prevent contamination of product and littering of surrounding areas.

H. Promptly inspect shipments to ensure that products comply with requirements, quantities are correct, and products are undamaged.

I. Provide equipment and personnel to handle products by methods to prevent soiling, disfigurement, or damage, and to minimize handling.

J. Arrange for the return of packing materials, such as wood pallets, where economically feasible.

3.03 STORAGE AND PROTECTION

A. Provide protection of stored materials and products against theft, casualty, or deterioration.

B. Designate receiving/storage areas for incoming products so that they are delivered according to installation schedule and placed convenient to work area in order to minimize waste due to excessive materials handling and misapplication. See Section 01 7419.

C. Store and protect products in accordance with manufacturers' instructions.

D. Store with seals and labels intact and legible.

E. Arrange storage of materials and products to allow for visual inspection for the purpose of determination of quantities, amounts, and unit counts. Periodically inspect to verify products are undamaged and are maintained in acceptable condition.

F. Store sensitive products in weathertight, climate-controlled enclosures in an environment favorable to product.

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

H. For exterior storage of fabricated products, place on sloped supports above ground.

I. Protect products from damage or deterioration due to construction operations, weather, precipitation, humidity, temperature, sunlight and ultraviolet light, dirt, dust, and other contaminants.

J. Comply with manufacturer's warranty conditions, if any.

K. Cover products subject to deterioration with impervious sheet covering. Provide ventilation to prevent condensation and degradation of products.

L. Prevent contact with material that may cause corrosion, discoloration, or staining.

M. Provide equipment and personnel to store products by methods to prevent soiling, disfigurement, or damage.

3.04 NON-CONFORMING WORK

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

END OF SECTION

SECTION 01 7000
EXECUTION AND CLOSEOUT REQUIREMENTS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Examination, preparation, and general installation procedures.

B. Cleaning and protection.

C. General requirements for maintenance service.

1.02 RELATED REQUIREMENTS

A. Section 01 7800 - Closeout Submittals: Project record documents, operation and maintenance data, warranties, and bonds.

1.03 PROJECT CONDITIONS

A. Use of explosives is not permitted.

B. Ventilate enclosed areas to assist cure of materials, to dissipate humidity, and to prevent accumulation of dust, fumes, vapors, or gases.

C. Dust Control: Execute work by methods to minimize raising dust from construction operations. Provide positive means to prevent air-borne dust from dispersing into atmosphere and over adjacent property.
   1. Provide dust-proof barriers between construction areas and areas continuing to be occupied by Owner.

D. Noise Control: Provide methods, means, and facilities to minimize noise produced by construction operations.
   1. At All Times: Excessively noisy tools and operations will not be tolerated inside the building at any time of day; excessively noisy includes jackhammers.
   2. Outdoors: Limit conduct of especially noisy exterior work to [_____].
   3. Indoors: Limit conduct of especially noisy interior work to [_____].

E. Pest and Rodent Control: Provide methods, means, and facilities to prevent pests and insects from damaging the work.

F. Rodent Control: Provide methods, means, and facilities to prevent rodents from accessing or invading premises.

G. Pollution Control: Provide methods, means, and facilities to prevent contamination of soil, water, and atmosphere from discharge of noxious, toxic substances, and pollutants produced by construction operations. Comply with federal, state, and local regulations.

PART 2 PRODUCTS

2.01 PATCHING MATERIALS

A. New Materials: As specified in product sections; match existing products and work for patching and extending work.

B. Type and Quality of Existing Products: Determine by inspecting and testing products where necessary, referring to existing work as a standard.

C. Product Substitution: For any proposed change in materials, submit request for substitution described in Section 01 6000 - Product Requirements.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that existing site conditions and substrate surfaces are acceptable for subsequent work. Start of work means acceptance of existing conditions.

B. Verify that existing substrate is capable of structural support or attachment of new work being applied or attached.

C. Examine and verify specific conditions described in individual specification sections.

D. Take field measurements before confirming product orders or beginning fabrication, to minimize waste due to over-ordering or mis-fabrication.

E. Verify that utility services are available, of the correct characteristics, and in the correct locations.

F. Prior to Cutting: Examine existing conditions prior to commencing work, including elements subject to damage or movement during cutting and patching. After uncovering existing work, assess conditions affecting performance of work. Beginning of cutting or patching means acceptance of existing conditions.

3.02 PREPARATION

A. Clean substrate surfaces prior to applying next material or substance.

B. Seal cracks or openings of substrate prior to applying next material or substance.

C. Apply manufacturer required or recommended substrate primer, sealer, or conditioner prior to applying any new material or substance in contact or bond.

3.03 GENERAL INSTALLATION REQUIREMENTS

A. Install products as specified in individual sections, in accordance with manufacturer's instructions and recommendations to extent that those instructions and recommendations are more explicit or stringent than requirements contained in Contract Documents. Notify Architect of conflicts between Manufacturer's installation instructions and Contract Document requirements.

B. Provide attachment and connection devices and methods necessary for securing Work. Secure work true to line and level. Anchor each product securely in place, accurately located, and aligned with other Work. Allow for expansion and building movement.

C. Make vertical elements plumb and horizontal elements level, unless otherwise indicated.

D. Install equipment and fittings plumb and level, neatly aligned with adjacent vertical and horizontal lines, unless otherwise indicated.

E. Make consistent texture on surfaces, with seamless transitions, unless otherwise indicated.

F. Visual Effects: Provide uniform joint widths in exposed work. Arrange joints in exposed work to obtain best visual effect. Refer questionable choices to Architect for final decision.

G. Install each component during weather conditions and Project status that will ensure best possible results. Isolate each part of completed construction from incompatible material as necessary to prevent deterioration.

H. Coordinate temporary enclosures with required inspections and tests, to reduce necessity of uncovering completed construction for that purpose.

I. Mounting Heights: Where mounting heights are not shown, install individual components at standard mounting heights recognized within the industry or local codes for that application. Refer questionable mounting height decisions to Architect for final decision.

3.04 CUTTING AND PATCHING

A. Whenever possible, execute the work by methods that avoid cutting or patching.

B. Perform whatever cutting and patching is necessary to:
   1. Complete the work.
   2. Fit products together to integrate with other work.
   3. Provide openings for penetration of mechanical, electrical, and other services.
   4. Match work that has been cut to adjacent work.
   5. Repair areas adjacent to cuts to required condition.
   6. Repair new work damaged by subsequent work.
   7. Remove samples of installed work for testing when requested.
   8. Remove and replace defective and non-complying work.

C. Execute work by methods that avoid damage to other work and that will provide appropriate surfaces to receive patching and finishing. In existing work, minimize damage and restore to original condition.

D. Employ original installer to perform cutting for weather exposed and moisture resistant elements, and sight exposed surfaces.

E. Cut rigid materials using masonry saw or core drill. Pneumatic tools not allowed without prior approval.

F. Restore work with new products in accordance with requirements of Contract Documents.

G. Fit work air tight to pipes, sleeves, ducts, conduit, and other penetrations through surfaces.

H. At penetrations of fire rated walls, partitions, ceiling, or floor construction, completely seal voids with fire rated material in accordance with Section 07 8400, to full thickness of the penetrated element.

I. Patching:
   1. Finish patched surfaces to match finish that existed prior to patching. On continuous surfaces, refinish to nearest intersection or natural break. For an assembly, refinish entire unit.
   2. Match color, texture, and appearance.
   3. Repair patched surfaces that are damaged, lifted, discolored, or showing other imperfections due to patching work. If defects are due to condition of substrate, repair substrate prior to repairing finish.

3.05 PROGRESS CLEANING

A. Maintain areas free of waste materials, debris, and rubbish. Maintain site in a clean and orderly condition.

B. Remove debris and rubbish from pipe chases, plenums, attics, crawl spaces, and other closed or remote spaces, prior to enclosing the space.

C. Broom and vacuum clean interior areas prior to start of surface finishing, and continue cleaning to eliminate dust.

D. Keep site and adjoining streets reasonably clean. If necessary, sprinkle rubbish and debris with water to suppress dust.

E. 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.

F. Clean and maintain completed construction as frequently as necessary throughout construction period. Adjust and lubricate operable components to ensure ability to operate without damaging effects.

G. Supervise construction activities to ensure that no part of construction completed or in progress, is subject to harmful, dangerous, damaging, or otherwise deleterious exposure during construction period.

H. Before and during application of painting materials, clear area where such work is in progress of debris, rubbish, and building materials that may cause dust. Sweep floors and vacuum as required and take all possible steps to keep area dust free.

I. Clean exposed surfaces and protect as necessary to avoid damage and deterioration.

J. Place extra materials of value remaining after completion of associated work have become Owner's property as directed by Owner or Architect.

K. Collect and remove waste materials, debris, and trash/rubbish from site periodically and dispose off-site; do not burn or bury.

3.06 PROTECTION OF INSTALLED WORK

A. Protect installed work from damage by construction operations.

B. Provide special protection where specified in individual specification sections.

C. Provide temporary and removable protection for installed products. Control activity in immediate work area to prevent damage.

D. Provide protective coverings at walls, projections, jambs, sills, and soffits of openings.

E. Protect finished floors, stairs, and other surfaces from traffic, dirt, wear, damage, or movement of heavy objects, by protecting with durable sheet materials.

F. Prohibit traffic or storage upon waterproofed or roofed surfaces. If traffic or activity is necessary, obtain recommendations for protection from waterproofing or roofing material manufacturer.

G. Remove protective coverings when no longer needed; reuse or recycle coverings if possible.

3.07 ADJUSTING

A. Adjust operating products and equipment to ensure smooth and unhindered operation.

3.08 FINAL CLEANING

A. Execute final cleaning after Substantial Completion but before making final application for payment.
   1. Clean areas to be occupied by Owner prior to final completion before Owner occupancy.

B. Use cleaning materials that are nonhazardous.

C. Comply with individual manufacturer's cleaning instructions.

D. Clean interior and exterior glass, surfaces exposed to view; remove temporary labels, stains and foreign substances, polish transparent and glossy surfaces, vacuum carpeted and soft surfaces.

E. Clean each surface or unit to condition expected in normal, commercial building cleaning and maintenance program, including but not limited to:
   1. Interior Cleaning:
      a. Exercising care not to scratch glass.
      b. Remove marks, stains, fingerprints and dirt.
      c. Clean and polish woodwork and finish hardware.
      d. Clean plumbing fixtures and tile work. Remove spots, soil or paint.
      e. Clean surfaces of mechanical and electrical equipment. Remove excess lubrication and other substances. Clean light fixtures and lamps.
      f. Clean other fixtures and equipment and remove stains, paint, dirt, and dust.
      g. Remove temporary floor protection and clean floors.
   2. Exterior Cleaning:
      a. Exercising care not to scratch glass.
      b. Remove marks, stains, and dirt from exterior surfaces.
      c. Clean and polish finish hardware.
      d. Remove temporary protection systems.
      e. Clean dirt, mud, and other foreign material from paving and sidewalks.
      f. Clean drop inlets, through-curb drains, and other drainage structures.
      g. Remove trash, debris, and foreign material from landscaped areas.

F. Remove all labels that are not permanent. Do not paint or otherwise cover fire test labels or nameplates on mechanical and electrical equipment.

G. Clean equipment and fixtures to a sanitary condition with cleaning materials appropriate to the surface and material being cleaned.

H. Clean filters of operating equipment.

I. Clean site; sweep paved areas, rake clean landscaped surfaces.

J. Remove waste, surplus materials, trash/rubbish, and construction facilities from the site; dispose of in legal manner; do not burn or bury.

3.09 CLOSEOUT PROCEDURES

A. Closeout process consists of three specific project closeout inspections. Contractor shall plan sufficient time in construction schedule to allow for required inspections before expiration of Contract Time.

B. Contractor shall conduct his own inspections of The Work and shall not request closeout inspections until The Work of the contract is reasonably complete and correction of obvious defects or omissions are complete or imminent.

C. Date of Substantial Completion shall not occur until completion of construction work, unless agreed to by Architect and included on Certificate of Substantial Completion.

D. Make submittals that are required by governing or other authorities.
   1. Provide copies to Architect and Owner.

E. 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.
   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 and his appropriate consultants, together with Contractor and mechanical, plumbing, fire protection, and electrical sub-contractors shall conduct a space by space and exterior inspection to review materials and workmanship and to demonstrate that systems and equipment are operational.
      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.

F. 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.

G. 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.

3.10 MAINTENANCE

A. Provide service and maintenance of components indicated in specification sections.

B. Maintenance Period: As indicated in specification sections or, if not indicated, not less than one year from the Date of Substantial Completion or the length of the specified warranty, whichever is longer.

C. Examine system components at a frequency consistent with reliable operation. Clean, adjust, and lubricate as required.

D. Include systematic examination, adjustment, and lubrication of components. Repair or replace parts whenever required. Use parts produced by the manufacturer of the original component.

E. Maintenance service shall not be assigned or transferred to any agent or subcontractor without prior written consent of the Owner.

END OF SECTION

SECTION 01 7419
CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL

PART 1 GENERAL

1.01 WASTE MANAGEMENT REQUIREMENTS

A. Owner requires that this project generate the least amount of trash and waste possible.

B. Employ processes that ensure the generation of as little waste as possible due to error, poor planning, breakage, mishandling, contamination, or other factors.

C. Methods of trash/waste disposal that are not acceptable are:
   1. Burning on the project site.
   2. Burying on the project site.
   3. Dumping or burying on other property, public or private.
   4. Other illegal dumping or burying.

D. Regulatory Requirements: Contractor is responsible for knowing and complying with regulatory requirements, including but not limited to Federal, state and local requirements, pertaining to legal disposal of all construction and demolition waste materials.

1.02 DEFINITIONS

A. Asphalt Pavement, Brick, and Concrete (ABC) Rubble: Rubble that contains only weathered (cured) asphalt pavement, clay bricks and attached mortar normally used in construction, or concrete that may contain rebar. The rubble shall not be mixed with, or contaminated by, another waste or debris.

B. Clean: Untreated and unpainted; not contaminated with oils, solvents, caulk, or the like.

C. Construction and Demolition Waste: Solid wastes typically including building materials, packaging, trash, debris, and rubble resulting from construction, remodeling, repair and demolition operations.

D. Disposal: Removal off-site of demolition and construction waste and subsequent sale, recycling, reuse, or deposit in landfill or incinerator acceptable to authorities having jurisdiction.

E. Recycle: To remove a waste material from the project site to another site for remanufacture into a new product for reuse by others.

F. Salvage: To remove a waste material from the project site to another site for resale or reuse by others.

1.03 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

PART 3 EXECUTION

2.01 WASTE MANAGEMENT PLAN IMPLEMENTATION

A. Instruction: Provide on-site instruction of appropriate separation, handling, and recycling, salvage, reuse, and return methods to be used by all parties at the appropriate stages of the project.

B. Meetings: Discuss trash/waste management goals and issues at project meetings.
   1. Prebid meeting.
   2. Regular job-site meetings.

C. Facilities: Provide specific facilities for separation and storage of materials for recycling, salvage, reuse, return, and trash disposal, for use by all contractors and installers.
   1. Provide containers as required.
   2. Provide adequate space for pick-up and delivery and convenience to subcontractors.
   3. Keep recycling and trash/waste bin areas neat and clean and clearly marked in order to avoid contamination of materials.

D. Hazardous Wastes: Separate, store, and dispose of hazardous wastes according to applicable regulations.

E. Reuse of Materials On-Site: Set aside, sort, and protect separated products in preparation for reuse.

END OF SECTION

SECTION 01 7800
CLOSEOUT SUBMITTALS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Project Record Documents.

B. Operation and Maintenance Data.

C. Warranties and bonds.

D. Maintenance materials.

1.02 RELATED REQUIREMENTS

A. Section 01 3000 - Administrative Requirements: Submittals procedures, shop drawings, product data, and samples.

B. Individual Product Sections: Specific requirements for operation and maintenance data.

C. Individual Product Sections: Warranties required for specific products or Work.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.01 PROJECT RECORD DOCUMENTS

A. Do not use record documents for construction purposes:
   1. Protect from deterioration and loss in secure, fire-resistive location.
   2. Provide access to record documents for Architect's reference during normal working hours.

B. Maintain clean, undamaged set of Drawings:
   1. Mark set to show actual installation where installation varies from the Work as originally shown.
   2. Give particular attention to concealed elements that would be difficult to measure and record at a later date.
   3. Mark record sets with red erasable pencil. Use other colors to distinguish between variations in separate categories of the Work.
   4. Mark new information that is important to Owner, but was not shown on Drawings.
   5. Note related Change Order numbers where applicable.

C. Maintain on site one set of the following record documents; record actual revisions to the Work:
   1. Drawings.
   2. Specifications.
   3. Addenda.
   4. Change Orders and other modifications to the Contract.
   5. Reviewed shop drawings, product data, and samples.
   6. Manufacturer's instruction for assembly, installation, and adjusting.

D. Ensure entries are complete and accurate, enabling future reference by Owner.

E. Store record documents separate from documents used for construction.

F. Specifications: Legibly mark and record at each product section description of actual products installed, including the following:
   1. Manufacturer's name and product model and number.
   2. Product substitutions or alternates utilized.
   3. Changes made by Addenda and modifications.

3.02 OPERATION AND MAINTENANCE DATA

A. Source Data: For each product or system, list names, addresses and telephone numbers of Subcontractors and suppliers, including local source of supplies and replacement parts.

B. Product Data: Mark each sheet to clearly identify specific products and component parts, and data applicable to installation. Delete inapplicable information.

C. Drawings: Supplement product data to illustrate relations of component parts of equipment and systems, to show control and flow diagrams. Do not use Project Record Documents as maintenance drawings.

D. Typed Text: As required to supplement product data. Provide logical sequence of instructions for each procedure, incorporating manufacturer's instructions.

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

F. Project Manual:
   1. Copy of complete Project Manual including Addenda, Modifications as defined in General Conditions, and other interpretations issued during construction:
      a. Mark these documents to show variations in actual Work performed in comparison with text of specifications and Modifications.
      b. Show substitutions, selection of options, and similar information, particularly on elements that are concealed or cannot otherwise be readily discerned later by direct observation.

G. Maintenance Contracts:
   1. Digital format only.

H. Operations and Maintenance Data:
   1. Digital format only:
      a. Cleaning instructions.
      b. Maintenance instructions.
      c. Operations instructions.
      d. Equipment list.
      e. Parts list.

I. Warranty Documentation:
   1. Digital format of final, executed warranties.

J. Record Documentation:
   1. Digital format only.
      a. Certifications.
      b. Color and pattern selections
      c. Design Data.
      d. Manufacture Reports.
      e. Manufacturer's literature or cut sheets.
      f. Shop Drawings.
      g. Source Quality Control.
      h. Special Procedures.

K. Testing and Inspection Agency Reports.
   1. Testing and Inspection Reports.

3.03 WARRANTIES AND BONDS

A. Obtain warranties and bonds, executed in duplicate by responsible Subcontractors, suppliers, and manufacturers, within 10 days after completion of the applicable item of work. Except for items put into use with Owner's permission, leave date of beginning of time of warranty until Date of Substantial completion is determined.

B. Verify that documents are in proper form, contain full information, and are notarized.

C. Co-execute submittals when required.

D. Retain warranties and bonds until time specified for submittal.

E. Include originals of each in operation and maintenance manuals, indexed separately on Table of Contents.

F. Manual: Bind in commercial quality 8-1/2 by 11 inch three D side ring binders with durable plastic covers.

G. Cover: Identify each binder with typed or printed title WARRANTIES AND BONDS, with title of Project; name, address and telephone number of Contractor and equipment supplier; and name of responsible company principal.

H. Table of Contents: Neatly typed, in the sequence of the Table of Contents of the Project Manual, with each item identified with the number and title of the specification section in which specified, and the name of product or work item.

I. Separate each warranty or bond with index tab sheets keyed to the Table of Contents listing. Provide full information, using separate typed sheets as necessary. List Subcontractor, supplier, and manufacturer, with name, address, and telephone number of responsible principal.

3.04 MAINTENANCE MATERIAL SUBMITTALS

A. Submit item(s) required by Section 01 3000 - Administrative Requirements and as defined in individual specification sections if required in Contract Documents. Items may be provided at completion of Work or with Closeout Submittals.

END OF SECTION

SECTION 02 4113

SELECTIVE SITE DEMOLITION

PART 1 - GENERAL

1.1 SUMMARY

A. Includes But Not Limited To:
   1. Demolish and remove portions of existing site facilities as described in Contract Documents.

B. Related Requirements:
   1. New and replacement work specified in appropriate specification Sections.

1.2 ADMINISTRATIVE REQUIREMENTS

A. Scheduling:
   1. Include on Construction Schedule showing sequence of individual site demolition operations.

1.3 SUBMITTALS

A. Closeout Submittals:
   1. Include following in Operations And Maintenance Manual specified in Section 01 7800:
      a. Record Documentation:
         1) Identify abandoned utility and service lines and capping locations on record drawings.

PART 2 - PRODUCTS: Not Used

PART 3 - EXECUTION

3.1 PREPARATION

A. Notify corporations, companies, individuals, and local authorities owning conduits running to property.
   1. Protect and maintain conduits, drains, sewers, pipes, and wires that are to remain on the property.
   2. Arrange for removal of wires running to and on property. Remove pipes and sewers in accordance with instructions in Contract Documents.

3.2 PERFORMANCE

A. Execute work in orderly and careful manner, with due consideration for occupants continuing using the building..

B. Carefully remove, disassemble, or dismantle as required, and store in approved location on site, existing items to be reused in completed work. Coordinate with Owner for equipment and materials to be removed by Owner.

3.3 CLEANING

A. Keep streets and roads reasonably clean, and sweep daily.

B. Sprinkle demolition rubbish and debris as necessary to lay dust.

C. Promptly remove demolition materials, rubbish, and debris from property.

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 or recycled.

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. Scheduling:
   1. Indicate detailed sequence of selective demolition and removal work, with starting and ending dates for each activity.

1.4 SUBMITTALS

1.5 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.

1.6 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.
   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.
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. 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.

C. 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.

D. 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 3000
CAST-IN-PLACE CONCRETE

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Concrete formwork.

B. Concrete anchors

C. Concrete foundation walls.

D. Concrete reinforcement.

E. Joint devices associated with concrete work.

F. Concrete curing.

1.02 RELATED REQUIREMENTS

A. Section 07 9200 - Joint Sealants: Products and installation for sealants and joint fillers for saw cut joints and isolation joints in slabs.

B. Section 31 0500 for field applied termiticide and mildewcide for concrete surfaces.

1.03 REFERENCE STANDARDS

A. ACI 117 - Specifications for Tolerances for Concrete Construction and Materials 2010 (Reapproved 2015).

B. ACI 211.1 - Standard Practice for Selecting Proportions for Normal, Heavyweight, and Mass Concrete 1991 (Reapproved 2009).

C. ACI 301 - Specifications for Structural Concrete 2016.

D. ACI 302.1R - Guide to Concrete Floor and Slab Construction 2015.

E. ACI 304R - Guide for Measuring, Mixing, Transporting, and Placing Concrete 2000 (Reapproved 2009).

F. ACI 305R - Guide to Hot Weather Concreting 2010.

G. ACI 306R - Guide to Cold Weather Concreting 2016.

H. ACI 308R - Guide to External Curing of Concrete 2016.

I. ACI 318 - Building Code Requirements for Structural Concrete and Commentary 2014 (Errata 2018).

J. ACI 347R - Guide to Formwork for Concrete 2014, with Errata (2017).

K. ANSI/NFSI B101.1 - Test Method For Measuring Wet SCOF Of Common Hard-Surface Floor Materials 2009.

L. ANSI/NFSI B101.3 - Test Method For Measuring Wet DCOF Of Common Hard-Surface Floor Materials 2012.

M. ASTM A108 - Standard Specification for Steel Bar, Carbon and Alloy, Cold Finished 2018.

N. ASTM A307 - Standard Specification for Carbon Steel Bolts, Studs, and Threaded Rod 60 000 PSI Tensile Strength 2014, with Editorial Revision (2017).

O. ASTM A563 - Standard Specification for Carbon and Alloy Steel Nuts 2015.

P. ASTM A615/A615M - Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement 2020.

Q. ASTM A775/A775M - Standard Specification for Epoxy-Coated Steel Reinforcing Bars 2017.

R. ASTM A884/A884M - Standard Specification for Epoxy-Coated Steel Wire and Welded Wire Reinforcement 2019, with Editorial Revision (2020).

S. ASTM A1064/A1064M - Standard Specification for Carbon-Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete 2018a.

T. ASTM C1077 - Standard Practice for Agencies Testing Concrete and Concrete Aggregates for Use in Construction and Criteria for Testing Agency Evaluation 2017.

U. ASTM C1602/C1602M - Standard Specification for Mixing Water Used in the Production of Hydraulic Cement Concrete 2012.

V. ASTM C33/C33M - Standard Specification for Concrete Aggregates 2018.

W. ASTM C39/C39M - Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens 2020.

X. ASTM C94/C94M - Standard Specification for Ready-Mixed Concrete 2020.

Y. ASTM C143/C143M - Standard Test Method for Slump of Hydraulic-Cement Concrete 2020.

Z. ASTM C150/C150M - Standard Specification for Portland Cement 2020.

AA. ASTM C171 - Standard Specification for Sheet Materials for Curing Concrete 2016.

BB. ASTM C173/C173M - Standard Test Method for Air Content of Freshly Mixed Concrete by the Volumetric Method 2016.

CC. ASTM C309 - Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete 2019.

DD. ASTM C618 - Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use in Concrete 2019.

EE. ASTM C685/C685M - Standard Specification for Concrete Made by Volumetric Batching and Continuous Mixing 2017.

FF. ASTM C779/C779M - Standard Test Method for Abrasion Resistance of Horizontal Concrete Surfaces 2019.

GG. ASTM C827/C827M - Standard Test Method for Change in Height at Early Ages of Cylindrical Specimens of Cementitious Mixtures 2016.

HH. ASTM C1059/C1059M - Standard Specification for Latex Agents for Bonding Fresh to Hardened Concrete 2013.

II. ASTM C1107/C1107M - Standard Specification for Packaged Dry, Hydraulic-Cement Grout (Nonshrink) 2017.

JJ. ASTM C1240 - Standard Specification for Silica Fume Used in Cementitious Mixtures 2020.

KK. ASTM C1315 - Standard Specification for Liquid Membrane-Forming Compounds Having Special Properties for Curing and Sealing Concrete 2019.

LL. ASTM C1602/C1602M - Standard Specification for Mixing Water Used in the Production of Hydraulic Cement Concrete 2012.

MM. ASTM D471 - Standard Test Method for Rubber Property--Effect of Liquids 2016a.

NN. ASTM D523 - Standard Test Method for Specular Gloss 2014 (Reapproved 2018).

OO. ASTM D8139 - Standard Specification for Semi-Rigid, Closed-Cell Polypropylene Foam, Preformed Expansion Joint Fillers for Concrete Paving and Structural Construction 2017.

PP. ASTM D994/D994M - Standard Specification for Preformed Expansion Joint Filler for Concrete (Bituminous Type) 2011 (Reapproved 2016).

QQ. ASTM D1751 - Standard Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Nonextruding and Resilient Bituminous Types) 2018.

RR. ASTM D1752 - Standard Specification for Preformed Sponge Rubber Cork and Recycled PVC Expansion Joint Fillers for Concrete Paving and Structural Construction 2018.

SS. ASTM D2103 - Standard Specification for Polyethylene Film and Sheeting 2015.

TT. ASTM D3963/D3963M - Standard Specification for Fabrication and Jobsite Handling of Epoxy-Coated Steel Reinforcing Bars 2015.

UU. ASTM D5767 - Standard Test Method for Instrumental Measurement of Distinctness-of-Image (DOI) Gloss of Coated Surfaces 2018.

VV. ASTM E154/E154M - Standard Test Methods for Water Vapor Retarders Used in Contact with Earth Under Concrete Slabs, on Walls, or as Ground Cover 2008a, with Editorial Revision (2013).

WW. ASTM E1155 - Standard Test Method for Determining F(F) Floor Flatness and F(L) Floor Levelness Numbers 2014.

XX. ASTM E1155M - Standard Test Method for Determining F(F) Floor Flatness and F(L) Floor Levelness Numbers (Metric) 2014.

YY. ASTM E1643 - Standard Practice for Selection, Design, Installation and Inspection of Water Vapor Retarders Used in Contact with Earth or Granular Fill Under Concrete Slabs 2018a.

ZZ. ASTM E1745 - Standard Specification for Plastic Water Vapor Retarders Used in Contact with Soil or Granular Fill under Concrete Slabs 2017.

AAA. ASTM E329 - Standard Specification for Agencies Engaged in Construction Inspection, Testing, or Special Inspection 2020.

BBB. ASTM E96/E96M - Standard Test Methods for Water Vapor Transmission of Materials 2016.

CCC. ASTM F1554 - Standard Specification for Anchor Bolts, Steel, 36, 55, and 105-ksi Yield Strength 2018.

DDD. ASTM F3125/F3125M - Standard Specification for High Strength Structural Bolts and Assemblies, Steel and Alloy Steel, Heat Treated, Inch Dimensions 120 ksi and 150 ksi Minimum Tensile Strength, and Metric Dimensions 830 MPa and 1040 MPa Minimum Tensile Strength 2019, with Editorial Revision (2020).

EEE. COE CRD-C 48 - Method of Test for Water Permeability of Concrete 1992.

FFF. COE CRD-C 513 - COE Specifications for Rubber Waterstops 1974.

GGG. COE CRD-C 621 - Handbook for Concrete and Cement Standard Specification for Packaged, Dry 1997.

HHH. ICC-ES AC193 - Acceptance Criteria for Mechanical Anchors in Concrete Elements 2015.

III. ICC-ES AC308 - Acceptance Criteria for Post-Installed Adhesive Anchors in Concrete Elements 2016.

JJJ. ICC-ES AC380 - Acceptance Criteria for Termite Physical Barrier Systems 2014, with Editorial Revision (2017).

KKK. ICRI 310.2R - Selecting and Specifying Concrete Surface Preparation for Sealers, Coatings, Polymer Overlays, and Concrete Repair 2013.

LLL. NSF 61 - Drinking Water System Components - Health Effects 2019.

MMM. NSF 372 - Drinking Water System Components - Lead Content 2016.

1.04 DEFINITIONS

A. Cold Weather, as referred to in this Section, is four (4) hours with ambient temperature below 40 deg F in twenty-four (24) hour period.

B. Floor Flatness (FF): Rate of change in elevation of floor over 12 inches section.

C. Floor Levelness (FL): Measures difference in elevation between two points which are 10 feet apart.

D. Hot Weather, as referred to in this Section, is ambient air temperature above 100 deg F or ambient air temperature above 90 deg F with wind velocity 8 mph or greater.

1.05 QUALITY ASSURANCE

A. Perform work of this section in accordance with ACI 301 and ACI 318.

1. Maintain one copy of each document on site.

B. Qualifications: Requirements of Section 01 4000 applies, but is not limited to following:
   1. Installers and Installation Supervisor:
      a. ACI-certified Flatwork Technician and Finisher and a supervisor who is an ACI-certified Concrete Flatwork Technician.
      b. Certification for National Ready Mixed Concrete Association (NRMCA).
   2. Ready-Mix Supplier:
      a. Comply with ASTM C94/C94M requirements and be certified according to NRMCA's "Certification of Ready Mixed Concrete Production Facilities".
   3. Testing Agencies:
      a. Independent agency qualified according to ASTM C1077 and ASTM E329.
         1) Personnel conducting field tests shall be qualified as ACI Concrete Field Testing Technicians, Grade I according to ACI CP-1 or equivalent certification program.
         2) Personnel performing laboratory tests shall be ACI-certified Concrete Strength Testing Technician and Concrete Laboratory Testing Technician - Grade I. Testing Agency laboratory supervisor shall be ACI-certified Concrete Laboratory Testing Technician - Grade II.

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

D. Follow recommendations of ACI 305R when concreting during hot weather.

E. Follow recommendations of ACI 306R when concreting during cold weather.

F. For slabs required to include moisture vapor reducing admixture (MVRA), do not proceed with placement unless manufacturer's representative is present for every day of placement.

G. MANDATORY Pre-Installation Conference:
   1. Agenda items, review following:
      a. Review Section 01 4000 for Testing and Inspection administrative requirements and responsibilities and Field Quality Control tests and inspections required of this section.
         1) Review requirements and frequency of testing and inspections.
      b. Set up concrete placement pour card system and verify that all relevant trades have signed off prior to concrete placement.
      c. Obtaining trade sign-offs on each pour card will be responsibility of General Contactor’s foreman or whoever is in charge of ordering concrete.
      d. Pour cards will be turned in to Quality Assurance representative after the work has been completed so that they can be reviewed and filed.
      e. Review installation scheduling, coordination, placement of building concrete, and placement of items installed in and under concrete.
      f. Review installation scheduling, coordination and placement of site concrete and of items installed in concrete.
      g. Review "Verification of Conditions" requirements.
      h. Review requirements for preparation of subgrade and aggregate base requirements.
      i. Review formwork requirements.
      j. Review approved mix design requirements, mix designs and use of admixtures.
      k. Review reinforcing bar submittals.

l. Review installation schedule and placement of reinforcing bars.
m. Review placement, finishing, and curing of concrete, including cold and hot weather requirements.
n. Review joint layout plan for control and expansion joints, fillers for sidewalks, curbs, and gutters:
1) Review jointing requirements.
2) Joint layout for concrete paving is specified in Section 32 1313.
o. Review smooth rubbed concrete finish procedures and requirements (applied immediately after removing concrete formwork while concrete is "green").
p. Review layout plan, scheduling, coordination, and placement requirements of detectable warning panels.
q. Review concrete slab tolerances and corrective measures if tolerances not met.
r. Review safety issues.

H. Scheduling:
1. Notify Testing Agency and Architect twenty-four (24) hours minimum before placing concrete.
2. Schedule pre-installation conference prior to placing of footings, installation of foundation forms and reinforcing steel, and installation of anchors, dowels, inserts, and block outs in foundation walls and slabs.

PART 2 PRODUCTS

2.01 CONCRETE FORMWORK

A. Formwork Design and Construction: Comply with guidelines of ACI 347R to provide formwork that will produce concrete complying with tolerances of ACI 117.

B. Form Materials: Contractor's choice of standard products with sufficient strength to withstand hydrostatic head without distortion in excess of permitted tolerances.
1. Form Facing for Exposed Finish Concrete: Contractor's choice of materials that will provide smooth, stain-free final appearance.
2. Form Facing for Exposed Finish Concrete: Steel.
3. Earth Cuts: Do not use earth cuts as forms for vertical surfaces. Natural rock formations that maintain a stable vertical edge may be used as side forms.
a. Vertical earth cuts may be used for footings provided the footing width and length are 6" wider and longer than scheduled.
4. Form Coating: Release agent that will not adversely affect concrete or interfere with application of coatings.
5. Form Ties: Cone snap type that will leave no metal within 1-1/2 inches of concrete surface.

2.02 CONCRETE ANCHORS

A. General:
1. Use hot-dipped galvanized or stainless steel with matching nuts and washers in exterior and moist interior applications unless indicated otherwise on Contract Drawings.
a. Install hot-dipped or stainless steel anchor bolts to attach wood sill plates to foundation with 1/4 inch by 3 inch x 3 inch minimum adjustable plate washers and standard cut washers between wood sill plates and nuts.
b. Nut: Conform to requirements of ASTM A563, Grade A, Hex.
c. Conform to requirements of ASTM F3125/F3125M for chemical, physical and mechanical requirements for quenched and tempered bolts manufactured from steel and alloy steel.
2. Threaded rod for adhesive anchors and cast-in anchors:
a. Conform to requirements of ASTM A307, Grade A or ASTM F1554 Grade 36 unless indicated otherwise on Contract Drawings.
3. Cast-In-Place Anchor Bolts:
a. J-Bolts:

1) Non-headed type threaded 2 inches minimum conforming to requirements of ASTM F1554, Grade A.
2) Anchor hook to project 2 inches minimum including bolt diameter.

b. Headed Bolts:
1) Headed type threaded 2 inches minimum conforming to requirements of ASTM F1554, Grade A.

4. Headed Concrete Anchor Studs:
a. Composed of low carbon steel meeting requirements of ASTM A108.
b. Tensile Strength: 61,000 psi minimum.
c. Yield Strength: 49,000 psi minimum.
5. Deformed Bar Anchors:
a. Manufactured in accordance with requirements of ASTM A1064/A1064M.
b. Tensile Strength: 80,000 psi minimum.
c. Yield Strength: 70,000 psi minimum.
6. Reinforcing Bars:
a. Composed of deformed carbon steel meeting requirements of ASTM A615/A615M, Grade 60 (field bent bars may be Grade 40)
7. Adhesive Anchors:
a. Products shall have current ESR conforming to current ICC Acceptance Criteria ICC-ES AC308 for concrete.
b. Rod diameter and embedment length as indicated on Contract Drawings.
c. Acceptable Products:
1) HIT-RE 500V3 with SafeSet Epoxy Adhesive by Hilti Fastening Systems, Tulsa, OK www.us.hilti.com.
2) Pure 110+ by Powers Fasteners Inc., Brewster NY www.powers.com.
3) SET-XP Epoxy by Simpson Strong-Tie Co., Pleasanton, CA www.simpsonanchors.com.
4) Equal as approved by Architect before installation. See Section 01 6000.
8. Expansion Anchors:
a. Products shall have current ESR conforming to current ICC Acceptance Criteria ICC-ES AC193 for concrete.
b. Acceptable Products:
1) KWIK Bolt TZ Expansion Anchor by Hilti Fastening Systems, Tulsa, OK www.us.hilti.com.
2) Power-Stud +SD2 by Powers Fasteners Inc., Brewster NY www.powers.com.
3) Strong-Bolt by Simpson Strong-Tie Co., Pleasanton, CA www.simpsonanchors.com.
4) Equal as approved by Architect before installation. See Section 01 6000.
9. Screw Anchors:
a. Provide anchors with length identification markings conforming to ICC Acceptance Criteria ICC-ES AC193 for concrete.
b. Type Two Acceptable Products:
1) KWIK HUS-EZ by Hilti Fastening Systems, Tulsa, OK www.us.hilti.com.
2) Wedge-Bolt+ by Powers Fasteners Inc., Brewster NY www.powers.com.
3) Titen HD by Simpson Strong Tie Co, Pleasanton, CA www.simpsonanchors.com.
4) Equals as approved by Architect through shop drawing submittal before installation. See Section 01 6000.

2.03 REINFORCEMENT MATERIALS

A. Reinforcing Steel: ASTM A615/A615M, Grade 60 (60,000 psi), except dowels that are to be field bent, Grade 40 minimum.
1. Type: Deformed billet-steel bars.
2. Finish: Unfinished, unless otherwise indicated.

3. Bars shall be free of heavy rust scales and flakes, or other bond-reducing coatings.

B. Epoxy Coated Reinforcement Steel Bars:
   1. Bars shall have grade identification marks and conform to ASTM A615/A615M with coating conforming to ASTM A775/A775M and comply with requirements of ACI 318.21.2.5:
      a. Bar supports shall be completely coated with epoxy or vinyl, compatible with both concrete and epoxy coating on bars. Coating shall be at least 1/8 inch thick at tips.
      b. Tie wire shall be nylon coated.
   2. Actual yield strength based on mill tests does not exceed specified yield strength by more than 18,000 psi and Ratio of actual ultimate stress (at breaking point) to actual tensile yield stress shall not be less than 1.25.
      a. Grade 60 minimum, except dowels that are to be field bent, Grade 40 minimum.
   3. Bars shall be deformed type.
   4. Bars shall be free of heavy rust scales and flakes, or other bond-reducing coatings.

C. Reinforcement Accessories:
   1. Tie Wire: Annealed, minimum 16 gauge, 0.0508 inch.
   2. Bar Supports:
      a. Concrete masonry units or bricks are not acceptable.
      b. For exposed-to-view concrete surfaces, where legs of supports are in contact with forms, provide supports with legs which are plastic protected (CRSI, Class 1) or stainless steel protected (CSRI, Class 2).
      c. Acceptable Products:
         1) Concrete 'dobies' or blocks wired to reinforcing.
         2) Manufactured chairs with 4 sq inch bearing surface on sub-grade, or other feature to prevent chair from being pushed into sub-grade or damaging vapor retarder under slabs on grade.
   3. Chairs, Bolsters, Bar Supports, Spacers: Sized and shaped for adequate support of reinforcement during concrete placement.
   4. Provide stainless steel, galvanized, plastic, or plastic coated steel components for placement within 1-1/2 inches of weathering surfaces.

2.04 CONCRETE MATERIALS

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

B. Cement: ASTM C150/C150M, Type I - Normal Portland type
   1. Acquire cement for entire project from same source.

C. Concrete mix design: Submit mix designs to meet following requirements:
   1. Mix Type A:
      a. For general purpose for footings and for exterior concrete (excluding concrete paving, curbs, gutters and waterways) where not subject to freeze/thaw cycles and deicing salts or where higher strength is needed due to soil conditions and as otherwise required by the contract drawings.
      b. 3000 psi (20.68 MPa) minimum at twenty-eight (28) days.
      c. Water / Cementitious Material: 0.45 to 0.50 by weight.
   2. Mix Type B:
      a. For unexposed interior concrete slabs on grade and as otherwise required by the contract drawings.
      b. 3500 psi (24.13 MPa) minimum at twenty-eight (28) days.
      c. Water / Cementitious Material: 0.45 maximum by weight.

3. Mix Type C:
   a. For exposed interior concrete slabs on grade that receive polished floor finishing system and as otherwise required by the contract drawings.
   b. 3500 psi (24.13 MPa) minimum at twenty-eight (28) days.
   c. Water / Cementitious Material: 0.45 maximum by weight.
   d. Drying shrinkage of concrete mix is to be limited to 0.032 percent at twenty-eight (28) days when tested per ASTM C157. Use 1 gal (3.785 liter) of shrinkage reducing admixture per 1 cu yd (0.765 cu m) of concrete.
4. Mix Type D:
   a. For foundation walls, exterior concrete paving, curbs, gutters, and waterways not exposed to freeze/thaw cycles and deicing salts and as otherwise required by the contract drawings.
   b. 4000 psi (27.58 MPa) minimum at twenty-eight (28) days.
   c. Water / Cementitious Material: 0.45 maximum by weight.
   d. For concrete paving, use mix design based upon use of 1-1/2 inches coarse aggregate (about 15 percent).
5. Mix Type E:
   a. For exterior concrete exposed to freeze/thaw cycles and deicing salts or where soils are "corrosive" and as otherwise required by the contract drawings.
   b. 4500 psi (31.03 MPa) minimum at twenty-eight (28) days.
   c. Water / Cementitious Material: 0.40 maximum by weight.
   d. Use twenty-five (25) percent Class F fly ash as part of cementitious material.
   e. Mix Type E should be used for all exterior concrete exposed to freeze/thaw cycles and deicing salts, unless dictated otherwise by site conditions.
   f. For concrete paving, use mix design based upon use of 1-1/2 inches coarse aggregate (about 15 percent).
6. Mix Type F - Self-Consolidating Concrete (SCC):
   a. Rarely used optional mix type.
   b. Self-consolidating concrete may be used for all architectural concrete, heavily reinforced concrete, concrete for structural repairs, and other members as described in contract documents.
   c. 4000 psi (27.58 MPa) minimum at twenty-eight (28) days.
   d. All self-consolidating concrete shall contain high-range water-reducing admixture and viscosity-modifying admixture where required.
   e. Minimum flow of 20 inches (508 mm) - 30 inches (762 mm) or as required by successful test placement.
   f. Workability, pump ability, finish ability, and setting time of mix design shall be verified with successful test placement onsite.
   g. Viscosity Modifying Admixture (VMA) shall be used to optimize viscosity of Self-Consolidating Concrete (SCC) at dosage rates per manufacturer’s recommendation.
7. Air Entrainment: Six (6) percent, plus or minus 1-1/2 percent for exterior concrete and foundation walls exposed to freeze/thaw cycles.
8. Do not add water any time during mixing cycle above amount required to meet specified water / cement ratio. No reduction in amount of cementitious material is allowed.

D. Slump:
   1. 4 inch (100 mm) slump maximum before addition of high range water reducer.
   2. 8 inch (200 mm) slump maximum with use of high range water reducer.
   3. Slump not required for Mix Type G.

E. General:
   1. Submit a letter on quarry’s letterhead that certifies all aggregate for concrete complies with the requirements of this section. Material certificates which are submitted shall be signed by both the materials producer and the contractor, certifying that materials comply with or

exceed requirements specified herein to the Architect, Civil and Structural Engineering Consultant and the Independent Testing Laboratory for review and approval.

2. Aggregates for all concrete shall come from a quarry that is DOT approved and meets or exceeds durability Class I aggregate. The quarry shall submit a letter to Engineer that certifies that all aggregate complies with DOT requirements for durability. Aggregate not meeting DOT durability requirements shall not be used.

F. Fine and Coarse Aggregates: ASTM C33/C33M.
   1. Acquire aggregates for entire project from same source.

G. Fly Ash: ASTM C618, Class C or F.
   1. Not to exceed twenty-five (25) percent of weight of cementitious materials.

H. Water: ASTM C1602/C1602M; clean, potable, and not detrimental to concrete.

2.05 ADMIXTURES

A. No admixture shall contain calcium chloride nor shall calcium chloride be used as an admixture. All chemical admixtures used shall be from same manufacturer and compatible with each other.
   1. Do not use chemicals that will result in soluble chloride ions in excess of 0.1 percent by weight of cement.

B. Mix design shall show proposed admixtures, amount, usage instructions, and justification for proposed use. Do not use any admixtures without Architect's written approval.
   1. Chemical accelerator or retarder may be used if necessary to meet environmental conditions and construction schedules.

C. Alkali-Silica Reactivity Inhibiting Admixture:
   1. Specially formulated lithium nitrate admixture for prevention of alkali-silica reactivity (ASR) in concrete. Admixture must have test data indicating conformance to ASTM C1293.
   2. Manufacturer: As approved by Architect before use. See Section 01 6000.

D. Viscosity Modifying Admixture (VMA):
   1. Liquid admixture used to optimize viscosity of Self-Consolidating Concrete (SCC). Subject to compliance with requirements, provide following at dosage rates per manufacturer’s recommendations.
   2. Manufacturer: As approved by Architect before use. See Section 01 6000.

E. Air Entraining Admixture: ASTM C260/C260M.
   1. Manufacturer: As approved by Architect before use. See Section 01 6000.

F. High Range Water Reducing Admixture: ASTM C494/C494 Type F.
   1. Manufacturer: As approved by Architect before use. See Section 01 6000.

G. High Range Water Reducing and Retarding Admixture (Superplasticizer): ASTM C494/C494M Type G.
   1. Manufacturer: As approved by Architect before use. See Section 01 6000.

H. Water Reducing Admixture: ASTM C494/C494M Type A.
   1. Manufacturer: As approved by Architect before use. See Section 01 6000.

I. Water Reducing and Accelerating Admixture: ASTM C494/C494 Type E.
   1. Manufacturer: As approved by Architect before use. See Section 01 6000.

J. Water Reducing and Retarding Admixture: ASTM C494/C494M Type D
   1. Manufacturer: As approved by Architect before use. See Section 01 6000.

K. Accelerating Admixture: ASTM C494/C494M Type C.
   1. Manufacturer: As approved by Architect before use. See Section 01 6000.

L. Retarding Admixture: ASTM C494/C494M Type B.
   1. Manufacturer: As approved by Architect before use. See Section 01 6000.

M. Shrinkage Reducing Admixture: ASTM C494/C494M Type S.
   1. Manufacturer: As approved by Architect before use. See Section 01 6000.

N. Non-Chloride, Non-Corrosive Accelerating Admixture: ASTM C494/C494M Type C or E.
   1. Manufacturer: As approved by Architect before use. See Section 01 6000.

O. Corrosion Inhibiting Admixture: ASTM C494/C494M Type C and ASTM C1582/C1582M.
   1. Liquid admixture to inhibit corrosion of steel reinforcement in concrete by introducing proper amount of anodic inhibitor. Admixture shall contain thirty (30) percent calcium nitrite solution and shall be used where called for in specifications or on drawings.
   2. Manufacturer: As approved by Architect before use. See Section 01 6000.

P. Moisture Vapor Reduction Admixture (MVRA):
   1. Liquid, inorganic admixture free of volatile organic compounds (VOCs) and formulated to close capillary systems formed during curing to reduce moisture vapor emission and transmission with no adverse effect on concrete properties or finish flooring.
   2. Manufacturer: As approved by Architect before use. See Section 01 6000.

Q. Waterproofing Admixture:
   1. Admixture formulated to reduce permeability to liquid water, with no adverse effect on concrete properties.
   2. Admixture Composition: Crystalline, functioning by growth of crystals in capillary pores.
   3. Admixture Composition: Hydrophobic polymer waterproofing and corrosion inhibitor, functioning by closing concrete pores and chemical bonding.
   4. Permeability of Cured Concrete: No measurable leakage when tested in accordance with COE CRD-C 48 at 200 psi; provide test reports.
   5. Potable Water Contact Approval: National Science Foundation (NSF) certification for use on structures holding potable water, based on testing in accordance with NSF 61 and NSF 372.
   6. Manufacturer: As approved by Architect before use. See Section 01 6000.

R. Rapid Drying Admixture in Interior Concrete Slabs on Grade:
   1. Admixture specifically designed to promote rapid drying of concrete.
   2. Manufacturer: As approved by Architect before use. See Section 01 6000.

2.06 ACCESSORY MATERIALS

A. Underslab Vapor Retarder:
   1. Sheet Material: ASTM E1745, Class A; stated by manufacturer as suitable for installation in contact with soil or granular fill under concrete slabs. Single ply polyethylene is prohibited.
   2. Thickness: 15 mil minimum
   3. Water Vapor Permeance: ASTM E96, Metah A, Perm 0.01
   4. Puncture Resistance: ASTM D1709
   5. Installation: Comply with ASTM E1643
   6. Accessory Products: Vapor retarder manufacturer's recommended tape, adhesive, mastic, prefabricated boots, etc., for sealing seams and penetrations.
   7. Manufacturer: As approved by Architect before use. See Section 01 6000.

B. Termite-Resistant Vapor Barrier Sheet: Plastic sheet complying with ASTM E1745, Class C; stated by manufacturer as suitable for installation in contact with soil or granular fill under concrete slabs, and for exclusion of subterranean termites.
   1. Installation: Comply with ASTM E1643.
   2. Accessory Products: Vapor retarder manufacturer's recommended tape, adhesive, prefabricated boots, etc., for sealing seams and penetrations.
   3. Manufacturers: As approved by Architect before use. See Section 01 6000.

C. Termite-Excluding Underslab Barrier and Waterproofing Membrane: Composite sheet of polyethylene film, termite-excluding barrier sealant, and non-woven polypropylene fabric.
   1. Total Thickness: 95 mils (0.095 inch).
   2. Termite Resistance: 100 percent when tested in accordance with ICC-ES AC380.

3. Water Vapor Permeance: 0.03 perm, maximum, when tested in accordance with ASTM E96/E96M.
4. Accessory Products: Manufacturer's recommended flexible sealant tape, adhesive, mastic, etc., for sealing seams and penetrations.
5. Manufacturers: As approved by Architect before use. See Section 01 6000.

D. Termite-Resistant Barrier Sealant:
1. Solvent-based; single component, no-sag, non-skinning, non-hardening, non-bleeding; vapor-impermeable; intended for fully concealed applications.
2. Manufacturers: As approved by Architect before use. See Section 01 6000.

E. Non-Shrink Cementitious Grout: Premixed compound consisting of non-metallic aggregate, cement, water reducing and plasticizing agents.
1. Grout: Comply with ASTM C1107/C1107M.
2. Meet following requirements:
a. ASTM C1107/C1107M, Type B or Type C.
b. Corps and Engineers CRD C-621.
c. Compressive strength of 6000 psi (41 MPa) minimum.
3. Manufacturers: As approved by Architect before use. See Section 01 6000.

F. Non-Shrink Epoxy Grout: Moisture-insensitive, two-part; consisting of epoxy resin, non-metallic aggregate, and activator (use on expansion joints of interior slabs on grade of Welfare Services Projects):
1. Composition: High solids content material exhibiting positive expansion when tested in accordance with ASTM C827/C827M.
2. 100 percent solids, two-component, moisture-insensitive, semi-rigid epoxy for use as joint filler for saw cut and tooled interior joints.
3. Self leveling consistency.
4. Shore A Hardness: 75 to 80.
5. Meet following minimum criteria:
a. Tensile Strength: 600 psi (4.2 MPa).
b. Ultimate Elongation: 35 percent.
6. Manufacturers: As approved by Architect before use. See Section 01 6000.

G. Semi-Rigid Joint Filler (control joints of interior concrete slabs on grade in warehouse areas of Welfare Services Projects):

2.07 BONDING AND JOINTING PRODUCTS

A. Bonding Agents:
1. Manufacturers: As approved by Architect before use. See Section 01 6000.

B. Latex Bonding Agent: Non-redispersable acrylic latex, complying with ASTM C1059/C1059M, Type II.
1. Manufacturers: As approved by Architect before use. See Section 01 6000.

C. Slab Isolation Joint Filler: 1/2 inch thick, height equal to slab thickness, with removable top section that will form 1/2 inch deep sealant pocket after removal.
1. Material: ASTM D1751, cellulose fiber.
2. Manufacturers: As approved by Architect before use. See Section 01 6000.

D. Expansion Joint Filler:
1. Expansion Joint Filler Material:
a. Design Criteria:
1) Resilient, flexible, non-extruding, expansion-contraction joint filler meeting requirements of ASTM D1751.
2) 1/2 inch (12.7 mm) thick.
3) Resilience:
(a) When compressed to half of original thickness, recover to minimum of seventy (70) percent of original thickness.

b. Manufacturers: As approved by Architect before use. See Section 01 6000.

E. Finishing Material (Exposed Vertical Faces of Foundation and Retaining Walls):
1. Do not apply finishing material (parge coat) to foundation or retaining walls.

F. Slab Contraction Joint Device (if used): Preformed linear strip intended for pressing into wet concrete to provide straight route for shrinkage cracking.
1. Manufacturers: As approved by Architect before use. See Section 01 6000.

G. Slab Construction Joint Devices (if used and required by contract drawings): Combination keyed joint form and screed, galvanized steel, with rectangular or round knockout holes for conduit or rebar to pass through joint form at 6 inches on center; ribbed steel stakes for setting.
1. Provide removable plastic cap strip that forms wedge-shaped joint for sealant installation.
a. Height: To suit slab thickness.
b. Manufacturers: As approved by Architect before use. See Section 01 6000.
2. Dowel Sleeves: Plastic sleeve for smooth, round, steel load-transfer dowels.
a. Manufacturers: As approved by Architect before use. See Section 01 6000.

2.08 CURING MATERIALS

A. Membrane Curing:
1. Clear water-based, ready-to use membrane curing agent that cures freshly placed concrete, forming effective barrier against moisture loss from concrete surface.
2. Design Criteria:
a. Exterior Concrete:
1) Dissipating or non-dissipating membrane curing agent.
b. Interior Concrete:
1) Dissipating membrane curing agent only.
2) Gradually dissipate after twenty-eight (28) days without leaving stain or discoloring concrete surface.
c. VOC-compliant compound.
d. Meet requirements of ASTM C309 and AASHTO M 148, Type 1 or 1-D, Class B.
e. Interior concrete: containing no mineral spirits, naphtha, or other components detrimental to finish flooring installation.
f. Maintain ninety-five (95) percent of mix water present in concrete mass after application.
3. Horizontal and Vertical Cast-In-Place Structural Concrete:
a. Acceptable Products.
1) Exterior Concrete:
(a) Clear Cure J7WB by Dayton Superior Corporation, Miamisburg. OH www.daytonsuperior.com.
(b) Clear Water Resin by Right Point, Dekalb, IL www.rightpointe.com.
(c) L&M Cure R by L&M Construction Chemicals, Inc. Omaha, NE www.lmcc.com.
(d) VOCOMP 20 (do not use when concrete sealer will be applied in areas of freeze/thaw and deicer salts) by W.R. Meadows, Inc. Hampshire, IL www.wrmeadows.com.
(e) 1100-Clear by W. R. Meadows, Inc. Hampshire, IL www.wrmeadows.com.
(f) Equal as approved by Architect before use. See Section 01 67000
2) Interior Concrete:
(a) Clear Cure J7WB by Dayton Superior Corporation, Miamisburg. OH www.daytonsuperior.com.
(b) Clear Water Resin by Right Point, Dekalb, IL www.rightpointe.com.
(c) L&M Cure R by L&M Construction Chemicals, Inc. Omaha, NE www.lmcc.com.
(1) 1100-Clear by W. R. Meadows, Inc. Hampshire, IL www.wrmeadows.com.

(d) Equal as approved by Architect before use. See Section 01 6000.

B. Water Curing:
   1. Required Locations:
      a. Use on polished concrete finishing surfaces in areas as shown on Contract Drawings.
      b. Used on all interior concrete floor surfaces including offices that receive carpet.
      c. Used on concrete surfaces in areas as shown in Contract Documents.
   2. Water-Curing Materials:
      a. Type Two Acceptable Products:
         1) Absorptive Cover: Meet requirements of AASHTO M 182, Class 2 burlap cloth made from jute or kenaf and weighing minimum of 9 oz per sq yd (305 grams per sq m) when dry.
         2) Moisture-Retaining Cover: White, opaque membrane meeting requirements of ASTM C171 minimum.
         3) Equals as approved by Architect before using. See Section 01 6000.

2.09 MIXING

A. On Project Site: Mix in drum type batch mixer, complying with ASTM C685/C685M. Mix each batch not less than 1-1/2 minutes and not more than 5 minutes.

B. Transit Mixers: Comply with ASTM C94/C94M.

C. Adding Water: If concrete arrives on-site with slump less than suitable for placement, do not add water that exceeds the maximum water-cement ratio or exceeds the maximum permissible slump.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify lines, levels, and dimensions before proceeding with work of this section and before concrete is placed.
   1. Notify Architect of incorrect dimensions or spot elevations in writing.
   2. Do not place concrete until corrections are made and verified.

3.02 PREPARATION

A. Formwork: Comply with requirements of ACI 301. Design and fabricate forms to support all applied loads until concrete is cured, and for easy removal without damage to concrete.

B. Verify that forms are clean and free of rust before applying release agent.

C. Coordinate placement of embedded items with erection of concrete formwork and placement of form accessories.

D. Concrete Mixing:
   1. General:
      a. All concrete shall be machine mixed.
      b. Water gauge shall be provided to deliver exact predetermined amount of water for each batch.
      c. Reliable system must be employed to insure that no less than predetermined amount of cement goes into each batch.
      d. Re-tempering partly set concrete will not be permitted.
   2. Transit Mix:
      a. Transit mix concrete may be used provided it conforms to Specifications and tests herein described and ASTM C94/C94M.
      b. Central plant producing concrete and equipment transporting it are suitable for production and transportation of controlled concrete and plant is currently approved by local state DOT.
      c. Maximum elapsed time between time of introduction of water and placing shall be one (1) hour.

d. Minimum time of mixing shall be one (1) minute per cubic yard after all material, including water, has been placed in drum, and drum shall be reversed for an additional two (2) minutes.
e. Mixing water shall be added only in presence of Inspecting Engineer or inspector employed by Testing Agency.
f. Trucks shall not be overloaded in excess of rated capacity as recommended by manufacturer.

3. Cold Weather Concreting Procedures:
   a. General Requirements:
      1) Materials and equipment required for heating and protection of concrete shall be approved and available at Project site before beginning cold weather concreting.
      2) Forms, reinforcement, metallic embedments, and fillers shall be free from snow, ice, and frost. Surfaces that will be in contact with newly placed concrete, including subgrade materials, shall be 35 deg F (2 deg C) minimum at time of concrete placement.
      3) Thaw sub-grade 6 inches (150 mm) deep minimum before beginning concrete placement. If necessary, re-compact thawed material.
      4) Use no frozen materials or materials containing ice.
      5) See ACI 306.1 'Standard Specification for Cold Weather Concreting' for additional requirements.
4. Hot Weather Concreting Procedures:
   a. General:
      1) Maximum concrete temperature allowed is 90 deg F (32 deg C) in hot weather.
      2) Cool aggregate and subgrades by sprinkling.
      3) Avoid cement over 140 deg F (60 deg C).
      4) Use cold mixing water or ice.
      5) Use fog spray or evaporation retardant to lessen rapid evaporation from concrete surface.
      6) See ACI 305.1 'Specification for Hot Weather Concreting' for additional requirements.

E. Surface Preparation:
1. Earthwork Preparation:
   a. Aggregate base and subgrade:
      1) Prepare aggregate base as specified in Section 312323.
      2) Prepare natural soil subgrade as specified in Section 31 2200.
      3) Prepare fill subgrade as specified in Section 31 2323.
2. Concrete Slab Thickness:
   a. Increase thickness of concrete beneath detectable warning panels one inch (25 mm).
3. Inserts, bolts, boxes, templates, pipes, conduits, and other accessories required by Divisions 22, 23, and 26 shall be installed and inspected before placing concrete.
4. Install inserts, bolts, boxes, templates, pipes, conduits, and other accessories furnished under other Sections to be installed as part of work of this Section:
   a. Tie anchor bolts for hold-down anchors and columns securely to reinforcing steel.

F. Where new concrete is to be bonded to previously placed concrete, prepare existing surface by cleaning and applying bonding agent in according to bonding agent manufacturer's instructions.
1. Use latex bonding agent only for non-load-bearing applications.

G. Where new concrete with integral waterproofing is to be bonded to previously placed concrete, prepare surfaces to be treated in accordance with waterproofing manufacturer's instructions. Saturate cold joint surface with clean water, and remove excess water before application of coat of waterproofing admixture slurry. Apply slurry coat uniformly with semi-stiff bristle brush at rate recommended by waterproofing manufacturer.

H. In locations where new concrete is doweled to existing work, drill holes in existing concrete, insert steel dowels and pack solid with non-shrink grout.

I. Interior Slabs on Grade: Install vapor retarder under interior slabs on grade. Comply with ASTM E1643. Lap joints minimum 6 inches. Seal joints, seams and penetrations watertight with manufacturer's recommended products and follow manufacturer's written instructions. Repair damaged vapor retarder before coving.

J. Removal:
   1. Remove water and debris from space to be placed.
   2. Vapor Retarder Over Aggregate Base: Install compactible granular fill before placing vapor retarder as indicated on drawings. Do not use sand.

3.03 INSTALLATION OF FORMWORK

A. Forms:
   1. Assemble forms so forms are sufficiently tight to prevent leakage.
   2. Properly brace and tie forms.
   3. Provide temporary cleanouts at base of tall forms if used to facilitate cleaning and inspection.
   4. Make proper form adjustments before, during, and after concreting.
   5. Use new forms, or used forms that have been cleaned of loose concrete and other debris from previous concreting and repaired to proper condition. Use APA Plyform B-B Class I, or APA HDO Plyform B-B Class I, on exposed to view concrete that do not receive a smooth rubbed finish.
   6. Use metal cold joint forms when unable to place concrete for footings, foundations, and slabs in continuous pours.
   7. Provide beveled 2 inch by 4 inch keys where shown on Contract Drawings for tall or heavily loaded walls.

B. Accessories:
   1. General:
      a. Provide for installation of inserts, templates, fastening devices, sleeves, and other accessories to be set in concrete before placing.
      b. Position anchor bolts for hold-down anchors and columns and securely tie in place before placing concrete.
   2. Form Release / Finish Agents:
      a. Film thickness shall be no thicker than as recommended by Manufacturer.
      b. Allow no release / finish agent on reinforcing steel or footings.
   3. Expansion Joints:
      a. Install at joints between floor slab and foundation wall where shown on Drawings.

C. Form Removal (Slab on Grade):
   1. Removal of forms can usually be accomplished in twelve (12) to twenty-four (24) hours.
   2. If temperature is below 50 deg F (10 deg C) or if concrete (stairs, beams, etc) depends on forms for structural support, leave forms intact for sufficient period for concrete to reach adequate strength.
   3. For exposed to view surfaces that receive a smooth rubbed finish, remove forms while concrete is still “green”.
   4. Metal bars or prys should not be used. Use wood wedges, tapping gradually when necessary.

3.04 INSTALLING REINFORCEMENT AND OTHER EMBEDDED ITEMS

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

B. Fabricate and handle epoxy-coated reinforcing in accordance with ASTM D3963/D3963M.

C. Comply with requirements of ACI 301. Clean reinforcement of loose rust and mill scale, and accurately position, support, and secure in place to achieve not less than minimum concrete coverage required for protection.

D. Install welded wire reinforcement in maximum possible lengths, and offset end laps in both directions. Splice laps with tie wire.

E. Verify that anchors, seats, plates, reinforcement and other items to be cast into concrete are accurately placed, positioned securely, and will not interfere with concrete placement.

F. Avoid cutting or puncturing vapor retarder during reinforcement placement and concrete operations.

G. Clean reinforcement of loose rust and mill scale, earth, ice, and other materials which reduce or destroy bond with concrete.

H. Blowtorch shall not be used to facilitate field cutting or bending or any other reinforcing work.

I. Reinforcement shall not be bent after partially embedded in hardened concrete.

J. Placing Reinforcement:
   1. Comply with Concrete Reinforcing Steel Institute CRSI 'Manual of Standard Practice' recommended practice for 'Placing Reinforcing Bars' for details and methods of reinforcement placement and supports. and as herein specified.
   2. Accurately position, support, and secure reinforcement against displacement by formwork, construction, or concrete placement operations:
      a. Locate and support reinforcing by chairs, runners, bolsters, bar supports, spacers, or hangers, as required as recommended by 'ACI Detailing Manual, except slab on grade work.
      b. Support bars in slabs on grade and footings with specified bar supports around perimeter and at 4-1/2 feet on center each way maximum to maintain specified concrete cover.
      c. Install bar supports at bar intersections.
   3. Bend bars cold.
   4. Dowel vertical reinforcement for formed concrete columns or walls out of footing or structure below with rebar of same size and spacing required above.
   5. Securely anchor and tie reinforcement bars and dowels before placing concrete. Set wire ties with ends directed into concrete, not toward exposed concrete surfaces.

K. Splices:
   1. Per requirements of Structural Drawings.

L. Tolerances:
   1. Provide following minimum concrete cover for reinforcement as per ACI 318 or ACI 318M.

M. Arrange, space and securely tie bars and bar supports to hold reinforcement in position during concrete placement operations:
   1. Concrete cast against and permanently exposed to earth:
      a. Interior Slabs on Grade: 1 inch clear from top of slab at 4 inches slabs, 2 inches clear at 6 inches slabs.
         1) Sections other than Slabs: 3 inches.
      b. Concrete Exposed to Earth or Weather:
         1) No. 6 and Larger Bars: 2 inches.
         2) No. 5 and Smaller Bars, W31 and D31 Wire: 1-1/2 inches.
      c. Concrete not exposed to weather or in contact with ground:
         1) Slabs, walls, and joists:
            (a) No. 14 and No. 18 bars: 1-1/2 inches.
            (b) No. 11 bars and smaller: 3/4 inches.
         2) Beams and Columns:
            (a) Primary reinforcement, ties, stirrups and spirals: 1-1/2 inches.

3.05 PLACING CONCRETE

A. Place concrete in accordance with ACI 304R.

B. Place concrete for floor slabs in accordance with ACI 302.1R.

C. Notify Architect not less than 24 hours prior to commencement of placement operations.

D. Maintain records of concrete placement. Record date, location, quantity, air temperature, and test samples taken.

E. General:
   1. Place as soon after mixing as possible.
   2. Deposit as nearly as possible in final position.
   3. No concrete shall be deposited in water.
   4. Placing of concrete shall be continuous until panel or section is complete.
   5. Compact concrete in forms by vibrating and other means where required.
      a. Thoroughly consolidate concrete around reinforcing bars (Consolidation not required in concrete around reinforcing bars with Mix Type G).
      b. Use and type of vibrators shall conform to ACI 309.
   6. Form vertical surfaces full depth. Do not allow concrete to flow out from under forms in any degree into landscaped areas.
   7. Consolidate concrete thoroughly.
   8. Do not embed aluminum in concrete.
   9. Do not use contaminated, deteriorated, or re-tempered concrete.
   10. Avoid accumulation of hardened concrete.
   11. Dusting with cement not permitted.

F. Footings:
   1. Bear 12 inches (300 mm) minimum into undisturbed earth or on mechanically compacted engineered fill. Step footings at ratio of 1-1/2 horizontal to One vertical unless detailed otherwise.
   2. Level top of finish footing and leave rough.
   3. Where joints are required, bulkhead, key horizontally, and dowel with two No. 5 reinforcing bars, 48 inches (1 200 mm) long.

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

H. Interior Slabs:
   1. For continuous placing and where shown on Drawings, saw cut one inch (25 mm) deep control joints before shrinkage occurs (2 inches at 6 inch slabs) (50 mm at 150 mm slabs).
      a. Do not install control joints where Drawings indicate they are not to be installed.

I. Exterior Slabs:
   1. For continuous placing and where shown on Drawings, saw cut one inch (25 mm) deep control joints before shrinkage occurs (2 inches at 6 inch slabs) (50 mm at 150 mm slabs).

J. Miscellaneous Concrete Elements:
   1. Equipment Bases: Coordinate with appropriate Sections for locations and dimensions.
   2. Sidewalks, Exterior Stairs, And Landings:
      a. Slope with cross slope of 1/8 to 1/4 inch per ft (3 to 6 mm per 300 mm) (one to two percent) in direction of intended drainage.
      b. Slope away from building 1/8 to 1/4 inch per ft (3 to 6 mm per 300 mm) (one to two percent) minimum.
      c. Concrete walks shall be screeded to bring surface to grades and lines as indicated.
      d. Surface shall be floated with wood float with no coarse aggregate showing and then given broom finish before concrete sets.

K. Vertical Surfaces:
   1. Retaining Walls, Exposed Foundations, etc:
      a. Finish provided by form release / finish agent specified.
      b. Repair of Unacceptable Concrete.
   2. Immediately after removing forms, remove joints, marks, bellies, projections, loose materials, and cut back metal ties from surfaces to be exposed.

3. Point up voids with cement mortar, 1:2 mix, and rub exposed surface with carborundum to smooth, even surface matching surrounding undamaged area.

L. Ensure reinforcement, inserts, waterstops, embedded parts, and formed construction joint devices will not be disturbed during concrete placement.

M. Place concrete continuously without construction (cold) joints wherever possible; where construction joints are necessary, before next placement prepare joint surface by removing laitance and exposing the sand and sound surface mortar, by sandblasting or high-pressure water jetting.

3.06 SLAB JOINTING

A. Locate joints as indicated on drawings (do not use control joints in interior concrete slabs in meetinghouse).
   1. Concrete Control Joints on Center Spacing.
      a. Sidewalks: 4-6 feet
   2. Concrete Expansion Joint (isolation) Joints on Center Spacing.
      a. Sidewalks, Curbs and Gutters: 40-100 feet

B. Anchor joint fillers and devices to prevent movement during concrete placement.

C. Isolation Joints: Use preformed joint filler with removable top section for joint sealant, total height equal to thickness of slab, set flush with top of slab.
   1. Install wherever necessary to separate slab from other building members, including columns, walls, equipment foundations, footings, stairs, manholes, sumps, and drains.

D. Load Transfer Construction and Contraction Joints: Install load transfer devices as indicated; saw cut joint at surface as indicated for contraction joints.

E. Saw Cut Contraction Joints: Saw cut joints before concrete begins to cool, within 4 to 12 hours after placing; use 3/16 inch thick blade and cut at least 1 inch deep but not less than one quarter (1/4) the depth of the slab.

F. Contraction Joint Devices: Use preformed joint device, with top set flush with top of slab.

G. Construction Joints: Where not otherwise indicated, use metal combination screed and key form, with removable top section for joint sealant.

H. Seal expansion joints as specified in Section 07 9200 for following areas:
   1. Between entryway slabs and building foundations.
   2. Between sidewalks and building foundations.
   3. Within flat drainage structures and at joints between flat drainage structures and other concrete elements.

I. Expansion joints are not required to be sealed for following areas:
   1. Within aprons and where apron abuts sidewalks.
   2. Within sidewalks.

3.07 FLOOR FLATNESS AND LEVELNESS TOLERANCES

A. An independent testing agency, as specified in Section 01 4000, will inspect finished slabs for compliance with specified tolerances.

B. Correct the slab surface if tolerances are less than specified.

C. Minimum F(F) Floor Flatness and F(L) Floor Levelness Values:
   1. Exposed to View and Foot Traffic: F(F) of 20; F(L) of 15, on-grade only.
   2. Under Carpeting: F(F) of 25; F(L) of 20, on-grade only.
   3. Under Thin Resilient Flooring and Thinset Tile: F(F) of 35; F(L) of 25, on-grade only.

D. Measure F(F) Floor Flatness and F(L) Floor Levelness in accordance with ASTM E1155 (ASTM E1155M), within 48 hours after slab installation; report both composite overall values and local values for each measured section.

E. Correct the slab surface if composite overall value is less than specified and if local value is less than two-thirds of specified value or less than F(F) 13/F(L) 10.

F. Correct defects by grinding or by removal and replacement of the defective work. Areas requiring corrective work will be identified. Re-measure corrected areas by the same process.

3.08 CONCRETE FINISHING

A. Repair surface defects, including tie holes, immediately after removing formwork.

B. Unexposed Form Finish: Rub down or chip off fins or other raised areas 1/4 inch or more in height.

C. Exposed Form Finish: Rub down or chip off and smooth fins or other raised areas 1/4 inch or more in height. Provide finish as follows:
   1. Smooth Rubbed Finish: Wet concrete and rub with carborundum brick or other abrasive, immediately after form removal.

D. Interior Concrete Slabs: Finish to requirements of ACI 302.1R, and as follows:
   1. Screed Concrete.
   2. Float Finish:
      a. Float as soon after screeding as possible.
      b. Consolidate surface with power-driven floats with exception of areas inaccessible to power-driven floats, which may be hand-floated.
      c. Re-straighten, cutting down high spots and filling low spots.
      d. Repeat float passes and re-straightening until surface has uniform, smooth, granular texture.
      e. Surfaces to Receive Thick Floor Coverings: "Wood float" as described in ACI 302.1R; thick floor coverings include quarry tile, ceramic tile, and Portland cement terrazzo with full bed setting system.
   3. Trowel Finish:
      a. Steel trowel slab after concrete has set enough to avoid bringing water and fines to surface.
      b. Perform troweling with power-driven trowels with exception of areas inaccessible to power-driven trowels, which may be hand-troweled.
      c. Continue troweling passes and re-straightening with 10 foot (3 meter) highway straightedge until surface is free of trowel marks and uniform in texture and appearance.
      d. Apply burnished, burned-out trowel finish.
      e. Surfaces to Receive Thin Floor Coverings: "Steel trowel" as described in ACI 302.1R; thin floor coverings include carpeting, resilient flooring, seamless flooring, resinous matrix terrazzo, thin set quarry tile, and thin set ceramic tile.
   4. Other Surfaces to Be Left Exposed: Trowel as described in ACI 302.1R, minimizing burnish marks and other appearance defects.

E. In areas with floor drains, maintain floor elevation at walls; pitch surfaces uniformly to drains at 1:100 nominal.

3.09 CURING AND PROTECTION

A. Comply with requirements of ACI 308R. Immediately after placement, protect concrete from premature drying, excessively hot or cold temperatures, and mechanical injury.

B. Maintain concrete with minimal moisture loss at relatively constant temperature for period necessary for hydration of cement and hardening of concrete.
   1. Normal concrete: Not less than seven days.
   2. High early strength concrete: Not less than four days.

C. Formed Surfaces: Cure by moist curing with forms in place for full curing period.

D. Surfaces Not in Contact with Forms:

1. Initial Curing: Start as soon as free water has disappeared and before surface is dry. Keep continuously moist for not less than three days by membrane curing, water ponding, water-saturated sand, water-fog spray, or saturated burlap.
2. Slabs and Floors To Receive Adhesive-Applied Flooring: Membrane Cure. Curing compounds and other surface coatings are usually considered unacceptable by flooring and adhesive manufacturers. If such materials must be used, either obtain the approval of the flooring and adhesive manufacturers prior to use or remove the surface coating after curing to flooring manufacturer's satisfaction.
3. Slabs and Floors to Receive Polished Finish: Water cure
4. Final Curing: Begin after initial curing but before surface is dry.
    a. Moisture-Retaining Sheet: Lap strips not less than 3 inches and seal with waterproof tape or adhesive; secure at edges.
    b. Curing Compound: Apply in two coats at right angles, using application rate recommended by manufacturer.

3.10 NON-SHRINK GROUTING

A. Surface Preparation:
1. Prepare concrete surfaces in accordance with Manufacturer’s written instructions:
2. Remove all loose materials.
3. Clean surface of any substance that could interfere with bond on material including dirt, paint, tar, asphalt, wax, oil, grease, latex compounds, form release agents, laitance, loose toppings, foreign substances and any other residues.
4. Saturate area to be grouted with water in accordance with Manufacturer’s written instructions.

B. Mixing:
1. Mix grout in accordance with Manufacturer’s written instructions.
2. Add mix water in amount in accordance with Manufacturer’s written instructions to provide required placing consistency.
3. Do not add water in amount that will cause bleeding or segregation of mixed grout.
4. Do not add any sand, cement, admixtures, or fluidifiers to grout.

C. Placement:
1. Place grout in accordance with Manufacturer’s written instruction including but not limited to the following:
    a. Proper curing is required.
    b. Use cold weather or hot weather grouting procedures in accordance with Manufacturer’s written instructions, as temperature dictates:
        1) Do not use at temperatures that may cause premature freezing.
        2) Do not allow to freeze until 4000 psi (27.6 MPa) is attained.
    c. Employ cold weather or hot weather grouting practices as temperatures dictates.
2. Completely eliminate air pockets and provide full contact between grout and item being grouted. Do not exceed Manufacturer’s recommended thickness.

D. Curing:
1. Cure grout in accordance with Manufacturer’s written instructions or ACI curing practices.
2. Wet cure grout until forms are removed.
3. Seal grout surfaces after forms are removed as recommended by Manufacturer.

E. Keep grout surfaces wet after curing compound has dried for as long as recommended by Manufacture.

F. Protect placed grout from freezing until minimum strength of 4000 psi (27.58 MPa) is reached.

G. Protect placed grout from damage during construction.

3.11 FIELD QUALITY CONTROL

A. Quality Control is sole responsibility of Contractor.

1. Owner's employment of an independent Testing Agency does not relieve Contractor of Contractor's obligation to perform testing and inspection as part of his Quality Control:
    a. Testing and inspections, if performed by Contractor, will be responsibility of Contractor to be performed by an independent entity.

B. Provide free access to concrete operations at project site and cooperate with appointed firm.

C. Submit proposed mix design of each class of concrete to inspection and testing firm for review prior to commencement of concrete operations.

D. Tests of concrete and concrete materials may be performed at any time to ensure compliance with specified requirements.

E. Compressive Strength Tests: ASTM C39/C39M, for each test, mold and cure three concrete test cylinders. Obtain test samples for every 100 cubic yards or less of each class of concrete placed.

F. Take one additional test cylinder during cold weather concreting, cured on job site under same conditions as concrete it represents.

G. Perform one slump test for each set of test cylinders taken, following procedures of ASTM C143/C143M.

H. Slab Testing: Cooperate with manufacturer of specified moisture vapor reducing admixture (MVRA) to allow access for sampling and testing concrete for compliance with warranty requirements.

I. Permeability Test: Test concrete with waterproofing admixture according to COE CRD-C 48.

J. Expansion Anchors / Adhesive Anchors / Screw Anchors:
    1. Certified Inspector from Testing Agency shall verify procedures used for installation of all concrete anchors and monitor their installation for compliance with Manufacturer's requirements.
    2. Inspections:
        a. Inspections shall include required verification and inspection of anchors as referenced in IBC Table 1704.4 and in accordance with most current version of ACI 318 or ACI 318M and applicable ASTM material standards that:
            1) The correct rod/anchor is used; size and type.
            2) The correct hole size is used and prepared per Manufacturer's instructions.
            3) That climactic conditions, and concrete temperature, allow for the anchors' installation and use.
            4) Proper hole cleaning equipment, per Manufacturer's instructions, is used.
            5) Torque applied to anchors does not exceed Manufacturer's allowable limits.
                (a) Torque applied to anchors is per Manufacturer's instructions.

3.12 DEFECTIVE CONCRETE

A. Test Results: The testing agency shall report test results in writing to Architect and Contractor within 24 hours of test.

B. Defective Concrete: Concrete not complying with required lines, details, dimensions, tolerances or specified requirements.

C. Repair or replacement of defective concrete will be determined by the Architect. The cost of additional testing shall be borne by Contractor when defective concrete is identified.

D. Do not patch, fill, touch-up, repair, or replace exposed concrete except upon express direction of Architect for each individual area.

3.13 PROTECTION

A. Do not permit traffic over unprotected concrete floor surface until fully cured.

B. Protect installed products from damage during construction.

END OF SECTION

SECTION 06 0573
WOOD TREATMENT

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Preservative treatment for wood materials.

B. Insect Prevention treatment for wood materials.

1.02 DEFINITIONS

A. Preservative-Treated Wood: Wood exposed to high levels of moisture or heat susceptible to decay by fungus and other organisms, and to insect attack. The damage caused by decay or insects can jeopardize the performance of the wood members so as to reduce the performance below that required. Preservative treatment requires pressure-treatment process to achieve depth of penetration of preservative into wood to verify that the wood will be resistant to decay and insects over time.

B. Treated Wood: Wood impregnated under pressure with compounds that reduce its susceptibility to flame spread or to deterioration caused by fungi, insects, or marine bores.

C. Flame Spread: The propagation of flame over a surface.

D. Flame Spread Index: The numerical value assigned to a material tested in accordance with ASTM E84 or UL 723.

E. Smoke-Developed Index: The numerical value assigned to a material tested in accordance with ASTM E84 or UL 723.

1.03 REFERENCE STANDARDS

A. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials 2020.

B. AWPA U1 - Use Category System: User Specification for Treated Wood 2018.

C. NFPA 255 - Standard Method of Test of Surface Burning Characteristics of Building Materials 2006.

D. UL 723 - Standard for Test for Surface Burning Characteristics of Building Materials Current Edition, Including All Revisions.

1.04 DELIVERY, STORAGE, AND HANDLING

A. General: Cover wood products to protect against moisture. Support stacked products to prevent deformation and to allow air circulation.

B. Keep materials dry during transit with labels intact and store in dry location at all times.

PART 2 PRODUCTS

2.01 SITE APPLIED FIRE RETARDANT WOOD TREATMENT

A. Materials:
   1. Lumber grade and species shall be as specified for particular use.
   2. Identify treated lumber as to name of treater, preservative used, and retention in lbs/cu ft.
   3. Season after treatment to moisture content required for non-treated material.

B. Surface-Applied Fire-Retardant:
   1. Description:
      a. Water-based, post-treatment, interior/exterior fire retardant, and wood preservative that penetrates wood products and bonds with cellular structure. Protects by developing self-extinguishing reaction when treated wood comes in contact with an open flame.
      b. Post-treatment must be used with OSB wood sheathing and structural composite lumber (LSL, LVL, PSL).
      c. Post-treatment may be used with plywood or lumber materials.

2. Design Criteria:
    a. Prior to treatment, wood is to be kiln-dried to maximum moisture content of nineteen (19) percent for lumber and fifteen (15) percent for sheathing (plywood).
    b. Meet requirements as defined in UCFA of American Wood Protection Association Standard U1 for interior Type A (HT) fire-retardant use and AWPA Standards P50.
    c. Meet Regulatory Agency Sustainability Approvals.
    d. Meet requirements of NFPA 255.
    e. Provide dye for easy visual identification.
    f. Treat lumber and plywood for new work in accordance with AWPA Standards.
3. Acceptable Manufacturers:
    a. Quality Standard: Flame Stop IM (color white) by Flame Stop by, Ft. Worth, TX www.flamestop.com.
    b. Equal meeting design criteria as approved by Architect before bidding. See Section 016000.

2.02 FACTORY APPLIED WOOD TREATMENT

A. Factory Applied Preservative Wood Treatment:
1. Acceptable Manufacturers:
    a. Arch Wood Protection Inc, Atlanta, GA www.wolmanizedwood.com.
    b. Hoover Treated Wood Products, Thomson, GA www.frtw.com.
    c. Osmose Inc, Griffin, GA www.osmose.com.
    d. U S Borax Inc, Valencia, CA www.borax.com/wood.
    e. Viance LLC, Charlotte, NC www.treatedwood.com.
    f. Equal as approved by Architect before bidding. See Section 016000.
2. Framing lumber grade and species shall be as specified in Section 061100 for particular use.
3. Interior Wood In Contact With Concrete or Masonry:
    a. Preservatives:
        1) Disodium octoborate tetrahydrate (DOT / SBX) meeting requirements of AWPA U1 and with retention of 0.25 lbs per cu ft.
        2) Zinc borate meeting requirements of AWPA U1 and with retention of 0.17 lbs per cu ft.
        3) CCA-C (47.5 percent chromium trioxide, 18.5 percent copper oxide and 34 percent arsenic pentoxide) by Koppers Performance Chemicals, Griffin, Georgia, http://www.koppersperformancechemicals.com/ (0.25 lb/cu ft minimum retention).
        4) DURA-GUARD by Hoover Treated Wood Products, Thomson, GA www.frtw.com (.40 lb/cu ft minimum retention).
    b. Lumber: Treat in accordance with AWPA U1.
    c. Millwork: Treat in accordance with AWPA N1 and dry after treatment.
4. Exterior Wood Continuously Exposed To Weather:
    a. Preservatives: Waterborne preservatives meeting requirements of AWPA U1 with retention levels as required by AWPA U1 for specific application.
    b. Lumber: Treat in accordance with AWPA U1.

B. Factory Applied Insect Prevention Wood Treatment (control of termites):
1. Design Criteria:
    a. Description:
        1) Preservative treatment for insect protection of exterior wood and wood cellulose composite millwork products. Requirements for exterior millwork for preservation formulations applied with pressure or no-pressure methods for treated exterior wood and wood cellulosic composite millwork.
        2) LSL material can be treated but LVL material is not to be treated.

3) Millwork is defined in this specification as exterior products such as prefit wood windows, sash, screens, window frames, blinds, shutters, wood doors, door jambs, cut-to-length trim, and machined knocked-down parts of those products.

b. General:
   1) Treat lumber and wood sheathing for new work in accordance with AWPA Standards and dried after treatment.
   2) Hardwood lumber and wood sheathing used in Architectural Millwork shall be preserved by fifteen (15) minute dip treatment in accordance with requirements of WDMA I.S.4.
   3) Wood products that are saw cut or bored after treatment shall have raw edges treated with two brush coats of same preservative originally used for treatment.
   4) Plywood, Pine and Hemlock: Follow recommendations of AWPA N1.

c. Lumber:
   1) Framing Lumber, LSL Material and Wood Plywood:
      (a) Design Criteria:
         (1) Product must be AWPA approved.
         (2) Provide retention rate required to provide 40 year minimum protection using the AWPA category system (UCS) standards. Adjust the retention rate for the potential hazard of decay and termites.
         (3) The assay zone is the outer 0.60 inches of the wood for these specifications.
         (4) Incising not required but allowed with structural engineer of record approval.
         (5) Incising can reduce the structural capacity of the wood.
      (b) Quality Standards. See Section 01 4000.
         (1) Hi-Clear II by Permapost Products Co., Hillsboro, OR www.permapost.com (0.25 lb/cu ft retention; do not use this product in Hawaii, California or Southeast).
         (2) CCA-C (47.5 percent chromium trioxide, 18.5 percent copper oxide and 34 percent arsenic pentoxide) by Koppers Performance Chemicals, Griffin, GA www.koppersperformancechemicals.com (0.60 lb/cu ft minimum retention for projects in Hawaii, California and Southeast).
         (3) Hi-Bor by Koppers Performance Chemicals, Griffin, GA www.kloppersperformancechemicals.com (0.17 lb/cu ft minimum; 0.40 lb/cu ft minimum retention for projects in Hawaii, California and Southeast). Borate treated wood is to be stored off ground and be covered for protection from water.
         (4) SillBor by Arch Wood Protection, Inc., Atlanta, GA www.lonza.com/products-services/wood-protection.aspx (0.17 lb/cu ft minimum; 0.40 lb/cu ft minimum retention of SillBor for projects in Hawaii, California and Southeast). Borate treated wood is to be stored off ground and be covered for protection from water.
      (c) For Treating Cut Ends, Notches, and etc, at Job Site:
         (1) Apply copper naphthenate solution or other solution containing at least 1 percent copper. use generous amount to completely saturate any untreated areas exposed by cutting or drilling.

d. Moisture Requirements:
   1) Water-soluble treated wood shall have moisture reduced to twelve (12) percent to fifteen (15) percent before installation.
   2) Tribucide treated wood shall have moisture reduced to nineteen (19) percent before installation.

PART 3 EXECUTION

3.01 PREPARATION

A. Remove dust, dirt and other contaminants from treatment surfaces. Remove tarpaulins, drop cloths, strippable protective films, etc., from areas to be treated. Move equipment and stored materials that block or prevent product application.

3.02 INSTALLATION - GENERAL

A. Provide temporary ventilation during and immediately after installation sufficient to remove indoor air contaminants.

3.03 SITE APPLIED WOOD TREATMENT

A. Comply with manufacturers written mixing and installation instructions.

3.04 APPLICATION

A. Treated wood shall not be installed in areas where it is exposed to precipitation, direct wetting, or regular condensation.

END OF SECTION

SECTION 06 1000
ROUGH CARPENTRY

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Structural dimension lumber framing.
B. Non-structural dimension lumber framing.
C. Rough opening framing for doors, windows, and roof openings.
D. Sheathing.
E. Roof-mounted curbs.
F. Roofing nailers.
G. Preservative treated wood materials.
H. Miscellaneous framing and sheathing.
I. Concealed wood blocking, nailers, and supports.
J. Miscellaneous wood nailers, furring, and grounds.

1.02 RELATED REQUIREMENTS

A. Section 03 3000 - Cast-in-Place Concrete: Setting anchors in concrete.
B. Section 06 1733 - Wood I-Joists.
C. Section 06 1800 - Glued-Laminated Construction.
D. Section 07 2500 - Weather Barriers: Water-resistive barrier over sheathing.
E. Section 09 2116 - Gypsum Board Assemblies: Gypsum-based sheathing.

1.03 REFERENCE STANDARDS

A. ASTM D2559 - Standard Specification for Adhesives for Bonded Structural Wood Products for Use Under Exterior Exposure Conditions 2012a (Reapproved 2018).
B. ASTM F1667 - Standard Specification for Driven Fasteners: Nails, Spikes, and Staples 2018a.
C. AWC (WFCM) - Wood Frame Construction Manual for One- and Two-Family Dwellings 2015.
D. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware 2016a.
E. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process 2020.
F. ASTM C557 - Standard Specification for Adhesives for Fastening Gypsum Wallboard to Wood Framing 2003 (Reapproved 2017).
G. ASTM D3498 - Standard Specification for Adhesives for Field-Gluing Wood Structural Panels (Plywood or Oriented Strand Board) to Wood Based Floor System Framing 2019a.
H. ASTM E96/E96M - Standard Test Methods for Water Vapor Transmission of Materials 2016.
I. ICC-ES AC38 - Acceptance Criteria for Water-Resistive Barriers 2016.
J. ICC-ES AC380 - Acceptance Criteria for Termite Physical Barrier Systems 2014, with Editorial Revision (2017).
K. PS 1 - Structural Plywood 2009.
L. PS 2 - Performance Standard for Wood-Based Structural-Use Panels 2010.
M. PS 20 - American Softwood Lumber Standard 2020.
N. SPIB (GR) - Grading Rules 2014.
O. WCLIB (GR) - Standard Grading Rules for West Coast Lumber No. 17 2018.

P. WWPA G-5 - Western Lumber Grading Rules 2017.

1.04 DELIVERY, STORAGE, AND HANDLING

A. Delivery And Acceptance Requirements:
   1. Protect lumber and sheathing and keep under cover in transit and at job site.
   2. Do not deliver material unduly long before it is required.

B. Storage And Handling Requirements:
   1. Store lumber and sheathing on level racks and keep free of ground to avoid warping.
   2. Stack to insure proper ventilation and drainage.

PART 2 PRODUCTS

2.01 GENERAL REQUIREMENTS

A. Dimension Lumber: Comply with PS 20 and requirements of specified grading agencies.
   1. Species: Douglas Fir-Larch, unless otherwise indicated.
   2. If no species is specified, provide any species graded by the agency specified; if no grading agency is specified, provide lumber graded by any grading agency meeting the specified requirements.
   3. Grading Agency: Any grading agency whose rules are approved by the Board of Review, American Lumber Standard Committee (www.alsc.org) and who provides grading service for the species and grade specified; provide lumber stamped with grade mark unless otherwise indicated.
   4. Design Criteria:
      a. Meet requirements of PS 20 and National Grading Rules for softwood dimension lumber.
      b. Bear grade stamp of WWPA, SPIB, or other association recognized by American Lumber Standards Committee identifying species of lumber by grade mark or by Certificate of Inspection.
      c. Lumber 2 inches (50 mm) or less in nominal thickness shall not exceed 19 percent in moisture content at time of fabrication and installation and be stamped 'S-DRY', 'K-D', or 'MC15'.
      d. Preservative Treated Plates / Sills:
         1) 2x4 (38 mm by 64 mm): Standard and better Douglas Fir, Southern Pine, or HemFir, or StrandGuard by iLevel by Weyerhaeuser Boise, ID www.ilevel.com. (LSL 1.3 E) or as indicated on Contract Drawings.
         2) 2x6 (38 mm by 140 mm) And Wider: No. 2 or MSR 1650f - 1.5e Douglas Fir, Southern Pine, HemFir, or StrandGuard by iLevel by Weyerhaeuser, Boise, ID www.ilevel.com. (LSL 1.3 E) or as indicated on Contract Drawings.
   5. Lumber of other species or grades is acceptable provided structural and appearance characteristics are equivalent to or better than products specified.

2.02 DIMENSION LUMBER FOR CONCEALED APPLICATIONS

A. Sizes: Nominal sizes as indicated on drawings.

B. Moisture Content: S-dry or MC19.

C. Stud Framing:
   1. Species: Any allowed under referenced grading rules, or as noted by contract drawings.
   2. Grade: No. 2, or as noted by Contract Drawings.

D. Joist, Rafter, and Small Beam Framing:
   1. Machine stress-rated (MSR) as follows:
      a. Fb-single (minimum extreme fiber stress in bending): 1350 psi, or as noted by Contract Drawings.
      b. E (minimum modulus of elasticity): 1,300,000 psi, or as noted by contract drawings.
   2. Species and Grades: As indicated on drawings for various locations.

E. Miscellaneous Framing, Blocking, Nailers, Grounds, and Furring:

1. Lumber: S4S, No. 2 or Standard Grade.
2. Boards: Standard or No. 3.

2.03 STRUCTURAL COMPOSITE LUMBER

A. At Contractor's option, structural composite lumber may be substituted for concealed dimension lumber and timbers.

B. Materials shall be tested and evaluated in accordance with ASTM D5456.

C. Materials shall have current ICC-ES Evaluation Report, report approved by International Codes Council, or report issued by Architect approved model code evaluation service and shall comply with requirements of report.

D. Identify materials by stamp or stamps indicating manufacturer's name, product trade name, grade, species (if applicable), evaluation report number, plant number, and name or logo of independent inspection agency.

E. Adhesive: Meet requirements of ASTM D2559.

F. Factory fabricated beams, headers, and columns, of sizes and types indicated on drawings; structural capacity as published by manufacturer.
   1. Columns: Use laminated veneer lumber, laminated strand lumber, or parallel strand lumber with manufacturer's published E (modulus of elasticity): 1,800,000 psi, minimum.
   2. Beams: Use laminated veneer lumber, laminated strand lumber, or parallel strand lumber with manufacturer's published E (modulus of elasticity): 1,800,000 psi, minimum.
   3. Headers Not Longer Than 48 inches: Use laminated veneer lumber, laminated strand lumber, or parallel strand lumber.
   4. Manufacturers:
      a. Boise Cascade Company: www.bc.com/#sle.
      b. Weyerhaeuser Company: www.weyerhaeuser.com/#sle.
      c. Jager Industries Inc, Calgary, AB www.jagerbuildingsystems.com 4. Louisiana Pacific Corp, Portland, OR www.lpcorp.com.
      d. Roseburg Forest Products, Roseburg, OR www.roseburg.com.
      e. Trus Joist Corp, Div Weyerhaeuser, Boise, ID www.tjm.com or Surrey, BC (604) 588-7878.
      f. Web Joist, Chehalis, WA www.webjoist.com.

2.04 CONSTRUCTION PANELS (WOOD SHEATHING)

A. See Contract Drawings for required thicknesses, span ratings and attachment requirements.

B. Sheathing: Meet requirements of PS 1, PS 2, or PRP-133 (TECO). Except where plywood is specifically indicated on Contract Drawings, oriented strand board (OSB) is acceptable.

C. Sheathing shall bear grade stamp from American Plywood Association (APA) or equal grading organization.

D. Sheathing shall not exceed 18 percent moisture content when fabricated or more than 19 percent when installed in Project.

E. Sheathing used for same purpose shall be of same thickness. In all cases, thickness specified is minimum required regardless of span rating.

F. Minimum span ratings for given thicknesses shall be as follows:
   1. Thickness = Span Rating
      a. 3/8 inch = 24 / 0
      b. 7/16 inch nominal = 24 / 16
      c. 15/32 inch actual = 32 / 16
      d. 1/2 inch nominal = 32 / 16
      e. 19/32 inch actual = 40 / 20
      f. 5/8 inch nominal = 40 / 20
      g. 23/32 inch actual = 48 / 24

2.05 ACCESSORIES

A. Fasteners and Anchors:
   1. General:
      a. Fasteners for preservative treated and fire-retardant-treated wood shall be of hot dipped zinc-coated galvanized steel, stainless steel, silicon bronzed, or copper. Coating weights for zinc-coated fasteners shall be in accordance with ASTM A153/A153M.
   2. Blocking:
      a. Sound lumber without splits, warps, wane, loose knots, or knots larger than 1/2 inch.
      b. Utility or better
   3. Nails:
      a. Meet requirements of ASTM F1667.
      b. Unless noted otherwise, nails listed on Drawings or in Specifications shall be common nail diameter, except 16d nails, which shall be box diameter.
   4. SDS Screws:
      a. Category Four Approved Products. See Section 01 6200 for definitions of categories.
      b. SDS Screws by Simpson Strong Tie Co, Dublin, CA www.strongtie.com.
   5. Powder-Actuated Fasteners:
      a. Type One Quality Standard: Hilti X-DNI 62P8.
      b. Manufacturers:
         1) Hilti, Tulsa, OK www.us.hilti.com.
         2) Redhead Division of ITW, Wood Dale, IL www.itw-redhead.com and Markham, ON www.itwconstruction.ca.
   6. Drywall Screws: Bugle head, hardened steel, power driven type, length three times thickness of sheathing.
   7. Framing Anchors:
      a. Framing anchors and associated fasteners in contact with preservative hot dipped zinc coated galvanized steel or stainless steel. Do not use stainless steel items with galvanized items.
      b. Acceptable Products:
         1) KC Metals Inc, San Jose, CA www.kcmetals.com.
         2) Simpson Strong Tie Co, Dublin, CA www.strongtie.com.
         3) United Steel Products Co Inc (USP), Montgomery, MN www.uspconnectors.com.
         4) Equals as approved by Architect through shop drawing submittal before installation.

B. Joist Hangers: Hot dipped galvanized steel, sized to suit framing conditions.
   1. For contact with preservative treated wood in exposed locations, provide minimum G185 galvanizing complying with ASTM A653/A653M.

C. Sill Gasket on Top of Foundation Wall: 1/4 inch thick, plate width, closed cell plastic foam from continuous rolls.

D. Termite-Resistant Sill Plate Barrier: Self-adhesive, film-backed barrier with release sheet; adheres to concrete substrates and blocks termite access.
   1. Thickness: 68 mils (0.068 inch).
   2. Termite Resistance: 100 percent when tested in accordance with ICC-ES AC380.

E. Construction Adhesives: Adhesives complying with ASTM C557 or ASTM D3498.
   1. Manufacturers:
      a. Meet requirements of ‘APA-The Engineered Wood Association’ Specification AFG-01 or ASTM D3498.
      b. Use phenol-resorcinol type for use on pressure treated wood products.

PART 3 EXECUTION

3.01 PREPARATION

A. Use preservative treated wood for wood members in contact with concrete or masonry, including wall, sill and ledger plates, door and window subframes and bucks, etc.

B. Install sill gasket under sill plate of framed walls bearing on foundations; puncture gasket cleanly to fit tightly around protruding anchor bolts.

C. Coordinate installation of rough carpentry members specified in other sections.

3.02 INSTALLATION - GENERAL

A. Select material sizes to minimize waste.

B. Reuse scrap to the greatest extent possible; clearly separate scrap for use on site as accessory components, including: shims, bracing, and blocking.

C. Where treated wood is used on interior, provide temporary ventilation during and immediately after installation sufficient to remove indoor air contaminants.

3.03 FRAMING INSTALLATION

A. Furring Strips:
   1. On Wood or Steel: Nail or screw as required to secure firmly.
   2. At ceilings:
      a. Attach furring strips to the underside of structural elements with #8 wood screws, of length to penetrate wood framing 1 inch minimum.

B. Roof and Ceiling Framing:
   1. Place with crown side up.
   2. Install structural blocking and bridging as necessary and as described in Contract Drawings.
   3. Special Requirements:
      a. Roof and Ceiling Joists: Lap joints 4 inches minimum and secure with code approved framing anchors.
      b. Roof Rafters and Outlookers:
         1) Cut level at wall plate and provide at least 2-1/2 inches bearing where applicable. Spike securely to plate with three 10d nails.
         2) Attach to trusses or other end supports with framing anchors described in Contract Drawings.
         3) Provide for bracing at bearing partitions.

C. Installation of Wood Trusses:
   1. Handle, erect, and brace wood trusses in accordance with TPI/WTCA Booklet BCSI.
   2. Do not install damaged or broken wood trusses. Replace wood trusses that are broken, damaged, or have had members cut out during course of construction.
   3. Provide construction bracing from trusses in accordance with TPI DSB-89.
   4. Provide continuous 2x4 horizontal web bracing as shown on truss shop drawings.
      a. Secure bracing to each truss with two 10d or 16d nails.
      b. Lap splice bracing by placing bracing members side by side on common web member. Butt splices are not acceptable.
   5. Unless directed or shown otherwise, provide diagonal 2x4 bracing between trusses at each line of horizontal web bracing.
      a. This diagonal bracing shall be continuous and extend from junction of web and top chord of one truss to junction of web and bottom chord of different truss.
      b. Install bracing at approximately 45 degree angle. Bracing will extend over three trusses minimum or more as determined by height of trusses and 45 degree installation angle.
      c. Install brace on side of web opposite horizontal web bracing and nail to each web with two 10d or 16d nails.
      d. Install one brace every 20 feet as measured from top of brace to top of next brace.

D. Wall Framing:
   1. Openings: Single, bearing stud supporting header and on adjacent (king) stud continuous between top and bottom plates, unless show otherwise.
   2. Corners And Partition Intersections: Triple Studs.
   3. Top Plates in Bearing Partitions/Walls: Doubled or tripled and lapped, unless shown otherwise. Stagger joints at least 48 inches.

E. Installation of GlueLams:
   1. Install work in accordance with Fabricator's instructions and GlueLam Erection Safety Practices.
   2. Adequately support and brace work until tied into building structure to insure against collapse due to wind or other forces.
   3. Maintain protection of beams until roofing has been installed.

F. Installation of Structural Composite Lumber:
   1. Install temporary horizontal and cross bracing to hold members plumb and in safe condition until permanent bracing is installed.
   2. Install permanent bracing and related components before application of loads to members.

G. Sill Plates:
   1. Shear Walls and Bearing Walls (structural walls):
      a. Provide specified anchor 12 inches maximum and 4 inches minimum from each end of each plate.
      b. Fasten with anchor bolts embedded in concrete or with post-installed anchors as noted in Contract Drawings.
   2. Non-Structural Walls: Fasten with powder actuated fasteners.
   3. In addition to requirements of paragraphs '1' and '2' above, set sill plates of interior walls measuring less than 36 inches in length in solid bed of specified construction adhesive, except where sill sealer is used.
   4. Install specified seal sealer under sill plates of exterior walls and of acoustically insulated interior walls.

H. Beams And Girders:
   1. Pre-Fabricated Members:
      a. Solid glue-lam, LVL, LSL or PSL members may be used in place of built-up 2x framing members. Size shall be same as built-up member.
      b. Solid LVL or PSL members may be used in place of built-up LVL members. Size shall be same as sum of built-up members.
   2. Wood shims are not acceptable under ends.
   3. Do not notch framing members unless specifically shown in Drawing detail.

I. Nailing:
   1. Use nails and nail spacings required by Contract Drawings and:
      a. Top plates: Spiked together, 16d, 16 inches on center.
      b. Top plates: Laps, lap members 48 inches minimum and nail with 16d nails 4 inches on center
      c. Top plates: Intersections, three 16d
      d. Backing and blocking: Three 8d, each end.
      e. Corner studs and angles: 16d, 16 inches on center.

J. Set structural members level, plumb, and true to line. Discard pieces with defects that would lower required strength or result in unacceptable appearance of exposed members.

K. Make provisions for temporary construction loads, and provide temporary bracing sufficient to maintain structure in true alignment and safe condition until completion of erection and installation of permanent bracing.

L. Install structural members full length without splices unless otherwise specifically detailed.

M. Comply with member sizes, spacing, and configurations indicated, and fastener size and spacing indicated, but not less than required by applicable codes, AWC (WFCM) Wood Frame Construction Manual.

N. Install horizontal spanning members with crown edge up and not less than 1-1/2 inches of bearing at each end.

O. Construct double joist headers at ceiling; use metal joist hangers unless otherwise detailed.

P. Provide bridging at joists in excess of 8 feet span as detailed. Fit solid blocking at ends of members.

Q. Frame wall openings with two or more studs at each jamb; support headers on cripple studs.

3.04 BLOCKING, NAILERS, AND SUPPORTS

A. Provide framing and blocking members as indicated or as required to support finishes, fixtures, specialty items, and trim.

B. In framed assemblies that have concealed spaces, provide solid wood fire blocking as required by applicable local code, to close concealed draft openings between floors and between top story and roof/attic space; other material acceptable to code authorities may be used in lieu of solid wood blocking.

C. In metal stud walls, provide continuous blocking around door and window openings for anchorage of frames, securely attached to stud framing.

D. In walls, provide blocking attached to studs as backing and support for wall-mounted items, unless item can be securely fastened to two or more studs or other method of support is explicitly indicated.

E. Where ceiling-mounting is indicated, provide blocking and supplementary supports above ceiling, unless other method of support is explicitly indicated.

F. Provide the following specific non-structural framing and blocking:
   1. Wall brackets.
   2. Grab bars.
   3. Wall-mounted door stops.

3.05 ROOF-RELATED CARPENTRY

A. Coordinate installation of roofing carpentry with deck construction, framing of roof openings, and roofing assembly installation.

B. Provide wood curb at all roof openings except where prefabricated curbs are specified and where specifically indicated otherwise. Form corners by alternating lapping side members.

3.06 INSTALLATION OF CONSTRUCTION PANELS (WOOD SHEATHING)

A. Roof Sheathing: Secure panels with long dimension perpendicular to framing members, with ends staggered and over firm bearing.
   1. At long edges use sheathing clips ("H" clips) where joints occur between roof framing members.
   2. At long edges provide solid edge blocking where joints occur between roof framing members where roof is blocked. Refer to Contract Drawings.
   3. Nail panels to framing; staples are not permitted.
   4. Placing:
      a. Lay face grain at right angles to supports. Provide blocking for support if framing turns at roof overhang.
      b. Provide 1/8 inch (3 mm) space between sheets at end and side joints.
      c. Stagger panel end joints.
      d. Sheathing shall be continuous of two spans minimum.
   5. Edge Bearing and Blocking:
      a. As indicated on Contract Drawings.
   6. Nail Spacing:

a. As indicated on Contract Drawings.
b. Place nails at least 3/8 inch (9.5 mm) in from edge.

7. Thickness:
a. As indicated on Contract Drawings.

8. Do not install any piece of roof sheathing with shortest dimension of less than 24 inches (600 mm) unless support is provided under all edges.

B. Wall Sheathing: Secure with long dimension perpendicular to wall studs, with ends over firm bearing and staggered, using nails, screws, or staples.
1. Use plywood or other acceptable structural panels at building corners, for not less than 96 inches, measured horizontally.
2. Provide inlet diagonal bracing at corners.
3. Place water-resistive barrier horizontally over wall sheathing, weather lapping edges and ends.
4. Spacing:
a. Provide 1/8 inch (3 mm) space between sheets at end and edge joints.
5. Edge Bearing And Blocking:
a. Panel edges shall bear on framing members and butt along their center lines.
b. Back block panel edges, which do not bear on framing members, with 2 inch nominal (45 mm) framing.
6. Nail Spacing:
a. As indicated on Contract Drawings.
b. Place nails not less than 3/8 inch (9.5 mm) in from edge.
7. Thickness:
a. As indicated on Contract Drawings.

C. Communications and Electrical Room Mounting Boards: Secure with screws to studs with edges over firm bearing; space fasteners at maximum 24 inches on center on all edges and into studs in field of board.
1. At fire-rated walls, install board over wall board indicated as part of the fire-rated assembly.
2. Where boards are indicated as full floor-to-ceiling height, install with long edge of board parallel to studs.
3. Install adjacent boards without gaps.
4. Size: 48 by 96 inches, installed horizontally at ceiling height.
5. Size and Location: As indicated on drawings.

3.07 TOLERANCES

A. Framing Members: 1/4 inch from true position, maximum.

B. Surface Flatness of Floor: 1/8 inch in 10 feet maximum, and 1/4 inch in 30 feet maximum.

C. Variation from Plane (Other than Floors): 1/4 inch in 10 feet maximum, and 1/4 inch in 30 feet maximum.

3.08 FIELD QUALITY CONTROL

A. Field Inspections:
1. Sheathing:
a. General:
1) Quality Control is sole responsibility of Contractor.
b. For walls and roof areas where nail spacing is 4 inches and less on center, Inspector shall verify wood panel sheathing, grade, thickness and nominal size of framing members, adjoining panel edges, nail size and spacing, bolting and other fastening of other components.

END OF SECTION

SECTION 06 1800
GLUED-LAMINATED CONSTRUCTION

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Glue laminated wood beams and purlins.

B. Preservative treatment of wood.

C. Steel hardware and attachment brackets.

1.02 REFERENCE STANDARDS

A. AITC 117 - Standard Specifications for Structural Glued Laminated Timber of Softwood Species 2010.

B. AITC A190.1 - American National Standard for Wood Products - Structural Glued Laminated Timber 2007.

C. ANSI A190.1 - Standard for Wood Products - Structural Glued Laminated Timber 2017.

D. ASTM A36/A36M - Standard Specification for Carbon Structural Steel 2014.

E. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products 2017.

F. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware 2016a.

G. ASTM A563 - Standard Specification for Carbon and Alloy Steel Nuts 2015.

H. ASTM A563M - Standard Specification for Carbon and Alloy Steel Nuts (Metric) 2007 (Reapproved 2013).

I. ASTM D2559 - Standard Specification for Adhesives for Bonded Structural Wood Products for Use Under Exterior Exposure Conditions 2012a (Reapproved 2018).

J. ASTM F3125/F3125M - Standard Specification for High Strength Structural Bolts and Assemblies, Steel and Alloy Steel, Heat Treated, Inch Dimensions 120 ksi and 150 ksi Minimum Tensile Strength, and Metric Dimensions 830 MPa and 1040 MPa Minimum Tensile Strength 2019.

K. AWPA U1 - Use Category System: User Specification for Treated Wood 2018.

L. AWS D1.1/D1.1M - Structural Welding Code - Steel 2020.

M. RIS (GR) - Standard Specifications for Grades of California Redwood Lumber 2019.

N. SPIB (GR) - Grading Rules 2014.

O. WCLIB (GR) - Standard Grading Rules for West Coast Lumber No. 17 2018.

P. WWPA G-5 - Western Lumber Grading Rules 2017.

1.03 QUALITY ASSURANCE

A. Designer Qualifications: Design structural members under direct supervision of a Professional Structural Engineer experienced in design of this work and licensed in the State in which the Project is located.

B. Manufacturer/Fabricator Qualifications: Company specializing in manufacture of glue laminated structural units with three years of documented experience, and certified by AITC in accordance with AITC A190.1.

1.04 DELIVERY, STORAGE, AND HANDLING

A. Protect members to AITC requirements for individually wrapped.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Glued-Laminated Structural Units:
   1. Approved Suppliers.
      a. BMC, West Jordan, UT. www.BuildWithBMC.com. Contact Dan Egelund:
         1) Office: (801) 224-0541.
         2) Mobile: (801) 376-2385.
         3) E-Mail: Dan.Egelundr@BuildWithBMC.com or www.BuildWithBMC.com.
      b. J. M. Thomas Forest Products, Ogden, UT. www.thomasforest.com. Contact Tom Karren:
         1) Office: (800) 962-8780.
         2) FAX: 801-782-9652.
         3) E-Mail: tom@thomasforest.com.
      c. Shelter Products, Inc., Portland, OR www.shelter-products.com. Contact Mike Running:
         1) Office: (800) 662-3612.
         2) Cell: NA.
         3) FAX: (503) 238-2663.
         4) E-Mail: mrunning@shelter-products.com.
      d. Substitutions: See Section 01 6000 - Product Requirements.

2.02 GLUED-LAMINATED UNITS

A. Glued-Laminated Units: Fabricate in accordance with AITC 117 Industrial grade.
   1. Verify dimensions and site conditions prior to fabrication.
   2. Cut and fit members accurately to length to achieve tight joint fit.
   3. Fabricate member with camber built in.
   4. Do not splice or join members in locations other than those indicated without permission.
   5. Fabricate steel hardware and connections with joints neatly fitted, welded, and ground smooth.
   6. Welding: Perform welding in accordance with AWS D1.1/D1.1M.
   7. After end trimming, seal with penetrating sealer in accordance with AITC requirements.

2.03 MATERIALS

A. Lumber: Softwood lumber complying with RIS (GR) grading rules with 12 percent maximum moisture content before fabrication. Design for the following values, unless noted otherwise on Contract Drawings:

B. Steel Connections and Brackets: ASTM A36/A36M weldable quality, galvanize per ASTM A123/A123M.

C. Anchor Bolts: ASTM F3125/F3125M, Type 1 heavy hex high strength bolts and ASTM A563 (ASTM A563M) nuts; hot-dip galvanized to meet requirements of ASTM A153/A153M, matching washers.

D. Laminating Adhesive: Tested for wet/exterior service in accordance with ASTM D2559.

E. Bearing Plate Anchors: Expansion shield and lag bolt type for anchorage to solid masonry or concrete.

2.04 WOOD TREATMENT

A. Factory-Treated Lumber: Comply with requirements of AWPA U1 - Use Category System for pressure impregnated wood treatments determined by use categories, expected service conditions, and specific applications.

B. Preservative Pressure Treatment:
   1. Preservative Pressure Treatment of Glued-Laminated Structural Units: AWPA U1, Use Category UC3B, Commodity Specification F using waterborne preservative to 0.25 lb/cu ft retention.
      a. Kiln dry lumber after treatment and before lamination to maximum moisture content of 19 percent.

2. Marking: Marked each piece with stamp of an ALSC-accredited testing agency, certifying level and type of treatment in accordance with AWPA standards.

2.05 FABRICATION

A. Fabricate glue laminated structural members in accordance with AITC Industrial grade. At locations exposed in public areas: Architectural Grade.

B. Fabricate beams in accordance with requirements of ANSI A190.1.

C. Camber beams to radius of 2000 ft unless shown otherwise on Contract Drawings.

D. Welding: Perform welding in accordance with AWS D1.1/D1.1M.

E. Verify dimensions and site conditions prior to fabrication.

F. Cut and fit members accurately to length to achieve tight joint fit.

G. Fabricate member with camber built in.

H. Do not splice or join members in locations other than those indicated without permission.

I. Fabricate steel hardware and connections with joints neatly fitted, welded, and ground smooth.

J. After end trimming, seal with penetrating sealer in accordance with AITC requirements.

K. Field Finishing of Members: Specified in Section 09 9113 and 09 9123.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that supports are ready to receive units.

B. Verify sufficient end bearing area.

3.02 PREPARATION

A. Coordinate placement of bearing items.

3.03 ERECTION

A. Lift members using protective straps to prevent visible damage.

B. Set structural members level and plumb, in correct positions or sloped where indicated.

C. Provide temporary bracing and anchorage to hold members in place until permanently secured.

D. Fit members together accurately without trimming, cutting, splicing, or other unauthorized modification.

E. Swab and seal the interior wood surfaces of field drilled holes in members with primer.

END OF SECTION

SECTION 06 2000
FINISH CARPENTRY

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Finish carpentry items.

B. Wood doors.

C. Hardware and attachment accessories.

1.02 RELATED REQUIREMENTS

A. Section 09 9113 - Exterior Painting: Painting of finish carpentry items.

B. Section 09 9123 - Interior Painting: Painting of finish carpentry items.

1.03 REFERENCE STANDARDS

A. AWI/AWMAC/WI (AWS) - Architectural Woodwork Standards 2014, with Errata (2018).

B. AWMAC/WI (NAAWS) - North American Architectural Woodwork Standards, U.S. Version 3.1 2017, with Errata (2019).

C. HPVA HP-1 - American National Standard for Hardwood and Decorative Plywood 2016.

1.04 ADMINISTRATIVE REQUIREMENTS

A. Coordinate the work with plumbing rough-in, electrical rough-in, and installation of associated and adjacent components.

B. Sequence installation to ensure utility connections are achieved in an orderly and expeditious manner.

1.05 SUBMITTALS

A. Product Data:
   1. Provide manufacturer's product data, color selection, storage and handling instructions for factory-fabricated units.
   2. Provide instructions for attachment hardware and finish hardware.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Protect from moisture damage.

PART 2 PRODUCTS

2.01 DESIGN CRITERIA

A. Design Criteria:
   1. General:
      a. AWS Custom Grade is minimum acceptable standard, except where explicitly specified otherwise, for materials, construction, and installation of architectural woodwork.
   2. Materials:
      a. Lumber:
         1) Grade:
            (a) No defects in boards smaller than 600 sq in.
            (b) One defect per additional 150 sq inches in larger boards.
            (c) Select pieces for uniformity of grain and color on exposed faces and edges.
            (d) No mineral grains accepted.
         2) Allowable Defects:
            (a) Tight knots not exceeding 1/8 inch in diameter. No loose knots permitted.
            (b) Patches (dutchmen) not apparent after finishing when viewed beyond 18 inches.

(c) Checks or splits not exceeding 1/32 inch by 3 inches and not visible after finishing when viewed beyond 18 inches.
(d) Stains, pitch pockets, streaks, worm holes, and other defects not mentioned are not permitted.
(e) Normal grain variations, such as cats eye, bird's eye, burl, curl, and cross grain are not considered defects.

3) Use maximum lengths possible, but not required to exceed 10 feet without joints. No joints shall occur closer than 72 inches in straight runs exceeding 18 feet. Runs between 18 feet and 10 feet may have no more than one joint. No joints shall occur within 72 inches of outside corners nor within 18 inches of inside corners.
4) Moisture content shall be six (6) percent maximum at fabrication. No opening of joints due to shrinkage is acceptable.

B. Fabrication:
1. Follow Architectural Woodwork Standards (AWS) for fabrication of Architectural Woodwork.
2. Tolerances:
a. No planer marks (KCPI) allowed. Sand wood members and surfaces with 100 grit or finer.
b. Maximum Gap: None allowed.
c. Flushness Variation: 0.015 inch maximum.
d. Sanding Cross Scratches: 1/4 inch maximum.
e. Plug screw holes. Screw locations not to be visible beyond 18 inches.
3. Fabricate work in accordance with measurements taken on job site.
4. 'Ease' sharp corners and edges of exposed members to promote finishing and protect users from slivers. Radius of 'easing' shall be uniform throughout Project and between 1/32 and 1/16 of an inch.
5. Fabricate so veneer grain is vertical.
6. Joints:
a. Use lumber pieces with similar grain pattern when joining end to end.
b. Compatibility of grain and color from lumber to panel products is required.
7. Install hardware in accordance with Manufacturer's directions. Leave operating hardware operating smoothly and quietly.
8. Remove or repair damaged surface of or defects in exposed finished surfaces of architectural woodwork to match adjacent similar undamaged surface.

2.02 FINISH CARPENTRY ITEMS

A. Quality Standard: Custom Grade, in accordance with AWI/AWMAC/WI (AWS), unless noted otherwise.

B. Interior Woodwork Items:
1. Moldings, Bases, Casings, and Miscellaneous Trim: Clear white pine; prepare for paint finish.
2. Wood trim at ceiling trim.

C. Wood Stair: Materials:
1. Treads:
a. 5/4 inch clear Douglas Fir or Southern Pine, or 1-1/8 inch thick high density particle board preformed stair tread.
b. Treads to have 1/2 inch radius at top outside edge.
2. Risers: 4/4 inch clear Douglas Fir or Southern Pine, or 3/4 inch plywood.

2.03 LUMBER MATERIALS

A. Interior Wood For Opaque, Painted Finish:
1. Solid wood doors
2. Ceiling trim, etc.

3. Solid wood shall be any species allowed by AWS Custom grade.

2.04 PLASTIC MATERIALS

A. Materials:
   1. Acrylic Solid Surface Window Stools:
      a. Design Criteria:
         1) Meet requirements of ANSI/ICPS SS-1.
      b. General:
         1) 1/2 inch thick 100 percent acrylic polymer.
      c. Approved Colors: As selected by Architect from Manufacturer's standard solid (white or off white only) colors.
         1) Glacier White by Corian.
         2) Bisque by Corian.
         3) Cameo White by Corian.
         4) Vanilla by Corian.

2.05 FASTENINGS

A. Adhesive for Purposes Other Than Laminate Installation: Suitable for the purpose; not containing formaldehyde or other volatile organic compounds.

2.06 HARDWARE

A. Manufacturer Contact List:
   1. Blum Inc, Stanley, NC www.blum.com.
   2. Bommer Industries, Landrum, SC www.bommer.com.
   3. ClosetMaid, a division of Emerson Electric, Ocala, Florida www.closetmaid.com
   4. CompX National, Mauldin, SC www.nclnet.com.
   5. Dow Chemical, Midland, MI www.dow.com.
   6. Flynn & Enslow, San Francisco, CA www.flynnenslow.com.
   7. Grass America Inc, Kernersville, NC www.grassusa.com.
   8. Hafele America Co., Archdale, NC hafele.com.
   9. Hillside Wire Cloth Co., Inc., Bloomfield, NJ www.hillsidewirecloth.com.
   10. Ives, Indianapolis, IN www.iveshardware.com.
   11. Knape & Vogt, Grand Rapids, MI www.knapeandvogt.com or Knape & Vogt Canada, Mississaugua, ON (905) 676-8972.
   12. Olympus Lock Co, Seattle, WA www.olympus-lock.com.
   13. Owens Corning, Toledo, OH www.owens-corning.com.
   14. Salice America Inc, Charlotte, NC www.saliceamerica.com.
   15. SOSS Door Hardware (Division of Universal Industrial Products Company) Pioneer OH www.soss.com.
   16. Stanley, New Britain, CT www.stanleyhardware.com or Oakville, ON (800) 441-1759.
   17. TWP Inc., Berkley, CA www.twpinc.com.
   18. Wire Cloth Manufacturers Inc., Mine Hill, NJ www.wireclothman.com.

B. Wardrobe Hooks (Coat and Hat Hooks) : 581 by Ives.

C. Shelf Brackets: 187WH extra heavy duty brackets by Knape & Vogt. Size according to shelf width, end of bracket to be within 2 inches (50 mm) of front edge of shelf.

2.07 FABRICATION

A. Shop assemble work for delivery to site, permitting passage through building openings.

B. When necessary to cut and fit on site, provide materials with ample allowance for cutting. Provide trim for scribing and site cutting.

C. Shelves:
   1. Design Criteria:
      a. Fabricate the work of this section to AWS ‘Custom Grade’.

b. Species as acceptable for AWS 'Custom Grade'.

2. Material:
   a. Panel Product:
      1) Glues (adhesives) used in manufacture and fabrication of panel products shall be Type I or II.
      2) Moisture content shall be same as specified for lumber.
      3) Cores:
         (a) All Other: Industrial grade particle board with minimum density of 45 lbs per cu ft.
      4) Facings:
         (a) All facings shall be Melamine or Kortron.
      5) Thickness:
         (a) 30 Inch Span And Less: 3/4 inch thick.
         (b) Spans Over 30 Inches To 42 Inches: One inch thick.
         (c) Spans Over 42 inches: One inch thick and provide equal center supports.
   b. Edgings:
      1) Use 3/4 inch Kortron or Melamine faced Panel Product with hot glued 3 mm thick PVC with eased edges. Apply banding on all four edges of adjustable shelving and on exposed edges of fixed shelving, with one-inch return onto unexposed edges.
      2) Edge banding color to match Panel Product.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify adequacy of backing and support framing.

B. Verify mechanical, electrical, and building items affecting work of this section are placed and ready to receive this work.

3.02 INSTALLATION

A. AWS Custom Grade is minimum acceptable standard, except where explicitly specified otherwise, for installation of architectural woodwork.

B. Install custom fabrications in accordance with AWI/AWMAC/WI (AWS) or AWMAC/WI (NAAWS) requirements for grade indicated.

C. Install hardware in accordance with manufacturer's written instructions.

3.03 INSTALLATION OF ACCESSORIES

A. Coat and Hat Hooks:
   1. Mount coat hook on Office side of Office doors in center of door, 54 inches from finish floor to top of hook base.

3.04 SITE APPLIED WOOD TREATMENT

A. Apply preservative treatment in accordance with manufacturer's instructions.

3.05 PREPARATION FOR SITE FINISHING

A. Set exposed fasteners. Apply wood filler in exposed fastener indentations. Sand work smooth.

B. Site Finishing: See Section 09 9113 and 09 9123.

C. Before installation, prime paint surfaces of items or assemblies to be in contact with cementitious materials.

3.06 TOLERANCES

A. Maximum Variation from True Position: 1/16 inch.

B. Maximum Offset from True Alignment with Abutting Materials: 1/32 inch.

END OF SECTION

SECTION 07 1113
BITUMINOUS DAMPPROOFING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Bituminous dampproofing.

1.02 SUBMITTALS

A. Product Data: Provide properties of primer, bitumen, and mastics.

B. Manufacturer's Installation Instructions: Indicate special procedures and perimeter conditions requiring special attention.

1.03 FIELD CONDITIONS

A. Maintain ambient temperatures above 40 degrees F for 24 hours before and during application until dampproofing has cured.

PART 2 PRODUCTS

2.01 BITUMINOUS DAMPPROOFING

A. Acceptable Products:
   1. Ecomul-11 by Epro Waterproofing Systems, Derby, KS www.eproserv.com.
   2. Henry 788 by Henry Company, El Segundo, CA www.henry.com.
   3. Karnak 100 by Karnak Chemical Corp, Clark, NJ www.karnakcorp.com.
   4. Sealmastic Asphalt Emulsion Dampproofing Type I by W R Meadows, Hampshire, IL www.wrmeadows.com.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify existing conditions are acceptable prior to starting this work.

B. Verify substrate surfaces are durable, free of matter detrimental to adhesion or application of dampproofing system.

C. Verify that items penetrating surfaces to receive dampproofing are securely installed.

3.02 PREPARATION

A. Protect adjacent surfaces not designated to receive dampproofing.

B. Clean and prepare surfaces to receive dampproofing in accordance with manufacturer's instructions.

C. Do not apply dampproofing to surfaces unacceptable to manufacturer.

D. Apply mastic to seal penetrations, small cracks, or minor honeycombs in substrate.

3.03 APPLICATION

A. Spray Application:
   1. Spray to a thickness of 10 mils (0.254 mm) minimum.

B. Brush / Roller Application:
   1. Apply two coats of dampproofing at rate recommended by Manufacturer.
   2. Apply coats in cross hatch method so coats are applied perpendicular to each other.
   3. Before applying second coat allow first coat to dry in accordance with Manufacturer's recommendations.

C. Prime surfaces in accordance with manufacturer's instructions.

D. Apply from 6 inches below finish grade elevation down to top of footings.

E. Seal items watertight with mastic, that project through dampproofing surface.

F. Do not backfill against bituminous dampproofing for twenty-four (24) hours after application.

END OF SECTION

SECTION 07 2100
THERMAL INSULATION

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Board insulation.

B. Batt insulation.

C. Batt insulation for filling perimeter window and door shim spaces and crevices in exterior wall and roof.

1.02 RELATED REQUIREMENTS

A. Section 07 2500 - Weather Barriers: Separate air barrier and vapor retarder materials.

1.03 REFERENCE STANDARDS

A. ASTM C578 - Standard Specification for Rigid, Cellular Polystyrene Thermal Insulation 2019.

B. ASTM C665 - Standard Specification for Mineral-Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing 2017.

C. ASTM C1289 - Standard Specification for Faced Rigid Cellular Polyisocyanurate Thermal Insulation Board 2019.

D. ASTM C764 - Standard Specification for Mineral Fiber Loose-Fill Thermal Insulation 2019.

E. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials 2020.

F. ASTM E136 - Standard Test Method for Assessing Combustibility of Materials Using a Vertical Tube Furnace at 750°C 2019a.

1.04 SUBMITTALS

A. Product Data: Provide data on product characteristics, performance criteria, and product limitations.

B. Manufacturer's Installation Instructions: Include information on special environmental conditions required for installation and installation techniques.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Thermal Insulation 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.

2.02 FOAM BOARD INSULATION MATERIALS

A. Type 2 Insulation:
   1. Extruded Polystyrene (XPS) Board Insulation: Complies with ASTM C578 with either natural skin or cut cell surfaces.
      a. Type and Compressive Resistance: Type X, 15 psi (104 kPa), minimum.
      b. Flame Spread Index (FSI): Class A - 0 to 25, when tested in accordance with ASTM E84.
      c. Smoke Developed Index (SDI): 450 or less, when tested in accordance with ASTM E84.

B. Type 1 & Type 3 Insulation:

1. Polyisocyanurate (ISO) Board Insulation: Rigid cellular foam, complying with ASTM C1289.
   a. Classifications:
      1) Type I: Faced with aluminum foil on both major surfaces of the core foam.
         (a) Class 2 - Glass fiber reinforced or non-reinforced core foam.
   b. Flame Spread Index (FSI): Class A - 0 to 25, when tested in accordance with ASTM E84.
   c. Smoke Developed Index (SDI): 450 or less, when tested in accordance with ASTM E84.
   d. Board Edges: Square.
   e. Manufacturers:
      1) (Type 3 Insulation) Dow Chemical Company; THERMAX (ci): www.dowbuildingsolutions.com/#sle.
         (a) Provide Weathermate flashing tape at all joints by Dow Chemical.
      2) (Type 3 Insulation) Dow Chemical Company THERMAX Heavy Duty: www.dowbuildingsolutions.com/#sle.

2.03 BATT INSULATION MATERIALS

A. Order insulation by 'R' value rather than 'U' value, rating, or thickness, either 16 or 24 inches wide according to framing spacing.

B. Where batt insulation is indicated, either glass fiber or mineral fiber batt insulation may be used, at Contractor's option.

C. Glass Fiber Batt Insulation: Flexible preformed batt or blanket, complying with ASTM C665; friction fit.
   1. Flame Spread Index: 25 or less, when tested in accordance with ASTM E84.
   2. Smoke Developed Index: 50 or less, when tested in accordance with ASTM E84.
   3. Combustibility: Non-combustible, when tested in accordance with ASTM E136, except for facing, if any.
   4. Thermal Resistance: R-value in accordance with the following:
      a. Acoustically Insulated Ceilings:
         1) Enclosed Spaces: Fill framed cavity with batt of appropriate thickness.
         2) Unenclosed Spaces: R-19.
         3) Unenclosed Spaces above Offices and Restrooms: R-30.
      b. Thermally Insulated Ceilings / Roof:
         1) R-38 Standard: All Other. (R-49).
      c. Wood Wall Stud Framing:
         1) (R-11) 3-1/2 inches deep
         2) (R-19) 5-1/2 inches deep
         3) (R-25) 7-1/4 inches deep
         4) (R-30) 9-1/4 inches deep
         5) (R-38) 11-1/4 inches deep.
   5. Kraft faced meeting requirements of ASTM C665, Type II, Class C.
   6. Foil faced meeting requirements of ASTM C665, Type III.
      a. Class A: Exposed insulation.
      b. Class B: Enclosed insulation.
   7. Unfaced Insulation: Meet requirements of ASTM C665, Type I.
   8. Support at trussed rafters:
      a. Provide support at trussed rafters where insulation is not enclosed by structure or drywall.
      b. Provide stings/wires which run perpendicular to framing and attach at each trussed rafter and to framing at 32 inches O.C. minimum and where batt ends adjoin each other.

c. Class Two Quality Standard: Simpson Strong Tie IS Insulation Supports with 14 gauge carbon steel, spring wire and mitered tips for 16 inch O.C. and 24 inch O.C. spacing.

2.04 BLOWN INSULATION

A. Blown Insulation: Fiber glass. Comply with requirements of ASTM C764, Type I or II, non-combustible when tested in accordance with ASTM E136.

B. 'R' Factor Required:
1. Order insulation by 'R' factor rather than 'U' factor, rating, or thickness.
a. Unenclosed Spaces: Fill framed cavity with appropriate thickness.

2.05 ACCESSORIES

A. Sheet Vapor Retarder: Specified in Section 07 2500.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that substrate, adjacent materials, and insulation materials are dry and that substrates are ready to receive insulation.

B. Verification Of Conditions:
1. Inspection:
a. Examine substrate and verify framing is suitable for installation of insulation:
b. Verify that mechanical and electrical services have been installed and tested.
c. Notify Architect of unsuitable conditions in writing.
d. Do not install insulation over unsuitable conditions:
1) Commencement of Work by installer is considered acceptance of substrate.

3.02 BOARD INSTALLATION AT EXTERIOR WALLS

A. Type 3 Insulation:
1. Following Manufacturer Installation Instructions including the following:
a. Butt adjoining boards tightly together with all seams vertical.
b. Tape seams with Manufacturer’s white foil tape to cover joints and seams between boards of insulation. Match tape color to board color.
c. Notch around wall members and other obstructions as closely as possible and seal with sealant.

B. Rigid thermal insulation board is not a structural panel and may not be used as nailing base for other building products.

3.03 BATT INSTALLATION

A. Install insulation and vapor retarder in accordance with manufacturer's instructions.

B. If two layers of insulation are used to attain required 'R' value, only layer towards interior of building shall have facing.

C. Provide minimum clearance around recessed lighting fixtures as approved by local code.

D. Install in exterior wall and roof spaces without gaps or voids. Do not compress insulation.

E. Trim insulation neatly to fit spaces. Insulate miscellaneous gaps and voids.

F. Fit insulation tightly in cavities and tightly to exterior side of mechanical and electrical services within the plane of the insulation.

G. Install with factory-applied vapor retarder membrane facing warm side of building spaces. Lap ends and side flanges of membrane over framing members.

H. Staple or nail facing flanges in place at maximum 6 inches on center.

I. Retain insulation batts in place with spindle fasteners at 12 inches on center.

J. Tape seal butt ends, lapped flanges, and tears or cuts in membrane.

K. At wood framing, place vapor retarder on warm side of insulation by stapling at 6 inches on center. Lap and seal sheet retarder joints over member face.

L. Tape seal tears or cuts in vapor retarder.

M. Extend vapor retarder tightly to full perimeter of adjacent window and door frames and other items interrupting the plane of the membrane. Tape seal in place.

N. Coordinate work of this section with requirements for vapor retarder specified in Section 07 2500.

O. Coordinate work of this section with construction of air barrier seal specified in Section 07 2500.

P. Where insulation is not enclosed by structure or drywall, support in place with wire or other suitable material as approved by Architect before bid.

3.04 BLOWN INSULATION INSTALLATION

A. General:
   1. Install in accordance with manufacturer's instructions.
   2. Install in insulation in sufficient depth to provide thermal value specified after settlement of insulation.
   3. Do not blow insulation into electrical devices and vents.
   4. Provide minimum clearance around recessed lighting fixtures as approved by local code.

3.05 FIELD QUALITY CONTROL

A. See Section 01 4000 - Quality Requirements, for additional requirements.

B. Field Tests And Inspections:
   1. Upon completion of installation, visually inspect each insulated area and verify that all insulation is complete and properly installed.

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

3.06 PROTECTION

A. Do not permit installed insulation to be damaged prior to its concealment.

END OF SECTION

SECTION 07 2400
EXTERIOR INSULATION AND FINISH SYSTEMS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Composite wall and soffit cladding of rigid insulation and reinforced finish coating (Class PB).

B. Composite wall and soffit cladding of rigid insulation and reinforced finish coating over cementitious base coat (Class PM).

C. Drainage and water-resistive barriers behind insulation board.

D. Incidental uses of same finish coating applied directly to concrete and masonry.

1.02 REFERENCE STANDARDS

A. ANSI/FM 4880 - Evaluating the Fire Performance of Insulated Building Panel Assemblies and Interior Finish Materials 2017.

B. ASTM C150/C150M - Standard Specification for Portland Cement 2020.

C. ASTM C578 - Standard Specification for Rigid, Cellular Polystyrene Thermal Insulation 2019.

D. ASTM C1063 - Standard Specification for Installation of Lathing and Furring to Receive Interior and Exterior Portland Cement-Based Plaster 2019a.

E. ASTM C1382 - Standard Test Method for Determining Tensile Adhesion Properties of Sealants When Used in Exterior Insulation and Finish Systems (EIFS) Joints 2016.

F. ASTM C1397 - Standard Practice for Application of Class PB Exterior Insulation and Finish Systems (EIFS) and EIFS with Drainage 2013 (Reapproved 2019).

G. ASTM E2570/E2570M - Standard Test Methods for Evaluating Water-Resistive Barrier (WRB) Coatings Used under Exterior Insulation and Finish Systems (EIFS) or EIFS with Drainage 2007, with Editorial Revision (2014).

H. ASTM E330/E330M - Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference 2014.

I. ASTM E2273 - Standard Test Method for Determining the Drainage Efficiency of Exterior Insulation and Finish Systems (EIFS) Clad Wall Assemblies 2018.

J. ASTM E2486/E2486M - Standard Test Method for Impact Resistance of Class PB and PI Exterior Insulation and Finish Systems (EIFS) 2013 (Reapproved 2018).

K. ICC-ES AC212 - Acceptance Criteria for Water-Resistive Coatings Used as Water-Resistive Barriers over Exterior Sheathing 2015.

L. ICC-ES AC219 - Acceptance Criteria for Exterior Insulation and Finish Systems 2009, with Editorial Revision (2014).

M. ICC-ES AC235 - Acceptance Criteria for EIFS Clad Drainage Wall Assemblies 2009, with Editorial Revision (2012).

N. ISO 9001 - Quality management systems -- Requirements 2015.

1.03 SUBMITTALS

A. Product Data: Provide data on system materials, product characteristics, performance criteria, and system limitations.

B. Shop Drawings: Indicate wall joint patterns, joint details, and molding profiles.
   1. Provide Manufacturer's details and recommended sealant application and details for flashing of drainage EIFS assembly.
   2. Show wall layout, connections, details, expansion joints and installation sequence.

C. Selection Samples: Submit manufacturer's standard range of samples illustrating available coating colors and textures.

D. Verification Samples: Submit actual samples of selected coating on specified substrate, minimum 12 inches square, illustrating project colors and textures.

E. Manufacturer's Installation Instructions: Indicate preparation required, installation techniques, and jointing requirements.

F. Closeout Submittals:
   1. Include following in Operations And Maintenance Manual specified in Section 01 7800:
      a. Operations and Maintenance Data:
         1) Maintenance, cleaning, and repair instructions.
      b. Warranty Documentation:
         1) Final, executed copy of Warranty.
      c. Record Documentation:
         1) Manufacturers documentation:
            (a) Manufacturer's literature.
            (b) Color selection.
            (c) Shop Drawings.

1.04 QUALITY ASSURANCE

A. Maintain copy of specified installation standard and manufacturer's installation instructions at project site during installation.

B. EIFS Manufacturer Qualifications: Provide EIFS products other than insulation from the same manufacturer with qualifications as follows:
   1. Member in good standing of EIMA (EIFS Industry Members Association).
   2. Manufacturer of EIFS products for not less than 5 years.
   3. Manufacturing facilities ISO 9001 certified.

C. Insulation Manufacturer Qualifications: Approved by manufacturer of EIFS and approved and labeled under third party quality program as required by applicable building code.

D. Installer shall be experienced and competent in installation EIFS systems and have performed at least ten (10) installations of similar size, scope, and complexity in each of the past five (5) years and be approved and listed applicator by EIFS Manufacturer.

E. Single Source Responsibility: All EIFS materials shall be from a single manufacturing source, or listed as an approved source.

F. Pre-Installation Conferences:
   1. Participate in MANDATORY pre-installation conference.
   2. Schedule meeting for after installation of foam and reinforcing mesh, but before flashing of openings.
   3. In addition to agenda items specified in Section 01 3100, review following:
      a. During Conference, apply flashing at one window and associated back-wrapping at same location. Examine foam and reinforcing installation as well.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Delivery: Deliver materials to project site in manufacturer's original, unopened containers with labels intact. Inspect materials and notify manufacturer of any discrepancies.

B. Storage: Store materials as directed by manufacturer's written instructions.
   1. Protect adhesives and finish materials from freezing, temperatures below 40 degrees F and temperatures in excess of 90 degrees F.
   2. Protect Portland cement based materials from moisture and humidity. Store under cover off the ground in a dry location.
   3. Protect insulation materials from exposure to sunlight.
   4. Stack insulation board flat, fully supported off the ground.

1.06 FIELD CONDITIONS

A. Do not prepare materials or apply EIFS under conditions other than those described in the manufacturer's written instructions.

B. Do not prepare materials or apply EIFS during inclement weather unless areas of installation are protected. Protect installed EIFS areas from inclement weather until dry.

C. Do not install coatings or sealants when ambient temperature is below 40 degrees F.

D. Do not leave installed insulation board exposed to sunlight for extended periods of time.

1.07 WARRANTY

A. Provide manufacturer's standard material warranty, covering a period of not less than 10 years.

B. Provide separate warranty from installer covering labor for repairs or replacement for a period of not less than 5 years.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Quality Standard. See Section 01 6000.
   1. BASF Senergy Senerflex Channeled Adhesive Design.
   2. Dryvit Outsulation Plus MD.
   3. Parex Standard Water Master Drainage.
   4. Master Wall Rollershield Drainage System.

B. Approved Manufacturers:
   1. BASF Wall Systems, Jacksonville, FL www.senergy.basf.com.
   2. Dryvit, West Warwick, RI www.dryvit.com.
   3. Master Wall Inc, Midland, GA www.masterwall.com.
   4. Parex, Anaheim, CA www.parex.com.
   5. STO Finish Systems Div, Atlanta, GA www.stocorp.com.

2.02 EXTERIOR INSULATION AND FINISH SYSTEM

A. Description:
   1. Drainage type Exterior Insulation and Finish System (EIFS) consisting of Adhesive to create drainage planes, Expanded Polystyrene Insulation (EPS) Board, Base Coat with embedded Reinforcing Fabric Mesh, and Finish Coat. System is installed over drainage track or back wrapped weep holes and applied over glass mat gypsum sheathing or wall sheathing.
   2. Style / pattern / color as selected by Architect or Owner’s Representative.

B. Design Criteria:
   1. EIFS shall be constructed such that it meets performance characteristics required in ASTM E2568.
   2. System to meet the performance and testing requirements of the International Code Council (ICC) Acceptance Criteria ICC-ES AC212 and ICC-ES AC235.
   3. Design Wind loads:
      a. Withstand positive and negative wind loads as specified by Building Code and tested by ASTM E330/E330M.
   4. Drainage Medium to comply with requirements of ASTM E2273.
   5. Substrate Systems:
      a. Engineered to withstand applicable design loads as required by IBC Chapter 16 including required safety factor.
      b. Maximum deflection of substrate system under positive or negative design loads shall not exceed L/240 of span except as otherwise approved in writing by EIFS manufacturer prior to installation.
      c. Substrate dimensional tolerance: Flat within 1/4 inch (6.4 mm) in any 4 feet (1.2 m) radius.
      d. Surface irregularities: Sheathing not over 1/8 inch (3 mm); masonry not over 3/16 inch (4.76 mm).

6. Impact Resistance Classification: EIFS shall be classified in accordance with ASTM E2486/E2486M classification and impact ranges as follows:
    a. Standard Impact Resistance:
        1) Impact Range: 25-49 in-lbs (2.8 - 5.6 J).
        2) Minimum Tensile Strength: 150 lbs/in (27 g/cm).
7. Insulation Board: Meet requirements of ASTM C578, nominal 1 lb per cu ft (16 kg per cu m) aged expanded polystyrene by EIFS Manufacturer.
8. Portland Cement: Shall be Type I or II, meeting ASTM C150/C150M, white or gray in color, fresh and free of lumps.
9. Weather Resistance:
    a. EIFS with drainage shall have an average minimum drainage efficiency of ninety (90) percent when tested in accordance of requirements of ASTM E2273.
    b. Water-resistive barrier shall comply with IBC Section 1404.2 or ASTM E2570/E2570M.

2.03 MATERIALS

A. General:
1. Acceptable substrate:
    a. Gypsum Sheathing: See Section 09 92116: ‘Gypsum Board Assemblies’.
    b. Oriented Strand Board (OSB): See Section 06 1000: ‘Rough Carpentry’.
    c. Plywood: See Section 06 1636: ‘Wood Panel Product Sheathing’.
2. The configuration of the water resistive barrier, drainage plane and flashing and EIFS materials, must allow for the egress of incidental moisture.
3. Inclined surfaces shall follow the guidelines listed below:
    a. Minimum slope: 6 inch (152 mm) of vertical rise in 12 inches (305 mm) of horizontal run.
    b. For sloped surfaces, run of slope shall be a maximum of 12 inches (305 mm).
    c. Usage not meeting above criteria shall be approved by EIFS Manufacturer prior to installation.
4. Building interior shall be separated from insulation board by 1/2 inch (12.7 mm) of gypsum board or equivalent fifteen (15) minute thermal barrier.

B. Base Coat:
1. Manufacturer's standard.

C. Drainage Track:
1. Standard of EIFS Manufacturer.

D. Finish Coat:
1. One hundred (100) percent acrylic, factory-mixed, elastomeric, flexible coating with integral color and texture.

E. Liquid Applied Water Resistive Barrier:
1. Apply liquid applied water resistive barrier over all seams of sheathing and embed sheathing tape.
2. Then spray or roll apply additional liquid applied water resistive barrier over all sheathings and substrates in number of coats and constancy as per Manufacturer’s requirements and recommendations to achieve coverages as required.

F. Insulation Board:
1. At system termination, completely encapsulate insulation board edges by mesh reinforced base coat, substrate or drainage track (limited to terminations at foundation).
2. Maximum thickness of insulation board shall be in accordance with applicable building codes and EIFS manufacturer requirements.

G. Insulation Board Adhesive: Standard of EIFS Manufacturer.

2.04 ACCESSORY MATERIALS

A. Flashing:

1. Flashing shall be continuous and watertight.
2. Flashing shall be designed and installed to prevent water infiltration behind the EIFS.

B. Expansion Joints: Continuous expansion joints shall be installed at the following locations in accordance with Manufacturer's recommendations:
   1. At building expansion joints.
   2. At substrate expansion joints.
   3. At floor lines in wood frame construction.
   4. Where EIFS panels abut one another.
   5. Where EIFS abuts other materials.
   6. Where significant structural movement occurs, such as the following:
      a. Changes in roof line.
      b. Changes in building shape and/or structural system.
      c. Where substrate changes.
   7. Substrate movement and expansion and contraction of EIFS and adjacent materials shall be taken into account in design of expansion joints, with proper consideration given to sealant properties, installation conditions, temperature range, coefficients of expansion of materials, joint width to depth ratios, and other material factors. Minimum width of expansion joints shall be as follows:
      a. 1/2 inch (12.7 mm) where EIFS abuts other materials.
      b. 3/4 inch (19 mm) EIFS abuts the EIFS.

C. Mechanical Fasteners:
   1. Masonry:
      a. Type M expansion fastener with 1-1/2 inch (38 mm) diameter washer and one inch (25 mm) minimum penetration into masonry.
   2. Steel Framing, 20 ga (0.91 mm) And Thinner:
      a. Type S self-tapping bugle head screws with 1-1/2 inch (38 mm) diameter washer and 5/8 inch (15.9 mm) minimum penetration into framing.
   3. Steel Framing, Thicker Than 20 ga (0.91 mm):
      a. Type S-12 self-tapping bugle head screws with 1-1/2 inch (38 mm) diameter washer and 5/8 inch (15.9 mm) minimum penetration into framing.
   4. Wood Framing:
      a. Type W bugle head screws with 1-1/2 inch (38 mm) diameter washer and 5/8 inch (15.9 mm) minimum penetration into framing.

D. Reinforcing Mesh:
   1. Standard Mesh: Balanced, open weave treated glass fiber mesh by EIFS Manufacturer, 4 oz per sq yd (135 g per sq m) minimum weight.
   2. High Strength Mesh: A balanced, open weave treated glass fiber mesh by EIFS Manufacturer made for high impact areas, 20 oz per sq yd (678 g per sq m) minimum.

E. Sealants:
   1. Quality Standard. See Section 01 6000:
      a. Silicone by Dow or GE as acceptable to EIFS Manufacturer.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that substrate is sound and free of oil, dirt, other surface contaminants, efflorescence, loose materials, or protrusions that could interfere with EIFS installation and is of a type and construction that is acceptable to EIFS manufacturer. Do not begin work until substrate and adjacent materials are complete and thoroughly dry.

B. Verify that step flashing and roof diverters have been installed properly for 'roof to wall'

C. Notify Architect of unsuitable conditions in writing.
   1. Do not install material over unsuitable conditions.

D. Commencement of Work by installer is considered acceptance of substrate.

3.02 PREPARATION

A. Install self-furring metal lath over solid substrates that are deemed unacceptable to receive adhesively applied insulation. Install in accordance with ASTM C1063, except for butt-lapping instead of overlapping.

B. Protect adjoining work and property during installation.

C. Clean surfaces thoroughly prior to installation.

D. Prepare substrate to be free of foreign materials, such as oil, dust, dirt, form-release agents, efflorescence, paint, wax, water repellants, moisture, frost, and any other condition that may inhibit adhesion using methods recommended by the Manufacturer for achieving best results.

E. Application of wet materials shall not take place during inclement weather unless appropriate protection is provided. Protect materials from inclement weather until they are completely dry.

3.03 INSTALLATION - GENERAL

A. Install in accordance with EIFS manufacturer's instructions and ASTM C1397.
   1. Where different requirements appear in either document, comply with the most stringent.
   2. Neither of these documents supersedes provisions of Contract Documents that defines contractual relationships between parties or scope of this work.

B. Liquid Applied Water Resistive Barrier:
   1. Verify substrate is dry, clean, sound, and free of releasing agents, paint, or other coatings prior to installation of fluid applied water resistive barrier.
   2. Apply reinforcing mesh to all existing holes, seams and chipped areas.
   3. Once first coat of holes, seams and chipped areas are covered with reinforcing mesh and fluid applied water resistive barrier is applied, apply new coat over entire existing sheathing surface.

C. Insulation Board:
   1. Follow Manufacturer’s written instruction for installation of Insulation Board.
   2. Apply insulation board horizontally in running bond pattern with joints staggered in relation to substrate joints and staggered and interlocked at corners.
   3. Attach board to substrate with mechanical fasteners where required by EIFS Manufacturer.
   4. Sand high spots to create smooth surface.

D. Base Coat And Reinforcing:
   1. Apply base coat to insulation board on fascia, soffit, and wall areas below level of lower eaves.

E. Embed one (1) layer of high strength mesh with edges abutted and material smoothed out until completely embedded in adhesive. Allow twenty-four (24) hours to cure.
   1. Apply base coat over cured, reinforced base coat and remaining exposed insulation board.

F. Embed one (1) layer of standard reinforcing mesh overlapping edges 2-1/2 inches (63 mm) minimum. Smooth out material until completely embedded and allow to cure for twenty-four (24) hours.
   1. Apply base coat to all exposed insulation board. Embed one (1) layer of high strength mesh with edges abutted and material smoothed out until completely embedded in adhesive. Allow to cure for twenty-four (24) hours.
   2. Apply base coat over cured, reinforced base coat. Embed one (1) layer of standard reinforcing mesh overlapping edges 2-1/2 inches (63 mm) minimum. Smooth out material until completely embedded and allow twenty-four (24) hours to cure.

G. Finish Coat:
   1. Correct surface irregularities, such as trowel marks and board lines.
   2. Apply finish coat with stainless steel trowel using sufficient manpower and equipment to insure continuous wet edge to prevent cold joint, scaffolding lines, etc. Same type of

equipment and techniques shall be used by all applicators. Finish shall closely match samples prepared for Architect.

H. Apply sealants as required by EIFS Manufacturer.

3.04 TOLERANCES

A. Deflection of the substrate systems shall not exceed L/240 times the span.

B. Substrate shall be flat within 1/4 inch (6.4 mm) in 4 feet (1.2 m) radius.

3.05 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. Roof To Wall:
      a. Non-conforming work includes required 2 inch (50 mm) minimum spacing above roofing.
   2. Correct any work found defective or not complying with contract document requirements at no additional cost to the Owner.

3.06 CLEANING

A. Clean EIFS surfaces and work areas of foreign materials resulting from EIFS operations.

3.07 PROTECTION

A. Protect completed work from damage and soiling by subsequent work.

END OF SECTION

SECTION 07 2500
WEATHER BARRIERS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Vapor Retarders: Materials to make exterior walls, joints between exterior walls and roof, joints around frames of openings in exterior walls, water vapor resistant and air tight.

1.02 QUALITY ASSURANCE

A. Air Barrier Association of America (ABAA) Evaluated Materials Program (EAP); www.airbarrier.org/#sle: Use evaluated materials from a single manufacturer regularly engaged in air barrier material manufacture, and use secondary materials approved in writing by primary material manufacturer.

1.03 FIELD CONDITIONS

A. Maintain temperature and humidity recommended by the materials manufacturers before, during and after installation.

PART 2 PRODUCTS

2.01 AIR BARRIER MATERIALS (WATER VAPOR PERMEABLE AND WATER-RESISTIVE)

A. Air Barrier Sheet, Mechanically Fastened:
   1. Approved Products. See Section 01 6000:
      a. Styrofoam Weathermate Plus by Dow, Chemical Co, Midland, MI www.dow.com
      b. Tyvek HomeWrap by Du Pont Company, Wilmington, DE www.dupont.com
      c. DriShield Housewrap by Protecto Wrap, Denver, CO www.protectowrap.com
      d. Fortress Pro by Raven Industries, Sioux Falls, SD www.ravenind.com
      e. Typar Housewrap by Fiberweb, Old Hickory, TN www.typar.com.
   2. Materials:
      a. Air Retarder:
         1) Non-woven.
         2) Meet requirements of ASTM E1677, Type I.
      b. Sealing Tape:
         1) Acceptable Products:
            (a) DuPont Contractor Tape.
            (b) Fortress Pro Seaming Tape.
            (c) Typar Construction Tape.
            (d) 3M Contractor Sheathing Tape.
            (e) Protecto Wrap BT25 XL Window Sealing Tape.
            (f) As recommended in writing by Air Retarder Manufacturer.
      c. Fasteners:
         1) Approved Products.
            (a) Metal Framing: Corrosion resistant, self-tapping screws and plastic washers or Tyvek Wrap Caps. Screws to be 3/4 inch (19 mm) long minimum and washers one inch (25 mm) diameter.
            (b) Wood Framing: Corrosion resistant roofing nails with 3/4 inch (19 mm) long shank minimum and one inch (25 mm) diameter plastic head or Tyvek Wrap Caps. Staples are only allowed to aid in installation with permanent fasteners installed immediately thereafter.

2.02 ACCESSORIES

A. Sealants, Tapes, and Accessories for Sealing Weather Barrier and Sealing Weather Barrier to Adjacent Substrates: As specified or as recommended by weather barrier manufacturer.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that surfaces and conditions are ready to accept the work of this section.

3.02 PREPARATION

A. Remove projections, protruding fasteners, and loose or foreign matter that might interfere with proper installation.

B. Clean and prime substrate surfaces to receive adhesives in accordance with manufacturer's instructions.

3.03 INSTALLATION

A. Install materials in accordance with manufacturer's instructions.

B. Air Barriers: Install continuous airtight barrier over surfaces indicated, with sealed seams and with sealed joints to adjacent surfaces.

C. Vapor Retarders: Install continuous airtight barrier over surfaces indicated, with sealed seams and with sealed joints to adjacent surfaces.

D. Apply sealants and adhesives within recommended application temperature ranges. Consult manufacturer if temperature is out of this range.

E. Mechanically Fastened Sheets - On Exterior:
   1. Install sheets shingle-fashion to shed water, with seams generally horizontal.
   2. Overlap seams as recommended by manufacturer but at least 6 inches.
   3. Overlap at outside and inside corners as recommended by manufacturer but at least 12 inches.
   4. Attach to framed construction with fasteners extending through sheathing into framing. Space fasteners at 12 to 18 inches on center along each framing member supporting sheathing.
   5. Attach to masonry construction using mechanical fasteners spaced at 12 to 18 inches on center vertically and maximum 24 inches on center horizontally.
   6. For applications specified to be airtight, seal seams, laps, penetrations, tears, and cuts with self-adhesive tape; use only large-headed, gasketed fasteners recommended by the manufacturer.
   7. Install water-resistive barrier over jamb flashings.
   8. Install air barrier and vapor retarder underneath the jamb flashings.
   9. Install head flashings under weather barrier.
   10. At openings to be filled with frames having nailing flanges, wrap excess sheet into opening; at head, seal sheet over flange and flashing.

F. Mechanically Fastened Sheets - Vapor Retarder On Interior:
   1. When insulation is to be installed in assembly, install vapor retarder over insulation.
   2. Installation as Air Barrier System:
      a. Roof/Attic/Ceiling Applications:
         1) Staple to bottom of ceiling joists as recommended by Manufacturer.
         2) Seal retarder to interior and exterior wall top plates using recommended sealants.
         3) Fasten retarder through sealant to plates as recommended by Manufacturer.
         4) Allow retarder to overlap at corners as recommended by Manufacturer.
      b. Exterior Wall Applications:
         1) Install wall application as recommended by Manufacturer.
         2) Apply recommended sealant over ceiling overlapped retarder material at top plate, to frame around window and door rough openings and to bottom plate as recommended by Manufacturer to ensure an air-tight assembly.
      c. Acoustical and Sealant Application at Sheet Terminations:
         1) Install sealants as recommended by Manufacturer to ensure an air-tight assembly.
      d. Lapped Joint Treatment:
         1) Apply recommended sealant to wood stud surface.

2) Overlap and as recommended by Manufacturer.
3) Seal overlapped joint using recommended sheathing tape.
4) All vertical and horizontal seams should be treated as described above.

e. Penetrations:
1) Building envelope penetrations include windows, doors, electrical outlets, gas lines, plumbing, etc:
(a) Cut and fit sheeting tightly around penetrations as recommended by Manufacturer.
(b) Seal retarder around all electrical, HVAC and plumbing penetrations with recommended sealants or sheathing tapes.

f. Window and Door Treatment:
1) Cut sheeting to fit rough opening as recommended by Manufacturer.
2) Apply recommended sealant between retarder and window frame.
3) Attach through sealant to window head, jambs and sill. Seal window to rough opening with recommended sealant.
4) Apply recommended sealant between interior finishing material and attached sheeting.

g. Sheet Tears and Holes:
1) Cover all tears and holes with recommended sheathing tape.
2) Treat large holes (greater than 1 inch (25 mm)) like large penetrations using square patch.

h. Electrical Outlets:
1) Wrap and seal electrical boxes using recommended sheathing tapes and sealants.
2) Airtight plastic boxes are recommended.

i. Plumbing Penetrations:
1) Secure plumbing lines to rigid mounting panel.
2) Seal penetrations using recommended sealants.
3) Attach sheeting to mounting panel using recommended sealants.

j. Air Barrier System Continuity:
1) Install as continuous interior air barrier system:
(a) Maintain air barrier system continuity at wall, ceiling, floor and foundation intersections. Use recommended sealants. Seal between framing and retarder overlaps.
(b) Coordinate installation details with framing and insulation trade contractors.

3. Fasteners:
a. Fasteners as approved by Manufacturer:
1) Following recommendations for type, size, spacing and installation methods.
2) To resist wind forces, fastened to supporting structure and supported by gypsum wallboard on one side and insulation on other.

4. Seal penetrations through vapor retarder immediately before installation of gypsum board.

G. Openings and Penetrations in Exterior Weather Barriers:
1. Install flashing over sills, covering entire sill frame member, extending at least 5 inches onto weather barrier and at least 6 inches up jambs; mechanically fasten stretched edges.
2. At openings to be filled with frames having nailing flanges, seal head and jamb flanges using a continuous bead of sealant compressed by flange and cover flanges with sealing tape at least 4 inches wide; do not seal sill flange.
3. At openings to be filled with non-flanged frames, seal weather barrier to each side of opening framing, using flashing at least 9 inches wide, covering entire depth of framing.
4. At head of openings, install flashing under weather barrier extending at least 2 inches beyond face of jambs; seal weather barrier to flashing.
5. At interior face of openings, seal gap between window/door frame and rough framing, using joint sealant over backer rod.

6. Service and Other Penetrations: Form flashing around penetrating item and seal to weather barrier surface.

3.04 FIELD QUALITY CONTROL

A. Vapor retarder is to be airtight and free from holes, tears, and punctures.
   1. Immediately before installation of gypsum board, inspect vapor retarder for holes, tears, and punctures and repair damaged areas.
   2. Immediately before completion of Project, inspect exposed vapor retarder for holes, tears, and punctures and repair damaged areas.

B. Do not cover installed weather barriers until required inspections have been completed.

C. Take digital photographs of each portion of the installation prior to covering up.

3.05 PROTECTION

A. Do not leave materials exposed to weather longer than recommended by manufacturer.

END OF SECTION

SECTION 07 6200
SHEET METAL FLASHING AND TRIM

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Fabricated sheet metal items, including flashings, counterflashing's, gutters, downspouts, exterior penetrations, and other items indicated in Schedule.

B. Sealants for joints within sheet metal fabrications.

1.02 DEFINITIONS

A. Base Flashing: That portion of flashing attached to or resting on roof deck to direct flow of water onto the roof covering.

B. Cap Flashing: Material used to cover top edge of base flashings or other flashings to prevent water seepage behind base flashing. Cap flashing overlaps base flashing.

C. Collar: Pre-formed flange placed over vent pipe to seal roof around vent pipe opening. Also called vent sleeve.

D. Drip Edge: Non-corrosive, non-staining material used along eaves and rakes to allow water runoff to drip clear of underlying building.

E. Flange: Metal pan extending up and down roof slope around flashing pieces. Usually at plumbing vents.

F. Flashing: Components used to prevent seepage of water into a building around any intersection or projection in a roof such as vent pipes, adjoining walls, and valleys.

G. Metal Flashing: Roof components made from sheet metal that are used to terminate roofing membrane or other material alongside roof perimeters as well as at roof penetrations.

H. Penetration: Any object that pierces surface of roof.

I. Pipe Boot: Prefabricated flashing piece used to flash around circular pipe penetrations. Also known as a Roof Jack.

J. Roof Jack: Term used to describe a Pipe Boot or Flashing Collar.

K. Valley: Internal angle formed by intersection of two sloping roof planes to provide water runoff.

L. Vent: Any outlet for air that protrudes through roof deck such as pipe or stack. Any device installed on roof, gable or soffit for purpose of ventilating underside of roof deck.

M. Vent Sleeve: See collar.

1.03 REFERENCE STANDARDS

A. AAMA 2605 - Voluntary Specification, Performance Requirements and Test Procedures for Superior Performing Organic Coatings on Aluminum Extrusions and Panels (with Coil Coating Appendix) 2017a.

B. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process 2020.

C. ASTM A792/A792M - Standard Specification for Steel Sheet, 55% Aluminum-Zinc Alloy-Coated by the Hot-Dip Process 2010 (Reapproved 2015).

D. ASTM B209 - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate 2014.

E. ASTM C920 - Standard Specification for Elastomeric Joint Sealants 2018.

F. ASTM D4586/D4586M - Standard Specification for Asphalt Roof Cement, Asbestos-Free 2007 (Reapproved 2018).

1.04 DELIVERY, STORAGE, AND HANDLING

A. Stack material to prevent twisting, bending, and abrasion, and to provide ventilation. Slope metal sheets to ensure drainage.

B. Prevent contact with materials that could cause discoloration or staining.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Galvanized Sheet Metal Flashing and Trim Manufacturers:
   1. Acceptable Manufacturers Of Metal:
      a. CMG - Coated Metals Group, Denver, CO www.cmgmetals.com.
      b. Drexel Metals, LLC, Ivyland, PA www.drexmet.com.
      c. Fabral, Lancaster, PA www.fabral.com.
      d. Firestone Metal Products, Anoka, MN www.unaclad.com.
      e. MBCI, Houston, TX www.mbci.com.
      f. Metal Sales Manufacturing Corp, Sellersburg, IN www.mtlsales.com.
      g. O'Neal Flat Rolled Metals (member of O'Neal Industries), Brighton, CO www.ofrmetals.com.
      h. Petersen Aluminum Corp, Elk Grove, IL www.pac-clad.com.
      i. Ryerson, Chicago, IL www.ryerson.com.

2.02 SHEET MATERIALS

A. Galvanized Steel: ASTM A653/A653M, with G90/Z275 zinc coating; minimum 24 gauge, (0.0239 inch) thick base metal.
   1. 16 ga (1.262 mm) for metal protective cover.
   2. 22 ga (0.792 mm) for hold-down clips.
   3. 24 ga (0.635 mm) for all other.

B. Pre-Finished Galvanized Steel: ASTM A653/A653M, with G90/Z275 zinc coating; shop pre-coated with PVDF coating.
   1. PVDF (Polyvinylidene Fluoride) Coating: Superior Performance Organic Finish, AAMA 2605; multiple coat, thermally cured fluoropolymer finish system.
   2. Color: Match existing.
   3. Thickness:
      a. 16 ga (1.262 mm) for metal protective cover.
      b. 22 ga (0.792 mm) for hold-down clips.
      c. 24 ga (0.635 mm) for all other.

2.03 FABRICATION

A. Form sections true to shape, accurate in size, square, and free from distortion or defects.

B. Form pieces in longest possible lengths.

C. Hem exposed edges on underside 1/2 inch; miter and seam corners.

D. Form material with flat lock seams, except where otherwise indicated; at moving joints, use sealed lapped, bayonet-type or interlocking hooked seams.

2.04 FACTORY FABRICATED ITEMS

A. Galvanized Reglets:
   1. Acceptable Products:
      a. Fry Springlock Reglets by Fry Reglet Corp, Alhambra, CA www.fryreglet.com.

B. Stainless Steel Reglets:
   1. Acceptable Products:
      a. Fry Springlock Reglets by Fry Reglet Corp, Alhambra, CA www.fryreglet.com.

C. Metal Soffit Panels:

D. Performance:
   1. Design Criteria:
      a. Flush panel design.
         1) Panels shall be interlocked full length of panel.

2) Panel widths shall be Manufacturer's standard.

b. Performance Standard: ATAS Wind-LOK Soffit MPS120.

c. Perforation a required option where indicated. Perforated full width of panel with holes designed so one dimension does not exceed 1/8 inch.

E. Materials:
1. 0.032 inch thick minimum 3105-H24 alloy aluminum meeting requirements of ASTM B209.
2. 24 ga galvanized steel meeting requirements of ASTM A653/A653M, G 90.
3. 24 ga minimum 50 ksi galvalume steel meeting requirements of ASTM A792/A792M AZ-55.

F. Fabrication:
1. Panels shall be uniformly dimensioned, roll formed to lengths to avoid trimming.
2. Panel system shall be anchored as recommended by Manufacturer.
3. Panels shall be continuous.

G. Finish:
1. Polyvinylidene Fluoride (PVF2) Resin-base (Kynar 500 or Hylar 5000) finish for coil coating components containing 70 percent minimum PVF2 in resin portion of formula. Thermo-cured two coat system consisting of corrosion inhibiting epoxy primer and top coat factory applied over properly pre-treated metal.
2. Color as selected by Architect from Manufacturer's standard colors.

H. Accessories:
1. Continuous Soffit Vent:
2. Acceptable Products:
a. Aluminum 8.8 sq in net free ventilation per lineal foot. Width: 2 inches. Color: match existing.
1) Mastic VAS70 Vent-A-Strip (Model 70) by Mastic Home Exteriors by Ply Gem Chicago, IL www.mastic.com/.
b. Aluminum 9.9 sq in net free ventilation per lineal foot. Width: 2-1/4 inches. Color: white or brown.
1) Mastic VAS79 Vent-A-Strip (Model 79) by Mastic Home Exteriors by Ply Gem Chicago, IL www.mastic.com/.

I. Installation:
1. Conceal fasteners where possible. Paint heads of exposed fasteners to match background.
2. Isolate from dissimilar metals to prevent electrolytic action.

2.05 ACCESSORIES

A. Fasteners: Same material and finish as flashing metal, with soft neoprene washers of strength and type consistent with function.

B. Concealed Sealants: Non-curing butyl sealant.

C. Exposed Sealants: ASTM C920; elastomeric sealant, with minimum movement capability as recommended by manufacturer for substrates to be sealed; color to match adjacent material.

D. Plastic Cement: ASTM D4586/D4586M, Type I.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify roof openings, curbs, pipes, sleeves, ducts, and vents through roof are solidly set, reglets in place, and nailing strips located.

B. Verify roofing termination and base flashings are in place, sealed, and secure.

3.02 PREPARATION

A. Install starter and edge strips, and cleats before starting installation.

B. Install surface mounted reglets true to lines and levels, and seal top of reglets with sealant.

C. Back paint concealed metal surfaces with protective backing paint to a minimum dry film thickness of 15 mil.

3.03 INSTALLATION

A. Install with small, watertight seams.

B. Slope to provide positive drainage.

C. Provide sufficient hold down clips to insure true alignment and security against wind.

D. Provide 4 inch (100 mm) minimum overlap.

E. Allow sufficient tolerance for expansion and contraction.

F. Insulate work to prevent electrolytic action.

3.04 CLEANING

A. Leave metals clean and free of defects, stains, and damaged finish.

3.05 SCHEDULE

A. Step Flashing:
   1. Step flashing required for steep slope for roof to wall flashing.
      a. 24 ga pre-finished galvanized steel meeting requirements for sheet metal specified in materials above.
      b. Size: 5 inch x 5 inch by 8 inch or 12 inches length.

B. Gutters and Downspouts:
   1. Materials
      a. Steel:
         1) Downspouts: Rectangular, 26 ga (0.0217 inches - 0.5512 mm) galvanized steel including necessary elbows.
         2) Gutters: 24 ga (0.0276 inches - 0.7010 mm) galvanized steel.
         3) Brackets: 22 ga (0.0336 inches - 0.8534 mm) galvanized steel or 26 ga (0.0217 inches - 0.478 mm) double-hemmed minimum.
      b. Aluminum:
         1) Downspouts: Rectangular 0.032 inch (0.813 mm) minimum aluminum including necessary elbows.
         2) Gutters: 0.04 inch (1.0 mm) minimum aluminum.
         3) Brackets: 0.06 inch (1.52 mm) minimum aluminum.
      c. Screws, Bolts, Nails, And Accessory Fasteners: Non-corrosive and of strength and type consistent with function.
      d. Downspouts, gutters, brackets, fasteners, and accessories shall be compatible material.
   2. Fabrication:
      a. Fabricate in accordance with SMACNA Architectural Manual recommendations, where applicable.
      b. Cross-sectional configuration of gutter shall be Style A, (Page 1.13 6th Edition) of SMACNA Architectural Manual.
      c. Form accurately to details.
      d. Profiles, bends, and intersections shall be even and true to line.
   3. Finishes:
      a. Metal exposed to view shall have face coating of polyvinylidene Fluoride (PVF2) Resin-base finish (Kynar 500 or Hylar 5000) containing seventy (70) percent minimum PVF2 in resin portion of formula.
         1) Thermo-cured two (2) coat system consisting of corrosion inhibiting epoxy primer and top coat factory applied over properly pre-treated metal.
         2) Reverse side coating shall be thermo-cured system consisting of corrosion inhibiting epoxy primer applied over properly pre-treated metal.

b. Color to match fascia.

4. Installation:
   a. Allow no more than 40 feet between downspouts. Lap joints in downspouts 1-1/2 inches minimum in direction of water flow.
   b. Furnish and install outlet tubes and gutter ends where required. Furnish and install expansion joints in runs exceeding 50 feet and in runs that are restrained at both ends. Lap other joints in gutter one inch minimum, apply sealant in lap, and stainless steel rivet one inch on center maximum.

C. Aluminum Fascia:
   1. Materials:
      a. Aluminum: 0.032 inch thick minimum complete with accessories recommended by Manufacturer for proper installation.
   2. Finishes:
      a. Face coating Polyvinylidene Fluoride (PVF2) Resin-base finish (Kynar 500 or Hylar 5000) for coil coating components containing 70 percent minimum PVF2 in resin portion of formula. Thermocured two coat system consisting of corrosion inhibiting epoxy primer and top coat factory applied over properly pre-treated metal.
      b. Color match existing.
   3. Fabrication: Fascia may either be shop-fabricated using metal from a specified manufacturer, or a factory-fabricated standard system from a specified manufacturer.

D. Roof Jacks For Metal Flues: Factory-made galvanized steel.

E. Pipe Flashing For Concentric Piping Flashing Retrofitting:
   1. Description:
      a. Pipe flashing to be compatible with existing roof membrane.

F. Pipe Flashing For Plumbing Vent Lines metal flues, and HVAC Air Piping: Ultra-pure high consistency molded one hundred (100) percent silicone rubber pipe boot that prevents cracking and splitting for life of roof.
   1. Product: To be compatible with existing roof membrane.

END OF SECTION

SECTION 07 9200
JOINT SEALANTS

PART 1 GENERAL

1.01 SUMMARY

A. Includes But Not Limited To:
   1. Furnish and install sealants not specified to be furnished and installed under other Sections.
   2. Quality of sealants to be used on Project not specified elsewhere, including submittal, material, and installation requirements.

B. Related Requirements:
   1. Removing existing sealants specified in Sections where work required.
   2. Furnishing and installing of sealants is specified in Sections specifying work to receive new sealants.
   3. Section 07 2400: Sealants for EIF Systems.

C. Products Furnished But not Installed Under This Section:
   1. Interior Ceramic Tile Joint Sealants:

D. Related Requirements:
   1. Section 09 3000: 'Tiling'.

1.02 REFERENCES

A. Reference Standards:
   1. ASTM International:
      a. ASTM C920-14a, ‘Standard Specification for Elastomeric Joint Sealants’.
      b. ASTM C1193-16, ‘Standard Guide for Use of Joint Sealants’.
      c. ASTM C1330-02(2013), ‘Standard Specification for Cylindrical Sealant Backing for Use with Cold Liquid Applied Sealants’.
      d. ASTM C1481-12(2017) 'Standard Guide for Use of Joint Sealants with Exterior Insulation & Finish Systems (EIFS)'.
      e. ASTM D5893/D5893M-16, ‘Standard Specification for Cold Applied, Single Component, Chemically Curing Silicone Joint Sealant for Portland Cement Concrete Pavements’.

1.03 REFERENCE STANDARDS

A. 40 CFR 59, Subpart D - National Volatile Organic Compound Emission Standards for Architectural Coatings; U.S. Environmental Protection Agency current edition.

B. ASTM C1193 - Standard Guide for Use of Joint Sealants 2016.

C. ASTM C1330 - Standard Specification for Cylindrical Sealant Backing for Use with Cold Liquid-Applied Sealants 2018.

D. ASTM C1481 - Standard Guide for Use of Joint Sealants with Exterior Insulation and Finish Systems (EIFS) 2012.

E. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials 2020.

F. ASTM E90 - Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements 2009 (Reapproved 2016).

G. UL 723 - Standard for Test for Surface Burning Characteristics of Building Materials Current Edition, Including All Revisions.

H. ASTM C834 - Standard Specification for Latex Sealants 2017.

I. ASTM C919 - Standard Practice for Use of Sealants in Acoustical Applications 2018.

J. ASTM C920 - Standard Specification for Elastomeric Joint Sealants 2018.

1.04 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.

1.05 SUBMITTALS

A. Action Submittals:
   1. Product Data:
      a. Manufacturer's specifications and other data needed to prove compliance with the specified requirements.
      b. Manufacturer's literature for each Product.
      c. Schedule showing joints requiring sealants. Show also backing and primer to be used.

1.06 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.

1.07 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 80 deg F (27 deg C) or as per Manufacturer's written recommendations.
   4. Do not use sealants that have exceeded shelf life of product.

1.08 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.
   3. Ambient Conditions:
      a. Do not apply caulking at temperatures below 40 deg F (4 deg C).

1.09 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

2.01 SYSTEMS

A. Manufacturers:
   1. Manufacturer Contact List:
      a. Dow Corning Corp., Midland, MI www.dowcorning.com.
      b. Franklin International, Inc. Columbus, OH www.titebond.com.
      c. GE Sealants & Adhesives (see Momentive Performance Materials Inc.).
      d. Laticrete International Inc., Bethany, CT www.laticrete.com.
      e. Momentive Performance Materials Inc. (formally GE Sealants & Adhesives), Huntersville, NC www.ge.com/silicones.
      f. Sherwin-Williams, Cleveland, OH www.sherwin-williams.com.
      g. Sika Corporation, Lyndhurst, NJ www.sikaconstruction.com or Sika Canada Inc, Pointe Claire, QC www.sika.ca.
      h. Tremco, Beachwood, OH www.tremcosealants.com or Tremco Ltd, Toronto, ON (800) 363-3213.

B. Materials:
   1. Design Criteria:
      a. Compliance: Meet or exceed requirements of these standards:
         1) ASTM C920: Elastomeric joint sealant performance standard.
         2) ASTM D5893/D5893M: Silicone Joint Sealant for Concrete Pavements.
      b. Comply with Manufacturer's ambient condition requirements.
      c. Sealants must meet Manufacturer's shelf-life requirements.
      d. Sealants must adhere to and be compatible with specified substrates.
      e. Sealants shall be stable when exposed to UV, joint movements, and environment prevailing at project location.
      f. Primers (Concrete, stone, masonry, and other nonporous surfaces typically do not require a primer. Aluminum and other nonporous surfaces except glass require use of a primer. Installer Option to use Adhesion Test to determine if primer is required or use primer called out in related sections):
         1) Adhesion Test:
            (a) Apply silicone sealant to small area and perform adhesion test to determine if primer is required to achieve adequate adhesion. If necessary, apply primer at rate and in accordance with Manufacturer's instructions. See 'Field Quality Control' in Part 3 of this specification for Adhesive Test.
         2) If Primer required, shall not stain and shall be compatible with substrates.
         3) Allow primer to dry before applying sealant.
   2. Sealants At Exterior Building Elements:
      a. Description:
         1) Weathersealing expansion, contraction, perimeter, and other movement joints which may include all or part of the following for project:
            (a) Aluminum entrance perimeters and thresholds.
            (b) Columns.
            (c) Connections.
            (d) Door frames.
            (e) EIFS to metal joints.
            (f) Joints and cracks around windows.
            (g) Louvers.
            (h) Masonry.
            (i) Other joints necessary to seal off building from outside air and moisture.
      b. Design Criteria:
         1) Meet following standards for Sealant:
            (a) ASTM C920: Type S, Grade NS, Class 50 Use NT, M, G, A.

2) Limitations:
   (a) Do not use below-grade applications.
   (b) Do not use on surfaces that are continuously immersed or in contact with water.
   (c) Do not use on wet, damp, frozen or contaminated surfaces.
   (d) Do not use on building materials that bleed oils, plasticizers or solvents, green or partially vulcanized rubber gaskets or tapes.
3) Color:
   (a) Architect to select from Manufacturer's standard colors.
   (b) Match building elements instead of window (do not use white that shows dirt easily).

c. Approved Products. See Section 01 6000:
1) Dow Corning:
   (a) Primer: 1200 Prime Coat.
   (b) Sealant: 791 Silicone Weatherproofing Sealant.
2) Momentive Performance Materials (formerly, GE Sealants & Adhesives):
   (a) Primer: SS4044 Primer.
   (b) Sealant: GE SCS2000 SilPruf Silicone Sealant & Adhesive.
3) Tremco:
   (a) Primer:
      (1) Metal surface: No. 20 primer.
      (2) Porous surfaces: No. 23 primer.
   (b) Sealant: Spectrum 1 Silicone Sealant.

3. Sealants At EIFS:
a. Description:
1) Weatherproofing sealant for long term resistance to natural weathering, including: ultraviolet radiation, high and low temperatures and rain and snow, with negligible change in elasticity. May be used for application to horizontal or vertical surfaces.

b. Design Criteria:
1) Meet following standards for Sealant:
   (a) Used to seal EIFS to EIFS, not EIFS to other material.
   (b) ASTM C920: Type S, Grade NS, Class 100/50 Use NT, A, G, O.
   (c) ASTM C1481 guidelines for use of sealant with EIFS.
2) Limitations:
   (a) Do not use in structural glazing applications.
   (b) Do not use on surfaces that are underwater or in continuous contact with water.
   (c) Do not use on porous substrates.
   (d) Do not use on wet, damp, frozen or contaminated surfaces.
   (e) Do not use on surfaces where staining or discoloration may be concern, without prior testing.
   (f) Do not use on excessively basic or acidic substrates.
3) Color:
   (a) Architect to select from Manufacturer's standard colors.
   (b) Match building elements (do not use white that shows dirt easily).

c. Approved Products. See Section 01 6000:
1) Dow Corning:
   (a) Primer: 1200 Prime Coat.
   (b) Sealant: 790 Silicone Building Sealant.
2) Momentive Performance Materials (formerly, GE Sealants & Adhesives):
   (a) Primer: SCP3195P Primer.
   (b) Sealant: GE SCS2700 SilPruf LM Silicone Weatherproofing Sealant.

3) Sika:
   (a) Primer: Sikaflex Primer 429.
   (b) Sealant: Sikaflex 2C NS Non-Sag Silicone Sealant.
4) Tremco:
   (a) Primer: Porous surfaces: No. 23 primer.
   (b) Sealant: Spectrum 1 Silicone Sealant.

4. Sealants At Exterior Sheet Metal And Miscellaneous:
   a. Description:
      1) Weathersealing expansion, contraction, perimeter, and other movement joints which may include all or part of the following for project:
         (a) Flashings.
         (b) Gutters.
         (c) Penetrations in soffits and fascia's.
         (d) Roof vents and flues.
         (e) Lightning protection components.
   b. Design Criteria:
      1) Meet following standards for Sealant:
         (a) ASTM C920: Type S Grade NS, Class 25 (min) Use NT, M, G, A and O.
      2) Limitations:
         (a) Do not use below-grade applications.
         (b) Do not use on surfaces that are continuously immersed or in contact with water.
         (c) Do not use on wet, damp, frozen or contaminated surfaces.
         (d) Do not use on building materials that bleed oils, plasticizers or solvents, green or partially vulcanized rubber gaskets or tapes.
   c. Approved Products. See Section 01 6000:
      1) Dow Corning: 790 Silicone Building Sealant.
      2) Momentive Performance Materials (formerly, GE Sealants & Adhesives): GE SCS2350 Silicone Elastomeric Sealant.
      3) Tremco: Tremsil 600 Silicone Sealant.
5. Sealants At Expansion Joints in Exterior Concrete (Aprons, Entryway Slabs, Mowstrips, Retaining Walls, Sidewalks):
   a. Expansion Joints:
      1) Design Criteria:
         (a) Meet following standards for Sealant:
            (1) ASTM C920: Type S, Grade NS, Class 100/50 Use T, NT, M, G, A, and O.
      2) Sealant required at expansion for following areas:
         (a) Between entryway slabs and building foundations.
         (b) Between sidewalks and building foundations.
         (c) Miscellaneous vertical applications.
      3) Sealant NOT required at expansion joints for following areas:
         (a) Within aprons and where aprons abut building foundations and sidewalks.
         (b) Within mowstrips and where mowstrips abut building foundations and sidewalks.
         (c) Within sidewalks.
      4) Approved Products. See Section 01 6000:
         (a) Dow Corning:
            (1) Primer: 1200 Prime Coat.
            (2) Sealant: 790 Silicone Building Sealant.
         (b) Sika:
            (1) Primer: Sikasil Primer-2100.
            (2) Sealant: Sikasil-728 NS Non-Sag Silicone Sealant.

b. Penetrations thru Concrete Walls:
    1) Design Criteria:
        (a) Meet following standards for Sealant:
            (1) ASTM C920: Type S, Grade NS, Class 100/50 Use T, NT, M, G, A, and O.
    2) Approved Products. See Section 01 6000:
        (a) Dow Corning:
            (1) Primer: 1200 Prime Coat.
            (2) Sealant: 790 Silicone Building Sealant.
        (b) Sika:
            (1) Primer: Sikasil Primer-2100.
            (2) Sealant: Sikasil-728 NS Non-Sag Silicone Sealant.

6. Sealants At Control Joints in Exterior Concrete (Aprons, Entryway Slabs, Mowstrips, Retaining Walls, Sidewalks):
    a. Control Joints:
        1) Design Criteria:
            (a) Meet following standards for Sealant:
                (1) ASTM C920, Type S, Grade P, Class 100/50; Use T, M, G, A, O.
        2) Sealant required at control joints in following areas:
            (a) Retaining walls.
            (b) Miscellaneous vertical applications.
        3) Sealant is NOT required at control joints, unless needed to protect moisture sensitive soils or by Contract Drawings, in following areas:
            (a) Within aprons.
            (b) Within mowstrips.
            (c) Within sidewalks.
            (d) Within entryway slabs.
        4) Approved Products. See Section 01 6000:
            (a) Dow Corning:
                (1) Primer: 1200 Prime Coat.
                (2) Sealant: 890-SL Silicone Building Sealant.
            (b) Sika:
                (1) Primer: Primer: Sikasil Primer-2100.
                (2) Sealant: Sikasil-728 SL Self-leveling Silicone Sealant.

7. General Interior Sealants:
    a. General:
        1) Inside jambs and heads of exterior door frames.
        2) Both sides of interior door frames.
        3) Inside perimeters of windows.
        4) Miscellaneous gaps between substrates.
    b. Design Criteria:
        1) Meet ASTM C920, Type S, Grade NS, NT, and Class 25 test requirements.
        2) 100 percent silicone sealant.
    c. VOC Content of Interior Sealants:
        1) Provide sealants and sealant primers for use inside the weatherproofing system that comply with the following limits for VOC content when calculated according to 40 CFR 59, Subpart D (EPA Method 24):
            (a) Architectural Sealants: 250 g/L.
            (b) Sealant Primers for Nonporous Substrates: 250 g/L.
            (c) Sealant Primers for Porous Substrates: 775 g/L.
    d. Non-Paintable Sealant (Installer Option A):
        1) Approved Product. See Section 01 6000:
            (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.

e. Paintable Sealant (Installer Option B):
1) Approved Product. See Section 01 6000:
(a) Momentive Performance Materials (formerly, GE Sealants & Adhesives): GE SCS7000 Paintable Silicone Sealant.

8. Sealants For Interior Joints:
a. General:
1) Countertops and backsplash to wall.
2) Sinks and lavatories to countertops.
3) Joints between plumbing fixtures and other substrates.
b. Interior Ceramic Tile Joints are furnished in Section 07 9200 and installed in Section 09 3000 - Tiling including the following:
1) Ceramic tile inside corners.
2) Ceramic tile and paver tile joints.
3) Termination joints in font.
4) Termination joints in showers and font.
c. Description:
1) One-part acetoxy cure silicone sealant with fungicides to resist mold and mildew.
d. Design Criteria:
1) Meet ASTM C920, Type S, Grade NS, NT, and Class 25 test requirements.
2) 100 percent silicone sealant.
e. VOC Content of Interior Sealants:
1) Provide sealants and sealant primers for use inside the weatherproofing system that comply with the following limits for VOC content when calculated according to 40 CFR 59, Subpart D (EPA Method 24):
(a) Architectural Sealants: 250 g/L.
(b) Sealant Primers for Nonporous Substrates: 250 g/L.
(c) Sealant Primers for Porous Substrates: 775 g/L.
f. Color: As selected by Architect from Manufacturer's standard colors.
g. Approved Products. See Section 01 6000:
1) Dow Corning: Tub, Tile, And Ceramic Silicone Sealant.
2) Laticrete: Latasil Tile and Stone Silicone Sealant.
3) Momentive Performance Materials (formerly, GE Sealants & Adhesives): GE SCS1700 Sanitary Silicone Sealant.
4) Tremco: Tremsil 200 Silicone Sealant.

C. Acoustical Joint Sealants:
1. Design Criteria:
a. Meet requirements of ASTM C834.
b. Meet Class A flame spread rating.
2. Approved Products. See Section 01 6000:
a. OSI Pro-Series SC-175 Draft & Acoustical Sound Sealant by OSI Sealants Inc, Mentor, OH www.osisealants.com.
b. QuietZone Acoustic Caulk by Owens Corning, Toledo, OH www.owenscorning.com.
c. Acoustical Sealant by Tremco, Beachwood, OH www.tremcosealants.com or Toronto, ON (800) 363-3213.

d. Acoustical Sound Sealant by Titebond.
e. Acoustical Sealant by U S Gypsum, Chicago, IL www.usg.com.

2.02 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

3.01 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.

3.02 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.

3.03 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.

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. Install at perimeter joints and mechanical and electrical penetrations in sound insulated rooms. Apply sealant with hand-caulking gun with nozzle of proper size to fit joints. Use sufficient pressure to insure full contact to both sides of joint to full depth of joint.

F. Tool joints immediately after application of sealant if required to achieve full bedding to substrate or to achieve smooth sealant surface.

G. 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.

3.04 TOLERANCES

A. Provide joint tolerances in accordance with Manufacturer's printed instructions.

3.05 FIELD QUALITY CONTROL

A. Inspection:
   1. Examine sealant joints to verify compliance with Contract Document requirements.

B. Non-Conforming Work. Non-conforming work as covered in the General Conditions applies, but is not limited to the following:
   1. Sealant material found to be contaminated or damaged or inadequate preparation of substrate results in deficiencies in joint sealant adhesion is considered defective or not complying with Contract Document requirements.
   2. Correct any work found defective or not-complying with Contract Document requirements at no additional cost to Owner.

C. 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.

3.06 CLEANING

A. Remove sealant from adjacent surfaces in accordance with Sealant Manufacturer and Substrate Manufacturer recommendations as work progresses.

B. Remove masking tape and excess sealant.

C. Clean adjacent materials, which have been soiled, immediately (before setting) as recommended by Manufacturer.

D. Waste Management: Dispose of products in accordance with manufacturer's recommendation.

END OF SECTION

SECTION 08 0671
HARDWARE GROUP AND KEYING SCHEDULES

PART 1 GENERAL

1.01 SUMMARY

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

1.02 REFERENCES

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

1.03 DELIVERY, STORAGE, AND HANDLING

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

PART 1 HARDWARE GROUPS

2.01 STOREFRONT ENTRY DOORS

a. See Hardware Schedule in Drawings.

PART 1 KEYING SCHEDULE FOR FINISH HARDWARE

3.01 KEYING SCHEDULE

A. Keying system to be provided by the owner.

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.
   2. Section 08 4113: 'Aluminum-Framed Entrances And Storefronts' for aluminum entry frames.

1.2 REFERENCES

A. Reference Standards:
   1. American Architectural Manufacturers Association / Window & Door Manufacturers Association / CSA Group:
      a. AAMA/WDMA/CSA 101/I.S.2/A440-17, 'North American Fenestration Standard/Specification for windows, doors, and skylights'.
   2. ASTM International:
      a. ASTM A568/A568M-17a, 'Standard Specification for Steel, Sheet, Carbon, Structural, and High-Strength, Low-Alloy, Hot-Rolled and Cold-Rolled, General Requirements for.
      b. ASTM A653/A653M-17, 'Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process'.
   3. Steel Door Institute:
      a. SDI A250.8-2017, 'Specifications for Standard Steel Doors and Frames'.
      b. SDI A250.11-2012, 'Recommended Erection Instructions for Steel Frames'.

PART 2 - PRODUCTS

2.1 MANUFACTURED UNITS

A. Suppliers:
   a. Architectural Building Supply, Salt Lake City, UT www.cookandboardman.com:
      1) Contact Information: Russ Farley: phone (800) 574-4369, fax 801-484-6817, or e-mail russf@absdoors.com.
   b. Beacon Metals Inc, Salt Lake City, UT www.beacon-metals.com:
      1) Contact Information: Jared Butler: phone (801) 486-4884, cell (435) 216-2297, FAX 801-485-7647, or e-mail Jared@beacon-metals.com.
   c. Midwest D-Vision Solutions, Salt Lake City, UT www.mwdsutah.com.
      1) Contact Information: Dan Mercer, office (801) 377-4355, cell (801) 618-9456, e-mail danm@mwdsutah.com.

B. Frames:
   1. Cold rolled furniture steel:
      a. Interior Frames: 16 ga. (1.6 mm).
      b. Exterior Frames: 14 ga. (1.9 mm).
   2. Provide labeled frame to match fire rating of door.
   3. Finish:
      a. Use the following systems:
         1) Prime surfaces with rust inhibiting primer.

4. Anchors: 16 US ga (1.6 mm) minimum meeting UL or other code acceptable requirements for door rating involved.

C. 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 1416
FLUSH WOOD DOORS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Flush wood doors; flush and flush glazed configuration; fire-rated, non-rated, and acoustical.

1.02 RELATED REQUIREMENTS

A. Section 06 2000 - Finish Carpentry: Wood door frames.

B. Section 08 1213 - Hollow Metal Frames.

C. Section 08 7100 - Door Hardware.

1.03 REFERENCE STANDARDS

A. References

B. AAMA/WDMA/CSA 101/I.S.2/A440 - North American Fenestration Standard/Specification for Windows, Doors, and Skylights 2017.

C. ASTM C1036 - Standard Specification for Flat Glass 2016.

D. AWI/AWMAC/WI (AWS) - Architectural Woodwork Standards 2014, with Errata (2018).

E. AWMAC/WI (NAAWS) - North American Architectural Woodwork Standards, U.S. Version 3.1 2017, with Errata (2019).

F. CPA (Composite Panel Association) - Standard Publications 2016.

G. CPSC (Consumer Products Safety Commission - Safety Standard for Architectural Glazing Materials 16 CFR, Part 1201 CAT 1 and 11.

H. HPVA HP-1 - American National Standard for Hardwood and Decorative Plywood 2016.

I. NFPA 101-2018 - Life Safety Code 2018.

J. NFPA 252 - Standard Methods of Fire Tests of Door Assemblies 2017.

K. UL 10B - Standard for Fire Tests of Door Assemblies Current Edition, Including All Revisions.

L. UL 9 - Standard for Fire Tests of Window Assemblies Current Edition, Including All Revisions.

M. **Definitions**

1. Book-Match: Matching between adjacent veneer leaves on one panel face. Every other piece of veneer is turned over so that the adjacent leaves are “opened” as two pages in a book. The fibers of the wood, slanting in opposite directions in the adjacent leaves, create a characteristic light and dark effect when the surface is seen from an angle.
2. Fire-rated: Fire-retardant particleboard with an Underwriters’ Laboratory (UL) stamp for Class 1 fire rating (Flame Spread 20, Smoke Developed 25). Fire-rated doors are available with particleboard and mineral cores for ratings up to 1-1/2 hours.
3. Fire-rated Door: A door made of fire-resistant material that can be closed to prevent the spread of fire and can be rated as resisting fire for 20 minutes (1/3 hour), 30 minutes (1/2 hour), 45 minutes (3/4 hour) (C), 1 hour (B), or 1-1/2 hours (B). The door must be tested and carry an identifying label from a qualified testing and inspection agency.
4. Grade: Unless otherwise noted, this term means Grade rules for Economy, Custom, and/or Premium Grade.
    a. Custom Grade: Typically specified for and adequately covers most high-quality architectural woodwork, providing a well-defined degree of control over a project’s quality of materials, workmanship, or installation.
    b. Premium Grade: The highest Grade available in both material and workmanship where the highest level of quality, materials, workmanship, and installation is required.
5. Running Match: Each panel face is assembled from as many veneer leaves as necessary. Any portion left over from one panel may be used to start the next.

1.04 SUBMITTALS

A. Product Data: Indicate door core materials and construction; veneer species, type and characteristics.

B. Shop Drawings: Show doors and frames, elevations, sizes, types, swings, undercuts, beveling, blocking for hardware, factory machining, factory finishing, cutouts for glazing and other details.
   1. Provide information as required by AWI/AWMAC/WI (AWS) or AWMAC/WI (NAAWS).
   2. Indicate factory finish color and type.

C. Certificate: Submit labels and certificates required by quality assurance and quality control programs.

D. Samples:
   1. Interior Hardwood:
      a. Approval of sample by Owner. Douglas Fir or approved equal.

E. Manufacturer's Installation Instructions: Indicate special installation instructions.

F. Manufacturer's Qualification Statement.

G. Warranty executed in Owner's name.

H. 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.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Deliver in clean truck and, in wet weather, under cover.

B. Deliver to building site only after plaster, cement, and taping compound are completed and dry and after interior painting operations have been completed.

C. Individually wrap in polyethylene bags for shipment and storage.

D. Store doors in a space having controlled temperature and humidity range between 25 and 55 percent.

E. Accept doors on site in manufacturer's packaging and inspect for damage.

F. Store flat on a level surface in a dry, well ventilated building.

G. Cover to keep clean but allow air circulation.

H. Handle with clean gloves and do not drag doors across one another or across other surfaces.

I. Do not subject doors to abnormal heat, dryness, or humidity or sudden changes therein.

J. Condition doors to average prevailing humidity of locality before hanging.

1.06 WARRANTY

A. See Section 01 7800 - Closeout Submittals, for additional warranty requirements.

B. Interior Doors: Provide manufacturer's warranty for the life of the installation.
   1. Warranty shall include finishing, hanging, and installing hardware if manufacturing defect was discovered after door was finished and installed.
   2. Include coverage for delamination in any degree, warping or twisting of 1/4 inch or more in door panel at time of one-year warranty inspection, and telegraphing of core assembly: Variation of 1/100 inch or more in 3 inch span.

PART 2 PRODUCTS

2.01 DOORS

A. Wood Doors: 1-3/8 inches thick unless otherwise indicated; flush construction.

1. Type: AWS PC-5ME or FD-5ME.
2. Fully Type I Construction: Adhere all glue lines with Type I adhesive.
    a. Solid Core: Douglas Fir or approved equal.

B. Core:
1. Fully bonded to stiles and rails and sanded as a unit before applying veneers.
2. Non-Rated:
    a. 32 lb density meeting requirements of ANSI A208.1 Mat Formed Wood Particle Board, Grade 1-L-1 minimum.
    b. Stiles:
        1) 1-3/8 inches deep minimum before fitting.
        2) Stile face to be hardwood matching face veneer material, thickness manufacturer's standard.
    c. Rails:
        1) 1-3/8 inches
        2) Manufacturer's option.

2.02 DOOR CONSTRUCTION

A. Cores Constructed with stiles and rails:
1. Provide solid blocks at lock edge for hardware reinforcement.
2. Provide solid blocking for other through bolted hardware.

B. Factory machine doors for hardware other than surface-mounted hardware, in accordance with hardware requirements and dimensions.

C. Factory fit doors for frame opening dimensions identified on shop drawings, with edge clearances in accordance with specified quality standard.

D. Provide edge clearances in accordance with the quality standard specified.

2.03 FINISHES - WOOD DOORS

A. Finish work in accordance with AWI/AWMAC/WI (AWS) or AWMAC/WI (NAAWS), Section 5 - Finishing for grade specified and as follows:
1. Opaque:
    a. Primer.
        1) 2 coats of latex, color shown on door schedule.

PART 3 EXECUTION

3.01 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.

END OF SECTION

THIS PAGE LEFT BLANK INTENTIONALLY

SECTION 08 4313
ALUMINUM-FRAMED STOREFRONTS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Aluminum-framed storefront, with vision glass.

B. Aluminum doors and frames.

C. Weatherstripping.

D. Door hardware.

1.02 RELATED REQUIREMENTS

A. Section 08 7100 - Door Hardware: Hardware items other than specified in this section.

1.03 REFERENCE STANDARDS

A. 40 CFR 59, Subpart D - National Volatile Organic Compound Emission Standards for Architectural Coatings; U.S. Environmental Protection Agency current edition.

B. AAMA CW-10 - Care and Handling of Architectural Aluminum From Shop to Site 2015.

C. AAMA SFM-1 - Aluminum Storefront & Entrance Manual Current.

D. AAMA 501.2 - Quality Assurance and Diagnostic Water Leakage Field Check of Installed Storefronts, Curtain Walls, and Sloped Glazing Systems 2015.

E. AAMA 609 & 610 - Cleaning and Maintenance Guide for Architecturally Finished Aluminum (Combined Document) 2015.

F. AAMA 611 - Voluntary Specification for Anodized Architectural Aluminum 2014 (2015 Errata).

G. AAMA 2605 - Voluntary Specification, Performance Requirements and Test Procedures for Superior Performing Organic Coatings on Aluminum Extrusions and Panels (with Coil Coating Appendix) 2017a.

H. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes 2014.

I. ASTM B221M - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes (Metric) 2013.

J. ASTM B456 - Standard Specification for Electrodeposited Coatings of Copper Plus Nickel Plus Chromium and Nickel Plus Chromium 2017.

K. ASTM B633 - Standard Specification for Electrodeposited Coatings of Zinc on Iron and Steel 2019.

L. ASTM C1184 - Standard Specification for Structural Silicone Sealants 2018, with Editorial Revision.

M. ASTM C920 - Standard Specification for Elastomeric Joint Sealants 2018.

N. ASTM E283 - Standard Test Method for Determining the Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen 2004 (Reapproved 2012).

O. ASTM E330/E330M - Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference 2014.

P. ASTM E331 - Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform Static Air Pressure Difference 2000 (Reapproved 2016).

Q. ASTM E1886 - Standard Test Method for Performance of Exterior Windows, Curtain Walls, Doors, and Impact Protective Systems Impacted by Missile(s) and Exposed to Cyclic Pressure Differentials 2019.

R. ASTM E1996 - Standard Specification for Performance of Exterior Windows, Curtain Walls, Doors, and Impact Protective Systems Impacted by Windborne Debris in Hurricanes 2017.

S. BHMA A156.19 - American National Standard for Power Assist and Low Energy Power Operated Doors 2013.

T. ICC (IBC)-2018 - International Building Code 2018.

U. ICC A117.1 - Accessible and Usable Buildings and Facilities 2017.

V. NFRC 100 - Procedure for Determining Fenestration Product U-factors 2017.

1.04 ADMINISTRATIVE REQUIREMENTS

A. Coordinate with installation of other components that comprise the exterior enclosure.

1.05 SUBMITTALS

A. Product Data: Provide component dimensions, describe components within assembly, anchorage and fasteners, glass and infill, door hardware, internal drainage details, color and finishes, storefront entry system and low-energy door operators.

B. Shop Drawings: Indicate system dimensions, framed opening requirements and tolerances, affected related work, expansion and contraction joint location and details, and field welding required.
   1. Include design engineer's stamp or seal on shop drawings for attachments and anchors.
   2. Show exact dimensions of factory-fabricated frames and required tolerances for rough openings. Submit shop drawings in time for Pre-Installation Conference specified in Section 06 1100.
   3. Show locations, sizes, etc, of hardware reinforcing.
   4. Show wind loads and engineering for Project conditions.
   5. Clearly mark components to identify their location in Project.

C. Informational Submittals:
   1. Qualification Statement:
      a. Installer:
         1) Provide Qualification documentation if requested by Architect or Owner.

D. Closeout Submittals:
   1. Include following in Operations And Maintenance Manual specified in Section 01 7800:
      a. Operations and Maintenance Data:
         1) Maintenance, adjustment, and repair instructions.
      b. Warranty Documentation:
         1) Final, executed copy of Warranty.
            (a) Storefront warranty.
            (b) Storefront closers.
            (c) Low-energy door operator.
      c. Record Documentation:
         1) Manufacturers documentation:
            (a) Manufacturer's literature or cut sheets for storefront system and for each item of hardware.
            (b) Manufacturer’s literature of cut sheets for low-energy door operators.
            (c) Color and finish selections.
            (d) Parts lists.

1.06 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in performing work of type specified and with at least three years of documented experience.
   1. Provide aluminum entrances and storefront systems produced by firm experienced in manufacturing systems that are similar to those indicated for this project and have record of successful in-service performance.

2. Provide certified glass products through ANSI accredited certifications that include plant audits and independent laboratory performance testing.
    a. Insulating Glass Certification Council (IGCC).
    b. Safety Glazing Certification Council (SGCC).

B. Fabricator Qualifications:
1. Provide aluminum entrances and storefront systems fabricated by a firm experienced in producing systems that are similar to those indicated for this Project, and have record of successful in-service performance.
2. Fabricator shall have sufficient production capacity to produce components required without causing delay in progress of the Work.

C. Installer Qualifications:
1. Minimum three (3) years experience in storefront installations.
2. Minimum five (5) satisfactorily completed projects of comparable quality, similar size, and complexity in past three (3) years before bidding.
3. Upon request, submit documentation.

1.07 DELIVERY, STORAGE, AND HANDLING

A. Handle products of this section in accordance with AAMA CW-10.

B. Deliver all parts of door, together with hardware, in original, unopened packages with labels intact to Project at same time.

C. Store in clean, dry location, indoors in Manufacturer's unopened packaging until ready for installation and in accordance with Manufacturer's instructions.

D. Stack framing components in a manner that will prevent bending and avoid significant or permanent damage.

E. Protect materials and finish from damage during storage, handling and installation.

F. Protect finished aluminum surfaces with wrapping. Do not use adhesive papers or sprayed coatings that bond to aluminum when exposed to sunlight or weather.

1.08 FIELD CONDITIONS

A. Do not install sealants when ambient temperature is less than 40 degrees F. Maintain this minimum temperature during and 48 hours after installation.

1.09 WARRANTY

A. Manufacturer Warranty:
1. Storefront Entrances:
    a. Manufacturer's Warranty to be free of defects in material and workmanship.
    b. Manufacturer's Warranty against deterioration or fading.
    c. Manufacturer's Lifetime Warranty for Door Construction for normal use.
2. Closers:
    a. Closer Manufacturer's standard warranty, 10 years minimum.
3. Low-Energy Door Operator:
    a. Manufacturer's standard warranty.

B. Provide five year manufacturer warranty against failure of glass seal on insulating glass units, including interpane dusting or misting. Include provision for replacement of failed units.

C. Provide five year manufacturer warranty against excessive degradation of exterior finish. Include provision for replacement of units with excessive fading, chalking, or flaking.

PART 2 PRODUCTS

2.01 ASSEMBLIES

A. Manufacturers:
1. Arcadia Inc., Vernon CA www.arcadiainc.com.
    a. Contact Information: Ken Martinek, (602) 734-5327 kmartinek@arcadiainc.com.

2. Kawneer North America, Norcross, GA, www.kawneer.com/kawneer/north_america.
   a. 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.

2.02 FRAMING COMPONENTS AND ACCESSORIES

A. Aluminum Extrusions:
   1. 6063-T6 aluminum alloy or meet requirements of ASTM B221, alloy GS 10a T6.
   2. Anchors, Clips, and Accessories:
      a. Aluminum, nonmagnetic stainless steel, or zinc-coated steel or iron complying with ASTM B633 for SC 3 severe service conditions or other suitable zinc coating; provide sufficient strength to withstand design pressure indicated (properly isolated steel from aluminum).
   3. Fasteners:
      a. Aluminum, nonmagnetic stainless steel or other materials to be non-corrosive and compatible with aluminum window members, trim hardware, anchors, and other components.
   4. Glazing Gasket:
      a. Compression-type design with replaceable extruded EPDM rubber.
   5. Reinforcing Members:
      a. Aluminum, nonmagnetic stainless steel, or nickel/chrome-plated steel complying with ASTM B456 for Type SC 3 severe service conditions, or zinc-coated steel or iron complying with ASTM B633 for SC 3 severe service conditions or other suitable zinc coating; provide sufficient strength to withstand design pressure indicated.
      b. Mullion:
         1) Steel reinforced or heavy duty as necessary to prevent lateral flexing of mullion.
   6. Sills:
      a. Match height of door bottoms.
   7. Sealant:
      a. Structural Sealant meeting requirements of ASTM C1184 for fabrication within storefront system:
         1) Permanently elastic, non-shrinking, and non-migrating type for joint size and movement.
         2) Single-component neutral-curing silicone formulation compatible with system components specifically formulated and tested for use as structural sealant and approved by structural-sealant manufacturer for use in aluminum-framed systems indicated.
         3) Color: to simulate Anodized Bronze.
      b. Joint Sealants used at perimeter of storefront framing system: Elastomeric Sealant as specified in Section 07 9200.
      c. Provide sealants for use inside of the weatherproofing system that have a VOC content of 250 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
      d. Provide sealants for use inside of the weatherproofing system that have a VOC content of 250 g/L or less when required by local codes or AHJ.
   8. Tolerances:
      a. Tolerances for wall thickness and other cross-sectional dimensions of storefront members in compliance with AA Aluminum Standards and Data.

B. Storefront Framing System:

1. Brackets and Reinforcements:
   a. Manufacturer's standard high-strength aluminum with non-staining, nonferrous shims for aligning system components.
2. Fasteners and Accessories:
   a. Manufacturer's standard corrosion-resistant, non-staining, non-bleeding fasteners and accessories compatible with adjacent materials.
3. Perimeter Anchors:
   a. When steel anchors are used, provide insulation between steel material and aluminum material to prevent galvanic action.

C. Finish:
1. Match doors: Anodized Bronze.

D. Approved Products See Section 01 6000 :
1. Non-Thermal, 2 inch (50 mm) Sightline:
   a. Double Stack header at exterior doors only if shown on Contract Drawings.
   b. Single Glazed:
      1) AR450 by Arcadia.
      2) Trifab VG 450 by Kawneer.
   c. Double Glazed:
      1) AG451 by Arcadia.
      2) Trifab VG 451 by Kawneer.

E. Approved Products -HVHZ:
1. Non-Thermal:
   a. Single Glazed:
      1) IP2550 by Arcadia.
      2) IR 500 by Kawneer.
   b. Double Glazed:
      1) IP2551 by Arcadia.
      2) IR 501 by Kawneer.

2.03 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. Provide wind load and impact testing by testing laboratory when required by local codes and jurisdictions:
1. High Velocity Hurricane Zone (HVHZ):
   a. Florida Building Code (FBC):
      1) Comply with 1626.1, HVHZ - Impact Test for Wind-Bourn Debris' (2007 Code.
      2) Notice of Acceptance (NOA) for materials specified.

b. Wind Driven Rain.
1) Miami-Dade Protocol: Product Approval:
(a) PA 201, 'Large Missile Impact Test'.
(b) PA 202, 'Structural Pressure, Air, Water, and Forced Entry Testing'.
(c) PA 203, 'Cyclic Wind Pressure Loading'.

2. Hurricane-Prone Regions and Wind-Borne Debris Region:
a. Florida Building Code Compliance Office Protocol:
1) Testing Application Standard:
(a) TAS 201, 'Impact Test Procedures'.
(b) TAS 202, Criteria for Testing Impact and Non Impact Resistant Building Envelope Components using Uniform Static Air Pressure'.
(c) TAS 203, 'Criteria for Testing Products Subject to Cyclic Wind Pressure Loading'.
b. Florida Certificate of Product for materials specified.

2.04 MANUALLY OPERATED DOORS

A. Aluminum:
1. 6063-T6 aluminum alloy or meet requirements of ASTM B221, alloy GS 10a T6.

B. Stiles:
1. 3-1/2 inches by 1-3/4 inches by 0.125 inches (89 mm by 45 mm by 3.175 mm) thick nominal.

C. Top Rails:
1. 3-1/2 inches minimum by 1-3/4 inches by 0.125 inches (89 mm minimum by 45 mm by 3.175 mm) thick nominal.

D. Bottom Rails:
1. 10 inches minimum by 1-3/4 inches by 0.125 inches (254 mm minimum by 45 mm by 3.175 mm) thick nominal.

E. Construction:
1. Manufacturer's standard.

F. Glazing Stops:
1. Snap-in type with neoprene bulb-type glazing. Units shall be glazed from exterior side.

G. Weatherstripping:
1. Neoprene bulb-type.
2. Approved Products. See Section 01 6000 :
a. Peri-Plus Seal (PPS) by Arcadia.
b. Sealair by Kawneer.

H. Framing System Gaskets and Sealants:
1. Manufacturer's standard, recommended by manufacturer for joint type:
2. Sealants: As specified in Framing Components and Accessories.

I. Factory Finishing:
1. Fluorocarbon Carbon: Comply with AAMA 2605:
a. Polyvinylidene Fluoride (PVDF) Resin-base finish (Kynar 500 or Hylar 5000) containing seventy (70) percent minimum (PVDF) in resin portion of formula and providing pencil hardness of 3H. Thermo-cured two-coat system consisting of corrosion inhibiting epoxy primer and topcoat factory-applied over properly pretreated metal.
b. Class II, Clear Anodic Finish: AA-M12C22A31 (Mechanical Finish: nonspecular as fabricated; Chemical Finish etched, medium matte; clear coating 0.40 mils (0.01016 mm) to 0.70 mils (0.01778 mm) thick) complying with AAMA 611.1.
c. Approved Colors:
1) Anodized Bronze by Arcadia.

2) Anodized Bronze by Kawneer.

d. Approved Manufacturers. See Section 01 6000 :
1) BASF.
2) PPG Industries, Inc.
3) Valspar Corporation.

e. Approved Products. See Section 01 6200 :
1) Non-Thermal:
(a) MS362 Medium Stile by Arcadia.
(b) 350 Medium Stile by Kawneer.

f. Approved Products - HVHZ. See Section 01 6200:
1) Single Glazed:
(a) MS362IP Medium Stile by Arcadia.
(b) 350 IR by Kawneer.

2.05 GLAZING

A. Glazing as specified in Section 08 8000: '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: simulate Anodized Bronze.
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.

2.06 HARDWARE

A. Hinging:
1. Top and bottom offset, ball bearing pivots per door leaf.

B. Exit Devices:
1. Entry Doors:
a. Operation:
1) Entry shall be by key. Device shall be locked by cylinder from outside. Key shall be removable when cylinder is in locked or unlocked position.
2) Dogging operation shall be by manufacturer's accessible thumbturn cylinder function.
3) Exterior Trim: Lever Handle or Pull equal to Kawneer CO-9 or Arcadia OPR- 9.
4) Types: Rim Type. Provide type of strike that will allow installation of specified panic devices on storefront system specified.
2. Access Doors:
a. Operation:

1) Access accomplished by dogging device. Dogging operation shall be by accessible, permanent knob, not by removable allen wrench devices.
2) Exterior Trim: Match Entry Doors.
3) Types: Rim Type. Provide type of strike that will allow installation of specified panic devices on storefront system specified.

3. Emergency Egress Exit Doors:
   a. Operation:
      1) Exit only with no dogging.
      2) Exterior Trim: None.
      3) Type: Rim Type with type of strike that will allow installation of specified panic devices on storefront system specified.
      4) Color:
         (a) Equivalent to clear anodized.
      5) Approved Products. See Section 01 6200 :
         (a) Apex Series by Precision.
         (b) 80 Series by Sargent.
         (c) 98 or 99 Rim Series by Von Duprin.

C. Low-Energy Swing Door Operator:
   1. Meet requirements of ICC/ANSI 117.1 and BHMA A156.19.
   2. Wall-mounted push button operation.
   3. Solid state electronic control.
   4. Adjustable closing speed and hold-open range.
   5. Automatic and manual operating modes.
   6. Metal cover finished to match door.
   7. Approved Products. See Section 01 6000 :
      a. Besam SW100 by Besam (subsidiary of ASSA ABLOY) US-Monroe, NC www.besam.us.
      b. Horton Series 7100 Low Energy by Horton Automatics (Division of Overhead Door Corp.), Corpus Christi, TX www.hortondoors.com.
      c. Record 6100 Series Low Energy Swing Door Operator by Record-USA, Monroe, NC www.record-usa.com.
      d. Stanley Magic-Force by Stanley Access Technologies, Farmington, CT www.stanleyaccesstechnologies.com.

D. Thresholds:
   1. Exterior:
      a. Design Criteria: Meet handicap accessibility requirements.
      b. Exterior to Carpet Tile: Similar to Pemko 273 Profile.
      c. At Vestibule at Retail Area with Floor Mat: Acceptable Manufacturers:
         1) Half Saddle Model 254A by Pemko, Ventura, CA www.pemko.com.
         2) Equals approved by Architect before installation. See Section 01 6200.
      d. All Others: Manufacturer's standard.
   2. Interior:
      a. Design Criteria: Meet handicap accessibility requirements.
      b. Carpet Tile / Carpet to Carpet: Similar to Pemko 236.

E. Sweep Strips:
   1. Quality Standard:
      a. Entrance Manufacturer's standard (cover cap with no exposed fasteners).
      b. Pemko 293100 N8.

F. Push / Pulls:
   1. Approved Products. See Section 01 6000:
      a. PBR and OPR-9 by Arcadia.
      b. Kawneer CP and CO-9, clear anodized

G. High Security Cylinders And Cores:
   1. ASSA Instacores with ASSA Profile 62 key system:
      a. Church And Factory Authorized Distributor:
         1) Clark Security Products, 135 West 2950 South, Salt Lake City, UT.
            (a) Local: (801) 487-3227.
            (b) Other: (800) 453-6430.
            (c) FAX: (801) 487-3254.
   2. Medeco cores with Level Six HUK-IC keying system with special Church keyway:
      a. Church And Factory Authorized Distributors:
         1) Intermountain Lock & Supply Co, 3106 South Main, Salt Lake City, UT:
            (a) Utah: (801) 486-0079.
            (b) Other: (800) 453-5386.
            (c) FAX: (801) 485-7205.
         2) Clark Security Products, 135 West 2950 South, Salt Lake City, UT.
            (a) Local: (801) 487-3227.
            (b) Other: (800) 453-6430.
            (c) FAX: (801) 487-3254.
   3. Schlage cores with Primus Level 4+ keying system with special Church side bit milling:
      a. Church And Factory Authorized USA Distributors:
         1) Architectural Building Supply, P O Box 65678, Salt Lake City, UT 84165- 0678 or 2965 South Main St, Salt Lake City, UT 84115.
            (a) (801) 486-3481.
            (b) FAX: (801) 484-6817.

H. Removable Mullion:
   1. Approved Products. See Section 01 6000 .
   2. Von Duprin 4954 steel mullion with KR4954 lock assembly.

I. Kick Plates:
   1. Push side of Door only.
   2. 10 inches (254 mm) high by width of door less 3/4 inch (19 mm) on each side.
   3. Material: 0.050 inch (1.27 mm) thick Stainless Steel.
   4. Acceptable Manufacturers:
      a. Glynn-Johnson, Indianapolis, IN www.glynn-johnson.com.
      b. Hager, St Louis, MO (800) 255-3590 or (314) 772-4400 www.hagerhinge.com.
      c. Ives, Wallingford, CT www.iveshardware.com.
      d. Rockwood Manufacturing Co, Rockwood, PA www.rockwoodmfg.com.
      e. Equal as approved by Architect before bidding. See Section 01 6000.

2.07 FABRICATION

A. Construction shall meet Manufacturer's recommendations.

B. Fabricate components that, when assembled, have following characteristics:
   1. Profiles sharp, straight, and free of defects or deformations.
   2. Accurately fit joints; make joints flush, hairline and weatherproof.
   3. Means to drain water passing joints, condensation within framing members, and moisture migrating within system to exterior.
   4. Physical and thermal isolation of glazing from framing members.
   5. Accommodations for thermal and mechanical movements of glazing and framing to maintain required glazing edge clearances.
   6. Provisions for field replacement of glazing.
   7. Fasteners, anchors, and connection devices that are concealed from view to greatest extent possible.
   8. Framing members shall be internally reinforced and secured at head and sill as necessary for structural performance requirements and for hardware attachment.

C. Fabricate in factory to dimensions required to fit framed openings detailed on Contract Documents. Joints shall be tightly closed.

D. Mortise in manner to give maximum hardware-door connection strength and neatness of appearance. Adequately reinforce with back plates or rivets to hold pivots and closers.

E. Mechanically Glazed Framing Members: Fabricate for flush glazing without projecting stops.

F. Structural-Sealant-Glazed Framing Members: Include accommodations for using temporary support device to retain glazing in place while structural sealant cures.

G. Storefront Framing: Fabricate components for assembly using manufactures standard installation instructions.

H. After fabrication, clearly mark components to identify their locations in Project according to Shop Drawings.

2.08 HARDWARE FINISHES

A. Finishes for steel, brass, or bronze hardware items shall be satin chromium plated.

B. Materials other than steel, brass, or bronze shall be finished to match the appearance of satin chromium plated.

PART 3 EXECUTION

3.01 INSTALLERS

A. Performance Standard Installers: See Section 01 6000. See Section 01 4000 and 'Quality Assurance' in Part 1 'General' for Installer Qualifications of this specification:
   1. General Contractor responsible for Installer(s), verification of qualifications, and performance. Contact Approved Manufacturer's Representative specified in Part 2 'Products' of this specification for potential installers if desired.

3.02 EXAMINATION

A. Verify dimensions, tolerances, and method of attachment with other work.

B. Verify that wall openings and adjoining air and vapor seal materials are ready to receive work of this section.

C. Verify that framed openings comply with Contract Document requirements.

D. Verify floor is level across entire width of automatic door opening.

E. Verify sill conditions are level and/or sloped away from openings as specified.

F. 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.

G. Notify Architect and Owner in writing if framed openings are not as agreed upon.
   1. Do not install storefront entry and window frames until deficiencies in framed openings have been corrected to allow installation of standard entries and windows.
   2. Commencement of Work by installer is considered acceptance of substrate.

3.03 INSTALLATION

A. Install wall system in accordance with manufacturer's instructions.

B. Attach to structure to permit sufficient adjustment to accommodate construction tolerances and other irregularities.

C. Provide alignment attachments and shims to permanently fasten system to building structure.

D. Align assembly plumb and level, free of warp or twist. Maintain assembly dimensional tolerances, aligning with adjacent work.

E. Provide thermal isolation where components penetrate or disrupt building insulation.

F. Install sill flashings. Turn up ends and edges; seal to adjacent work to form water tight dam.

G. Where fasteners penetrate sill flashings, make watertight by seating and sealing fastener heads to sill flashing.

H. Pack fibrous insulation in shim spaces at perimeter of assembly to maintain continuity of thermal barrier.

I. Install doors without warp or rack. Adjust doors and hardware to provide ninety (90) degree operation, tight fit at contact points and smooth operation.

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

K. Thresholds:
   1. Accurately cut thresholds to fit profile of storefront frame. Bed exterior thresholds in specified sealant at contact points with floor and make watertight.

L. 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.

M. Glazing Characteristics:
   1. Interior Vestibule Glazing: Clear.
   2. Exterior Storefront Doors And Sidelights Opening Into Foyers And Corridors:
      a. Clear interior pane and Clear exterior pane with Low E treatment on surface 2.
   3. All Other Exterior Storefront Doors And Storefront:
      a. Obscure interior pane with pattern on surface 3 and Clear exterior pane with Low E treatment on surface 2.

N. Set thresholds in bed of sealant and secure.

O. Install hardware using templates provided.
   1. See Section 08 7100 for hardware installation requirements.

P. Touch-up minor damage to factory applied finish; replace components that cannot be satisfactorily repaired.

3.04 TOLERANCES

A. Maximum Variation from Plumb: 0.06 inch per 3 feet non-cumulative or 0.06 inch per 10 feet, whichever is less.

B. Maximum Misalignment of Two Adjoining Members Abutting in Plane: 1/32 inch.

C. Set plumb, square, level, and in correct alignment and securely anchor to following tolerances:
   1. Variation from plane: Limit to 1/8 inch (3 mm) in 12 feet (3.6 meters); 1/4 inch (6 mm) over total length.
   2. Offset from Alignment: For surfaces abutting in line, limit offset to 1/16 inch (1.6 mm).
   3. Offset at Corners: For surfaces meeting at corner, limit offset to 1/32 inch (0.8 mm).
   4. Diagonal measurements: Limit difference between diagonal measurements to 1/8 inch (3 mm).
   5. Sidelites: Line up horizontal rail in sidelight with door rail.

3.05 FIELD QUALITY CONTROL

A. Provide services of storefront manufacturer's field representative to observe for proper installation of system and submit report.

B. Field Tests and Inspections:
   1. Pull test doors, especially pairs of single doors separated by permanent mullions, to ensure security of opening.
   2. Make all necessary final adjustments to attain normal operation of each door and its mechanical hardware.

C. 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.

3.06 ADJUSTING

A. Adjust operating hardware and sash for smooth operation.

B. Adjust swing doors for proper operation after glazing entry. After repeated operation of completed installation, re-adjust door for optimum operating condition and safety if required.

3.07 CLEANING

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. Remove protective material from pre-finished aluminum surfaces.

C. Wash down surfaces with a solution of mild detergent in warm water, applied with soft, clean wiping cloths, and take care to remove dirt from corners and to wipe surfaces clean.

D. Upon completion of installation, thoroughly clean aluminum surfaces in accordance with AAMA 609 & 610.

E. Remove nonpermanent labels, protective films, and clean surfaces following recommended procedures.
   1. Do NOT remove permanent AAMA/CSA or NFRC labels.

F. Waste Management:
   1. Upon completion and verification of performance of installation, remove surplus materials, excess materials, rubbish, tools and equipment.

3.08 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.

END OF SECTION

SECTION 08 5313
VINYL WINDOWS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Vinyl-framed, factory-glazed windows.

1.02 RELATED REQUIREMENTS

A. Section 07 9200 - Joint Sealants: Sealing joints between frames and adjacent construction.

B. Section 08 8000 - Glazing.

1.03 REFERENCE STANDARDS

A. AAMA/WDMA/CSA 101/I.S.2/A440 - North American Fenestration Standard/Specification for windows, doors, and skylights 2017.

B. AAMA 701/702 - Combined Voluntary Specifications for Pile Weatherstrip and Replaceable Fenestration Weatherseals 2011.

C. AAMA 711 - Voluntary Specification for Self-Adhering Flashing Used for Installation of Exterior Wall Fenestration Products 2013.

D. AAMA 851 - Fenestration Sealants Guide for Windows, Window Walls and Curtain Walls 2009.

E. AAMA 902 - Voluntary Specification for Sash Balances 2016.

F. AAMA 910 - Life Cycle Specifications and Test Methods for AW Class Architectural Windows and Doors 2016.

G. AAMA 1503 - Voluntary Test Method for Thermal Transmittance and Condensation Resistance of Windows, Doors and Glazed Wall Sections 2009.

H. ASTM E90 - Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements 2009 (Reapproved 2016).

I. ASTM E330/E330M - Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference 2014.

J. ASTM E2112 - Standard Practice for Installation of Exterior Windows, Doors and Skylights 2019c.

K. ASTM F588 - Standard Test Methods for Measuring the Forced Entry Resistance of Window Assemblies, Excluding Glazing Impact 2017.

L. NFRC 200 - Procedure for Determining Fenestration Product Solar Heat Gain Coefficient and Visible Transmittance at Normal Incidence 2014, with Errata (2017).

1.04 SUBMITTALS

A. Product Data: Provide component dimensions, anchors, fasteners, glass, internal drainage, and manufacturers literature or cut sheet.
   1. Literature on glazing.
   2. Color selection selected from standard colors.
   3. Window U and SHGC Factors, written certificate from window manufacture.

B. Shop Drawings: Submit before beginning framing. Show rough opening requirements. Indicate opening dimensions, framed opening tolerances, affected related work, and installation requirements.

C. Manufacturer Instructions:
   1. 1. Manufacturer's published installation instructions for windows, flashing, and sealants.

D. Samples: Submit two, 2 by 3 inch in size, illustrating window frame section.

E. Grade Substantiation: Prior to submitting shop drawings or starting fabrication, submit one of the following showing compliance with specified grade:
   1. Evidence of AAMA Certification.

2. Evidence of WDMA Certification.
3. Evidence of CSA Certification.
4. Test report(s) by independent testing agency itemizing compliance and acceptable to authorities having jurisdiction.

F. Test Reports: Prior to submitting shop drawings or starting fabrication, submit test report(s) by independent testing agency showing compliance with performance requirements in excess of those prescribed by specified grade.

G. Warranty Documentation: Submit manufacturer warranty and ensure that forms have been completed in Owner's name and registered with manufacturer.
1. Include following in Operations And Maintenance Manual specified in Section 01 7800:
a. Warranty Documentation:
1) Include copy of final, executed warranty.

1.05 QUALITY ASSURANCE

A. Certifications:
1. Confirmation of ICC report for flashing.

B. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section, with not less than three years of documented experience.

C. Installer Qualifications: Company specializing in performing of type specified and with at least three years documented experience.

D. Identification:
1. When delivered to Project site, windows shall bear permanent label stating model of window and Manufacturer's name, or AAMA label.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Delivery And Acceptance Requirements:
1. Materials shall be delivered in original, unopened packages with labels intact.
2. Examine and report damaged materials to Architect and/or Owner immediately.

B. Storage And Handling Requirements:
1. Provide secure location protected from the weather and other trades.
2. Store window units in an upright position in clean and dry storage area above ground and protect from weather.

C. Protect finished surfaces with wrapping. Do not use adhesive papers or sprayed coatings that bond when exposed to sunlight or weather.

D. Jig, brace, and box the window frame assemblies for transport to minimize flexing of members or joints.

1.07 FIELD CONDITIONS

A. Do not install sealants when ambient temperature is less than 40 degrees F.

B. Maintain this minimum temperature during and after installation of sealants.

1.08 WARRANTY

A. Provide written non-prorated Manufacturer's warranty including:
1. Ten (10) years for glass, parts and labor.

B. Correct defective Work within a ten year period after Date of Substantial Completion.

C. Provide ten year manufacturer warranty for insulated glass units from seal failure, interpane dusting or misting, and replacement of same. Include coverage for degradation of color finish.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Vinyl Windows:

1. Hampton Series if available by Amsco Manufacturing Inc, Tulsa OK. www.amscowindows.com.
   a. Contact Information:
      1) General Information: 1880 South 1045 West Salt Lake City, Utah 84104 Phone (877) 267-2693, www.amscowindows.com.
   b. Or equal approved by Architect.

B. Manufactured Window Units:
   1. Fixed Window:
      a. Hampton Series Picture

2.02 DESCRIPTION

A. Vinyl Windows: Factory fabricated frame and sash members of extruded, hollow, ultra-violet-resistant, polyvinyl chloride (PVC) with integral color; with factory-installed glazing, hardware, related flashings, anchorage and attachment devices.
   1. Performance:
      a. Comply with minimum test requirements of AAMA / WDMA / CSA 101 for classification of specified window in following:
         1) Air infiltration.
         2) Water Resistance.
         3) Wind Load Resistance.
         4) Condensation Resistance.
         5) Uniform structural load.
      b. AAMA / WDMA / CSA 101 classification C30 minimum for windows, tested at 4 feet wide by 7 feet high minimum.
      c. Meet following thermal performance:
         1) Condensation Resistance Factor (CRF) of 48 minimum when tested in accordance with AAMA 1503.
         2) Thermal Transmittance of 0.65 maximum when tested in accordance with AAMA 1503.
   2. Manufactured Units:
      a. Windows:
         1) Factory glazed.
         2) Weatherstripped.
         3) Flanged for installation in framed buildings; Non-flanged for installation in masonry buildings. Installation method shall not require drilling into frame.
         4) Muntin Pattern:
            (a) Determined by building style selection.
         5) Balance mechanism serviceable in field.
         6) Outside window surfaces cleanable from inside building.
      b. Fixed Window:
         1) Hampton Series Picture.
   3. Configuration: As indicated on drawings.
      a. Product Type: AP - Awning projected window, C - Casement window, DW - Dual windows, FW - Fixed window, H - Hung window, vertically sliding, HS - Horizontal sliding window, in accordance with AAMA/WDMA/CSA 101/I.S.2/A440.
   4. Color: Selected from manufacturer's standard colors.
   5. Size to fit openings with minimum clearance around perimeter of assembly providing necessary space for perimeter seals.
   6. Framing Members: Fusion welded corners and joints, with internal reinforcement where required for structural rigidity; concealed fasteners.
   7. System Internal Drainage: Drain to exterior side by means of weep drainage network any water entering joints, condensation within glazing channel, or other migrating moisture within system.

8. Glazing Stops, Trim, Flashings, and Accessory Pieces: Formed of rigid PVC, fitting tightly into frame assembly.
9. Mounting Flange: Integral to frame assembly, providing weather stop at entire perimeter of frame.

2.03 COMPONENTS

A. Obscure Glazing Characteristics:
   1. Obscure interior pane with pattern on surface 3 and Clear exterior pane with Milgard SunCoatMax 366 Low-E treatment on surface 2.
   2. Windows into Foyers:
      a. Clear interior pane and Clear exterior pane with Milgard SunCoatMax 366 Low-E treatment on surface 2.

B. Clear Glazing Characteristics:
   1. Clear exterior pane and Clear interior pane with Milgard SunCoat Max 366 Low-E treatment on surface 2 or 3.

C. Glazing Beads: Manufacturer's standard.

D. Frame Depth: Manufacturer's standard.

E. Anchoring Devices:
   1. 1. Aluminum or stainless steel.

F. Fasteners/: Stainless steel.

G. Flashing: Accessories: Provide related flashings, anchorage and attachment devices as necessary for full assembly.
   1. Self-adhesive rubberized asphalt with protective sheet.
   2. Acceptable Products:
      a. Flexwrap by duPont Tyvek, Wilmington, DE www.tyvek.com.
      b. Eternabond, Mundelein, IL www.eternabond.com.
      c. FortiFlash 20 mil by Fortifiber, Reno, NV www.fortifiber.com.
      d. Vycor Self-Adhered Flashing by Grace Construction Products, Cambridge, MA www.na.graceconstruction.com.
      e. Optiflash B-20 by Covalence Coated Products, Homer, LA www.covalencecoatedproducts.com.
      f. BT25XL Window Sealing Tape by Protecto Wrap, Denver, CO www.protectowrap.com.
      g. Rufco-Shield Window & Door Flashing by Raven Industries, Sioux Falls, SD www.ravenind.com.

H. Glazing Sealant: As specified in Section 08 8000, sealant Type [___].

I. Exterior Window Sills: Refer to drawings.

J. Sealants for Setting Window Sill Pan Flashing: Provide butyl tape, non-hardening butyl, polyurethane, or silicone sealant; in compliance with ASTM E2112 installation practices.
   1. Refer to Section 07 9200 for additional requirements.

PART 3 EXECUTION

3.01 EXAMINATION

A. Evaluation And Assessment:
   1. Openings:
      a. Examine openings for adequacy in allowing successful installation and operation.
      b. Verify openings are prepared to specified dimensions and are plumb and level.
   2. Notify Architect in writing of inadequate conditions.
      a. Do not install windows until conditions have been corrected.
   3. Commencement of Work by installer is considered acceptance of substrate.

3.02 INSTALLATION

A. Install window unit assemblies in accordance with manufacturers instructions and applicable building codes.

B. Install windows in accordance with ASTM E2112.

C. Attach window frame and shims to perimeter opening to accommodate construction tolerances and other irregularities as necessary.

D. Align window plumb and level, free of warp or twist, and maintain dimensional tolerances and alignment with adjacent work.

E. Set sill members and sill flashing in continuous bead of sealant.

F. Provide thermal isolation where components penetrate or disrupt building insulation. Pack fibrous insulation in shim spaces at perimeter of assembly to maintain continuity of thermal barrier.

G. Apply flashing.

H. Install operating hardware.

3.03 TOLERANCES

A. Maximum Variation from Level or Plumb: 0.06 inches every 3 ft non-cumulative or 0.5 inches per 100 ft, whichever is less.

3.04 FIELD QUALITY CONTROL

A. Field Inspections:
   1. After installation of windows and before installation of exterior wall finish, inspect windows and compare to installation standard accepted at Pre-Installation Conference.

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

3.05 CLEANING

A. Remove protective material from pre-finished surfaces.

B. Wash surfaces by method recommended and acceptable to window manufacturer; rinse and wipe surfaces clean.

C. Remove excess glazing sealant and other contaminants by moderate use of mineral spirits or other solvent acceptable to sealant manufacturer and appropriate for application indicated. Maintain protection and provide final cleaning.

END OF SECTION

SECTION 08 7100
DOOR HARDWARE

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Hardware for wood and aluminum doors.

B. Thresholds.

C. Weatherstripping and gasketing.

1.02 RELATED REQUIREMENTS

A. Section 07 9200 - Joint Sealants: Sealants for setting exterior door thresholds.

B. Section 08 0671 - Hardware Group and Keying Schedule: Schedule of door hardware sets.

1.03 REFERENCE STANDARDS

A. ADA Standards - Americans with Disabilities Act (ADA) Standards for Accessible Design 2010.

B. BHMA A156.2 - American National Standard for Bored and Preassembled Locks & Latches 2017.

C. BHMA A156.16 - American National Standard for Auxiliary Hardware 2018.

D. BHMA A156.28 - American National Standard for Recommended Practices for Mechanical Keying Systems 2018.

E. DHI (H&S) - Sequence and Format for the Hardware Schedule 1996.

F. NFPA 80 - Standard for Fire Doors and Other Opening Protectives 2019.

G. NFPA 105 - Standard for Smoke Door Assemblies and Other Opening Protectives 2019.

1.04 ADMINISTRATIVE REQUIREMENTS

A. Coordinate the manufacture, fabrication, and installation of products that door hardware is installed on.

B. Sequence installation to ensure utility connections are achieved in an orderly and expeditious manner.

C. Furnish templates for door and frame preparation to manufacturers and fabricators of products requiring internal reinforcement for door hardware.

D. Provide hardware templates to Sections 08 1416 within fourteen (14) days after Architect approves hardware schedule.

1.05 SUBMITTALS

A. Product Data: Manufacturer's catalog literature for each type of hardware, marked to clearly show products to be furnished for this project, and includes construction details, material descriptions, finishes, and dimensions and profiles of individual components.
   1. Manufacturer's cut sheets.
   2. 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.
   3. Copy of hardware schedule.
   4. Written copy of keying system explanation.

B. Shop Drawings - Door Hardware Schedule: Submit detailed listing that includes each item of hardware to be installed on each door. Use door numbering scheme as included in Contract Documents.
   1. Submit hardware schedule indicating hardware to be supplied.
   2. 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.
3. Prepared by or under supervision of Architectural Hardware Consultant (AHC).
4. Comply with DHI (H&S) using door numbers and hardware set numbers as indicated in construction documents.
   a. Submit in vertical format, refer to Section 08 0671.
5. List groups and suffixes in proper sequence.
6. Provide complete description for each door listed.
7. Provide manufacturer's and product names, and catalog numbers; include functions, types, styles, sizes and finishes of each item.
8. Include account of abbreviations and symbols used in schedule.

1.06 QUALITY ASSURANCE

A. Installer Qualifications: Company specializing in performing work of the type specified for commercial door hardware with at least three years of documented experience.

1.07 DELIVERY, STORAGE, AND HANDLING

A. 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.

B. Include fasteners and accessories necessary for installation and operation of finish hardware in same package.

PART 2 PRODUCTS

2.01 SUPPLIERS

A. Approved Suppliers.
   1. Architectural Building Supply, Salt Lake City, UT www.cookandboardman.com:
      a. Contact Information: Russ Farley, phone (800) 574-4369, fax 801-484-6817, or e-mail russf@absdoors.com.
   2. Beacon Metals Inc, Salt Lake City, UT www.beacon-metals.com:
      a. Contact Information: Jared Butler, phone (801) 486-4884, cell (435) 216-2297, FAX 801- 485-7647, or e-mail Jared@beacon-metals.com.
   3. Midwest D-Vision Solutions, Salt Lake City, UT www.mwdsutah.com.
      a. Contact Information: Dan Mercer, office (801) 377-4355, cell (801) 618-9456, e-mail danm@mwdsutah.com.

2.02 DESIGN AND PERFORMANCE CRITERIA

A. Fasteners:
   1. Provide fasteners of proper type, size, quantity, and finish that comply with commercially recognized standards for proposed applications.
      a. Aluminum fasteners are not permitted.
      b. Provide phillips flat-head screws with heads finished to match door surface hardware unless otherwise indicated.
   2. Provide machine screws for attachment to reinforced hollow metal and aluminum frames.
      a. Self-drilling (Tek) type screws are not permitted.
   3. Provide stainless steel machine screws and lead expansion shields for concrete and masonry substrates.
   4. Provide wall grip inserts for hollow wall construction.
   5. Provide spacers or sex bolts with sleeves for through bolting of hollow metal doors and frames.
   6. Concealed Fasteners: Do not use through or sex bolt type fasteners on door panel sides indicated as concealed fastener locations, unless otherwise indicated.

2.03 FINISHES

A. Hardware Finishes:
   1. Finishes for brass or bronze hardware items shall match existing:

a. ANSI / BHMA Finish
1) Base Metal: Brass. Bronze.
2. Finishes for flat goods items to match existing hardware finish:
a. ANSI / BHMA Finish.

2.04 HINGES

A. Manufacturer Contact List:
1. Hager Companies, St Louis, MO www.hagerhinge.com.
2. Ives, New Haven, CT www.iveshardware.com.
3. McKinney, Scranton, PA www.mckinneyhinge.com.
4. PBB, Ontario, CA www.pbbinc.com.
5. Stanley (dormakaba Americas), Indianapolis IN www.stanleyhardwarefordoors.com/products/.

B. Hinges:
1. Doors:
a. Sizes:
1) Non-Fire-Rated Doors:
(a) 1-3/4 inch 44.5 mm non-fire-rated wood doors in wood frames: 4 inches by 4 inches.
(b) 1-3/8 inch 35 mm wood or metal doors: 3-1/2 inches by 3-1/2 inches.
2. Use non-removable pins on exterior opening doors.
3. Hinges on exterior doors shall be solid brass, plated to achieve specified finish.
4. Approved Products.
a. Interior:
1) Hager: BB 1279.
2) Ives: 5BBI.
3) McKinney: TA 2714.
4) MacPro / McKinney: MPB79.
5) PBB: BB81.
6) Stanley: FBB 179.
b. Exterior:
1) Hager: BB 1191.
2) Ives: 5BBI.
3) McKinney: TA 2314.
4) PBB: BB21.
5) Stanley: FBB 191.

2.05 SECURING DEVICES

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.

B. Manufacturers:
1. Manufacturer List:
a. Precision Hardware, Romulus, MI www.precisionhardware.com.
b. Rockwood, Manufacturing Co, Rockwood, PA www.rockwoodmfg.com.
c. Sargent, New Haven, CT www.sargentlock.com.
d. Schlage, Colorado Springs, CO www.schlage.com.
e. Von Duprin, Indianapolis, IN www.vonduprin.com.

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

C. General:
1. Backsets shall be 2-3/4 inches (70 mm).

D. Flush Bolts:
1. Rod length: 12 inch minimum.
2. Acceptable Products:
a. Manual Flush Bolts (Wood Doors):
1) Hager 283D.
2) Ives FB458.
3) Rockwood 555.
3. Dust Proof Strike:
a. Floor and/or threshold.
b. Type Two Acceptable Products:
1) Hager: 280X.
2) Ives: DP2.
3) Rockwood 570.
4) Equal as approved by Architect before installation. See Section 01 6000.

E. Locksets And Latchsets:
1. Design Criteria:
a. Grade 1 Heavy Duty Key-In Lever Cylindrical Lockset:
1) ANSI/BHMA A156.2 Series 4000 Grade 1.
2) Meet ADA Compliant ANSI A117.1 Accessibility Code.
3) Door Lever:
(a) Meet California code for 1/2 inch (12.7 mm) or less return to door.
(b) Vandal-Resistant Lever.
4) Deadlocking Latchbolt.
b. Grade 1 Heavy Duty Key-In Lever Cylindrical Lockets:
1) ANSI/BHMA A156.2 Series 4000 Grade 1.
2) Meet UL 3 hour fire rating.
3) Meet ADA Compliant ANSI A117.1 Accessibility Code.
4) Door Lever:
(a) Meet California code for 1/2 inch (12.7 mm) or less return to door.
(b) Vandal-Resistant Lever.
5) Deadlocking Latchbolt.
c. Grade 2 Standard Duty Key-In Lever Cylindrical Lockset:
1) ANSI/BHMA A156.2 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. Approved Products. See Section 01 6000:
1) Grade 1 Heavy Duty Key-In Lever Cylindrical Locksets (Used only in Meetinghouse Module doors with CES Seminary and Institute additions:
(a) 9K Series Best Lock with 15D Lever by Stanley standard cylinders - (I/C cores may be used when authorized by AEC).
(b) 195 Series with American Lever by Marks USA.
(c) 10 Line Series with L Lever by Sargent.
(d) ND Series with Rhodes (RHO) Lever by Schlage.
(e) 5400LN Series with Augusta (AU) Lever by Yale.
2) Grade 1 Heavy Duty Key-In Lever Cylindrical Locksets (Used only in Meetinghouse Module doors with CES Seminary and Institute additions):

(a) 9K Series Best Lock with 15D Lever by Stanley standard cylinders - (I/C cores may be used when authorized by AEC).
(b) 195 Series with American Lever by Marks USA.
(c) 10 Line Series with L Lever by Sargent.
(d) ND Series with Rhodes (RHO) Lever by Schlage.
(e) 5400LN Series with Augusta (AU) Lever by Yale.

3) Grade 2 Standard Duty Key-In Lever Cylindrical Locksets:
(a) 7K Series Best Lock with 15D Lever by Stanley standard cylinders.
(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.

F. Deadbolts:
1. Approved Products. See Section 01 6000.
a. Match manufacturer of locksets.

G. Standard Cylinders:
1. Provide cylinders for interior exit devices requiring cylinders.

H. Exit Devices:
1. Use operable lever trim.
2. Approved Products.
a. Apex Series by Precision.
b. 80 Series by Sargent.
c. 99 or 98 Series by Von Duprin.
d. 7100 Series by Yale.

2.06 DOOR PULLS AND PUSH BARS

A. Standard Door Push / Pulls:
1. Size: 15 inches (380 mm) by 3-1/2 inch (89 mm).
2. Acceptable Products:
a. PS3515, PL3515 / 80301 by Glynn-Johnson, Indianapolis, IN www.glynn-johnson.com.
b. 39E, 30S by Hager, St Louis, MO www.hagerhinge.com.
c. 8200, 8302 by Ives, Wallingford, CT www.iveshardware.com.
d. 70B, 105x70B by Rockwood Manufacturing Co, Rockwood, PA www.rockwoodmfg.com.
e. Equal as approved by Architect before installation. See Section 01 6000.

2.07 COORDINATORS

A. Approved Products. See Section 01 6000:
1. CO2 x FB1 by Glynn Johnson.
2. 297D by Hager.
3. Series 900 by Ives.
4. 1600 Series by Rockwood.

B. Meeting Stiles:
1. Acceptable Products:
a. [Insert Product] by Hager.
b. 136N by NGP.
c. 369AS by Pemko.

C. Astragals:
1. Acceptable Products:
a. 835S by Hager.
b. 139 DKB by NGP.

c. 357D by Pemko.

2.08 CLOSERS

A. Approved Manufacturers.
1. 8900 Series by Dorma Architectural Hardware, Reamstown, PA www.dorma.com/usa.
2. 1461 Series by LCN Closers, Princeton, IL www.lcnclosers.com.
3. 8501 Series by Norton Door Controls, Charlotte, NC www.nortondoorcontrols.com.
4. 1431 Series by Sargent, New Haven, CT www.sargentlock.com.
5. D-3550/D-3551 Series by Stanley (dormakaba Americas), Indianapolis IN www.stanleyhardwarefordoors.com/products/.

B. Surface-Mounted Overhead Door Closers:
1. Closers provided under this Section shall be from same Manufacturer.
2. Provide parallel arms on closers unless door position in relation to adjacent wall requires otherwise. Provide covers.
3. Door Closers on doors that swing 180 degree as shown on Contract Documents:
   a. Closers shall allow for 180 degree opening without engaging stop function. Wall stop or Floor stop is specified in Door Schedule.
   b. Closers shall have following features:
      1) Adjustable sweep speed.
      2) Adjustable backcheck.
      3) Non-handed, non-sized.
      4) Hold open arm function (Friction Hold Open) (Non-Fire-Rated Corridors).
      5) Delayed action closing where noted on Door Schedule.
4. Door Closers on doors that swing 90 degree as shown on Contract Documents:
   a. Closers shall allow for 100 degree opening with engaging stop function.
   b. Closers shall have following features:
      1) Adjustable sweep speed.
      2) Adjustable backcheck.
      3) Non-handed, non-sized.
      4) Hold open arm function with thumb turn or handle control (Cush And Hold) (Non-Fire- Rated Corridors).
      5) Delayed action closing where noted on Door Schedule.

2.09 KICK PLATES

A. Acceptable Manufacturers:
1. Glynn-Johnson, Indianapolis, IN www.glynn-johnson.com.
2. Hager, St Louis, MO (800) 255-3590 or (314) 772-4400 www.hagerhinge.com.
3. Ives, Wallingford, CT www.iveshardware.com.
4. Rockwood Manufacturing Co, Rockwood, PA www.rockwoodmfg.com.

B. Kick Plates: Provide along bottom edge of push side of every door with closer, except aluminum storefront and glass entry doors, unless otherwise indicated.
1. Material: 0.050 inch thick stainless steel.
2. Size: 10 inch high by 2 inch less door width (LDW) on push side of door.

2.10 STOPS AND HOLDERS

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

B. Stops:

1. Use wall type stops unless indicated otherwise on Door Schedule.
2. Provide model appropriate for substrate. Wall stops may be either cast or wrought.
3. Acceptable Products:
    a. Interior Wall Exterior Wall Floor Mount Overhead.
    b. Hager 236W 255W 243F
    c. Ives WS407CCV WS447 FS438
    d. Rockwood 409 474 / 475 440 / 441
    e. Glynn Johnson GJ 90S
    f. Sargent 590S Series

C. Door Stops And Holders:
1. Acceptable Products:
    a. Hager: 268F, 268S or 256S, 256W.
    b. Ives: WS444, WS449, FS446, FS450.
    c. Rockwood: 472, 473, 476, 477.

2.11 ACCESSORIES

A. Manufacturers:
1. Manufacturer Contact List:
    a. Hager, St Louis, MO www.hagerhinge.com.
    b. Ives, Wallingford, CT www.iveshardware.com.
    c. NGP - National Guard Products, Memphis, TN www.ngpinc.com.
    d. Pemko Manufacturing, Ventura, CA www.pemko.com.

B. Acoustical Seals:
1. Color as selected by Architect.
2. Acceptable Products:
    a. Door Bottom Shoe for Wood Door:
        1) 13VDkB by NGP.
        2) 211DV by Pemko.
    b. Door Bottom Shoe for Metal Door:
        1) 779S-A by Hager.
        2) 35EV by NGP.
        3) 217AV by Pemko.

C. Smoke Gaskets:
1. Color as selected by Architect.
2. Acceptable Products:
    a. 726 by Hager.
    b. 5050 by NGP.
    c. PK 55 by Pemko.

D. Sweepstrip (metal door bottom):
1. Clear anodized aluminum with black neoprene insert.
2. Reduce infiltration of air, wind, dust, rain, and snow.
3. Meet UL requirements.
4. For use with saddle thresholds.
5. Acceptable Products:
    a. 750S CLR by Hager.
    b. 198N A by NGP.
    c. 321 CN by Pemko.
    d. Equal as approved by Architect before bidding. See Section 01 6000.

E. Thresholds:
1. Acceptable Products:
    a. Design Criteria:
        1) Meet handicap accessibility requirements (ADA):

b. Interior Doors at Acoustic Seals, Approved Products:
   1) Carpet threshold (carpet to carpet):
      (a) 505S DBA by Hager.
      (b) 414 DKB by NGP.
      (c) 236 D by Pemko.
   2) Carpet threshold (carpet to concrete, wood, synthetic, or resilient flooring:
      (a) 417 DKB by NGP.
      (b) 174 D by Pemko.
   3) Saddle threshold:
      (a) 418S DBA by Hager.
      (b) 411 DKB by NGP.
      (c) 151 D by Pemko.

2.12 WEATHERSTRIPPING AND GASKETING

A. Weatherstripping:
   1. Acceptable Products:
      a. Finish: clear anodized aluminum.
      b. Perimeter:
         1) 800S by Hager.
         2) A625 A by NGP.
         3) 35041 CP by Pemko.
      c. Equal as approved by Architect before bidding. See Section 01 6000.
      d. Bottom (see Sweepstrip).

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that doors and frames are ready to receive this work; labeled, fire-rated doors and frames are properly installed, and dimensions are as indicated on shop drawings.

B. Verify that electric power is available to power operated devices and of correct characteristics.

3.02 INSTALLATION

A. Install hardware in accordance with manufacturer's instructions and applicable codes.

B. Install hardware on fire-rated doors and frames in accordance with applicable codes and NFPA 80.

C. Install hardware for smoke and draft control doors in accordance with NFPA 105.

D. Use templates provided by hardware item manufacturer.

E. Do not install surface mounted items until application of finishes to substrate are fully completed.

F. Door Hardware Mounting Heights: Distance from finished floor to center line of hardware item. As indicated in following list; unless noted otherwise in Door Hardware Schedule or on drawings.
   1. Mounting heights in compliance with ADA Standards:
      a. Locksets: 40-5/16 inch.
      b. Push Plates/Pull Bars: 42 inch.
      c. Deadlocks (Deadbolts): 48 inch.
      d. Exit Devices: 40-5/16 inch.
      e. Door Viewer: 43 inch; standard height 60 inch.

G. 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.

H. Set exterior door thresholds with full-width bead of elastomeric sealant at each point of contact with floor providing a continuous weather seal; anchor thresholds with stainless steel countersunk screws.

1. Refer to Section 07 9200 for additional requirements.

3.03 FIELD QUALITY CONTROL

A. Owner's Instructions:

1. Before Final Acceptance Meeting, send master keys to Janean Dean.

3.04 ADJUSTING

A. Adjust hardware for smooth operation.

B. Adjust gasketing for complete, continuous seal; replace if unable to make complete seal.

C. Adjust closers to provide maximum opening force as required by governing code authority and proper backcheck and sweep speed.

3.05 CLEANING

A. Clean finished hardware in accordance with manufacturer's written instructions after final adjustments have been made.

B. Clean adjacent surfaces soiled by hardware installation.

C. Replace items that cannot be cleaned to manufacturer's level of finish quality at no additional cost.

3.06 PROTECTION

A. Do not permit adjacent work to damage hardware or finish.

END OF SECTION

SECTION 08 8000
GLAZING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Insulating glass units.

B. Glazing units.

C. Glazing compounds and accessories.

1.02 REFERENCE STANDARDS

A. 16 CFR 1201 - Safety Standard for Architectural Glazing Materials Current Edition.

B. ANSI Z97.1 - American National Standard for Safety Glazing Materials Used in Buildings - Safety Performance Specifications and Methods of Test 2015.

C. ASTM C1036 - Standard Specification for Flat Glass 2016.

D. ASTM C1048 - Standard Specification for Heat-Strengthened and Fully Tempered Flat Glass 2018.

E. ASTM C1172 - Standard Specification for Laminated Architectural Flat Glass 2014.

F. ASTM C1193 - Standard Guide for Use of Joint Sealants 2016.

G. ASTM C1281 - Standard Specification for Preformed Tape Sealants for Glazing Applications 2016.

H. ASTM C1376 - Standard Specification for Pyrolytic and Vacuum Deposition Coatings on Flat Glass 2015.

I. GANA (GM) - GANA Glazing Manual 2008.

J. GANA (SM) - GANA Sealant Manual 2008.

K. GANA (LGRM) - Laminated Glazing Reference Manual 2009.

L. IGMA TM-3000 - North American Glazing Guidelines for Sealed Insulating Glass Units for Commercial & Residential Use 1990 (2016).

1.03 SUBMITTALS

A. Product Data on Insulating Glass Unit, Glazing Unit and Glazing Types: Provide structural, physical and environmental characteristics, size limitations, special handling and installation requirements.

B. Product Data on Glazing Compounds and Accessories: Provide chemical, functional, and environmental characteristics, limitations, special application requirements, and identify available colors.

C. Samples: Submit two samples 12 by 12 inch in size of glass units.

D. Installer's Qualification Statement.

E. Warranty Documentation: Submit manufacturer warranty and ensure that forms have been completed in Owner's name and registered with manufacturer.

1.04 QUALITY ASSURANCE

A. Perform Work in accordance with GANA (GM), GANA (SM), GANA (LGRM), IGMA TM-3000, for glazing installation methods. Maintain one copy on site.

B. 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.

1.05 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.

1.06 FIELD CONDITIONS

A. Do not install glazing when ambient temperature is less than 40 degrees F.

B. 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.

1.07 WARRANTY

A. Insulating Glass Units: Provide a ten (10) year manufacturer warranty, signed by insulating-glass Manufacturer/Fabricator, agreeing to replace insulating-glass units to include coverage for seal failure, moisture, interpane dusting or misting, including providing products to replace failed units from date of installation.

B. Laminated Glass: Provide a ten (10) year manufacturer warranty to include coverage for delamination, including providing products to replace failed units from date of installation.

C. Installer's Warranty:
   1. 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.

D. Heat Soaked Tempered Glass: Provide a five (5) year manufacturer warranty to include coverage for spontaneous breakage of fully tempered glass caused by nickel sulfide (NiS) inclusions.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Manufacturer Contact List for Low E Glazing:
   1. AGC Flat glass North America, Kingsport, TN www.us.agc.com.
   2. Carlex (subsidiary of Central Glass Co., Ltd., Nashville, TN www.carlex.com.
   3. Guardian Industries Corp., Auburn Hills, MI www.guardian.com.
   4. Oldcastle Building Envelope, Santa Monica, CA www.oldcastlebe.com
   5. Pilkington North America Inc., Toledo, OH www.pilkington.com.
   6. Vitro Architectural Glass (formerly PPG glass), Cheswick, PA www.ppgglass.com or PPG Canada Ltd, Glass Division, Toronto, ON (416) 789-3331.

2.02 PERFORMANCE REQUIREMENTS - EXTERIOR GLAZING ASSEMBLIES

A. Glass units for exterior fixed windows, monumental and vent sash window units shall have U Factor of 0.34 and SHGC of 0.33. Provide written Manufacturer's confirmation with glazing submittal.

B. Exterior Window Glazing:
   1. Thickness: 1/8 inch (3 mm) minimum, Double Strength (Insulated Glass).
   2. Glazing shall have following characteristics:
      a. Low-Emissivity (or Low E):
         1) Design Criteria:

(a) Clear:
(b) Meet requirements of ASTM C1036, Type I, Class I, Quality Q3.
(c) Location: Surface 2.

2) Low-Emissivity (or Low E) Acceptable Product:
(a) Performance Standard:
(b) 70 percent Visible Light Transmission (VLT).
(c) 0.29 U-value winter.
(d) 0.27 U-value summer.
(e) 0.38 Solar Heat Gain Coefficient (SHGC).
(f) 0.44 Shading Coefficient.
(g) 11 percent Visible Light Reflectance.
(h) Quality Standard:
(i) Cardinal LoE³-366.
(j) Solarban 70 XL.
(k) Other low E glazing system standard with window manufacturer that meets or exceeds performance characteristics of specified glazing is acceptable as approved by Architect before bidding. See Section 01 6000.

3) Acceptable Manufacturers:
(a) AGC.
(b) Guardian.
(c) Vitro Architectural Glass.
(d) Equal as approved by Architect before bidding. See Section 01 6000.

b. Obscure:
1) Design Criteria:
(a) Meet requirements of ASTM C1036, Type II, Class I, Form 3, Quality Q8, Pattern - #62.

c. Glazing in Windows within 24 inches (600 mm) of Exterior Doors:
1) Design Criteria:
(a) Tempered.
(b) Meet requirements of ASTM C1048, Kind FT, Condition A, Type I, Class I, Quality Q3.

C. Storefront Glazing:
1. Thickness: 1/4 inch (6 mm).
2. Glazing shall have following characteristics:
a. Low-Emissivity (or Low E):
1) Design Criteria:
(a) Clear.
(b) Insulated Glass: 1 inch (25 mm) units with 1/2 inch (13 mm) airspace and two (2) 1/4 inch (6 mm) lites.
(c) Meet requirements of ASTM C1036, Type I, Class I, Quality Q3.
(d) Location: Surface 2.

2) Low-Emissivity (or Low E) Acceptable Product:
(a) Performance Standard:
(b) 64 percent Visible Light Transmission (VLT).
(c) 0.28 U-value winter.
(d) 0.26 U-value summer.
(e) 0.27 Solar Heat Gain Coefficient (SHGC).
(f) 0.32 Shading Coefficient.
(g) 12 percent Visible Light Reflectance.
(h) Quality Standard:
(i) Cardinal LoE³-366.
(j) Solarban 70 XL.

(k) Equal product by Acceptable Manufacturer as approved by Architect before bidding. See Section 01 6000.

3) Acceptable Manufacturers:
(a) AGC.
(b) Guardian.
(c) Vitro Architectural Glass.
(d) Equal as approved by Architect before bidding. See Section 01 6000.

b. Obscure:
1) Design Criteria:
(a) Meet requirements of ASTM C1036, Type II, Class I, Form 3, Quality Q8, Pattern - #62.

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.

D. Fabrication:
1. Except where glass exceeds 66 inches (1 675 mm) in width, cut clear glass so any wave will run horizontally when glazed.
2. Sealed, Insulating Glazing Units:
a. Double pane, sealed insulating glass units. Install at exterior windows and exterior aluminum-framed storefront.
b. Unit Thickness: 5/8 inch (16 mm) minimum, one inch (25 mm) maximum.
c. Insulated obscure units shall consist of one pane of specified obscure glass and one pane of standard glass.
d. Type Seal:
1) Metal-to-glass bond and separated by 1/2 inch (12.7 mm) dehydrated air space.
2) Use non-hardening sealants.
e. Approved Fabricators. See Section 01 6000
1) Members of Sealed Insulating Glass Manufacturer's Association.

2.03 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

C. 3M Sun Control Window Fillm Night Vision NV-25: -DI retail windows and vestibule windows only by Owner approval.

PART 3 EXECUTION

3.01 VERIFICATION OF CONDITIONS

A. Verify that openings for glazing are correctly sized and within tolerances, including those for size, squareness, and offsets at corners.

B. Verify that the minimum required face and edge clearances are being provided.

C. Verify that surfaces of glazing channels or recesses are clean, free of obstructions that may impede moisture movement, weeps are clear, and support framing is ready to receive glazing system.

D. Verify that sealing between joints of glass framing members has been completed effectively.

E. Proceed with glazing system installation only after unsatisfactory conditions have been corrected.

3.02 PREPARATION

A. Clean contact surfaces with appropriate solvent and wipe dry within maximum of 24 hours before glazing. Remove coatings that are not tightly bonded to substrates.

B. Seal porous glazing channels or recesses with substrate compatible primer or sealer.

C. Prime surfaces scheduled to receive sealant where required for proper sealant adhesion.

3.03 INSTALLATION, GENERAL

A. Install glazing in compliance with written instructions of glass, gaskets, and other glazing material manufacturers, unless more stringent requirements are indicated, including those in glazing referenced standards.

B. Install glazing sealants in accordance with ASTM C1193, GANA (SM), and manufacturer's instructions.

C. Do not exceed edge pressures around perimeter of glass lites as stipulated by glass manufacturer.

D. Set glass lites of system with uniform pattern, draw, bow, and similar characteristics.

E. Set glass lites in proper orientation so that coatings face exterior or interior as indicated.

F. Prevent glass from contact with any contaminating substances that may be the result of construction operations such as, and not limited to the following; weld splatter, fire-safing, plastering, mortar droppings, etc.

3.04 FIELD QUALITY CONTROL

A. See Section 01 4000 - Quality Requirements, for additional requirements.

B. Glass and Glazing product manufacturers to provide field surveillance of the installation of their products.

C. Monitor and report installation procedures and unacceptable conditions.

3.05 CLEANING

A. Remove excess glazing materials from finish surfaces immediately after application using solvents or cleaners recommended by manufacturers.

B. Remove non-permanent labels immediately after glazing installation is complete.

C. Clean glass and adjacent surfaces after sealants are fully cured.

3.06 PROTECTION

A. After installation, mark pane with an 'X' by using removable plastic tape or paste; do not mark heat absorbing or reflective glass units.

B. Remove and replace glass that is damaged during construction period prior to Date of Substantial Completion.

END OF SECTION

SECTION 09 0561
COMMON WORK RESULTS FOR FLOORING PREPARATION

PART 1 GENERAL

1.01 SECTION INCLUDES

A. This section applies to floors identified in Contract Documents that are receiving the following types of floor coverings:
   1. Carpet tile.
   2. Thin-set ceramic tile and stone tile.
   3. Preparing floor substrate to receive flooring as described in Contract Documents.

B. Preparation of new and existing concrete floor slabs for installation of floor coverings.

C. Testing of concrete floor slabs for moisture and alkalinity (pH) (See form below).

D. Remediation of concrete floor slabs due to unsatisfactory moisture or alkalinity (pH) conditions.
   1. Contractor shall perform all specified remediation of concrete floor slabs. If such remediation is indicated by testing agency's report and is due to a condition not under Contractor's control or could not have been predicted by examination prior to entering into the contract, a contract modification will be issued.

1.02 REFERENCE STANDARDS

A. ASTM F710 - Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring 2019, with Editorial Revision (2020).

B. ASTM F1869 - Standard Test Method for Measuring Moisture Vapor Emission Rate of Concrete Subfloor Using Anhydrous Calcium Chloride 2016a.

C. ASTM F2170 - Standard Test Method for Determining Relative Humidity in Concrete Floor Slabs Using in situ Probes 2019a.

D. ICRI - Concrete Slab Moisture Testing Program Current.

1.03 ADMINISTRATIVE REQUIREMENTS

A. Review condition of floor regarding compliance with concrete installation tolerances and other work necessary to prepare floors for installation of flooring.

B. Review additional agenda items all related flooring sections.

C. Scheduling:
   1. Concrete Moisture Testing:
      a. General Contractor Responsibility to provide:
         1) Maintain ambient temperatures and relative humidity conditions as specified in Field Conditions in Part 1 of this specification before Moisture Testing Agency will test for concrete moisture.
         2) Provide access for and cooperate with Moisture Testing Agency.

1.04 DELIVERY, STORAGE, AND HANDLING

A. Deliver, store, handle, and protect products in accordance with manufacturer’s instructions and recommendations.

B. Deliver materials in manufacturer’s packaging; include installation instructions.

C. Keep materials from freezing.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.01 PREPARATION

A. Flooring Preparation:
   1. General:

a. Prepare floor substrate in accordance with ASTM F710, ‘Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring’ (This standard is used for preparing concrete floors for all flooring).
    1) Required RH test and alkalinity test of concrete slab has been performed.
b. Concrete floor slab patching:
    1) Cracks, chips and joints must be properly patched or repaired.
c. Concrete surface cured, clean, dry, and free of dirt, dust, grease, wax, and other foreign substances that will compromise flooring installations.
    1) Removal of curing compounds.
    2) Remove paint, sealer, grease, oil, silicone sealants, and other materials incompatible with flooring adhesives.
    3) Removal of overspray from painted walls (essential so glue will stick).
d. Vacuum and damp mop floor areas to receive flooring before flooring installation.

2. Carpeted floor areas:
    a. Prepare floor substrate in accordance with Carpet And Rug Institute (CRI) best practices to receive carpet installation and to provide installation that meets Carpet Manufacturer's warranty requirements.
3. Carpet Accessories:
    a. Sundry items, such as adhesives, shall be conditioned to building ambient conditions before use.

3.02 PROTECTION

A. Cover prepared floors with building paper or other durable covering.

END OF SECTION

SECTION 09 2116
GYPSUM BOARD ASSEMBLIES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Performance criteria for gypsum board assemblies.

B. Cementitious backing board.

C. Gypsum wallboard.

D. Joint treatment and accessories.

E. Textured finish system.

1.02 RELATED REQUIREMENTS

A. Section 06 1000 - Rough Carpentry: Building framing and sheathing.

B. Section 06 1000 - Rough Carpentry: Wood blocking product and execution requirements.

1.03 REFERENCE STANDARDS

A. ASTM C11 - Standard Terminology Relating to Gypsum and Related Building Materials and Systems 2018b.

B. ASTM C475/C475M - Standard Specification for Joint Compound and Joint Tape for Finishing Gypsum Board 2017.

C. ASTM C645 - Standard Specification for Nonstructural Steel Framing Members 2018.

D. ASTM C665 - Standard Specification for Mineral-Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing 2017.

E. ASTM C754 - Standard Specification for Installation of Steel Framing Members to Receive Screw-Attached Gypsum Panel Products 2020.

F. ASTM C840 - Standard Specification for Application and Finishing of Gypsum Board 2019b.

G. ASTM C919 - Standard Practice for Use of Sealants in Acoustical Applications 2018.

H. ASTM C954 - Standard Specification for Steel Drill Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Steel Studs From 0.033 in. (0.84 mm) to 0.112 in. (2.84 mm) in Thickness 2018.

I. ASTM C1002 - Standard Specification for Steel Self-Piercing Tapping Screws for Application of Gypsum Panel Products or Metal Plaster Bases to Wood Studs or Steel Studs 2018.

J. ASTM C1047 - Standard Specification for Accessories For Gypsum Wallboard and Gypsum Veneer Base 2019.

K. ASTM C1178/C1178M - Standard Specification for Coated Glass Mat Water-Resistant Gypsum Backing Panel 2018.

L. ASTM C1396/C1396M - Standard Specification for Gypsum Board 2017.

M. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials 2020.

N. ASTM E90 - Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements 2009 (Reapproved 2016).

O. ASTM E119 - Standard Test Methods for Fire Tests of Building Construction and Materials 2020.

P. ASTM E413 - Classification for Rating Sound Insulation 2016.

Q. GA-214 - Recommended Levels of Finish - Gypsum Board, Glass Mat and Fiber-Reinforced Gypsum Panels 2015.

R. GA-216 - Application and Finishing of Gypsum Panel Products 2016.

S. GA-600 - Fire Resistance Design Manual 2015.

T. GA-801 - Handling and Storage of Gypsum Panel Products: A Guide for Distributors, Retailers, and Contractors 2017.

U. UL 263 - Standard for Fire Tests of Building Construction and Materials Current Edition, Including All Revisions.

V. UL 723 - Standard for Test for Surface Burning Characteristics of Building Materials Current Edition, Including All Revisions.

1.04 SUBMITTALS

A. Product Data: Provide data on gypsum board, accessories, and joint finishing system.

B. Samples: Submit two samples of predecorated gypsum board, 12 by 12 inches in size, illustrating finish color and texture.
   1. Light Orange Peel Texture:
      a. Provide minimum of one (1) 12 inch (309 mm) square control samples on primed gypsum wallboard of 'light orange peel' texture to show possible variations.
   2. Light Skip Trowel Texture:
      a. Provide minimum of one (1) 12 inch (309 mm) square control samples on primed gypsum wallboard of 'light orange peel' texture to show possible variations.
   3. Hawk and Trowel, Multi-Directional (lightly sanded) Texture:
      a. Provide minimum of one (1) 12 inch (309 mm) square control samples on primed gypsum wallboard of 'multi-directional' texture (70/30, 80/20, and 90/10) to show possible variations.

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

1.05 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials to project site in unopened containers clearly labeled with manufacturer's name and identification of contents.

B. Follow 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.

C. Store materials in dry and clean location until needed for installation. During installation, handle in a manner that will prevent marring and soiling of finished surfaces.

D. 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.

1.06 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

2.01 GYPSUM BOARD ASSEMBLIES

A. Provide completed assemblies complying with ASTM C840 and GA-216.
   1. See PART 3 for finishing requirements.

2.02 BOARD MATERIALS

A. Manufacturers - Gypsum-Based Board:
   1. American Gypsum Company: www.americangypsum.com/#sle.
   2. CertainTeed Corporation: www.certainteed.com/#sle.
   3. Georgia-Pacific Gypsum: www.gpgypsum.com/#sle.
   4. National Gypsum Company: www.nationalgypsum.com/#sle.
   5. PABCO Gypsum: www.pabcogypsum.com/#sle.
   6. USG Corporation: www.usg.com/#sle.

B. Gypsum Wallboard: Paper-faced gypsum panels as defined in ASTM C1396/C1396M; sizes to minimize joints in place; ends square cut, long edges tapered.
   1. General:
      a. Size:
         1) Provide maximum lengths and widths available that will minimize joints in each area and that correspond with support system indicated.
      b. Quality Standard:
         1) Core: Fire-resistant rated gypsum core.
         2) Complies with Type X requirements of ASTM C1396/C1396M (Section 5).
         3) Surface paper: Face paper suitable for painting.
         4) Long edges: Tapered edge.
   2. Application: Use for vertical surfaces and ceilings, unless otherwise indicated.
   3. At Assemblies Indicated with Fire-Resistance Rating: Use type required by indicated tested assembly; if no tested assembly is indicated, use Type X board, UL or WH listed.
   4. Thickness:
      a. Vertical Surfaces: 5/8 inch.
      b. Ceilings: 5/8 inch.
   5. Paper-Faced Products:
      a. American Gypsum Company; LightRoc Gypsum Wallboard: www.americangypsum.com/#sle.
      b. American Gypsum Company; FireBloc Type X Gypsum Wallboard: www.americangypsum.com/#sle.
      c. CertainTeed Corporation; Type X Drywall: www.certainteed.com/#sle.
      d. Georgia-Pacific Gypsum; ToughRock: www.gpgypsum.com/#sle.
      e. Georgia-Pacific Gypsum; ToughRock Fireguard X: www.gpgypsum.com/#sle.
      f. National Gypsum Company; Gold Bond BRAND Fire-Shield Gypsum Board: www.nationalgypsum.com/#sle.

C. Impact Resistant Wallboard:
   1. Type: Fire-resistance-rated Type X, UL or WH listed.
   2. Thickness: 5/8 inch.
   3. Edges: Tapered.
   4. Paper-Faced Products:
      a. National Gypsum Company; Gold Bond Hi-Impact XP Gypsum Board: www.nationalgypsum.com/#sle.
      b. USG; Fiberrock VHI (Very High Impact) Abuse-Resistant Board.

D. Backing Board For Wet Areas: One of the following products:
   1. Glass Mat Faced Board: Coated glass mat water-resistant gypsum backing panel as defined in ASTM C1178/C1178M.
      a. Fire-Resistance-Rated Type: Type X core, thickness 5/8 inch.
      b. Square edges.

c. Products:
1) DensShield Fireguard Type X by Georgia Pacific.
2) GlasRoc Tilebacker Type X by CertainTeed.

2.03 GYPSUM WALLBOARD 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.

B. Corner And Edge Trim:
1. Metal, paper-faced metal, paper-faced plastic, or solid vinyl meeting requirements of ASTM C1047. Surfaces to receive bedding cement treated for maximum bonding.

C. Control Joint:
1. Bent zinc sheet with V-shaped slot, perforated flanges, covered with plastic tape meeting requirements of ASTM C1047.

D. Furring Channels:
1. Quality Standards:
a. Walls: Galvanized DWFC-25.
b. Ceilings: Galvanized DWFC-20.
2. Accessories as required by Manufacturer's fire tests to provide necessary fire ratings.

E. Acoustic Insulation: ASTM C665; preformed glass fiber, friction fit type, unfaced. Thickness: 2 inch.

F. Acoustic Sealant: Acrylic emulsion latex or water-based elastomeric sealant. Supplied and installed in accordance with ASTM Standards. Including but not limited to ASTM C919-19; do not use solvent-based non-curing butyl sealant.

G. Finishing Accessories: ASTM C1047, galvanized steel or rolled zinc, unless noted otherwise.
1. Types: As detailed or required for finished appearance.
2. Special Shapes: In addition to conventional corner bead and control joints, provide U-bead at exposed panel edges.

H. Beads, Joint Accessories, and Other Trim: ASTM C1047, rigid plastic, galvanized steel, or rolled zinc, unless noted otherwise.
1. Expansion Joints:
a. Type: V-shaped metal with factory-installed protective tape.

I. Joint Materials: Best grade or ASTM C475/C475M and as recommended by gypsum board manufacturer for project conditions.
1. Paper Tape: 2 inch wide, creased paper tape for joints and corners, except as otherwise indicated.
2. Joint Reinforcing:
a. Paper reinforcing tape acceptable to Gypsum Board Manufacturer.
3. Joint Compound: Drying type, vinyl-based, ready-mixed. Best grade or type recommended by Board Manufacturer and meeting requirements of ASTM C475/C475M.
a. Use Taping Compound for first coat to embed tape and accessories.
b. Use Taping Compound or All-Purpose Compound for subsequent coats except final coat.
c. Use Finishing Compound for final coat and for skim coat.

J. Finishing Compound: Surface coat and primer, takes the place of skim coating.

K. High Build Drywall Surfacer: Vinyl acrylic latex-based coating for spray application, designed to take the place of skim coating and separate paint primer.
   1. 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.

L. Primer On Surfaces To Receive Wallcovering:
   1. White, self-sizing, water based, all purpose wallcovering primer.
   2. Acceptable Products:
      a. Shieldz Universal Pre-Wallcovering Primer by Wm. Zinsser and Company.

M. Primer / Surfacer On Surfaces To Receive Texturing:
   1. 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.

N. Textured Finish Materials: Latex-based compound; plain.
   1. Products:
      a. ProForm Perfect Spray EM/HF by National Gypsum.
      b. Sheetrock Wall & Ceiling Texture by US Gypsum.

O. Fasteners:
   1. Bugle head screws meeting requirements of ASTM C1002:
      a. Gypsum Board:
         1) Type W: For fastening gypsum board to wood members, of length to penetrate wood framing 5/8 inch (15.9 mm) minimum.
         2) 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. Glass Mat Gypsum Tile Backer:
         1) Wood Framing: 11 ga (0.1233 in) (3.1318 mm), galvanized with 7/16 inch (11 mm) head, hot dipped. Screws: Type W or Type S Hi-Lo, bugle head, rust resistant.
         2) Light-gauge metal framing: Type S Hi-Lo, bugle or wafer head, self-tapping, rust resistant. Hi-Lo screws.
         3) Heavy-gauge metal framing: Type S-12 Hi-Lo, bugle or wafer head, rust resistant.

P. Screws for Fastening of Gypsum Panel Products to Cold-Formed Steel Studs Less than 0.033 inches in Thickness and Wood Members: ASTM C1002; self-piercing tapping screws, corrosion-resistant.

Q. Screws for Fastening of Gypsum Panel Products to Steel Members from 0.033 to 0.112 inch in Thickness: ASTM C954; steel drill screws, corrosion-resistant.

R. Screws for Fastening Gypsum Sheathing: Bugle head screws as recommended by Sheathing Manufacturer and meeting requirements of ASTM C1002, corrosion resistant treated.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that project conditions are appropriate for work of this section to commence.

B. Examine gypsum board before installation. Reject panels that are wet, moisture damaged, and mold damaged.

C. Notify Architect of unsuitable conditions in writing.
   1. Do not install board over unsuitable conditions.

D. Commencement of Work by installer is considered acceptance of substrate.

3.02 ACOUSTIC ACCESSORIES INSTALLATION

A. Acoustic Insulation: Place tightly within spaces, around cut openings, behind and around electrical and mechanical items within partitions, and tight to items passing through partitions.

B. Sound Isolation Tape: Apply to vertical studs and top and bottom tracks/runners in accordance with manufacturer's instructions.

C. Acoustic Sealant: Install in accordance with manufacturer's instructions.
   1. Place one bead continuously on substrate before installation of perimeter framing members.
   2. Place continuous bead at perimeter of each layer of gypsum board.
   3. Seal around all penetrations by conduit, pipe, ducts, and rough-in boxes, except where firestopping is provided.

D. Acoustical Shielding: Install in accordance with manufacturer's instructions for application between studs and gypsum board.

E. Installation shall comply with ASTM C919-19

3.03 BOARD 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. Comply with ASTM C840, GA-216, and manufacturer's instructions. Install to minimize butt end joints, especially in highly visible locations.

D. Single-Layer Nonrated: Install gypsum board in most economical direction, with ends and edges occurring over firm bearing.
   1. Exception: Tapered edges to receive joint treatment at right angles to framing.

E. Exposed Gypsum Board in Interior Wet Areas: Seal joints, cut edges, and holes with water-resistant sealant.

F. 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.

G. Glass Mat Gypsum Tile Backer:
1. Apply glass mat gypsum tile backer to framing. Attach using specified fasteners spaced 6 inches (150 mm) on center on edges and into all framing members. Drive screws flush with surface of board.
2. Shim board to be plumb and flat or level and flat, depending on location.
3. Apply reinforcing only at joints where abutting different materials.

H. Installation on Wood Framing: For rated assemblies, comply with requirements of listing authority. For nonrated assemblies, install as follows:
1. Single-Layer Applications: Screw attachment.

3.04 INSTALLATION OF TRIM AND ACCESSORIES

A. Control Joints: Place control joints consistent with lines of building spaces and as indicated.
1. Not more than 30 feet apart on walls and ceilings over 50 feet long.
2. At exterior soffits, not more than 30 feet apart in both directions.

B. Corner Beads: Install at external corners, using longest practical lengths.

C. Edge Trim: Install at locations where gypsum board abuts dissimilar materials.

D. Decorative Trim: Install at locations shown on drawings and in accordance with manufacturer's instructions.

E. Moisture Guard Trim: Install on bottom edge of gypsum board according to manufacturer's instructions and in locations indicated on drawings.

3.05 JOINT TREATMENT

A. Glass Mat Faced Gypsum Board and Exterior Glass Mat Faced Sheathing: Use fiberglass joint tape, embed and finish with setting type joint compound.

B. Paper Faced Gypsum Board: Use paper joint tape, embed with drying type joint compound and finish with drying type joint compound.

C. Finish gypsum board in accordance with levels defined in ASTM C840, as follows:
   1. Gypsum Board Surfaces not painted or finished:
      a. GA-214 Level 1: ‘All joints and interior angles shall have tape set in joint compound. Surface shall be free of excess joint compound. Tool marks and ridges are acceptable'.
   2. Gypsum Board Surfaces 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.
   3. Gypsum Board Surfaces to Receive: Painted Texturing - Section 09 9123: 'Interior Painting':
      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'.
   4. Gypsum Board Surfaces to Receive: Smooth Gypsum Board Surfaces:
      a. GA-214 Level 4: 'All and interior angles shall have tape embedded in joint compound and two separate coats of joint compound applied over all flat joints and one separate coat of joint compound applied over interior angles. Fastener heads and accessories shall be covered with three separate coats of joint compound. All joint compound shall be smooth and free of tool marks and ridges. Coat prepared surface with specified primer'.

D. Finishing:
   1. General:
      a. 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.
      b. First Coat:
         1) 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.
         2) Completely fill gouges, dents, and fastener dimples.
         3) Allow to dry and sand lightly if necessary to eliminate high spots or excessive compound.
      c. Second Coat:
         1) 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.
         2) Re-coat gouges, dents, and fastener dimples.
         3) Allow to dry and sand lightly to eliminate high spots or excessive compound.
      d. 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.

3.06 TEXTURE FINISH

A. Apply finish texture coating in accordance with manufacturer's instructions and to match approved sample.

B. Location:
   1. Walls:
      a. Light Orange Peel Texture (or as approved by architect):
         1) All areas except those listed in following paragraph.
      b. Smooth:
         1) Mechanical Rooms, Storage Rooms, and other Utility Areas.
   2. Ceilings:
      a. Light Orange Peel Texture (or as approved by architect):
      b. Smooth Finish (no applied texture) to be applied to the following ceilings:
         1) Mechanical Rooms, Storage Rooms, and other Utility Areas.
         2) Restrooms.

C. Finishing:
   1. Texture:
      a. After gypsum board is taped, sanded, and primed, apply texture. Closely match samples accepted by Architect.
         1) 1) After wall has been textured, apply priming and paint as specified in Section 09 9123.
   2. 3. Smooth:
      a. a. No applied texture is required. Apply priming and paint as specified in Section 09 9123.

3.07 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.

3.08 TOLERANCES

A. Maximum Variation of Finished Gypsum Board Surface from True Flatness: 1/8 inch in 10 feet in any direction.

3.09 CLEANING

A. Remove from site debris resulting from work of this Section including taping compound spills.

END OF SECTION

SECTION 09 3000
TILING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Tile for floor applications.

B. Tile for wall applications.

1.02 REFERENCE STANDARDS

A. ANSI A108.4 - American National Standard Specifications for Installation of Ceramic Tile with Organic Adhesives or Water Cleanable Tile-Setting Epoxy Adhesive 2009 (Revised).

B. ANSI A108.5 - American National Standard Specifications for Installation of Ceramic Tile with Dry-Set Portland Cement Mortar or Latex-Portland Cement Mortar 1999 (Reaffirmed 2010).

C. ANSI A108.6 - American National Standard Specifications for Installation of Ceramic Tile with Chemical Resistant, Water Cleanable Tile-Setting and -Grouting Epoxy 1999 (Reaffirmed 2010).

D. ANSI A108.10 - American National Standard Specifications for Installation of Grout in Tilework 2017.

E. ANSI A108.11 - American National Standard Specifications for Interior Installation of Cementitious Backer Units 2018.

F. ANSI A118.3 - American National Standard Specifications for Chemical Resistant, Water Cleanable Tile-Setting and -Grouting Epoxy and Water Cleanable Tile-Setting Epoxy Adhesive 2013 (Revised).

G. ANSI A118.4 - American National Standard Specifications for Modified Dry-Set Cement Mortar 2012 (Revised).

H. ANSI A118.6 - American National Standard Specifications for Standard Cement Grouts for Tile Installation 2010 (Reaffirmed 2016).

I. ANSI A118.7 - American National Standard Specifications for High Performance Cement Grouts for Tile Installation 2010 (Reaffirmed 2016).

J. ANSI A118.11 - American National Standard Specifications for EGP (Exterior Glue Plywood) Latex-Portland Cement Mortar 1999 (Reaffirmed 2010).

K. ANSI A118.12 - American National Standard Specifications for Crack Isolation Membranes for Thin-Set Ceramic Tile and Dimension Stone Installation 2014.

L. ANSI A118.15 - American National Standard Specifications for Improved Modified Dry-Set Cement Mortar 2012.

M. ANSI A137.1 - American National Standard Specifications for Ceramic Tile 2019.

N. ASTM C144 - Standard Specification for Aggregate for Masonry Mortar 2018.

O. ASTM C150/C150M - Standard Specification for Portland Cement 2020.

P. ASTM C206 - Standard Specification for Finishing Hydrated Lime 2014.

Q. ASTM C207 - Standard Specification for Hydrated Lime for Masonry Purposes 2018.

R. ASTM C373 - Standard Test Methods for Determination of Water Absorption and Associated Properties by Vacuum Method for Pressed Ceramic Tiles and Glass Tiles and Boil Method for Extruded Ceramic Tiles and Non-tile Fired Ceramic Whiteware Products 2018.

S. ASTM C482 - Standard Test Method for Bond Strength of Ceramic Tile to Portland Cement Paste 2020.

T. ASTM C501 - Standard Test Method for Relative Resistance to Wear of Unglazed Ceramic Tile by the Taber Abraser 1984 (Reapproved 2015).

U. TCNA (HB) - Handbook for Ceramic, Glass, and Stone Tile Installation 2019.

1.03 SUBMITTALS

A. Product Data: Provide manufacturers' data sheets on tile, mortar, grout, and accessories. Include instructions for using grouts and adhesives.

B. Maintenance Data: Include recommended cleaning methods, cleaning materials, and stain removal methods.

C. Source Quality Control Submittals:
   1. Provide Manufacturer documentation indicating proposed materials will satisfy requirements for Manufacturer's Warranty.

D. Closeout Submittals:
   1. Include following in Operations And Maintenance Manual specified in Section 01 7800:
      a. Operations and Maintenance Data:
         1) Cleaning and maintenance instructions.
      b. Warranty Documentation:
         1) Include copy of final, executed warranty.
      c. Record Documentation:
         1) Manufacturers Documentation:
            (a) Source Quality Control Submittal documentation showing materials will satisfy requirements for Manufacturer's Warranty.
            (b) Manufacturer's cut sheets of materials used in installed system.
            (c) Tile color and pattern selections.

1.04 QUALITY ASSURANCE

A. Source Of Materials:
   1. Provide materials obtained from one (1) source for each type and color of tile, grout, and setting materials for Manufacturer's system warranty.

B. Installer Qualifications:
   1. Company specializing in performing tile installation, with minimum of five years of documented experience.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Protect adhesives from freezing or overheating in accordance with manufacturer's instructions.

1.06 FIELD CONDITIONS

A. Do not install solvent-based products in an unventilated environment.

B. Maintain ambient and substrate temperature above 50 degrees F and below 100 degrees F during installation and curing of setting materials.

PART 2 PRODUCTS

2.01 TILE

A. National Contract Suppliers. See Section 01 6000:
   1. Contact following suppliers to procure components of tile assembly:
      a. Daltile And Stone, Salt Lake City, UT: (801) 487-9901, fax (801) 487-0345 - www.daltileproducts.com.
      b. Interceramic: phone (214) 503-5433, fax (877) 551-1979
      c. Or approved by Architect.

B. Design Criteria:
   1. General:
      a. Porcelain Tile:
         1) Tile shall be standard quality, solid color throughout, graded in accordance with ANSI A137.1:
         2) Cove Base with external and internal corner pieces shall be standard grade.

b. Ceramic Tile:
1) Tile shall be standard quality, white or off-white body, square or cushion edge, graded in accordance with ANSI A137.1.
2) Square edge, white body, lug type wall tile. Field wall tile shall have two lugs on each edge to assure uniform joint, approximately 0.040 inch (one mm).
3) External and internal corner pieces shall be standard grade.

2. Capabilities:
a. Porcelain Tile:
1) Water Absorption when tested in accordance with ASTM C373: 0.1 to 0.5 percent.
2) Abrasive Wear Resistance when tested in accordance with ASTM C501: 275 minimum.
3) Breaking Strength when tested in accordance with ASTM C648: 300 lbs minimum.
4) Bond Strength when tested in accordance with ASTM C482: 200 psi minimum.
5) Coefficient of Friction: 0.42 minimum as measured by DCOF (Dynamic Coefficient of Friction) AcuTest method and requirements as per ANSI A137.1.

C. Description:
1. Porcelain Tile:
a. Finished floor with no slope shown on Contract Documents: 12 inches (300 mm) square minimum:
1) Cove Base: External and internal corner pieces to match with bull-nosed top:
(a) 6 inches by 12 inches (150 mm by 300 mm) with bull-nosed top by Daltile.
(b) 6 inches by 8 inches (150 mm by 200 mm) with bull-nosed top by Interceramic.
2) Approved Products. See Section 01 6000
(a) Harmonist Colorbody Porcelain by Daltile.
(b) Intertech Unglazed Porcelain by Interceramic.
3) Approved Colors. See Section 01 6000:
(a) HM21 Tranquil by Daltile.
(b) HM20 Serene by Daltile.
(c) Dotti Light Grey by Interceramic.
(d) Uni Ivory by Interceramic.
b. Finished floor with slope shown on Contract Documents: 2 inches (50 mm) square:
1) Cove Base: External and internal corner pieces to match with bull-nosed top:
(a) 5-6 inches by 12 inches (125-150 mm by 300 mm) with bull-nosed top or flat top.
2) Approved Products. See Section 01 6000:
(a) Keystones Colorbody Porcelain by Daltile (lead time 6 weeks).
(1) MD-5A Built Up Base Square Top.
(2) MD-5B Built Up Base Round Bullnose Top.
(b) Intertech Unglazed Porcelain by Interceramic.
3) Approved Colors. See Section 01 6000:
(a) Urban Putty D161 by Daltile.
(b) Urban Putty Speckle D201 by Daltile.
(c) Uni Ivory by Interceramic.
2. Ceramic Tile:
a. Wall Tile:
1) Walls: 4 inch by 4 inch (100 mm by 100 mm).
2) Approved Products. See Section 01 6200:
(a) Color Wheel Collection - Classic: Semi-Gloss or Gloss by Daltile.
(b) IC Brites or Bold Tones Series by Interceramic.
3) Approved Colors. See Section 01 6000:

(a) Room Walls:
(1) 0135 Almond by Daltile.
(2) Almond by Interceramic.
(b) Accent Color:
(1) 0100 White by Daltile.
(2) White by Interceramic.

2.02 SETTING MATERIALS

A. Manufacturer's Contact List:
1. Ardex Engineered Cements, Aliquippa, PA www.ArdexAmericas.com.
a. Contact Information: Don Richards (206) 979-0401 www.Don.richards@ArdexAmericas.com.
2. Custom Building Products, Seal Beach, CA www.custombuildingproducts.com.
a. Contact Information: John Gallup (206) 718-6024 johng@cbpmail.net.
3. Dal-Tile Corp., Div. of Mohawk Industries, Dallas, TX www.daltile.com.
4. Interceramic Inc., Garland, TX www.interceramic.com.
5. Laticrete International Inc., Bethany, CT www.laticrete.com.
6. Mapei Americas Headquarters, Deerfield Beach, FL www.mapei.com.
a. Contact Information: Bart A. Wilde (801) 467-2060 www.bwilde@mapei.com.
7. Merkrete, by Parex USA, Inc., Anaheim, CA www.merkrete.com.
a. Contact Information: Andy Townes (505) 873-1181 andy.townes@parexusa.com.
8. Schulter Systems L.P., Plattsburgh, NY www.schluter.com.

B. Materials:
1. Mortar Bed:
a. Portland Cement: Meet requirements of ASTM C150/C150M, Type 1, designation shall appear on bag.
b. Hydrated Lime:
1) Meet Requirements of one of following:
(a) ASTM C206.
(b) ASTM C207, Type S (designation shall appear on bag).
c. Sand: Clean, washed, well-graded, meeting requirements of ASTM C144 with gradation of 100 percent passing No. 8 sieve with not over five (5) percent passing No. 100 sieve.
d. Latex Additive; in lieu of all water:
1) Design Criteria:
(a) Meet material specification requirements of ANSI A118.4 or ANSI A118.11.
(b) Meet ANSI installation specification requirements of ANSI A108.5.
(c) Expansion joints complies with TCA method EJ171.
2) Acceptable Products:
(a) ARDEX: Ardex E 90 Mortar Admix.
(b) CUSTOM: Thin-Set Mortar Admix.
(c) LATICRETE: 4237 Latex Additive with 211 Powder.
(d) MAPEI: Planicrete AC.
(e) MERKRETE: 150 Latex Admixture.
2. Metal Trim:
a. Approved Products. See Section 01 6200:
1) Tile / Carpet Junction: Schluter-RENO-AETK.
2) Over Expansion Joints In Slabs: Schluter DILEX-BWS, color G, PG, or HB as selected by Architect.
3. Joint Sealants:
a. Interior Ceramic Tile Joints are furnished in Section 07 9213 and installed in Section 09 3013 'Ceramic Tiling' including the following:
1) Ceramic and paver cove base inside corners.

2) Ceramic and paver tile joints.
3) Termination joints in showers and fonts.

4. Backer Board Joint Reinforcing: 2 inch (50 mm) wide glass fiber mesh tape.
5. Tile Setting Products:
   a. Use only products of same Manufacturer to validate warranty, unless otherwise acceptable to Ceramic Tile Supplier.
   b. Use only products that meet Mortar Manufacturer's twenty five (25) year system warranty requirements.
   c. Latex-Portland Cement Mortar For Floors:
      1) Design Criteria:
         (a) Meet ANSI material specification requirements of ANSI A118.4, ANSI A118.11, or ANSI A118.15.
         (b) Meet ANSI installation specification requirements of ANSI A108.4 or ISO material specification ISO13007 installation material specification and C2ES1P2 performance requirements for adhesive.
      2) Approved Products. See Section 01 6000:
         (a) ARDEX: Ardex X77.
         (b) CUSTOM: Megalite Crack Prevention Mortar or FlexBond Premium Crack Prevention Thin-set Mortar (no additives needed).
         (c) LATICRETE: 254 Platinum Thinset.
         (d) MAPEI: Ultraflex 3.
         (e) MERKRETE: 735 Premium Flex.
   d. Latex/Polymer Modified Portland Cement Mortar For Walls:
      1) Design Criteria:
         (a) Meet ANSI material specification requirements of ANSI A118.4, ANSI A118.11, or ANSI A118.15.
         (b) Meet ANSI installation specification requirements of ANSI A108.4 or ISO material specification ISO13007 installation material specification and C2ES1P2 performance requirements for adhesive.
      2) Approved Products. See Section 01 6000:
         (a) ARDEX: Ardex X77.
         (b) CUSTOM: Megalite Thin-Set Mortar or FlexBond Fortified Thin-Set Mortar.
         (c) LATICRETE: 254 Platinum Thinset.
         (d) MAPEI: Ultraflex 3.
         (e) MERKRETE: 735 Premium Flex.
   e. Floor Grout (Epoxy):
      1) Design Criteria:
         (a) Meet ANSI material specification requirements of ANSI A118.3.
         (b) Meet ANSI installation specification requirements of ANSI A108.6 and ISO material specification ISO13007 RG.
      2) Approved Color:
         (a) ARDEX: 25 Stormy Mist.
         (b) CUSTOM: No. 145 Light Smoke.
         (c) LATICRETE: No. 24 Natural Grey.
         (d) MAPEI: No. 11 Sahara Beige.
         (e) MERKRETE: Pro Epoxy D-153 Buckskin.
      3) Approved Products. See Section 01 6000:
         (a) ARDEX: Ardex WA.
         (b) CUSTOM: CEG-Lite 100% Solids Commercial Epoxy Grout.
         (c) LATICRETE: SpectraLOCK PRO.
         (d) MAPEI: Kerapoxy (sanded).
         (e) MERKRETE: Pro Epoxy.
   f. Wall Grout (Modified Polymer):

1) Design Criteria:
   (a) Meet ANSI material specification requirements of ANSI A118.6 or ANSI A118.7.
   (b) Meet ANSI installation specification requirements of ANSI A108.10 or ISO material specification ISO13007 C2ES1P2.
2) Color:
   (a) ARDEX: No. 01 Polar White.
   (b) CUSTOM: No. 381 Bright White.
   (c) LATICRETE: No. 44 Bright White.
   (d) MAPEI: No. 00 White.
   (e) MERKRETE: D-11 Snow White.
3) Approved Products. See Section 01 6000:
   (a) ARDEX: Ardex FH.
   (b) CUSTOM: PolyBlend Non-Sanded Grout or Prism Color Consistent Grout.
   (c) LATICRETE: 1600 Series Unsanded Dry Set Wall Grout with 1776 Grout Admix Plus additive.
   (d) MAPEI: Keracolor-U Unsanded Polymer-Modified Grout.
   (e) MERKRETE: Non-Sanded ColorGrout, latex modified.

g. Waterproofing Membrane:
1) Design Criteria:
   (a) Meet ANSI installation specification requirements of ANSI A108.10.
   (b) ANSI installation specification requirements not required.
2) Approved Products. See Section 01 6000:
   (a) Troweled applied, cement based:
   (b) ARDEX: Ardex 8+9.
   (c) MAPEI: Mapelastic 315.
   (d) Liquid applied, latex based:
   (e) CUSTOM: RedGard Waterproofing or Crack Prevention Membrane or FractureFree Crack Prevention Membrane.
   (f) LATICRETE: Hydro Ban.
   (g) MAPEI: Mapelastic AquaDefense.
   (h) MERKRETE: Hydro-Guard SP-1.

h. Crack Isolation Membrane:
1) Design Criteria:
   (a) Meet ANSI installation specification requirements of ANSI A118.12.
   (b) ANSI installation specification requirements not required.
2) Approved Products. See Section 01 6000:
   (a) Flexible, thin, load-bearing, fabric-reinforced:
   (b) ARDEX: Ardex 8+9 with SK Mesh Tape.
   (c) CUSTOM: Crack Buster Pro Crack Prevention Mat Underlayment, with Peel & Stick Primer.
   (d) LATICRETE: Blue 92 Anti-Fracture Membrane.
   (e) MAPEI: Mapeguard 2, and Primer SM.
   (f) MERKRETE: Hydro-Guard SP-1.
   (g) Liquid applied, latex based:
   (h) CUSTOM: RedGard Waterproofing and Crack Prevention Membrane or FractureFree Crack Prevention Membrane.
   (i) LATICRETE: Hydro Ban.
   (j) MAPEI: Mapelastic AquaDefense.
   (k) MERKRETE: Fracture Guard 5000.

i. Stone Thresholds:
1) Texture and color variation shall be within limits established by Architect's approved sample.

2) Free of defects that would materially impair strength, durability, and appearance.
3) Finish: 80 grit exterior hone.
4) White marble, one (1) piece, 7/8 inch (22 mm) thick by 2 1/2 inches (64 mm) by door opening width. Cross-section to meet handicap accessibility requirements.

C. Mixes:
1. Mortar Beds:
a. Floor Mix: One Part Portland Cement, 5 Parts Dry Sand, 4 Part Damp Sand, 1/10 Part hydrated Lime optional.
b. Wall Mix: One Part portland cement, 5-1/2 to 7 Parts damp sand, 1/2 Part hydrated lime optional.

PART 3 EXECUTION

3.01 INSTALLERS

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

3.02 EXAMINATION

A. Verify that subfloor surfaces are smooth and flat within the tolerances specified for that type of work and are ready to receive tile.

B. Verify that wall surfaces are smooth and flat within the tolerances specified for that type of work, are dust-free, and are ready to receive tile.

C. Verify that subfloor surfaces are dust free and free of substances that could impair bonding of setting materials to subfloor surfaces.

D. Verify that concrete sub-floor surfaces are ready for tile installation by testing for moisture emission rate and alkalinity; obtain instructions if test results are not within limits recommended by tile manufacturer and setting materials manufacturer.

E. Verify that required floor-mounted utilities are in correct location.

F. Notify Architect in writing if surfaces are not acceptable to install tile:
1. Do not lay tile over unsuitable surface.
2. Commencing installation constitutes acceptance of surfaces and approval of existing conditions.

3.03 PREPARATION

A. Allow concrete to cure for twenty-eight (28) days minimum before application of mortar bed.

B. Protect surrounding work from damage.

C. Vacuum clean surfaces and damp clean.

D. Seal substrate surface cracks with filler. Level existing substrate surfaces to acceptable flatness tolerances.

E. Install backer board in accordance with ANSI A108.11 and board manufacturer's instructions. Tape joints and corners, cover with skim coat of setting material to a feather edge.

F. Prepare substrate surfaces for adhesive installation in accordance with adhesive manufacturer's instructions.

3.04 INSTALLATION - GENERAL

A. Interface with Other Work:
1. Grounds, anchors, plugs, hangers, door frames, electrical, mechanical, and other work in or behind tile shall be installed before tile work is started.

B. Special Techniques:
1. Install in accordance with following latest TCNA (HB) installation methods:
a. Flush Concrete Slabs with crack isolation membrane: TCNA F115.
b. Mortar Bed on Concrete Slab: TCNA F111 with reinforcing.

C. Tolerances:
   1. Plane of Vertical Surfaces:
      a. 1/8 inch in 8 feet (3 mm in 2.450 meters) from required plane shall be plumb and true with square corners.
   2. Variation in Slab Grade:
      a. Plus or minus 1/8 inch (3 mm) in any 10 feet (3.050 m) of floor slab and distance between high point and low point of slab of 1/2 inch (12.7 mm).
      b. Slab 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 (3.050 m) length and 1/2 inch (12.7 mm) diameter steel rod will not fit under straightedge anywhere along 10 foot (3.050 m) length.

D. General:
   1. Install tile in pattern indicated:
      a. Align joints when adjoining tiles on floor, base, walls, and trim are same size.
      b. Adjust to minimize tile cutting and to avoid tile less than half size.
      c. Center and balance areas of tile if possible.
   2. Extend tile into recesses and under equipment and fixtures to form a complete covering without interruption:
   3. Maintain heights of tilework in full courses to nearest obtainable dimension where heights are given in feet and inches (meters and millimeters) and are not required to fill vertical spaces exactly.
   4. Install cut tile with cuts on outer edges of field:
      a. Provide straight cuts that align with adjacent materials.
      b. When possible, smooth cut edges of tile or use appropriate cutter or wet saw to produce smooth cuts.
      c. Do not install tile with jagged or flaked edges.
   5. Terminate tile neatly at obstructions, edges, and corners, without disruption of pattern or joint alignment:
      a. Fit tile closely where edges are to be covered by trim, escutcheons, or similar devices.
   6. Provide straight tile joints of uniform width, subject to variance in tolerance allowed in tile size:
      a. Make joints smooth and even, without voids, cracks, or excess mortar or grout.
   7. Use a beating block and hammer or rubber mallet so faces and edges of individual tiles are flush and level with faces and edges of adjacent tiles, and to reduce lippage.
   8. Accessories in tilework shall be evenly spaced, properly centered with tile joints, and level, plumb, and true to correct projection.
   9. Leave finished installation clean and free of cracked, chipped, broken, unbonded, and otherwise defective tile work.

E. Application on Concrete Floor:
   1. On Mortar Bed:
      a. Apply mortar bed to depth equal to depression in slab minus 1/2 inch (12.7 mm).
      b. Properly cure before installing tile.
   2. Clean substrate surface thoroughly.
      a. Dampen if very dry, but do not saturate.
   3. Install tile with 100 percent contact with mortar bed.
      a. Obtaining 100 percent contact may require troweling mortar layer on back of each tile before placing on mortar bed.
   4. Install base by flush method (square or thin-lip method is not acceptable):
      a. Allow for expansion joint directly above any expansion or control joints in slab.
   5. Insert temporary filler in expansion joints.

F. Application of Mortar:
   1. Do not spread more mortar than can be covered within ten (10) to fifteen (15) minutes:
      a. If 'skinning' occurs, remove mortar and spread fresh material.
      b. Spread mortar with notches running in one (1) direction, perpendicular to pressing, pushing and pulling of tile during placement.
   2. Install tile before mortar has started initial cure:
      a. For thin set mortar application, use notch trowel that will achieve the recommended coverage of mortar after tiles have been installed.
   3. Place tile in fresh mortar, press, push and pull tile slightly to achieve as near 100 percent coverage and contact of tile with setting material and substrate as possible:
      a. Average contact area shall be not less than eighty (80) percent except on exterior or shower installations where contact area shall be ninety-five (95) percent when not less than three (3) tiles or tile assemblies are removed for inspection. The eighty (80) percent or ninety-five (95) percent coverage shall be sufficiently distributed to give full support of the tile.
      b. Support corners and edges with mortar leaving no hollow corners or edges.
   4. Install so there is 1/8 inch (3 mm) of mortar between tile and substrate after proper bedding:
      a. Periodically remove sheets or individual tiles to assure proper bond coverage consistent with industry specifications.
      b. If coverage is found to be insufficient, use a larger size notch trowel.

G. Application of Grout:
   1. Firmly set tile before applying grout:
      a. This requires forty-eight (48) hours minimum.
   2. Before grouting:
      a. Remove all paper and glue from face of mounted tile.
      b. Remove spacers or ropes before applying grouting:
   3. Mixing Grout:
      a. Use clean buckets and mixing tools:
         1) Use sufficient pressure and flow grout in progressively to avoid air pockets and voids.
      b. Machine mixing of grout is preferred to assure uniform blend. To prevent trapping air bubbles into prepared grout, use slow speed mixer.
      c. Slake for fifteen (15) minutes.
      d. Water or latex additives used for mixing with dry grout shall be measured accurately.
   4. Before grouting entire area, do a test area to assure there will be no permanent staining or discoloration of tile and to verify that excess grout can be easily removed from tile surface:
      a. If necessary, pre-coat exposed surfaces of tile with a grout release recommended by Grout Manufacturer to facilitate removal of excess grout.
   5. Installing Grout:
      a. Use caution, when grouting glazed ceramic tiles to prevent scratching or damaging surface of tile.
      b. Dampen dry joints prior to grouting with sand-portland cement grout, standard sanded cement grout, standard unsanded cement grout, polymer modified sanded tile grout, and polymer modified unsanded tile grout. Do not leave puddles of water in joints before grouting.
      c. Keep an adequate joint depth open for grouting. Force maximum amount of grout into joints.
      d. Apply grout to produce full, smooth grout joints of uniform width, and free of voids and gaps
         1) Fill joints of cushion edge tile to depth of cushion.
         2) Fill joints of square edge tile flush with surface.
         3) Fill joint between wall tile and bull-nosed paver tile base with floor grout.

e. Install floor tile with grout thickness of 3/16 inch (4.76 mm) maximum.
f. Remove excess grout from surface of tile before it loses its plasticity or begins to set.
g. Finished grout shall be uniform in color, smooth, and without voids, pin holes, or low spots.

H. Curing:
1. Keep installation at 65 to 85 deg F (18 to 30 deg C) during first eight (8) hours of cure. Shade area completely from sun during this period.

I. Application of Joint Sealants:
1. Apply joint sealants after grout has cured:
a. This requires forty-eight (48) hours minimum.
2. Before applying sealant:
a. Remove spacers or ropes before applying joint sealants.
b. Apply backer rod and joint sealants at expansion joints.

3.05 FIELD QUALITY CONTROL

A. Non-Conforming Work:
1. Correct any work found cracked, chipped, broken, unbounded and otherwise defective or not complying with contract document requirements at no additional cost to the Owner.

3.06 CLEANING

A. Clean tile and grout surfaces.

B. If one has been used, remove grout release and clean tile surfaces so they are free of grout residue and foreign matter:
1. If a grout haze or residue remains, use a suitable grout haze remover or cleaner.
2. Flush surface with clean water before and after cleaning.

3.07 PROTECTION

A. Do not permit traffic over finished floor surface for 4 days after installation.

B. Close to traffic areas where tile is being set and other tile work being done:
1. Keep closed until tile is firmly set.
2. Before, during, and after grouting, keep area clean, dry, and free from foreign materials and airflow that will interfere with setting and curing of grout.

C. Newly tiled floors shall not be walked on nor worked on without using kneeling boards or equivalent protection of tiled surface.

D. After cleaning, provide protective covering and maintain conditions protecting tile work from damage and deterioration:
1. Where tiled surfaces will be subject to equipment or wheel traffic or heavy construction traffic, cover protective covering with 1/4 inch (6 mm) hardboard, plywood, or similar material.

END OF SECTION

SECTION 09 5100
ACOUSTICAL CEILINGS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Acoustical units.

1.02 REFERENCE STANDARDS

A. ASCE 7 - Minimum Design Loads and Associated Criteria for Buildings and Other Structures Most Recent Edition Cited by Referring Code or Reference Standard.

B. ASHRAE Std 62.1-2013 - Ventilation for Acceptable Indoor Air Quality 2013.

C. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process 2020.

D. ASTM C423 - Standard Test Method for Sound Absorption and Sound Absorption Coefficients by the Reverberation Room Method 2017.

E. ASTM C635/C635M - Standard Specification for the Manufacture, Performance, and Testing of Metal Suspension Systems for Acoustical Tile and Lay-in Panel Ceilings 2017.

F. ASTM C636/C636M - Standard Practice for Installation of Metal Ceiling Suspension Systems for Acoustical Tile and Lay-In Panels 2013.

G. ASTM D610 - Standard Practice for Evaluating Degree of Rusting on Painted Steel Surfaces 2008 (Reapproved 2019).

H. ASTM D1779 - Standard Specification for Adhesive for Acoustical Materials 1998.

I. ASTM D3273 - Standard Test Method for Resistance to Growth of Mold on the Surface of Interior Coatings in an Environmental Chamber 2016.

J. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials 2020.

K. ASTM E119 - Standard Test Methods for Fire Tests of Building Construction and Materials 2020.

L. ASTM E580/E580M - Standard Practice for Installation of Ceiling Suspension Systems for Acoustical Tile and Lay-in Panels in Areas Subject to Earthquake Ground Motions 2020.

M. ASTM E795 - Standard Practices for Mounting Test Specimens During Sound Absorption Tests 2016.

N. ASTM E1111/E1111M - Standard Test Method for Measuring the Interzone Attenuation of Open Office Components 2014.

O. ASTM E1264 - Standard Classification for Acoustical Ceiling Products 2019.

P. ASTM E1414/E1414M - Standard Test Method for Airborne Sound Attenuation Between Rooms Sharing a Common Ceiling Plenum 2016.

Q. ASTM E1477 - Standard Test Method for Luminous Reflectance Factor of Acoustical Materials by Use of Integrating-Sphere Reflectometers 1998a, with Editorial Revision (2018).

R. NFPA 101 - Life Safety Code Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

S. NFPA 265 - Standard Methods of Fire Tests for Evaluating Room Fire Growth Contribution of Textile or Expanded Vinyl Wall Coverings on Full Height Panels and Walls 2019.

T. UL 723 - Standard for Test for Surface Burning Characteristics of Building Materials Current Edition, Including All Revisions.

1.03 ADMINISTRATIVE REQUIREMENTS

A. Sequence work to ensure acoustical ceilings are not installed until building is enclosed, sufficient heat is provided, dust generating activities have terminated, and overhead work is completed, tested, and approved.

B. Do not install acoustical units until after interior wet work is dry.

C. Coordination:
   1. 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.

1.04 SUBMITTALS

A. Samples: Submit two samples 12 by 12 inch in size illustrating material and finish of acoustical units.

B. One (1) sample of each variant of specified tile series.

C. Manufacturer's certifications that products comply with specified requirements including laboratory reports showing compliance with specified tests and standards. For acoustical performance, each carton of material must carry approved independent laboratory classification of NRC, CAC, and AC.

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

E. If requested by Owner, provide copies of Quality Assurance requirements for 'Class A' flame spread rating and 'Room-Corner Test'.

F. Manufacturer's Installation Instructions: Indicate special procedures and perimeter conditions requiring special attention.

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

H. Maintenance Materials: Furnish the following for Owner's use in maintenance of project..
   1. Acoustical Tile: Provide Owner with one (1) carton of each type of tile with same dye lot code.

1.05 QUALITY ASSURANCE

A. Acoustical Tile Unit Manufacturer 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 '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 '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 - Duratile'. Required for all projects and may not be waived by Owner.

1.06 DELIVERY, STORAGE, AND HANDLING

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

B. Storage And Handling Requirements:
1. Store materials where protected from moisture, direct sunlight, surface contamination, and damage.
2. Store in cool, dry location, out of direct sunlight and weather, and at temperatures between 32 deg F (0 deg C) and 86 deg F (30 deg C).
3. 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.

1.07 FIELD CONDITIONS

A. Ambient Conditions:
1. Building shall be enclosed, mechanical system operating with proper filters in place, and temperature and humidity conditions stabilized within limits under which Project will operate before, during, and after installation until Substantial Completion.
2. Installation shall be at temperatures between 50 deg F (10 deg C) and 86 deg F (30 deg C) or as per Manufacturer recommendations.

B. Maintain uniform temperature of minimum 60 degrees F, and maximum humidity of 40 percent prior to, during, and after acoustical unit installation.

1.08 WARRANTY

A. Acoustical Tile:
1. Provide manufacturer's ten (10) year limited system warranty for the following:
a. Manufacturer's warranty to be free from defects in material and factory workmanship.
b. Manufacturer's warranty against sagging and warping.

c. Manufacturer's warranty against mold/mildew and bacterial growth.

PART 2 PRODUCTS

2.01 REGULATORY AGENCY SUSTAINABILITY APPROVALS

A. All system components conform to ASTM standards.

2.02 MANUFACTURERS

A. Acoustic Tile: 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.

2.03 ACOUSTICAL TILE UNITS

A. 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 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. Approved Products. See Section 01 6200:

a. Duratile Item No. MN80377 by Armstrong.

2.04 ACCESSORIES:

A. Adhesive:
1. Description:
a. For use on acoustical ceiling tiles.
2. Design Criteria:
a. Meet requirements of ASTM D1779.
b. Meet NFPA Class A fire rating when tested in accordance with ASTM E84.
c. Fast grab and 'no sag' installation.
d. Water cleanup.
e. Not recommended for use on tiles larger than 12 inch x 12 inch (305 mm x 305 mm).
3. Acceptable Products:
a. Titebond No. 2704 Solvent Free Acoustical Ceiling Tile Adhesive by Franklin International.
b. Highest quality of adhesive from manufacturer recommended by Tile Manufacturer as approved by Architect before use. See Section 01 6000.

B. Edge Molding:
1. Steel 'U' molding with baked enamel finish.
2. Acceptable Products:
a. 7843 Series by Armstrong.
b. Equal as approved by Architect before installation. See Section 01 6000.

2.05 ACCESSORIES:

A. Gypsum Board: Type; 5/8 inch thick, ends and edges square, paper faced.

B. Touch-up Paint: Type and color to match acoustical and grid units.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify existing conditions before starting work.

B. Inspect for defects in backing and support that are not acceptable.
1. Examine areas around HVAC diffusers and light fixtures for tile installation problems.
2. 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).
3. Examine substrate for any problems that will compromise adhesion of ceiling tile.

C. Inspect for defects in support that are not acceptable.
1. All wet work (concrete, painting, and etc.) must be completed and dry.
2. Temperature conditions within Manufacturer's written recommendation.
3. Verify weather tightness of area to receive suspension system prior to installation.

D. Notify Architect of unsuitable conditions in writing.
1. Do not install acoustical ceiling panels until defects in support or environmental conditions are corrected.
2. Do not apply ceiling tile until defects in backing and support are corrected.

3.02 PREPARATION

A. Materials shall be dry and clean at time of application.

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

C. Measure each ceiling area and establish layout of acoustical units to balance border widths at opposite edges of each ceiling. Avoid use of less than half width units at borders, and comply with reflected ceiling plans. Coordinate panel layout with mechanical and electrical fixtures.

3.03 INSTALLATION - ACOUSTICAL TILE UNITS

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.

3.04 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.

3.05 CLEANING

A. Clean exposed surfaces of acoustical ceiling panels, including trim, edge moldings, and suspension members.
   1. Comply with Manufacturer's written instructions for cleaning and touch up of minor finish damage.

B. Waste Management:
   1. Remove from site all debris connected with work of this Section.

END OF SECTION

SECTION 09 6813

TILE CARPETING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes But Is Not Limited To:
   1. Coordination, sequencing, and scheduling for installation of carpet, carpet base, carpet accessories, leveling compounds and resilient base and accessories 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 0000: 'General Requirements':
      a. Section 01 7800: ‘Closeout Submittals’.

1.2 REFERENCES

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

B. Reference Standards:
   1. The Carpet and Rug Institute (CRI):
      a. CRI 104, 'Standard For Installation of Commercial Carpet' (Sept 2015).
      b. CRI TM-102, ‘School Carpet Minimum Average Specifications’.

1.3 ADMINISTRATIVE REQUIREMENTS

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

1.4 SUBMITTALS

A. Informational Submittals:
   1. Manufacturer Instructions:
      a. Published installation instructions.

B. Closeout Submittals:
   1. Include following in Operations And Maintenance Manual specified in Section 01 7800:
      a. Warranty Documentation:
         1) Copy of Warranty.

C. Maintenance Material Submittals:
   1. Extra Stock Materials:
      a. Leave carpet tiles equivalent to 15 percent of number installed as attic stock.
      b. Tie securely and wrap in protective cover.

1.5 QUALITY ASSURANCE

A. Regulatory Agency Sustainability Approvals:
   1. All products provided will meet requirements of all federal, state, and local codes having jurisdiction.
   2. Label meeting Federal Labeling Requirements, as stated in Textile Products Identification Act under Federal Trade Commission, shall be attached to certification samples and products delivered.

B. Qualifications: Section 01 4301 applies, but is not limited to following:
   1. Carpet Manufacturer Qualifications:
      a. Not less than five (5) years of production experience, whose published literature clearly indicates general compliance of products with requirements of this section.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Delivery And Acceptance Requirements:
   1. Deliver materials and accessories necessary for completion of carpet installation to site before beginning installation of carpet.
   2. Do not deliver materials before date scheduled for installation.

B. Storage And Handling Requirements:
   1. Store carpet and related materials in climate-controlled, dry space.
   2. Protect carpet from soil, dust, moisture and other contaminants and store on flat surface.

1.7 FIELD CONDITIONS

A. Ambient Conditions:
   1. Building Conditions:
      a. Conditions inside building shall be brought to levels to be normal at occupancy of building. Conditions include normal levels of humidity, lighting, heating, and air conditioning.
         1) Carpet installation is not to begin until HVAC system is operational and following conditions are maintained for at least forty-eight (48) hours before, during and seventy-two (72) hours after completion:
            a) Carpet is to be installed when indoor temperature is between 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. Include following in Operations And Maintenance Manual specified in Section 01 7800:
      a. Warranty Documentation:
         1) Final, executed copy of Warranty.
         2) Maintain fresh air ventilation after installation for seventy-two (72) hours minimum or until lingering odors are gone.
   3. Concrete Slab:
      a. General:
         1) Do not install carpet over concrete slabs until slabs have cured and are sufficiently dry to bond with adhesive.

1.8 WARRANTY

A. Manufacturer Warranty:
   1. Provide Carpet Manufacturer's standard Warranty which includes following:
      a. Warranty shall cover defects in installation, workmanship, and installation materials.

b. Warranty includes specific workmanship warranties for delamination, edge raveling, fuzzing, pilling, and other textural changes which can be controlled through proper manufacturing (no fraying, zippering, delamination, edge raveling, fuzzing, pilling in carpet is acceptable for any reason).
c. Warranty terms will include inspection of defective area within fifteen (15) days of receipt of written notice from Owner and completion of corrective work within forty-five (45) days, unless other arrangements are made in writing with Owner on case-by-case basis.
d. If carpet defect or installation defect continues to appear after two (2) separate notices for correction from Owner, replace carpet where defects have occurred.
e. If Carpet Manufacturer follows installation requirements of Section 09 0503 'Floor Substrate Preparation' Carpet Manufacture accepts liability of carpet installation for said given time as outlined in Special Warranty regardless of any climate or condition changes affecting RH levels of floor substrate.

2. Special Warranty:
   a. Modular Carpeting:
      1) General:
         a) Appearance Retention to be provided with Special Warranty requirements if not already included in Standard Warranty.

PART 2 - PRODUCTS

2.1 MODULAR CARPET

A. Listed below are the minimum specifications for modular carpet.
   1. Fiber:
      a. Mannington's Colorstrand SD Nylon.
      b. Mohawk Group Shadowpass
      c. Others approved by Architect.
   2. Dye Method: 100% Solution Dyed.
   3. Pile Weight: 16 oz.
   4. Pile Construction: Loop construction.
   5. Gauge: 1/12"
   6. Construction: Tufted or Woven
   7. Density: High Traffic Areas.
   8. Backing: High performance backing with moisture barrier.
   9. Size: 24" x 24".
   10. Color to be selected from Manufacturer's standard colors.

B. Flammability: Radiant Panel Test ASTM E-648, Class 1. shall pass FF1-70 or FF2-70. Smoke Density ASTM E-662 rating must be less than 450 in flaming mode.

2.2 WALK-OFF CARPET TILE

A. Provide walk-off carpet at all main building entrances. Exact locations listed on drawings.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verification Of Conditions:
   1. Verify required ambient conditions inside building for required normal levels of humidity, lighting, heating, and air conditioning have been maintained for at least forty-eight (48) hours before and during carpet installation and seventy-two (72) after installation of carpet.

3.2 PREPARATION

A. Flooring Preparation:
   1. Prepare floor substrate in accordance with Carpet And Rug Institute (CRI) best practices to receive carpet installation and to provide installation that meets Carpet Manufacturer's warranty requirements:
      a. Concrete floor slab patching:
         1) Cracks, chips and joints must be properly patched or repaired.
      b. Concrete surface cured, clean, dry, and free of foreign substances that will compromise carpet and/or other flooring installations.
         1) Removal of curing compounds.
         2) Remove paint, sealer, grease, oil, silicone sealants, and other materials incompatible with flooring adhesives.
         3) Removal of overspray from painted walls (essential so glue will stick).
   2. Vacuum and damp mop floor areas to receive flooring before flooring installation.

B. Carpet Accessories:
   1. Sundry items, such as adhesives, shall be conditioned to building ambient conditions before use.

3.3 INSTALLATION

A. Carpet:
   1. General:
      a. Install carpet and carpet base in accordance with CRI Carpet Installation Standard and manufacturer’s written instructions supplied with product.
      b. Install carpet under edge of metal thresholds where possible. Use specified carpet accessories at exposed edges.

3.4 FIELD QUALITY CONTROL

A. Field Inspections:
   1. Unacceptable carpet after installation shall include but not be limited to:
      a. Delaminating carpet from backings.
      b. Fiber loss less than specified.
      c. Edge raveling.
      d. Fuzzing of carpet fibers.
      e. Pilling of carpet fibers.
      f. Appearance retention less than control samples attached to Agreement.
      g. Dye bleeding.
      h. Zippering fibers in carpet.
      i. Color streaking.
      j. Irregular tufts of fiber.
   2. Unacceptable workmanship shall include but not be limited to:
      a. Improper floor preparation before installation.
      b. Failure of adhesive to completely adhere carpet to floor resulting in bubbles, ridges, or ripples where carpet has separated from floor.
      c. Failure to properly install carpet next to walls and door frames to eliminate gaps or puckering of carpet.
      d. Use of unspecified carpet.
      e. Carpet base ends not finished to terminate at door frames or vertical trim shall have 45 degree angle 'birdsmouth' finish.
      f. Adhesive exposed on carpet, on carpet base, beyond edges of carpet base, and on other surfaces of building.

B. Non-Conforming Work:
   1. Basis of Acceptable Carpeting: Source Quality Control Testing:

a. Carpet products not meeting Design Criteria and Source Quality Control Testing of this specification will be considered unacceptable carpeting.

2. Unacceptable Carpeting:
   a. Unacceptable carpeting will be rejected and shall be repaired or replaced at no additional cost to Owner. Owner's Representative will determine reasonable location of acceptable transition points for removal of unacceptable carpet.

3.5 CLEANING

A. General:
   1. Carpet Installer's Responsibility:
      a. Clean all exposed surfaces of adjoining areas of adhesive spatter before it sets.
      b. Carpeting:
         1) Remove any soiling and/or staining from carpet.
         2) Remove excessive adhesive with manufacturer recommended adhesive removers.

B. Damage to building:
   1. Carpeting:
      a. Carpet Installer's Responsibility:
         1) Clean and repair of all damaged surfaces to their original condition from carpet installation.

C. Waste Management:
   1. Carpet Installer's Responsibility:
      a. All work areas are to be kept clean, clear and free of debris at all times.
      b. Provide adequate waste receptacles and dispose of materials including all rubbish, wrapping paper, scraps, and trimmings from building and property in approved manner as specified in Section 01 7400.

3.6 PROTECTION

A. Protection of Carpeting:
   1. Owner Representative's Responsibility:
      a. No traffic of any kind on newly installed carpet for minimum of twenty-four (24) hours after installation is completed.
      b. No wheeled traffic of any kind placement of furniture or equipment on carpet for minimum of forty-eight (48) hours after completion of carpet installation.
      c. Protect carpet from abuse, vandalism, or damage occurring after installation is complete.
      d. Protect carpet adequately from soil, dust, moisture and other contaminants after carpet installation.

END OF SECTION

SECTION 09 9113
EXTERIOR PAINTING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Surface preparation.

B. Field application of paints.

1.02 DEFINITIONS

A. Comply with ASTM D16 for interpretation of terms used in this section.

1.03 REFERENCE STANDARDS

A. ASTM D16 - Standard Terminology for Paint, Related Coatings, Materials, and Applications 2016.

B. ASTM D4442 - Standard Test Methods for Direct Moisture Content Measurement of Wood and Wood-Based Materials 2020.

C. MPI (APSM) - Master Painters Institute Architectural Painting Specification Manual Current Edition.

D. SSPC-SP 1 - Solvent Cleaning 2015, with Editorial Revision (2016).

1.04 SUBMITTALS

A. Product Data: Provide complete list of products to be used, with the following information for each:
   1. Manufacturer's name, product name and/or catalog number, and general product category (e.g. "alkyd enamel").
   2. MPI product number (e.g. MPI #47).
   3. Cross-reference to specified paint system(s) product is to be used in; include description of each system.
   4. Manufacturer's installation instructions.
   5. Confirmation of colors selected and that each area to be painted or coated has color selected for it.

B. Samples: Submit two paper "draw down" samples, 4 x 6 inches in size, illustrating range of colors available for each finishing product specified.
   1. Where sheen is specified, submit samples in only that sheen.
   2. Where sheen is not specified, submit each color in each sheen available.

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.

1.05 QUALITY ASSURANCE

A. Applicator Qualifications: Company specializing in performing the type of work specified with minimum five years experience and minimum five (5) satisfactorily completed projects of comparable quality, similar size, and complexity in past three (3) years before bidding.
   1. Maintain qualified crew of painters throughout duration of the Work.
   2. Upon request, submit documentation.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Deliver products to site in sealed and labeled containers; inspect to verify acceptability.

B. Container Label: Include manufacturer's name, type of paint, brand name, lot number, brand code, coverage, surface preparation, drying time, cleanup requirements, color designation, and instructions for mixing and reducing.

C. Paint Materials: Store at minimum ambient temperature of 55 degrees F and a maximum of 90 degrees F, in ventilated area, and as required by manufacturer's instructions.

D. Deliver amount of materials necessary to meet Project requirements in single shipment.

E. Notify Architect two working days before delivery of coatings.

F. Store materials in single place.

G. Keep storage area clean and rectify any damage to area at completion of work of this Section.

H. Maintain storage area at 55 deg F (13 deg C) minimum.

1.07 FIELD CONDITIONS

A. Do not apply materials when surface and ambient temperatures are outside the temperature ranges required by the paint product manufacturer.

B. Follow manufacturer's recommended procedures for producing best results, including testing of substrates, moisture in substrates, and humidity and temperature limitations.

C. Do not apply exterior paint and finishes during rain or snow, or when relative humidity is outside the humidity ranges required by the paint product manufacturer.

D. Minimum Application Temperatures for Latex Paints: 50 degrees F for exterior; unless required otherwise by manufacturer's instructions.

E. Provide lighting level of 540 Lux 50 ft candles measured mid-height at substrate surface.
   1. Inspection of painting work shall take place under same lighting conditions as application.
   2. 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

2.01 PERFORMANCE AND DESIGN CRITERIA

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. 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. 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.
2) Color Level III:
(a) Number and placement of interior and exterior paint colors and gloss levels shall be Color Level III from MPI Manual, PDCA P3-93 as modified in following paragraph.
(b) Several paint colors or gloss levels will be selected for same substrate within designated interior rooms or exterior areas.

C. 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.

2.02 MANUFACTURERS

A. Provide paints and finishes used in any individual system from the same manufacturer; no exceptions.

2.03 PAINT SYSTEMS - EXTERIOR

A. Manufacturers: 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.
1. New Surfaces: Use MPI(a) EXT 5.1M Waterborne Light Industrial Coating system.
2. Previously Finished Surfaces: Use MPI(r) REX 5.1K Waterborne Light Industrial Coating.

B. Exterior Ferrous Metal:
1. Materials:
a. All paints and coatings.
1) Primer Coat: MPI Product 107, ‘Primer, Rust-Inhibitive, Water Based’.
2) Finish Coats: MPI Product 163, ‘Light Industrial Coating, Exterior, Water Based, Semi-Gloss (MPI Gloss Level 5).
b. Traffic signage:
1) Primer Coat: MPI Product 107, ‘Primer, Rust-Inhibitive, Water Based’.
2) Finish Coats: MPI Product 163, ‘Light Industrial Coating, Exterior, Water Based, Semi-Gloss (MPI Gloss Level 5).
2. Design Criteria:
a. Systems specified are in addition to prime coats provided under other Sections of Project Manual.
b. Finish Requirements: Use MPI Premium Grade finish requirements for work of this Section.
c. Gloss / Sheen Level Required: Gloss Level 5.

C. Exterior Galvanized Metal:
1. Materials:
a. Polyurethane:
1) Vinyl Wash Primer Coat: MPI Product 80: ‘Primer, Vinyl Wash’.
2) Finish Coats:

(a) Epoxy MPI Product 101: 'Primer, Epoxy, Anti-Corrosive, for Metal'.
(b) Polyurethane MPI Product 72: 'Polyurethane, Two-Component, Pigmented, Gloss (MPI Gloss Level 6-7)'.

b. Latex:
1) Waterborne Primer Coat: MPI Product 134: 'Primer, Galvanized, Water Based'.
2) Finish Coats: MPI Product 11: 'Latex, Exterior Semi-Gloss (MPI Gloss Level 5)'.

2. All Other:
a. New Surfaces: Use MPI(a) EXT 5.3H Latex Finish system.
b. Previously Finished Surfaces: Use MPI(r) REX 5.3H Latex Finish system.

PART 3 EXECUTION

3.01 EXAMINATION

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. Do not begin application of paints and finishes until substrates have been properly prepared.

C. Verify that surfaces are ready to receive work as instructed by the product manufacturer.

D. Examine surfaces scheduled to be finished prior to commencement of work. Report any condition that may potentially affect proper application.

E. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

F. Test shop-applied primer for compatibility with subsequent cover materials.

G. 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.

H. Measure moisture content of surfaces using an electronic moisture meter. Do not apply finishes unless moisture content of surfaces are below the following maximums:
1. Exterior Plaster and Stucco: 12 percent.
2. Fiber Cement Siding: 12 percent.
3. Masonry, Concrete, and Concrete Masonry Units: 12 percent.
4. Exterior Wood: 15 percent, measured in accordance with ASTM D4442.
5. Concrete Floors and Traffic Surfaces: 8 percent.

3.02 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.

C. Clean surfaces thoroughly and correct defects prior to application.

D. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

E. Remove or mask surface appurtenances, including electrical plates, hardware, light fixture trim, escutcheons, and fittings, prior to preparing surfaces for finishing.

F. Seal surfaces that might cause bleed through or staining of topcoat.

3.03 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.

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 9200.

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.

L. Remove unfinished louvers, grilles, covers, and access panels on mechanical and electrical components and paint separately.

M. Exterior Wood to Receive Opaque Finish: If final painting must be delayed more than 2 weeks after installation of woodwork, apply primer within 2 weeks and final coating within 4 weeks.

N. Apply products in accordance with manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual".

O. Where adjacent sealant is to be painted, do not apply finish coats until sealant is applied.

P. Do not apply finishes to surfaces that are not dry. Allow applied coats to dry before next coat is applied.

Q. Apply each coat to uniform appearance.

R. Dark Colors and Deep Clear Colors: Regardless of number of coats specified, apply additional coats until complete hide is achieved.

S. Exterior Ferrous Metal:
   1. 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.
   2. Existing Painted Surfaces:
      a. Remove deteriorated and chalked existing paint and rust down to sound substrate by scraping or power tools.
      b. Clean existing sound painted surfaces as well as scraped and sanded existing painted surfaces as recommended by Paint Manufacturer. If all traces of rust cannot be removed, apply rust blocker recommended by Paint Manufacturer before applying primer coat.
      c. Spot prime bare metal surfaces followed by a prime coat over entire surface to be painted.
      d. Lightly sand entire surface.
      e. Clean surface as recommended by Paint Manufacturer.
      f. Apply specified finish coats.

T. Exterior Galvanized Metal:
   1. New Surfaces:
      a. Clean 'passivated' or 'stabilized' galvanized steel as specified in SSPC-SP 1.
      b. After removal of 'passivated' or 'stabilized' coating or for surfaces without coating, clean surfaces to be painted with mineral spirits or product recommended by Paint Manufacturer. Change to clean rags or wiping cloths regularly to reduce possibility of re-contamination of surface.
      c. Apply prime coat.
      d. Apply finish coats.
   2. Existing Painted Surfaces:
      a. Remove deteriorated and chalked existing paint and rust deposits down to sound substrate by sanding, scraping, or wire brushing.
      b. Clean existing sound painted surfaces as well as scraped and sanded existing painted surfaces as recommended by Paint Manufacturer.
      c. Apply prime coat.
      d. Apply finish coats.
   3. Existing Unpainted Surfaces:
      a. Wirebrush or power wash as necessary to remove 'white rust'.
      b. Apply prime coat.
      c. Apply finish coats.

U. Exterior CMU, Concrete, Stucco
   1. New Surfaces:
      a. 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.
      b. Completely cover voids in masonry block.
      c. Roll after spraying if necessary to eliminate pinholing.
   2. Existing Unpainted Surfaces:
      a. Power wash surfaces to be painted.
      b. Fill cracks with masonry crack filler.
      c. Apply block filler and finish coat as required for new work.

3.04 FIELD QUALITY CONTROL

A. See Section 01 4000 - Quality Requirements, for general requirements for field inspection.

B. 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.

3.05 CLEANING

A. Collect waste material that could constitute a fire hazard, place in closed metal containers, and remove daily from site.

B. 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.

C. 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.

3.06 PROTECTION

A. Protect finishes until completion of project.

B. Touch-up damaged finishes after Substantial Completion.

END OF SECTION

SECTION 09 9123
INTERIOR PAINTING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Surface preparation.

B. Field application of paints.

C. Materials for backpriming woodwork.

D. Do Not Paint or Finish the Following Items:
   1. Items factory-finished unless otherwise indicated; materials and products having factory-applied primers are not considered factory finished.
   2. Items indicated to receive other finishes.
   3. Items indicated to remain unfinished.
   4. Fire rating labels, equipment serial number and capacity labels, bar code labels, and operating parts of equipment.
   5. Stainless steel, anodized aluminum, bronze, terne coated stainless steel, and lead items.
   6. Marble, granite, slate, and other natural stones.
   7. Floors, unless specifically indicated.
   8. Ceramic and other tiles.
   9. Brick, architectural concrete, cast stone, integrally colored plaster and stucco.
   10. Glass.
   11. Concrete masonry units in utility, mechanical, and electrical spaces.
   12. Acoustical materials, unless specifically indicated.
   13. Concealed pipes, ducts, and conduits.

1.02 DEFINITIONS

A. Comply with ASTM D16 for interpretation of terms used in this section.

1.03 REFERENCE STANDARDS

A. ASTM D16 - Standard Terminology for Paint, Related Coatings, Materials, and Applications 2016.

B. MPI (APL) - Master Painters Institute Approved Products List; Master Painters and Decorators Association Current Edition.

C. MPI (APSM) - Master Painters Institute Architectural Painting Specification Manual Current Edition.

1.04 QUALITY ASSURANCE

A. Applicator Qualifications: Company specializing in performing the type of work specified with minimum five years experience and approved by manufacturer.
   1. Minimum five (5) satisfactorily completed projects of comparable quality, similar size, and complexity in past three (3) years before bidding.
   2. Maintain qualified crew of painters throughout duration of the Work.
   3. Upon request, submit documentation.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Deliver products to site in sealed and labeled containers; inspect to verify acceptability.

B. Container Label: Include manufacturer's name, type of paint, brand name, lot number, brand code, coverage, surface preparation, drying time, cleanup requirements, color designation, and instructions for mixing and reducing.

C. Paint Materials: Store at minimum ambient temperature of 45 degrees F and a maximum of 90 degrees F, in ventilated area, and as required by manufacturer's instructions.

PART 2 PRODUCTS

2.01 PERFORMANCE AND DESIGN CRITERIA

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.

2.02 PAINTS AND FINISHES - GENERAL

A. Paints and Finishes: Ready mixed, unless intended to be a field-catalyzed paint.
   1. Where MPI paint numbers are specified, provide products listed in Master Painters Institute Approved Product List, current edition available at www.paintinfo.com, for specified MPI categories, except as otherwise indicated.
   2. Provide paints and finishes of a soft paste consistency, capable of being readily and uniformly dispersed to a homogeneous coating, with good flow and brushing properties, and capable of drying or curing free of streaks or sags.
   3. Provide materials that are compatible with one another and the substrates indicated under conditions of service and application, as demonstrated by manufacturer based on testing and field experience.
   4. For opaque finishes, tint each coat including primer coat and intermediate coats, one-half shade lighter than succeeding coat, with final finish coat as base color.
   5. Supply each paint material in quantity required to complete entire project's work from a single production run.
   6. Do not reduce, thin, or dilute paint or finishes or add materials unless such procedure is specifically described in manufacturer's product instructions.

2.03 PAINT SYSTEMS - INTERIOR

A. Interior Poured Concrete:
   1. Materials:
      a. MPI Product 60: 'Floor Paint, Latex, Low Gloss'.
   2. Performance:
      a. Design Criteria:
         1) Gloss / Sheen Level Required: Semi-Gloss.
      b. New Surfaces: Use MPI(a) INT 3.2A Latex Finish system 2. Previously Finished Surfaces: Use MPI(r) RIN 3.2A Latex Finish system.
      c. Finish Requirements: Use MPI Custom Grade finish requirements.

B. Interior Gypsum Board and Plaster:
   1. Materials:
      a. Primers:
         1) MPI Product 50, 'Primer Sealer, Latex, Interior'.
      b. Finish Coats:
         1) Rest Rooms And Custodial Rooms:
            (a) Buildings with only Gypsum Board surfaces in rooms:
            (b) MPI Product 115, 'Epoxy-Modified Latex, Interior, Gloss (MPI Gloss Level 6)'.
            (c) Buildings with CMU and Gypsum Board surfaces in same rooms:
            (d) MPI Product 77, 'Epoxy, Gloss'.
         2) Remaining Painted Surfaces:

(a) Walls/Partitions/Vertical Surfaces - MPI Product 141, 'Latex, Interior, High Performance Architectural, Semi-Gloss (MPI Gloss Level 5)'.
(b) Ceilings - MPI Product 143 'Latex, Interior, High Performance Architectural, Flat (MPI Gloss Level 1 or 2)'.

2. Performance:
   a. Design Criteria:
      1) New Surfaces: MPI Premium Grade finish requirements.
      2) Gloss / Sheen Required:
         (a) Rest Rooms And Custodial Rooms: Gloss Level 6.
         (b) Remaining Painted Surfaces: Gloss Level 5.
   b. Rest Rooms And Custodial Rooms:
      1) New Surfaces: Use MPI(a) INT 9.2F Waterborne Epoxy Finish system.
   c. All Other:
      1) New Surfaces: Use MPI(a) INT 9.2B Latex Finish system.

C. Interior Metal:
1. Materials:
   a. All paints and coatings shall comply with VOC content limits as indicated in section 01 8113.
   b. Primers:
      1) Ferrous Metal: MPI Product 107, ‘Primer, Rust-Inhibitive, Water Based’.
      2) Galvanized Metal: MPI Product 134: ‘Primer, Galvanized, Water Based’.
      3) Aluminum: MPI Product 95: ‘Primer, Quick Dry, for Aluminum’.
   c. Finish Coats: MPI Product 153: ‘Light Industrial Coating, Interior, Water Based, Semi-Gloss (MPI Gloss Level 5)’.
2. Performance:
   a. Design Requirements:
      1) New Surfaces: MPI Premium Grade finish requirements.
      2) Deteriorated Existing Surfaces: MPI Premium Grade finish requirements.
      3) Sound Existing Surfaces: MPI Custom Grade finish requirements.
      4) Gloss / Sheen Level Required: Gloss Level 5.
   b. Ferrous Metal:
      1) New Surfaces: Use MPI(a) INT 5.1B Waterborne Light Industrial Finish system.
      2) Previously Finished Surfaces: Use MPI(r) RIN 5.1B Waterborne Light Industrial Finish system.
   c. Galvanized Metal:
      1) New Surfaces: Use MPI(a) INT 5.3J Latex Finish system b. Previously Finished Surfaces: Use MPI(r) RIN 5.3AH Latex Finish system.
   d. Aluminum:
      1) New Surfaces: Use MPI(a) INT 5.4E Waterborne Light Industrial Finish system.
      2) Previously Finished Surfaces: Use MPI(r) REX 5.4E Light Industrial Finish system.

D. Interior Wood:
1. Materials:
   a. Woodwork:
      1) Primer Coat: MPI Product 39, ‘Primer, Latex, for Interior Wood’ or MPI Product 45, ‘Primer Sealer, Alkyd, Interior’.
      2) Finish Coats: MPI Product 153, ‘Light Industrial Coating, Interior, Water Based, Semi-Gloss (MPI Gloss Level 5)’.
2. Performance:
   a. Design Criteria:
      1) New Surfaces: MPI Premium Grade finish requirements.
      2) Deteriorated Existing Surfaces: MPI Premium Grade finish requirements.
      3) Sound Existing Surfaces: MPI Custom Grade finish requirements.

4) Gloss / Sheen Level Required: Gloss Level 5.

b. Systems:

1) All Other:

(a) New Surfaces: Use MPI(a) INT 6.3T or U Latex Finish system.

(b) Previously Finished Surfaces: MPI(r) Rin 6.3U Latex Finish system.

E. Locations indicated as Epoxy:

1. Materials

a. Wall and Ceiling Surfacing System:

1) Interior Primer:

(a) Approved Product. See Section 01 6000:

(b) Benjamin Moore equivalent to B28W601 PrepRite High Build Interior Latex Primer/Surfacer by Sherwin-Williams.

2) Epoxy:

(a) Color: 1065 Wood Ash (Benjamin Moore).

(b) Approved Product. See Section 01 6000:

(c) Benjamin Moore equivalent to B71W111 Pro Industrial HI-BLD Water-based Catalyzed Epoxy by Sherwin- Williams.

PART 3 EXECUTION

3.01 EXAMINATION

A. Do not begin application of paints and finishes until substrates have been properly prepared.

B. Verify that surfaces are ready to receive work as instructed by the product manufacturer.

C. Examine surfaces scheduled to be finished prior to commencement of work. Report any condition that may potentially effect proper application.

D. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.02 PREPARATION

A. Protection of In-Place Conditions:

1. Protect other finish work and adjacent materials during painting. Do not splatter, drip, or paint surfaces not intended to be painted. These items will not be spelled out in detail but pay special attention to the following:

a. Do not paint finish copper, bronze, chromium plate, nickel, stainless steel, anodized aluminum, or monel metal except as explicitly specified.

b. Keep cones of ceiling speakers completely free of paint. In all cases where painting of metal speaker grilles is required, paint without grilles mounted to speakers and without grilles on ceiling.

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.

C. Clean surfaces thoroughly and correct defects prior to application.

D. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

E. Remove or repair existing paints or finishes that exhibit surface defects.

F. Remove or mask surface appurtenances, including electrical plates, hardware, light fixture trim, escutcheons, and fittings, prior to preparing surfaces or finishing.

G. Seal surfaces that might cause bleed through or staining of topcoat.

H. Interior Poured Concrete:
   1. New Surfaces:
      a. Prep according to manufacturer's instructions.
      b. Apply prime coat.
      c. Apply finish coats.
   2. Existing Painted Surfaces:
      a. Remove deteriorated existing paint down to sound substrate by scraping and sanding. Feather edges of existing paint by sanding to be smooth with adjacent surfaces. Acid etch bare concrete areas, if necessary.
      b. Clean floors as recommended by Paint Manufacturer.
      c. Apply coating system.

I. Interior Gypsum Board and Plaster:
   1. Interface With Other Work: Properly clean and paint light cove interiors before installation of light fixtures.
   2. New Surfaces:
      a. Primer: Apply primer to be covered with other paint coats with roller only, or with spray gun and back-rolled.
   3. Existing Painted Surfaces:
      a. Remove deteriorated existing paint down to sound substrate by scraping or sanding. Feather edges of existing paint by sanding to be smooth with adjacent surfaces.
      b. Clean surface with mild soap and water, or with tri-sodium phosphate (TSP). Wash surfaces that have been defaced with marking pens, crayons, lipstick, etc, with solvent recommended by Paint Manufacturer. Spot prime such surfaces.
      c. Spackle and tape cracks. Sand to smooth finish and spot prime.
      d. Sand or chemically etch existing painted surface as required to prepare surface to accept new paint.
      e. Re-clean surface.
      f. Apply primer coat.
      g. Apply finish coats.

J. Interior Metal:
   1. 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.
   2. Existing Painted Surfaces:
      a. Remove deteriorated existing paint down to sound substrate by scraping and sanding. Feather edges of existing paint by sanding to be smooth with adjacent surfaces. Spot prime bare metal surfaces immediately.
      b. 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.
      c. Clean existing sound painted surfaces as well as scraped and sanded existing painted surfaces as recommended by Paint Manufacturer.
      d. Apply prime coat over entire surface to be painted.
      e. Lightly sand entire surface.
      f. Clean surface as recommended by Paint Manufacturer.
      g. Apply finish coats.

K. Interior Wood:
   1. New Surfaces:
      a. Spot prime nail holes, cracks, and blemishes before and after puttying.
      b. Apply stain blocker or other product recommended by Paint Manufacturer to knots before applying primer coat.
   2. Existing Painted Surfaces:
      a. Remove deteriorated existing paint down to sound substrate by scraping and sanding. Feather edges of existing paint by sanding to be smooth with adjacent surfaces. Spot prime bare wood areas on woodwork.
      b. Wash surfaces that have been defaced with marking pens, crayons, lipstick, etc, with solvent recommended by Paint Manufacturer. Spot prime such surfaces.
      c. Apply finish coats.

3.03 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.

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 9200.

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.
   1. Finish casework and wood trims that are specified to be installed under Section 06 2000 and that are not called out to be factory-or shop-finished. Back prime wood elements to be installed against concrete or masonry or that may be subjected to moisture.
   2. Paint mechanical, electrical, and audio/visual items that require field painting as indicated in Contract Documents. These include but are not limited to:
      a. Gas pipe from gas meter into building.
      b. Mechanical flues and pipes penetrating roof.
      c. Electrical panel and disconnect enclosures.
      d. Metal protective structures for refrigerant lines.
   3. Paint inside of chases in occupied spaces flat black for 18 inches (450 mm) or beyond sightline, whichever is greater.

L. Remove unfinished louvers, grilles, covers, and access panels on mechanical and electrical components and paint separately.

M. Apply products in accordance with manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual".

N. Where adjacent sealant is to be painted, do not apply finish coats until sealant is applied.

O. Do not apply finishes to surfaces that are not dry. Allow applied coats to dry before next coat is applied.

P. Apply each coat to uniform appearance in thicknesses specified by manufacturer.

Q. Dark Colors and Deep Clear Colors: Regardless of number of coats specified, apply as many coats as necessary for complete hide.

R. Sand wood and metal surfaces lightly between coats to achieve required finish.

S. Vacuum clean surfaces of loose particles. Use tack cloth to remove dust and particles just prior to applying next coat.

T. Reinstall electrical cover plates, hardware, light fixture trim, escutcheons, and fittings removed prior to finishing.

3.04 FIELD QUALITY CONTROL

A. See Section 01 4000 - Quality Requirements, for general requirements for field inspection.

B. 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.

3.05 CLEANING

A. Collect waste material that could constitute a fire hazard, place in closed metal containers, and remove daily from site.

B. 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.

C. 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.

3.06 PROTECTION

A. Protect finishes until completion of project.

B. Touch-up damaged finishes after Substantial Completion.

3.07 SCHEDULE OF PAINT COLORS

A. Interior Poured Concrete:
   1. [Insert Product and Color] by [Insert Manufacturer].

B. Interior Clear Finished Wood:
   a. Match other interior clear finished wood building elements.

C. Interior Gypsum Board, Plaster:
   1. Color Quality Standard. See Section 01 6000:
      a. 1065 Wood Ash by Benjamin Moore.

D. Interior Metal:
   1. Color Quality Standard. See Section 01 6000:

a. DE6385 Black Bean by Benjamin Moore.

E. Interior Painted Wood:
1. Color Quality Standard. See Section 01 6000:
a. 1065 Wood Ash by Benjamin Moore.

END OF SECTION

SECTION 09 0561
COMMON WORK RESULTS FOR FLOORING PREPARATION

PART 1 GENERAL

1.01 SECTION INCLUDES

A. This section applies to floors identified in Contract Documents that are receiving the following types of floor coverings:
   1. Carpet tile.
   2. Thin-set ceramic tile and stone tile.
   3. Preparing floor substrate to receive flooring as described in Contract Documents.

B. Preparation of new and existing concrete floor slabs for installation of floor coverings.

C. Testing of concrete floor slabs for moisture and alkalinity (pH) (See form below).

D. Remediation of concrete floor slabs due to unsatisfactory moisture or alkalinity (pH) conditions.
   1. Contractor shall perform all specified remediation of concrete floor slabs. If such remediation is indicated by testing agency's report and is due to a condition not under Contractor's control or could not have been predicted by examination prior to entering into the contract, a contract modification will be issued.

1.02 REFERENCE STANDARDS

A. ASTM F710 - Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring 2019, with Editorial Revision (2020).

B. ASTM F1869 - Standard Test Method for Measuring Moisture Vapor Emission Rate of Concrete Subfloor Using Anhydrous Calcium Chloride 2016a.

C. ASTM F2170 - Standard Test Method for Determining Relative Humidity in Concrete Floor Slabs Using in situ Probes 2019a.

D. ICRI - Concrete Slab Moisture Testing Program Current.

1.03 ADMINISTRATIVE REQUIREMENTS

A. Review condition of floor regarding compliance with concrete installation tolerances and other work necessary to prepare floors for installation of flooring.

B. Review additional agenda items all related flooring sections.

C. Scheduling:
   1. Concrete Moisture Testing:
      a. General Contractor Responsibility to provide:
         1) Maintain ambient temperatures and relative humidity conditions as specified in Field Conditions in Part 1 of this specification before Moisture Testing Agency will test for concrete moisture.
         2) Provide access for and cooperate with Moisture Testing Agency.

1.04 DELIVERY, STORAGE, AND HANDLING

A. Deliver, store, handle, and protect products in accordance with manufacturer’s instructions and recommendations.

B. Deliver materials in manufacturer’s packaging; include installation instructions.

C. Keep materials from freezing.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.01 PREPARATION

A. Flooring Preparation:
   1. General:

a. Prepare floor substrate in accordance with ASTM F710, ‘Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring’ (This standard is used for preparing concrete floors for all flooring).
    1) Required RH test and alkalinity test of concrete slab has been performed.
b. Concrete floor slab patching:
    1) Cracks, chips and joints must be properly patched or repaired.
c. Concrete surface cured, clean, dry, and free of dirt, dust, grease, wax, and other foreign substances that will compromise flooring installations.
    1) Removal of curing compounds.
    2) Remove paint, sealer, grease, oil, silicone sealants, and other materials incompatible with flooring adhesives.
    3) Removal of overspray from painted walls (essential so glue will stick).
d. Vacuum and damp mop floor areas to receive flooring before flooring installation.

2. Carpeted floor areas:
    a. Prepare floor substrate in accordance with Carpet And Rug Institute (CRI) best practices to receive carpet installation and to provide installation that meets Carpet Manufacturer's warranty requirements.
3. Carpet Accessories:
    a. Sundry items, such as adhesives, shall be conditioned to building ambient conditions before use.

3.02 PROTECTION

A. Cover prepared floors with building paper or other durable covering.

END OF SECTION

SECTION 10 1400
SIGNAGE

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Interior directional and informational signs.

1.02 REFERENCE STANDARDS

A. ADA Standards - Americans with Disabilities Act (ADA) Standards for Accessible Design 2010.

B. ICC A117.1 - Accessible and Usable Buildings and Facilities 2017.

1.03 SUBMITTALS

A. Product Data: Manufacturer's printed product literature for each type of sign, indicating sign styles, font, foreground and background colors, locations, overall dimensions of each sign.

B. Signage Schedule: Provide information sufficient to completely define each sign for fabrication, including room number, room name, other text to be applied, sign and letter sizes, fonts, and colors.
   1. When room numbers to appear on signs differ from those on drawings, include the drawing room number on schedule.
   2. When content of signs is indicated to be determined later, request such information from Owner through Architect at least 2 months prior to start of fabrication; upon request, submit preliminary schedule.
   3. Submit for approval by Owner through Architect prior to fabrication.

C. Manufacturer's Installation Instructions: Include installation templates and attachment devices.

1.04 QUALITY ASSURANCE

A. Regulatory Agency Sustainability Approvals:
   1. Sign shall meet ANSI A117.1 accessibility code and ADA standards for accessible design and local and state authorities having jurisdiction (AHJ) requirements.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Package signs as required to prevent damage before installation.

B. Package room and door signs in sequential order of installation, labeled by floor or building.

C. Store tape adhesive at normal room temperature.

1.06 FIELD CONDITIONS

A. Do not install tape adhesive when ambient temperature is lower than recommended by manufacturer.

B. Maintain this minimum temperature during and after installation of signs.

PART 2 PRODUCTS

2.01 SIGNAGE APPLICATIONS

A. Engraved Stone Panel Signage:
   1. Fabricators:
      a. Approved Sign Fabricators. See Section 01 6000:
         1) Hans Monument Co, Salt Lake City, UT www.hansmonuments.com.
            (a) Contact Information: Debbie Christensen (801) 484-1594 or fax (801) 467-8308.
         2) Mark H. Bott Co., Ogden, UT www.markbottco.com.
            (a) Contact Information: David E. Bott (801) 393-8087 or fax (801) 393-8080.

B. Miscellaneous Interior Signage.
   1. Approved Distributors. See Section 01 6000:
      a. Standard Interior Signs:

1) Room Signs: Molded clear acrylic sub-surface graphics sign with set-screw to attach to included mounting bracket.
2) Provide tactile / braille features in signage.
3) Color:
(a) Background: Black.
(b) Lettering: White.

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

C. Rest Room Doors Signs:
1. One sign for each designated Rest Room door indicating gender of users.
2. Quality Standard. See Section 01 6000.
a. No. 231595 California Title 24 signs by Best Sign Systems Inc, Montrose, CO www.bestsigns.com.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that substrate surfaces are ready to receive work.

3.02 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Install neatly, with horizontal edges level.

C. Locate signs and mount at heights indicated on drawings and in accordance with ADA Standards and ICC A117.1.

D. Protect from damage until Date of Substantial Completion; repair or replace damaged items.

END OF SECTION

SECTION 10 2113
METAL TOILET COMPARTMENTS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Metal toilet compartments.

1.02 REFERENCE STANDARDS

A. ASTM B86 - Standard Specification for Zinc and Zinc-Aluminum (ZA) Alloy Foundry and Die Castings 2018.

1.03 ADMINISTRATIVE REQUIREMENTS

A. Coordination: Coordinate the work with placement of support framing and anchors in walls and ceilings.

1.04 SUBMITTALS

A. Product Data: Provide data on panel construction, hardware, accessories, and color selection.

B. Manufacturer's Installation Instructions: Indicate special procedures.

C. Closeout Submittals:
   1. Include following in Operations and Maintenance Manual specified in Section 01 7800:
      a. Warranty Documentation:
         1) Final, executed copy of Warranty.
      b. Record Documentation:
         1) Manufacturers documentation:
            (a) Manufacturer's literature or cut sheet.
            (b) Color selection.

1.05 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 and handle in compliance with Manufacturer’s instructions and recommendations

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Metal Toilet Compartments:
   1. Accurate Partitions Inc, Lyons, IL www.accuratepartitions.com.
   2. AMPCO Products Inc, Miami, FL www.ampco.com.
   3. Flush-Metal Partition Corp, Maspeth, NY www.flushmetal.com.
   4. Global Steel Products Corp, Eastanollee, GA www.globalpartitions.com.
   5. Hadrian Inc, Mentor, OH www.hadrian-inc.com.
   6. Knickerbocker Partitions Corp, Freeport, NY www.knickerbockerpartition.com.
   7. Metpar, Westbury, NY www.metpar.com.

2.02 COMPONENTS

A. Toilet and Miscellaneous Partitions:
   1. Floor-mounted, overhead-braced.
   2. Panels:
      a. Galvanized bonderized steel sheets (minimum 0.00015 inch (0.004 mm) zinc coating).

b. Edges bound interlocked with drawn molding welded on corners.
c. Corners welded and ground smooth.
d. Sound deadening honeycomb core.
e. Provide wood blocking on all panels that have grab bars.
f. Gauge:
1) Doors: 22 ga (0.08 mm) minimum.
2) Panels: 22 ga (0.08 mm) minimum.
3) Pilasters: 22 ga (0.08 mm) minimum.
4) Screens: 22 ga (0.08 mm) minimum.

3. Posts:
a. 20 ga (one mm) minimum of same construction and finish as panels.
4. Headrails:
a. Aluminum.
b. 20 ga (one mm) minimum of same construction and finish as panels.
c. Anti-grip design.
5. Plinths:
a. 20 ga (one mm) Type 304 stainless steel, Number 4 finish.
b. 3 inch (76 mm) minimum high, secured with concealed clips.
c. All fasteners used to attach Plinths, Posts and Pilasters to the floor shall be Type 304 stainless steel.
6. Anchorages and fasteners:
a. Concealed: Non-corrosive, protective finish.
b. Tamper resistant Torx Head with pin screws.
7. Hardware:
a. Each door:
1) Gravity type hinges with double handed, nylon bottom cam, adjustable for partial door closing position, bottom hinge finished flush with door bottom.
2) Sliding or concealed door bolt with emergency access.
3) Door strike and keeper with rubber bumper.
4) Coat hook / door bumper.
b. Finish: Chrome plated.
c. Meet requirements of ASTM B86, Alloy AG 40A.

B. Urinal Partition:
1. Basic construction same as panels above, floor and ceiling mounted.
2. Width to be 16 inches (400 mm) minimum.
a. Partition maximum width shall not encroach into required accessibility clear floor space.

2.03 FINISHING

A. Finish and Color:
1. Powder-coated paint finish.
2. Color Quality Standards. See Section 01 6000.
a. Accurate:
1) Adobe 917
2) Light Gray 990
b. Ampco:
1) Porcelain 466PC
2) Folkstone 927PC
c. Global:
1) Khaki 2115
2) Almond 2103
d. Flush-Metal:
1) 35 Beige

2) 25 Oyster White
e. Hadrian:
1) Almond 603 or Latte 532
2) Linen 504
f. Knickerbocker:
1) Sand 5123
2) Mauve 4100
g. Metpar:
1) Almond 300
2) Desert Tan 500

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify existing conditions before starting work.

B. Verify that field measurements are as indicated.

C. Verify correct spacing of and between plumbing fixtures.

D. Verify correct location of built-in framing, anchorage, and bracing.

E. Field verify dimensions.

F. Verify that necessary blocking has been installed in framed walls for partition installation and for place where coat hook / door bumper will strike wall.

3.02 INSTALLATION

A. Install pilasters rigid, plumb, and level. Maintain proper door openings. Anchor pilaster to floor with Type 304 stainless steel fasteners embedded 2 inches (50 mm) into concrete slab below setting bed.

B. Secure panels to walls with two stirrup brackets minimum attached near top and bottom of each panel. Use fasteners of length to provide one-inch (25 mm) embedment into blocking or masonry.

C. Secure overhead brace to face sheets with two fasteners minimum per face. Set door tops parallel with brace. Set door bottom 12 inches (300 mm) above floor.

D. Plinth to be level with and snug to floor.

3.03 TOLERANCES

A. Maximum Variation From True Position: 1/4 inch.

B. Maximum Variation From Plumb: 1/8 inch.

3.04 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 at no additional cost to the Owner.
2. Replace damaged or severely scratched materials with new materials at no additional cost to the Owner.

3.05 ADJUSTING

A. Adjust and align hardware to uniform clearance at vertical edge of doors, not exceeding 3/16 inch.

B. Adjust hinges to position doors in partial opening position when unlatched. Return out swinging doors to closed position.

C. Adjust adjacent components for consistency of line or plane.

3.06 CLEANING

A. Remove protective masking. Clean exposed surfaces of partitions, hardware, fittings, and accessories.

B. Touch-up minor scratches and other finish imperfections using materials and methods recommended by Manufacturer.

END OF SECTION

SECTION 10 2800
TOILET ACCESSORIES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Commercial toilet accessories.

B. Utility room accessories.

1.02 REFERENCE STANDARDS

A. ADA Standards - Americans with Disabilities Act (ADA) Standards for Accessible Design 2010.

B. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware 2016a.

C. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process 2020.

D. ASTM A666 - Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar 2015.

E. ASTM C1036 - Standard Specification for Flat Glass 2016.

F. ASTM F446 - Standard Consumer Safety Specification for Grab Bars and Accessories Installed in the Bathing Area 2019.

G. ISO 25537 - Glass in building — Silvered, flat-glass mirror 2008.

1.03 SUBMITTALS

A. Product Data: Submit data on accessories describing operating characteristics, size, finish, details of function, rough-in dimensions and attachment methods.

B. Manufacturer's Installation Instructions: Indicate operation, care, cleaning instructions, special procedures and conditions requiring special attention.

C. Closeout Submittals:
   1. Include following in Operations And Maintenance Manual specified in Section 01 7800:
   2. Operations and Maintenance Data:
      a. Folding Bench:
         1) Manufacturer’s service and parts manual.
   3. Warranty Documentation:
      a. Final, executed copy of Warranty for each product.
   4. Record Documentation:
      a. Manufacturers documentation:
         1) Manufacturer's literature or cut sheets.

1.04 QUALITY ASSURANCE

A. Source Limitations:
   1. For products listed together in same Part 2 articles, obtain products from single source from single manufacturer.

1.05 WARRANTY

A. Commercial Toilet Accessories:
   1. Manufacturer's standard warranty.

B. Baby Changing Station:
   1. Manufacturer's standard warranty to be free from defects in material and workmanship under normal use and service, with proper maintenance, for five (5) years.

C. Special Mirror Warranty:
   1. Manufacturer's standard form in which manufacturer agrees to replace mirrors that develop visible silver spoilage or frame corrosion defects within specified warranty period:

a. Warranty Period: fifteen (15) years from date of Substantial Completion.

PART 2 PRODUCTS

2.01 OWNER-FURNISHED PRODUCTS

A. Approved Products :
   1. Automatic Touchless Towel Dispensers:
      a. WRB489260 by Bobrick
   2. Soap dispensers.
      a. B-2111 Surface –Mounted by Bobrick
   3. Toilet tissue dispensers.
      a. B-265 Surface Mounted by Bobrick

B. Baby Changing Station:
   1. Horizontal: Koala Kare model number KB200 by Koala.

2.02 MANUFACTURED UNITS

A. Manufacturers:
   1. Manufacturer Contact List:
      a. AJW Architectural Products, A&J Washroom Accessories, Inc., New Windsor, NY www.ajwashroom.com.
      b. American Specialties Inc (ASI), Yonkers, NY www.americanspecialties.com.
      c. Bobrick Washroom Equipment Inc, North Hollywood, CA www.bobrick.com or Bobrick Washroom Equipment of Canada Ltd, Scarborough, ON (416) 298-1611.
      d. Bradley Corp, Menomonee Falls, WI www.bradleycorp.com.
      e. General Accessory Manufacturing Co (GAMCO), Durant, OK www.gamcousa.com.

B. Materials:
   1. Design Criteria:
      a. Stainless Steel: ASTM A666 Type 304 (18-8); satin finish exposed surfaces unless otherwise indicated.
      b. Galvanized-Steel Mounting Devices: ASTM A153/A153M, hot-dip galvanized after fabrication.
      c. Fasteners:
         1) Exposed: Screws, bolts, and other devices of same material as accessory unit and tamper-and-theft resistant.
         2) Concealed: Galvanized Steel.
   2. Rest Rooms:
      a. Mirrors:
         1) Channel-Frame Mirror:
            (a) Frame: Type 304 or Type 430, 20 gauge stainless steel channel frame.
            (b) Roll-formed one piece construction.
            (c) Exposed surfaces have #4 satin finish.
            (d) Edges and corners are burr free.
            (e) Glass: 1/4 inch (6.4 mm) silver coated and hermetically sealed. Guaranteed for 15 years against silver spoilage. Mirrors meet ASTM C1036 requirements.
            (f) Concealed surface mounted wall hanger.
         2) Approved Products. See Section 01 6000:
            (a) AJW Architectural Products: Model U711.
            (b) American Specialties (ASI): Model 0620.
            (c) Bobrick: Model B-165.
            (d) Bradley: Model 781.
            (e) General Accessory (GAMCO): Model C Series.
      b. Sanitary Napkin Disposal Container:
         1) Design Criteria:

(a) Surface mounted type 304, 22 gauge stainless steel with #4 satin finish. Seamless construction with radius and hemmed edges.
(b) Stainless steel piano hinge.

2) Approved Products. See Section 01 6000:
(a) AJW Architectural Products: Model U590.
(b) American Specialties (ASI): Model 0852.
(c) Bobrick: Model B-270.
(d) Bradley: Model 4781-15.
(e) General Accessory (GAMCO): Model ND-1.

c. Single Robe Hook:
1) Surface mounted type 304, 22 gauge stainless steel with #4 satin finish.
2) Concealed mounting bracket.
3) Stainless steel locking setscrew on bottom.
4) Approved Products. See Section 01 6000:
(a) AJW Architectural Products: Model UX110SF.
(b) American Specialties (ASI): Model 7340-S.
(c) Bobrick: Model B6717.
(d) Bradley: Model 9114.
(e) General Accessory (GAMCO): Model 76717.

d. Grab Bars:
1) Configuration shown on Contract Drawings. Include center support for longer lengths when required:
2) Design Criteria:
(a) Comply with ADA guidelines and ADAAG accessible design for structural strength and local and state codes.
(b) Concealed mount.
(c) 18 ga (1.27 mm), type 304 stainless steel tubing.
(d) 1-1/2 inch (38 mm) diameter.
(e) Provide center support when required.
(f) Snap-on flange covers.
(g) Peened (non-slip) finish.
(h) Sustain loads in excess of 900 lbs (408 kg).
3) Approved Products. See Section 01 6000:
(a) AJW Architectural Products: Model UG3 Series.
(b) American Specialties (ASI): Model 3800 Series.
(c) Bobrick: Model B-6806 Series.
(d) Bradley: Model 812 Series.
(e) General Accessory (GAMCO): Model 150 Series.

e. Shelf:
1) Design Criteria:
(a) 18 ga (1.27 mm), stainless steel with No. 4 Satin finish.
(b) 6 inches (150 mm) wide.
2) Approved Products. See Section 01 6000:
(a) AJW Architectural Products: Model U776.
(b) American Specialties (ASI): Model 0692.
(c) Bobrick: Model B-296.
(d) Bradley: Model 756.
(e) General Accessory (GAMCO): Model S-6.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify existing conditions before starting work.

B. Verify exact location of accessories for installation.

C. For electrically-operated accessories, verify that electrical power connections are ready and in the correct locations.

D. Verify that field measurements are as indicated on drawings.

E. See Section 06 600 for installation of blocking, reinforcing plates, and concealed anchors in walls and ceilings.

3.02 PREPARATION

A. Deliver inserts and rough-in frames to site for timely installation.

B. Provide templates and rough-in measurements as required.

3.03 INSTALLATION

A. Install accessories in accordance with manufacturers' instructions in locations indicated on drawings.

B. Install plumb and level, securely and rigidly anchored to substrate.

C. Comply with ADA Accessibility Guidelines and installation heights as shown on Contract Drawings.

D. Assemble fixtures and associated fittings and trim in accordance with manufacturer's instructions.

E. Install using mounting devices proper for base structure.

F. Install equipment level, plumb, and firmly in place in accordance with manufacturer's rough-in drawings.

G. Where possible, mount like items in adjoining compartments back-to-back on same partition.

H. Grab Bars:
1. Install as per Manufacturers written installation instructions.
2. Install grab bars to withstand downward force of not less than 250 lbf (1112 N) per ASTM F446.

I. Baby Changing Stations:
1. Verify that solid blocking has been installed in wall framing where changing station is to be installed.
2. Do not install unit by any other means other than screws or lag bolts into solid blocking.

J. Install items in accordance with Manufacturer's submitted, written instructions for screws or lag bolts into solid substrate capable of supporting 200 lbs (90 kg). Install using mounting devices proper for base structure.

3.04 REPAIR

A. Repair or replace defective work, including damaged equipment and components.

B. Repair or replace malfunctioning equipment, or equipment with parts that bind or are misaligned.

3.05 CLEANING

A. Clean unit surfaces and leave in ready-to-use condition.

3.06 ADJUSTING

A. Test each piece of equipment provided with moving parts to assure proper operation, freedom of movement, and alignment. Install new batteries in battery-powered items.

3.07 CLOSEOUT ACTIVITIES

A. Turn over keys, tools, maintenance instructions, and maintenance stock to Owner.

3.08 PROTECTION

A. Protect installed accessories from damage due to subsequent construction operations.

END OF SECTION

SECTION 31 0500
COMMON EARTHWORK REQUIREMENTS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. General procedures and requirements for earthwork.

B. Verification of conditions.

C. Preparation.

D. Repair and restoration.

E. Field quality control.

1.02 RELATED REQUIREMENTS

A. Section 01 4000 - Quality Requirements: Procedures for testing, inspection, mock-ups, reports, certificates; use of reference standards.

1.03 REFERENCES

A. Definitions:

1. Aggregate Base: Layer of granular material immediately below concrete and asphalt paving or miscellaneous site concrete (sidewalks, curbs, etc) and below interior concrete slabs on grade.
2. Base: See Aggregate Base.
3. Building Grading: Sloping of grounds immediately adjacent to building. Proper grading causes water to flow away from a structure. Grading can be accomplished either with machinery or by hand.
4. Compacted Fill: Placement of soils on building site placed and compacted per Contract Documents.
5. Excavation: Removal of soil from project site or cavity formed by cutting, digging or scooping on project site.
6. Fine Grading (FG): Preparation of subgrade preceding placement of surfacing materials (any aggregate base and topsoil) for contour of building site required. Fine Grading is conducted to ensure that earth forms and surfaces have been properly shaped, and subgrade has been brought to correct elevations. It is performed after rough grading and placement of any complicated fill but before placement of aggregate base or topsoil.
7. Finish Grading: Completed surface elevation of landscaping areas for seeding, sodding and planting on building site.
8. Natural Grade: Undisturbed natural surface of ground.
9. Rough Grading (RG): Grading, leveling, moving, removal, and placement of existing or imported soil to its generally required location and elevation. Cut and fill is part of rough grading.
10. Subgrade (definition varies depending upon stage of construction and context of work being performed):
    a. Prepared natural soils on which fill, aggregate base, or topsoil is placed OR
    b. Prepared soils immediately beneath paving, sidewalks or topsoil.
11. Topsoil Placement and Grading: Topsoil placement and finish grading work required to prepare site for installation of landscaping.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.01 EXAMINATION

A. Verification of Conditions:

1. Contact Underground Service Alert to arrange for utility location services forty-eight (48) hours, minimum, before performing any work on site.

2. Perform minor, investigative excavations to verify location of various existing underground facilities at sufficient locations to assure that no conflict with the proposed work exists and sufficient clearance is available to avoid damage to existing facilities.
3. Perform investigative excavating ten (10) days, minimum, in advance of performing any excavation or underground work.
4. Notify Architect within twenty-four (24) hours upon discovery of conflicts or problems with existing facilities. Follow telephone or fax notification with letter and diagrams indicating conflict or problem with sufficient measurements and details to evaluate problem.

3.02 PREPARATION

A. Protection:
   1. Spillage:
      a. Avoid spillage by covering and securing loads when hauling on or adjacent to public streets or highways.
      b. Remove spillage and sweep, wash, or otherwise clean project, streets, and highways.
   2. Dust Control:
      a. Take precautions necessary to prevent dust nuisance, both on-site and adjacent to public and private properties.
      b. Correct or repair damage caused by dust.
   3. Existing Plants And Features:
      a. Do not damage tops, trunks, and roots of existing trees and shrubs on site that are intended to remain.
      b. Do not use heavy equipment within branch spread.
      c. Interfering branches may be removed only with permission of Architect.
      d. Do not damage other plants and features that are to remain.

3.03 REPAIR / RESTORATION

A. Adjust existing covers, boxes, and vaults to grade.

B. Replace broken or damaged covers, boxes, and vaults.

C. Independently confirm size, location, and number of covers, boxes, and vaults that require adjustment.

3.04 FIELD QUALITY CONTROL

A. See Section 01 4000 - Quality Requirements, for additional requirements.

B. Non-Conforming Work:
   1. If specified protection precautions are not taken or corrections and repairs not made promptly, Owner may take such steps as may be deemed necessary and deduct costs of such from monies due to Contractor. Such action or lack of action on Owner's part does not relieve Contractor from responsibility for proper protection of The Work.

END OF SECTION

SECTION 31 2200
GRADING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Removal of topsoil.

B. Rough grading .

C. Fine grading

1.02 RELATED REQUIREMENTS

A. Section 31 0500 - Common Earthwork Requirements.

B. Section 31 2316 - Excavation and Trenching.

C. Section 31 2323 - Fill and Aggregate Base: Filling and compaction of fill and aggregate base materials.

D. Section 32 9120 - Topsoil and Placement

E. Section 32 9122 - Topsoil Grading

F. Section 32 9223 - Sodding.

G. Section 32 9300 - Plants.

1.03 ADMINISTRATIVE REQUIREMENTS

A. Preinstallation Meeting: Per Section 31 0500 - Common Earthwork Requirements:.

1. Identify benchmark for establishing grades.
2. Examine site to pre-plan procedures for cuts, fill placements, and other necessary work.

1.04 SUBMITTALS

A. Project Record Documents: Accurately record actual locations of utilities remaining by horizontal dimensions, elevations or inverts, and slope gradients.

PART 2 PRODUCTS

2.01 MATERIALS

A. Topsoil: See Section 32 9120.

B. Other Fill and Aggregate Base Materials: See Section 31 2323.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that survey bench mark and intended elevations for the Work are as indicated.

B. Verify the absence of standing or ponding water.

3.02 PREPARATION

A. Identify required lines, levels, contours, and datum.

B. Stake and flag locations of known utilities.

C. Locate, identify, and protect from damage above- and below-grade utilities to remain.

D. Provide temporary means and methods to remove all standing or ponding water from areas prior to grading.

E. Protect site features to remain, including but not limited to bench marks, survey control points, existing structures, fences, sidewalks, paving, and curbs, from damage by grading equipment and vehicular traffic.

F. Protect plants, lawns, rock outcroppings, and other features to remain as a portion of final landscaping.

3.03 SOIL REMOVAL AND STOCKPILING

A. Stockpile excavated topsoil on site.

B. Stockpile topsoil to be re-used on site; remove remainder from site.

C. Remove excavated topsoil from site.

D. Stockpile excavated subsoil on site.

E. Stockpile subsoil to be re-used on site; remove remainder from site.

F. Remove excavated subsoil from site.

G. Stockpiles: Use areas designated on site; pile depth not to exceed 8 feet; protect from erosion.

3.04 ROUGH GRADING

A. Remove topsoil from areas to be further excavated, re-landscaped, or re-graded, without mixing with foreign materials.

B. Do not remove topsoil when wet.

C. Remove subsoil from areas to be further excavated, re-landscaped, or re-graded.

D. Do not remove wet subsoil , unless it is subsequently processed to obtain optimum moisture content.

E. When excavating through roots, perform work by hand and cut roots with sharp axe.

F. See Section 31 2323 for filling procedures.

G. Stability: Replace damaged or displaced subsoil to same requirements as for specified fill.

H. Remove and replace soils deemed unsuitable by classification and which are excessively moist due to lack surface water control.

3.05 FINE GRADING

A. Preparation:
   1. Protection Of In-Place Conditions: Protect utilities and site elements from damage.
   2. Landscaping and Planting Areas:
      a. Before grading, dig out weeds from planting areas by their roots and remove from site. Remove rocks larger than 1-1/2 inches in size and foreign matter such as building rubble, wire, cans, sticks, concrete, etc.
      b. Remove imported paving base material present in planting areas down to natural subgrade or other material acceptable to Architect.

3.06 TOLERANCES

A. Subgrade beneath compacted fill, aggregate base or topsoil shall be constructed smooth and even.

B. Landscaping and Planting Tolerances:
   a. Maximum variation from required grades shall be 1/10 of one foot (28 mm).
   b. To allow for final finish grades as specified in Section 32 9121 of planting areas, fine grade elevations before placing topsoil and mulch are:
      1) Sod Areas: 7 inches (175 mm) below top of walk or curb.
      2) Seeded Areas: 6 inches (150 mm) below top of walk or curb.
      3) Ground Cover Areas: 7 inches (180 mm) below top of walk or curb.
      4) Tree And Shrub Areas: 4 inches (100 mm) below top of walk or curb.

C. Slope grade away from building as specified in Section 31 2323.

3.07 REPAIR AND RESTORATION

A. Existing Facilities, Utilities, and Site Features to Remain: If damaged due to this work, repair or replace to original condition.

B. Other Existing Vegetation to Remain: If damaged due to this work, replace with vegetation of equivalent species and size.

3.08 FIELD QUALITY CONTROL

A. See Section 31 2323 for compaction density testing.

3.09 CLEANING

A. Leave site clean and raked, ready to receive landscaping.

END OF SECTION

SECTION 31 2316
EXCAVATION AND TRENCHING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Excavating for building volume below grade, footings, slabs-on-grade, and utilities within the building.

B. Trenching for utilities outside the building to utility main connections.

1.02 RELATED REQUIREMENTS

A. Section 31 0500 - Common Earthwork Requirements.

B. Section 31 2200 - Grading: Soil removal from surface of site.

C. Section 31 2200 - Grading: Grading.

D. Section 31 2323 - Fill and Aggregate Base: Fill materials, backfilling, and compacting.

E. Performance of excavating inside and outside of building required for electrical and mechanical work is responsibility of respective Section doing work unless arranged differently by Contractor.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.01 EXAMINATION

A. Verification Of Conditions:
   1. Carefully examine site and available information to determine type soil to be encountered.
   2. Discuss problems with Architect before proceeding with work.

3.02 PREPARATION

A. Locate, identify, and protect utilities that remain and protect from damage.

B. Contact Architect immediately upon discovery of undocumented utilities.

3.03 PERFORMANCE

A. Interface With Other Work:
   1. See Section 31 2323 for subgrade preparation at general excavations.

B. Excavate to accommodate new structures and construction operations.
   1. Excavate to the specified elevations.
   2. Excavate to the length and width required to safely install, adjust, and remove any forms, bracing, or supports necessary for the installation of the work.
   3. Cut utility trenches wide enough to allow inspection of installed utilities.
   4. Hand trim excavations. Remove loose matter.

C. Notify Architect of unexpected subsurface conditions and discontinue affected Work in area until notified to resume work.

D. Do not interfere with 45 degree bearing splay of foundations.

E. Provide temporary means and methods, as required, to remove all water from excavations until directed by Architect. Remove and replace soils deemed suitable by classification and which are excessively moist due to lack of dewatering or surface water control.

F. Utility Trenches:
   1. Unless otherwise indicated, excavation shall be open cut. Short sections of trench may be tunneled if pipe or duct can be safely and properly installed and backfill can be properly tamped in tunnel sections and if approved by Architect.
   2. Excavate to proper alignment, depth, and grade. Excavate to sufficient width to allow adequate space for proper installation and inspection of utility piping.

3. If trenches are excavated deeper than required, backfill until trench bottom is proper depth with properly compacted native material.
4. Pipe 4 inches in Diameter or Larger:
    a. Grade bottom of trenches to provide uniform bearing and support for each section of pipe on undisturbed soil at every point along its length.
    b. Except where rock is encountered, take care not to excavate below depths indicated.
        1) Where rock excavations are required, excavate rock with minimum over-depth of 4 inches below required trench depths.
        2) Backfill over-depths in rock excavation and unauthorized over-depths with loose, granular, moist earth, thoroughly compacted.
    c. Whenever wet or unstable soil incapable of properly supporting pipe, as determined by Architect, occurs in bottom of trench, remove soil to depth required and backfill trench to proper grade with coarse sand, fine grave, or other suitable material acceptable to Architect.

3.04 REPAIR

A. Repair damage to other portions of the Work resulting from work of this Section at no additional cost to Owner. Arrange for damage to be repaired by original installer.

B. Correct areas that are over-excavated and load-bearing surfaces that are disturbed; see Section 31 2323.

3.05 CLEANING

A. Stockpile excavated material to be re-used in area designated on site in accordance with Section 31 2200.

B. Remove excavated material that is unsuitable for re-use from site.

C. Remove excess excavated material from site.

END OF SECTION

SECTION 31 2323
FILL AND AGGREGATE BASE

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Filling, backfilling, and compacting for building volume below grade.

B. Backfilling and compacting for utilities outside the building to utility main connections.

C. Filling holes, pits, and excavations generated as a result of removal (demolition) operations.

D. Aggregate Base:

1.02 RELATED REQUIREMENTS

A. Section 31 0500 - Common Earthwork Requirements

B. Section 31 2200 - Grading: Removal and handling of soil to be re-used.

C. Section 31 2200 - Grading: Site grading.

D. Section 31 2316 - Excavation and Trenching: Removal and handling of soil to be re-used.

E. Division 32 - Exterior Improvements

1.03 REFERENCE STANDARDS

A. ASTM C150/C150M - Standard Specification for Portland Cement 2020.

B. ASTM C1602/C1602M - Standard Specification for Mixing Water Used in the Production of Hydraulic Cement Concrete 2012.

C. ASTM C796/C796M - Standard Test Method for Foaming Agents for Use in Producing Cellular Concrete Using Preformed Foam 2019.

D. ASTM D1883 - Standard Test Method for California Bearing Ratio (CBR) of Laboratory-Compacted Soils 2016.

E. ASTM D2487 - Standard Practice for Classification of Soils for Engineering Purposes (Unified Soil Classification System) 2017, with Editorial Revision.

F. ASTM D6817/D6817M - Standard Specification for Rigid Cellular Polystyrene Geofoam 2017.

G. ASTM D7557/D7557M - Standard Practice for Sampling of Expanded Geofoam Specimens 2009, with Editorial Revision (2013).

H. ASTM E1643 - Standard Practice for Selection, Design, Installation and Inspection of Water Vapor Retarders Used in Contact with Earth or Granular Fill Under Concrete Slabs 2018a.

PART 2 PRODUCTS

2.01 FILL MATERIALS

A. General Fill - Fill : Subsoil excavated on-site.
   1. Graded.
   2. Free of lumps larger than 3 inches, rocks larger than 2 inches, and debris.
   3. Complying with ASTM D2487 Group Symbol CL.

B. Fill:
   1. Well graded material conforming to ASTM D2487 free from debris, organic material, frozen materials, brick, lime, concrete, and other material which would prevent adequate performance of backfill.
      a. Under Building Footprint And Paved Areas: Fill shall comply with soil classification groups GW, CL, GP, GM, SW, SP, or SM. Fill may not contain stones over 6 inches diameter and ninety-five (95) percent minimum of fill shall be smaller than 1-1/2 inch in any direction.
      b. Under Landscaped Areas:
         1) Fill more than 36 inches below finish grade shall comply with soil classification groups GW, CL, GP, GM, SW, SP, or SM. Fill may not contain stones over 6

inches (150 mm) diameter and ninety (90) percent minimum of fill shall be smaller than 1-1/2 inch in any direction.

2) Fill less than 36 inches below finish grade shall comply with soil classification groups SW, SP, SM, or SC. Fill may not contain stones larger than 1-1/2 inches in any direction and ninety (90) percent minimum of fill shall be smaller than 3/8 inch in any direction.

C. Aggregate Base:
1. Under Interior Concrete Slab-On-Grade:
a. New Aggregate Base:
1) Gravel: 3/4 inch minimum to one inch maximum well-graded, clean gravel or crushed rock.
2) Base type gravel or crushed rock, graded by weight (three-quarter to one-inch clean gap-graded gravel); road Base type gravel or crushed stone (slag not allowed). Conform to the following gradation:

(a)	Sieve		Percent of Weight Passing
(1)	2 inch	(50.0 mm)	100
(2)	1 1/2 inch	(38.0 mm)	85 - 100
(3)	1 inch	(25.4 mm)	100
(4)	3/4 inch	(19.0 mm)	80 - 90
(5)	1/2 inch	(12.7 mm)	20 - 40
(6)	3/8 inch	(9.5 mm)	5 -10
(7)	No. 4	(4.750 mm)	0 12

D. SOURCE QUALITY CONTROL
1. See Section 01 4000 - Quality Requirements, for general requirements for testing and analysis of soil material.
2. Where fill materials are specified by reference to a specific standard, test and analyze samples for compliance before delivery to site.
3. If tests indicate materials do not meet specified requirements, change material and retest.

PART 3 EXECUTION

3.01 EXAMINATION

A. Identify required lines, levels, contours, and datum locations.

B. Verify areas to be filled are not compromised with surface or ground water.

3.02 PREPARATION

A. Scarify and proof roll subgrade surface to a depth of 6 inches to identify soft spots.
1. Cut out soft areas of subgrade not capable of compaction in place. Backfill with general fill.

B. Before placing fill, aggregate base, or finish work, prepare existing subgrade as follows:
1. Under Building Slab, Equipment Pad, Under Driveways, Parking, Under Miscellaneous Concrete Site Elements And Outside Face of Foundation Wall Areas:
a. Do not place fill or aggregate base over frozen subgrade.
b. Moisture condition to uniform moisture content of between optimum and four (4) percent over optimum, and mechanically compact 6 inches deep to ninety-five (95) percent minimum of relative compaction.
c. Finish grade to grades required by Contract Documents.
2. Landscape Areas:
a. Compact subgrade to eight-five (85) percent relative compaction.

C. Aggregate Base:
1. Do not perform work during unfavorable conditions as specified below:
a. Presence of free surface water.
b. Over-saturated sub base materials.

D. Vapor Retarder under Interior Concrete Slab-on-Grade:
   1. Unacceptable conditions for installation include presence of high winds which would tear or damage vapor retarder.

E. Compact subgrade to density equal to or greater than requirements for subsequent fill material.

F. Until ready to fill, maintain excavations and prevent loose soil from falling into excavation.

3.03 PERFORMANCE

A. Interface With Other Work:
   1. Section 31 2200 - Grading for rough grading and preparation of natural soil subgrades below fill and aggregate base materials.
   2. Section 31 2200 - Grading for grading of subgrade below aggregate base and topsoil.
   3. Do not place fill or aggregate base material when subgrade is frozen or unstable.
   4. Remove all standing water before placing fill or aggregate base material.

B. Fill:
   1. General:
      a. Before backfilling, show utility and service lines being covered on record set of Drawings. Do not backfill until utilities involved have been tested and approved by Architect and until instructed by Architect.
      b. Around Buildings And Structures: Slope grade away from building as specified unless noted otherwise in Contract Drawings. Hand backfill when close to building or where damage to building might result.
      c. Site Utilities:
         1) In Landscape Areas: Use backfill consisting of on-site soil.
         2) Under Pavement and Concrete Site Elements: Extend excavatable flowable fill/backfill to elevation of subgrade. Do not place aggregate base material until excavatable flowable fill/backfill has cured seventy-two hours.
      d. Do not use puddling or jetting to consolidate fill areas.

C. Compacting:
   1. Fill And Aggregate Base:
      a. Under Interior Concrete Slabs on Grade:
         1) Fill:
            (a) Place in 8 inch maximum uncompacted layers, moisture condition to plus or minus two (2) percent of optimum moisture content and mechanically compact to ninety-five (95) percent minimum of maximum laboratory density as established by ASTM D1157.
         2) Aggregate Base:
            (a) Place 4 inches minimum of aggregate base under vapor retarder, level, and mechanically compact to ninety-five (95) percent minimum of maximum laboratory density as established by ASTM D1157.
         3) Vapor Retarder:
            (a) Install vapor retarder in accordance with ASTM E1643 except where Contract Documents indicate otherwise and following instructions:
               (1) Install vapor retarder over aggregate base over compacted subgrade so entire area under slab is covered.
               (2) Install vapor retarder in accordance with ASTM E1643 at interior stem walls.
            (b) Lap joints 6 inches (150 mm) minimum and seal with specified seam tape.
               (1) Seal vapor retarder around pipes, conduits, and other utility items that penetrate vapor retarder using factory-fabricated boot installed as recommended by Manufacturer.
               (2) Except for punctures required for reinforcing and anchor bolts at top of stem walls, seal tears and punctures.

2. Under Miscellaneous Concrete Site Elements (sidewalks, curbs, gutters, not mow strips) And Outside Face of Foundation Walls:
   a. Fill:
      1) Place in 8 inch maximum uncompacted layers, dampen but do not soak, and mechanically compact to ninety-five (95) percent minimum of maximum laboratory density as established by ASTM D1557.
   b. Aggregate Base:
      1) Four inches minimum of aggregate base. Level, and mechanically compact to ninety-five (95) percent minimum of maximum laboratory density as established by ASTM D1157.
3. Utility Trenches:
   a. Site:
      1) Fill:
         (a) Place fill in 12 inch maximum uncompacted layers and moisture condition to plus or minus two (2) percent of optimum moisture content.
         (b) Compact fill to ninety-five (95) percent minimum relative compaction to within 12 inches of finish grade.
         (c) Compact fill above 12 inches to eight-five (85) percent relative compaction.
   b. Under Miscellaneous Slabs:
      1) Fill:
         (a) Place in 6 inch maximum uncompacted layers, moisture condition to plus or minus two (2) percent of optimum moisture content, and compact to ninety-five (95) percent minimum relative compaction to within 4 inches of finish grade.
      2) Aggregate Base:
         (a) Place 4 inches minimum of aggregate base, level, and compact. as specified in Part 3.
4. Fill Slopes: Compact by rolling or using sheepsfoot roller.
5. Backfill Under Footings if required by geotechnical evaluation report.
6. Landscape Areas:
   a. Compact fill to eighty-five (85) percent minimum relative compaction.
7. Other Backfills: Place other fills in 12 inch maximum uncompacted layers and compact to ninety-five (95) percent relative compaction.
8. Loose material from compacted subgrade surface shall be immediately removed before placing compacted fill or aggregate base course.

D. Fill to contours and elevations indicated using unfrozen materials.

E. Employ a placement method that does not disturb or damage other work.

F. Systematically fill to allow maximum time for natural settlement. Do not fill over porous, wet, frozen or spongy subgrade surfaces.

G. Maintain optimum moisture content of fill materials to attain required compaction density.

H. Slope grade away from building minimum 4”, unless noted otherwise. Make gradual grade changes. Blend slope into level areas.

I. Maintain temporary means and methods, as required, to remove all water while fill is being placed as required, or until directed by the Architect. Remove and replace soils deemed unsuitable by classification and which are excessively moist due to lack of dewatering or surface water control.

3.04 TOLERANCES

A. Top Surface of General Filling: Plus or minus 1 inch from required elevations.

3.05 REPAIR / RESTORATION

A. Repair damage to other portions of the Work resulting from work of this Section at no additional cost to Owner. On new work, arrange for damage to be repaired by original installer.

3.06 FIELD QUALITY CONTROL

A. See Section 01 4000 - Quality Requirements, for general requirements for field inspection and testing.

B. Field Tests and Inspections:
   1. Field tests and inspections and laboratory testing are provided by Owner's independent Testing Agency as specified in Section 01 4000.
      a. Quality Control is sole responsibility of Contractor:
         1) Owner's employment of an independent Testing Agency does no relieve Contractor of Contractor's obligation to perform testing and inspection as part of his Quality Control:
            (a) Testing and inspections, if performed by Contractor, will be responsibility of Contractor to be performed by an independent entity.
   2. Fill/Engineered Fill:
      a. Testing Agency shall provide testing and inspection for fill.
      b. Number of tests may vary at discretion of Architect.
      c. Testing Agency is to provide one (1) moisture-maximum density relationship test for each type of fill material.
      d. Prior to placement of engineered fill, inspector shall determine that site has been prepared in accordance with geotechnical evaluation report.
      e. Footing sugrade: At footing subgrades, inspector is to verify that soils confor to geotechnical evaluation report.
      f. Testing Agency will test compaction of soils according to ASTM D1556/D1556M, ASTM D2167, and ASTM D6938 as applicable. Lift thicknesses shall comply with geotechnical evaluation report. Inspector shall determine that in-place dry density of engineered fill material complies with geotechnical evaluation report. Tests will be performed at following locations and frequencies:
         1) Paved Areas: At each compacted fill and backfill layer, at least one (1) test for every 10,000 sq. ft. or less of paved areas but in no case less than three (3) tests.
         2) Building Slab Areas: At each compacted fill and backfill layer, at least one (1) test for every 2,500 sq. ft. or less of building slab area but in no case less than three (3) tests.
         3) Foundation Wall/Continuous Footing Backfill: At each compacted backfill layer, at least one (1) test for each 40 linear feet or less of wall length, but no fewer than two (2) tests.
         4) Trench Backfill: At each 12 inch compacted lift for each 100 linear feet or less of trench length but no fewer than two (2) tests.
         5) Sidewalks, Curbs, Gutters, Exterior Pads: Minimum of one (1) test for each lift for each 40 linear feet or one (1) test for every 5,000 sq. ft. or less of pad area but no fewer than three (3) tests.
   3. Aggregate Base:
      a. Interior slab-on-grade concrete areas:
         1) Testing Agency shall provide testing and inspection for interior aggregate base.
         2) Number of tests may vary at discretion of Architect.
         3) Testing Agency will test compaction of base in place according to ASTM D1556/D1556M, ASTM D2167, and ASTM D6938, as applicable. Tests will be performed at following frequency:
            (a) Building Slab Areas: One test for every 2,500 sq. ft. (232 sq. m) or less of building slab area but no fewer than three tests.
      b. Miscellaneous exterior concrete areas:
         1) Testing Agency shall provide testing and inspection for exterior aggregate base.
         2) Number of tests may vary at discretion of Architect.

3) Testing Agency will test compaction of base in place according to ASTM D1556/D1556M, ASTM D2167, and ASTM D6938, as applicable. Tests will be performed at following frequency:
   (a) Sitework Areas: One test for every 10,000 sq. ft. (930 sq. m) or less of exterior pads area but no fewer than three tests.

3.07 PROTECTION

A. Interior Slab-On-Grade Concrete:
   1. Vapor Retarder:
      a. Do not allow water onto vapor retarder or aggregate base before placing concrete.
      b. Protect membrane from possible punctures caused by reinforcing bar supports before placing concrete.

3.08 CLEANING

A. See Section 01 7419 - Construction Waste Management and Disposal, for additional requirements.

B. Remove unused stockpiled materials, leave area in a clean and neat condition. Grade stockpile area to prevent standing surface water.

END OF SECTION

SECTION 32 9122
TOPSOIL GRADING

PART 1 GENERAL

1.01 SUMMARY

A. Includes But Not Limited To:
   1. Perform topsoil grading required to prepare site for installation of landscaping as described in Contract Documents.
   2. Perform topsoil placement and finish grading work required to prepare site for installation of landscaping as described in Contract Documents.
   3. Furnish and apply soil amendments as described in Contract Documents.

B. Related Requirements:
   1. Section 31 0500: 'Common Earthwork Requirements':
   2. Section 31 1413: 'Topsoil Stripping And Stockpiling'.
   3. Section 31 2200: 'Grading'.

PART 2 PRODUCTS – NOT USED

PART 3 EXECUTION

3.01 PREPARATION

A. Protection Of In-Place Conditions:
   1. Protect utilities and site elements from damage.

B. Surface Preparation:
   1. Surfaces that meet specified topsoil elevations.
      a. Seven (7) days maximum before beginning seeding and planting:
         1) Loosen topsoil 6 inch (150 mm) deep, dampen thoroughly, and cultivate to properly break up clods and lumps.
         2) Rake area to remove clods, rocks, weeds, roots, debris or other material 1-1/2 inches (38 mm) or more in any dimension.
         3) Grade and shape landscape area to bring surface to true uniform planes free from irregularities and to provide drainage and proper slope to catch basins.
   2. Addition of Soil Amendments:
      a. Add specified soil amendments at specified rates to topsoil as directed by Topsoil Testing Report found in Section 32 9120 'Topsoil And Placement'.
      b. Add specified fertilizers at specified rates into topsoil as directed by Soil Testing Laboratory.
      c. Roto-till or otherwise mix soil amendments evenly into topsoil.
      d. Incorporate and leach soil amendments which require leaching, such as gypsum, within such time limits that soil is sufficiently dry to allow proper application of fertilizer and soil conditioners.

3.02 PERFORMANCE

A. General:
   1. Limit use of heavy equipment to areas no closer than 6 feet (1.80 meter) from building or other permanent structures. Use hand held tillers for preparation of subsoil in areas closer than 6 feet (1.80 m).
   2. Do not expose or damage existing shrub or tree roots.

B. Finish Grade Tolerances (As shown on General Planting Details in Contract Documents):
   1. Finish topsoil grade of planting areas before planting and after addition of soil additives shall be specified distances below top of adjacent pavement of any kind:
      a. Ground Cover Areas: 2 inches (50 mm) below.
      b. Seeded Areas: One inch (25 mm) below.
      c. Sodded Areas: 2 inches (50 mm) below.
      d. Tree and Shrub Areas (not individual trees): 4 inches (100 mm) below.

C. Placed Topsoil:
   1. At locations where topsoil has been placed as per Section 32 9120 'Topsoil And Placement', perform the following:
      a. Remove existing vegetation as required in preparation for new landscaping.
      b. Remove organic material, rocks and clods greater than 1-1/2 inch (38 mm) in any dimension, and other objectionable materials.

D. Grading:
   1. Coordinate grading as described in Section 32 9120 'Topsoil And Placement'.

E. Immediately before planting lawn and with topsoil in semi-dry condition, roll areas that are to receive lawn in two directions at approximately right angles with water ballast roller weighing 100 to 300 lbs (45 to 135 kg), depending on soil type.

F. Rake or scarify and cut or fill irregularities that develop as required until area is true and uniform, free from lumps, depressions, and irregularities.

3.03 PROTECTION

A. After landscape areas have been prepared, take no heavy objects over them except lawn rollers.

END OF SECTION