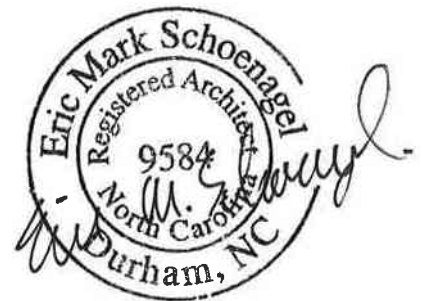


PROJECT MANUAL

UNIVERSITY OF NORTH CAROLINA
AT WILMINGTON
HOUSING VILLAGE PHASE 3
601 SOUTH COLLEGE ROAD
WILMINGTON, NORTH CAROLINA 28403
COMPLETE PACKAGE
CONSTRUCTION DOCUMENTS

5142301800 / SCO 22-29053-02D

VOLUME 1
JANUARY 15, 2026



01.15.2026

ESTIMATED
EMBODIED
CARBON

445 kgCO₂e/m²

LITTLE
DIVERSIFIED ARCHITECTURAL CONSULTING

January 15, 2026

University of North Carolina at Wilmington
Housing Village Phase 3
Complete Package - Construction Documents

5142301800
SCO 24-29053-02D

DOCUMENT 00 01 07 - SEALS PAGE

This document includes the Professional Seals of Design Professionals responsible for preparing the Construction Documents.

ARCHITECTURAL:

SEAL LOCATION:

NAME:

Eric Schoenagel
(Print)

Eric M. Schoenagel

(Signature)

9584

(Professional Number)



January 15, 2026

University of North Carolina at Wilmington
Housing Village Phase 3
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5142301800
SCO 24-29053-02D

STRUCTURAL:

SEAL LOCATION:

NAME:

Carl Schuett

(Print)

Carl Schuett

(Signature)

47005

(Professional Number)



January 15, 2026

University of North Carolina at Wilmington
Housing Village Phase 3
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5142301800
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PLUMBING:

SEAL LOCATION:

NAME:

James L. Currie

(Print)

(Signature)

031478

(Professional Number)



January 15, 2026

University of North Carolina at Wilmington
Housing Village Phase 3
Complete Package - Construction Documents

5142301800
SCO 24-29053-02D

MECHANICAL:

SEAL LOCATION:

NAME: James L. Currie
(Print)

(Signature)

031478
(Professional Number)



January 15, 2026

University of North Carolina at Wilmington
Housing Village Phase 3
Complete Package - Construction Documents

5142301800
SCO 24-29053-02D

ELECTRICAL:

SEAL LOCATION:

NAME:

Steve E. Robey

(Print)

(Signature)

043650

(Professional Number)



January 15, 2026

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Housing Village Phase 3
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CIVIL:

SEAL LOCATION:

NAME:

Steven J. Miller

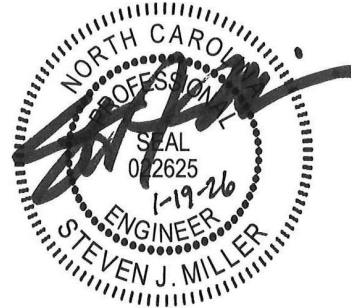
(Print)



(Signature)

NCPE 022625

(Professional Number)



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Housing Village Phase 3
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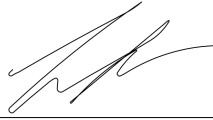
LANDSCAPE:

SEAL LOCATION:

NAME:

Charles Bradley

(Print)



(Signature)

NC 1717

(Professional Number)



January 15, 2026

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Housing Village Phase 3
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UNIVERSITY OF NORTH CAROLINA AT WILMINGTON
HOUSING VILLAGE PHASE 3
601 SOUTH COLLEGE ROAD
WILMINGTON, NORTH CAROLINA 28403

The undersigned Contractor hereby warrants, in accordance with the applicable provisions and terms set forth in the Contract Documents, all materials and workmanship incorporated in this Project against any and all defects due to faulty materials or workmanship or negligence for a period of 12 months, or such longer periods as set forth in the Contract Documents, from the effective date of Final Acceptance. This Contractor further warrants all work incorporated in this Project to remain leakproof and watertight at all points as applicable for a period of 24 months from the effective date of Final Acceptance.

This Warranty shall be binding where defects occur due to normal usage conditions and does not cover willful or malicious damage, damage caused by acts of God or other casualty beyond the control of the Contractor.

This Warranty shall be in addition to other warranties and guarantees set forth in the Contract Documents, and shall not act to constitute a waiver of additional protection of the Owner afforded, where applicable, by consumer protection and product liability provisions of law, and these stipulations shall not constitute waiver of any additional rights or remedies available to the Owner under the law.

Signed: _____
Name: _____
Title: _____
Date: _____

(Corporate Seal)

Subscribed and sworn before me this
_____ day of _____, 20____.

(Notary Public)

END OF SECTION 00 65 36

January 15, 2026

University of North Carolina at Wilmington
Housing Village Phase 3
Complete Package - Construction Documents

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SECTION 00 65 37 - ASBESTOS-FREE WARRANTY

UNIVERSITY OF NORTH CAROLINA AT WILMINGTON
HOUSING VILLAGE PHASE 3
601 SOUTH COLLEGE ROAD
WILMINGTON, NORTH CAROLINA 28403

The undersigned Contractor hereby warrants that no asbestos-containing materials of any kind were used in the construction of University of North Carolina at Wilmington Housing Village Phase 3, 601 South College Road, Wilmington, North Carolina 28403.

Signed: _____

Name: _____

Title: _____

Date: _____

(Corporate Seal)

Subscribed and sworn before me this

_____ day of _____, 20____.

(Notary Public)

END OF SECTION 00 65 37

January 15, 2026

University of North Carolina at Wilmington
Housing Village Phase 3
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GENERAL CONDITIONS OF THE CONTRACT

STANDARD FORM FOR CONSTRUCTION MANAGER-AT-RISK PROJECTS

NORTH CAROLINA DEPARTMENT OF ADMINISTRATION STATE CONSTRUCTION OFFICE

Form OC-15CM

This document is intended for use on State capital construction projects and shall not be used on any project that is not reviewed and approved by the State Construction Office. Extensive modification to the General Conditions by means of “Supplementary General Conditions” is strongly discouraged. State agencies and institutions may include special requirements in “Division 1 – General Requirements” of the specifications, where they do not conflict with the General Conditions.

Second Edition, Revision 2 - September 2025:
Articles: 2.c, 20.a, 31.f, 32.d, 33.c, 34, 52.b - h

GENERAL CONDITIONS OF THE CONTRACT

The use or reproduction of this document or any part thereof is authorized for and limited to use on projects of the State of North Carolina, and is distributed by, through and at the discretion of the State Construction Office, Raleigh, North Carolina, for that distinct and sole purpose.

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ARTICLE 1 - DEFINITIONS

- a. The contract documents consist of the Request for Proposal (RFP); Construction Manager's formal response to the RFP; General Conditions of the Contract; special conditions if applicable; Supplementary General Conditions; the drawing and specifications, including all bulletins, addenda or other modifications of the drawings and specifications incorporated into the documents prior to their execution; the contract; the performance bond; the payment bond; insurance certificates; the approval of the attorney general; and the certificate of the Office of State Budget and Management. All of these items together form the contract.
- b. The Owner is the State of North Carolina by and through the agency or institution named in the contract.
- c. The designer or project designer means the firm or firms of architects or engineers or both (and their consultants) which have undertaken to design the project pursuant to a contract with the Owner, (hereinafter, the "design contract").
- d. The Construction Manager-at-Risk (CM) accepts a relationship of trust and confidence between himself and the Owner and undertakes to act as the Owner's fiduciary in the handling and opening of bids in accordance with the provisions of North Carolina General Statute (N.C.G.S.) 143-128.1. The CM agrees to furnish his best skills and his best judgment to cooperate with the Owner and Designer for undertaking all necessary action contemplated under the contract documents to (a) establish during the design phase a Guaranteed Maximum Price (GMP) to construct the project and (b) ensure timely and quality completion of the project at a cost within the GMP. Construction Manager or CM as used in the contract documents means Construction Manager-at-Risk (CM at Risk).
- e. A subcontractor, as the term is used herein, shall be in the case of a principal trade contractor, a general, mechanical, electrical or plumbing contractor or in the case of a specialty contractor, a trade contractor who is not a principal trade contractor, who has entered into a direct contract with a CM, and includes one who furnishes materials worked to a special design in accordance with plans and specifications covered by the contract, but does not include one who only sells or furnishes materials not requiring work so described or detailed.
- f. Written notice shall be defined as notice in writing delivered in person to the contractor, or to a partner of the firm in the case of a partnership, or to a member of the contracting organization, or to an officer of the organization in the case of a corporation, or sent to the last known business address of the contracting organization by registered mail.
- g. Work, as used herein as a noun, is intended to include materials, labor, and workmanship of the appropriate contractor as supervised by the CM.
- h. The project is the total construction work to be performed under the contract documents.
- i. Construction Management Fee shall be an all-inclusive lump sum management fee which will include all Construction Manager-at-Risk home office, project site and project related costs including all Construction Manager-at-Risk overhead costs and profit.
- j. Change order, as used herein, shall mean a written order to the CM subsequent to the signing of the contract authorizing a change in the GMP contract. The change order shall be signed by the CM, designer and the Owner, and approved by the State Construction Office, in that order (Article 19).

- k. Field Order, as used herein, shall mean a written approval for the CM to proceed with the work requested by Owner prior to issuance of a formal Change Order. The field order shall be signed by the CM, designer, Owner, and State Construction Office (SCO).
- l. Field Change, as used herein, shall mean a written approval from the Owner for the CM to proceed with work requested by the Owner to be paid for from the CM Contingency or Owner's Project Reserve within the GMP.
- m. Time of Completion, as stated in the contract documents, is to be interpreted as consecutive calendar days measured from the date established in the written Notice to Proceed, or such other date as may be established herein (Article 23).
- n. Liquidated damages, as stated in the contract documents, is an amount reasonably estimated in advance to cover the consequential damages associated with the Owner's economic loss in not being able to use the Project for its intended purposes at the end of the contract's completion date as amended by change order, if any, by reason of failure of the CM to complete the work within the time specified. Liquidated damages does not include the Owner's extended contract administration costs (including but not limited to additional fees for architectural and engineering services, testing services, inspection services, commissioning services, etc.), such other damages directly resulting from delays caused solely by the CM, or consequential damages that the Owner identified in the bid documents that may be impacted by any delay caused solely by the CM (e.g., if a multi-phased project-subsequent phases, delays in start of other projects that are dependent on the completion of this Project, extension of leases and/or maintenance agreements for other facilities).
- o. Surety, as used herein, shall mean the bonding company or corporate body which is bound with and for the CM, and which engages to be responsible for the CM and his acceptable performance of the work.
- p. Routine written communications between the Designer and the Construction Manager are any communication other than a "request for information" provided in letter, memo, or transmittal format, sent by mail, courier, electronic mail, or facsimile. Such communications cannot be identified as "request for information".
- q. Clarification or Request for information (RFI) is a request from the CM seeking an interpretation or clarification by the Designer relative to the contract documents. The RFI, which shall be labeled (RFI), shall clearly and concisely set forth the issue or item requiring clarification or interpretation and why the response is needed. The RFI must set forth the CM's interpretation or understanding of the contract documents requirements in question, along with reasons for such an understanding.
- r. Approval means written or imprinted acknowledgement that materials, equipment or methods of construction are acceptable for use in the work.
- s. Inspection shall mean examination or observation of work completed or in progress to determine its compliance with contract documents.
- t. "Equal to" or "approved equal" shall mean materials, products, equipment, assemblies, or installation methods considered equal by the bidder in all characteristics (physical, functional, and aesthetic) to those specified in the contract documents. Acceptance of equal is subject to approval of the designer and owner.

- u. “Substitution” or “substitute” shall mean materials, products, equipment, assemblies, or installation methods deviating in at least one characteristic (physical, functional, or aesthetic) from those specified, but which in the opinion of the bidder would improve competition and/or enhance the finished installation. Acceptance of substitution is subject to the approval of the designer and owner.
- v. Provide shall mean furnish and install complete in place, new, clean, operational, and ready for use.
- w. Indicated and shown shall mean provide as detailed, or called for, and reasonably implied in the contract documents.
- x. Special inspector is one who inspects materials, installation, fabrication, erection or placement of components and connections requiring special expertise to ensure compliance with the approved construction documents and referenced standards.
- y. Commissioning is a quality assurance process that verifies and documents that building components and systems operate in accordance to the owner’s project requirements and the project design documents.
- z. Designer Final Inspection is the inspection performed by the design team to determine the completeness of the project in accordance with approved plans and specifications. This inspection occurs prior to SCO final inspection.
- aa. SCO Final Inspection is the inspection performed by the State Construction Office to determine the completeness of the project in accordance with NC Building Codes and approved plans and specifications.
- bb. Beneficial Occupancy is requested by the owner and is occupancy or partial occupancy of the building after all life safety items have been completed as determined by the State Construction Office. Life safety items include but not limited to fire alarm, sprinkler, egress and exit lighting, fire rated walls, egress paths and security.
- cc. Final Acceptance is the date in which the State Construction Office accepts the construction as totally complete. This includes the SCO Final Inspection and certification by the designer that all punch lists are completed.

ARTICLE 2 - INTENT AND EXECUTION OF DOCUMENTS

- a. The drawings and specifications are complementary, one to the other. That which is shown on the drawings or called for in the specifications shall be as binding as if it were both called for and shown. The intent of the drawings and specifications is to establish the scope of all labor, materials, transportation, equipment, and any and all other things necessary to provide a complete job. In case of discrepancy or disagreement in the contract documents, the order of precedence shall be: Form of Contract, specifications, large-scale detail drawings, small-scale drawings.
- b. The wording of the specifications shall be interpreted in accordance with common usage of the language except that words having a commonly used technical or trade meaning shall be so interpreted in preference to other meanings.

- c. The CM shall execute each copy of the response to RFP, contract, performance bond and payment bond as follows:
 - 1. If the documents are executed by a sole Owner, that fact shall be evidenced by the word "Owner" appearing after the name of the person executing them.
 - 2. If the documents are executed by a partnership, that fact shall be evidenced by the word "Co-Partner" appearing after the name of the partner executing them.
 - 3. If the documents are executed on the part of a corporation, they shall be executed by either the president or the vice president and the title of the office of such persons shall appear after their signatures.
 - 4. If the documents are made by a joint venture, they shall be executed by each member of the joint venture in the above form for sole Owner, partnership or corporation, whichever form is applicable to each particular member.
 - 5. The bonds shall be executed by an attorney-in-fact. There shall be attached to each copy of the bond a certified copy of power of attorney properly executed and dated.
 - 6. The seal of the bonding company shall be impressed on each signature page of the bonds.
 - 7. The date of performance and payment bond shall not be prior to the date of the contract.

ARTICLE 3 - CLARIFICATIONS AND DETAIL DRAWINGS

- a. In such cases where the nature of the work requires clarification by the designer, such clarification shall be furnished by the designer with reasonable promptness by means of written instructions or detail drawings, or both. Clarifications and drawings shall be consistent with the intent of contract documents, and shall become a part thereof.
- b. The CM and the Designer shall prepare, if deemed necessary, a schedule fixing dates upon which foreseeable clarifications will be required. The schedule will be subject to addition or change in accordance with progress of the work. The Designer shall furnish drawings or clarifications in accordance with that schedule. The CM shall not proceed with the work without such detail drawings and/or written clarifications.

ARTICLE 4 - COPIES OF DRAWINGS AND SPECIFICATIONS

The Designer or owner shall furnish free of charge to the CM electronic copies of plans and specifications. If requested by the CM, up to 30 paper copies of plans and specifications will be

provide free of charge, plus a clean set of black line prints on white paper of all appropriate drawings, upon which the CM shall clearly and legibly record all work-in-place that is at variance with the contract documents. Additional sets shall be furnished at cost, including mailing, to the CM at the request of the CM.

ARTICLE 5 - SHOP DRAWINGS, SUBMITTALS, SAMPLES, DATA

- a. Within fifteen (15) consecutive calendar days of the notice to proceed, a schedule for anticipated submission of all shop drawings, product data, samples, and similar submittals shall be prepared by the CM and provided to the designer. This schedule shall indicate the items, relevant specification sections, other related submittal data, and the date when these items will be furnished to the designer.
- b. The CM shall review, approve and submit to the Designer all Shop Drawings, Coordination Drawings, Product Data, Samples, Color Charts, and similar submittal data required or reasonably implied by the Contract Documents. Required Submittals shall bear the CM's stamp of approval, any exceptions to the Contract Documents shall be noted on the submittals, and copies of all submittals shall be of sufficient quantity for the Designer to retain up to three (3) copies of each submittal for his own use plus additional copies as may be required by the CM. Submittals shall be presented to the Designer in accordance with the schedule submitted in paragraph (a). so as to cause no delay in the activities of the Owner.
- c. The Designer shall review required submittals promptly, noting desired corrections if any, and retaining three (3) copies (1 for the Designer, 1 for the owner and 1 for SCO) for his use. The remaining copies of each submittal shall be returned to the CM not later than twenty (20) days from the date of receipt by the Designer, for the CM's use or for corrections and resubmittal as noted by the Designer. When resubmittals are required, the submittal procedure shall be the same as for the original submittals.
- d. Approval of shop drawings by the designer shall not be construed as relieving the CM from responsibility for compliance with the design or terms of the contract documents nor from responsibility of errors of any sort in the shop drawings, unless such error has been called to the attention of the designer in writing by the CM.

ARTICLE 6 - WORKING DRAWINGS AND SPECIFICATIONS AT THE JOB SITE

- a. The CM shall maintain, in readable condition at his job office, one complete set of working drawings and specifications for his work including all shop drawings. Such drawings and specifications shall be available for use by the Designer or his authorized representative, owner or State Construction Office.
- b. The CM shall maintain at the job office, a day-to-day record of work-in-place that is at variance with the contract documents. Such variations shall be fully noted on project drawings by the CM and submitted to the designer upon project completion and no later than thirty (30) days after acceptance of the project.
- c. The contractor shall maintain at the job office a record of all required tests that have been performed, clearly indicating the scope of work inspected and the date of approval or rejection.

ARTICLE 7 - OWNERSHIP OF DRAWINGS AND SPECIFICATIONS

All drawings and specifications are instruments of service and remain the property of the Owner. The use of these instruments on work other than this contract without permission of the Owner is prohibited. All copies of drawings and specifications other than contract copies shall be returned to the Owner upon request after completion of the work.

ARTICLE 8 - MATERIALS, EQUIPMENT, EMPLOYEES

- a. The CM shall, unless otherwise specified, supply & pay for all lighting, power, heat, sanitary facilities & water and shall require the Principal Trade and Specialty Contractors to, supply and pay for all labor, transportation, materials, tools, apparatus, scaffolding and incidentals necessary for the completion of his work, and to install, maintain and remove all equipment of the construction, other utensils or things, and be responsible for the safe, proper and lawful construction, maintenance and use of same. The CM shall construct in the best and most workmanlike manner, a complete job and everything incidental thereto, as shown on the plans, stated in the specifications, or reasonably implied there from, all in accordance with the contract documents.
- b. All materials shall be new and of quality specified, except where reclaimed material is authorized herein and approved for use. Workmanship shall at all times be of a grade accepted as the best practice of the particular trade involved, and as stipulated in written standards of recognized organizations or institutes of the respective trades except as exceeded or qualified by the specifications.
- c. Upon notice, the CM shall furnish evidence from the Principal Trade and Specialty Contractors as to quality of materials.
- d. Products are generally specified by ASTM or other reference standard and/or by manufacturer's name and model number or trade name. When specified only by reference standard, the CM through the Principal Trade or Specialty Contractor may select any product meeting this standard, by any manufacturer. When several products or manufacturers are specified as being equally acceptable, the CM through the Principal Trade or Specialty Contractor has the option of using any product and manufacturer combination listed. However, the CM through the Principal Trade or Specialty Contractor shall be aware that the cited examples are used only to denote the quality standard of product desired and that they do not restrict bidders to a specific brand, make, manufacturer or specific name; that they are used only to set forth and convey to bidders the general style, type, character and quality of product desired; and that equivalent products will be acceptable. The CM shall be responsible for reviewing all substitution requests from Principal Trade or Specialty Contractors prior to submission to the Project Designer and Owner and shall track & monitor all such requests. Requests for substitution of materials, items, or equipment shall be submitted to the Project Designer for approval or disapproval; such approval or disapproval shall be made by the designer prior to the opening of bids. Alternate materials may be requested after award if it can clearly be demonstrated that it is an added benefit to the owner and the designer and the owner approves.
- e. The CM shall obtain written approval from the designer for the use of products, materials, equipment, assemblies or installation methods claimed as equal to those specified. Such approvals must be obtained as soon after contract awards as possible and before any materials are ordered.

- f. The Designer is the judge of equality for proposed substitution of products, materials or equipment.
- g. If at any time during the construction and completion of the work covered by these contract documents, the conduct of any workman of the various crafts be adjudged a nuisance to the Owner or Designer, or if any workman be considered detrimental to the work, the CM shall order such parties removed immediately from grounds.

ARTICLE 9 - ROYALTIES, LICENSES AND PATENTS

It is the intention of the contract documents that the work covered herein will not constitute in any way infringement of any patent whatsoever unless the fact of such patent is clearly evidenced herein. The CM shall protect and save harmless the Owner against suit on account of alleged or actual infringement. The CM shall pay all royalties and/or license fees required on account of patented articles or processes, whether the patent rights are evidenced hereinafter.

ARTICLE 10 - PERMITS, INSPECTIONS, FEES, REGULATIONS

- a. The CM shall give all notices and comply with all laws, ordinances, codes, rules and regulations bearing on the conduct of the work under this contract. If the CM observes that the drawings and specifications are at variance therewith, he shall promptly notify the Designer in writing. Any necessary changes required after contract award shall be made by change order in accordance with Article 19. If the CM performs any work or authorizes any work to be performed knowing it to be contrary to such laws, ordinances, codes, rules and regulations, and without such notice to the designer, he shall bear all cost arising there from. Additional requirements implemented after bidding will be subject to equitable negotiations.
- b. All work under this contract shall conform to the North Carolina State Building Code and other State, local and national codes as are applicable. The cost of all required inspections and permits shall be the responsibility of the CM unless otherwise specified.
- c. Projects constructed by the State of North Carolina or by any agency or institution of the State are not subject to inspection by any county or municipal authorities and are not subject to county or municipal building codes. The CM shall, however, cooperate with the county or municipal authorities by obtaining building permits. Permits shall be obtained at no cost.
- d. Projects involving local funding (Community Colleges) are also subject to county and municipal building codes and inspection by local authorities. The CM shall pay the cost of these permits and inspections unless otherwise specified.

ARTICLE 11 - PROTECTION OF WORK, PROPERTY AND THE PUBLIC

- a. The CM shall be responsible for the entire site and the building or construction of the same and provide all the necessary protections, as required by the Owner or designer, and by laws or ordinances governing such conditions. The CM shall be responsible for any damage to the Owner's property or of that of others on the job, by them, their personnel, or their subcontractors, and shall make good such damages. The CM shall be responsible for and pay for any damages caused to the Owner. The CM shall have access to the project at all times.

- b. The CM shall be responsible to cover and protect all portions of the structure when the work is not in progress, provide and set all temporary roofs, covers for doorways, sash and windows, and all other materials necessary to protect all the work on the building. Any work damaged through the lack of proper protection or from any other cause, shall be repaired or replaced without extra cost to the Owner.
- c. No fires of any kind will be allowed inside or around the operations during the course of construction without special permission from the Designer.
- d. The CM shall ensure that all trees and shrubs designated to remain in the vicinity of the construction operations are protected in accordance with the requirements of the plans and specifications. All walks, roads, etc., shall be barricaded as directed by the designer to keep the public away from the construction. All trenches, excavations or other hazards in the vicinity of the work shall be well barricaded and properly lighted at night.
- e. The CM shall develop and implement a project safety plan that provides all necessary safety measures for the protection of all persons on the job, including the requirements of the A.G.C. Accident Prevention Manual in Construction, as amended, and shall fully comply with all state laws or regulations and North Carolina State Building Code requirements to prevent accident or injury to persons on or about the location of the work. The CM shall clearly mark or post signs warning of hazards existing, and shall barricade excavations, elevator shafts, stairwells and similar hazards. The CM shall insure that protection is provided against damage or injury resulting from falling materials and that all protective devices and signs be maintained throughout the progress of the work.
- f. The CM shall adhere to the rules, regulations and interpretations of the North Carolina Department of Labor relating to Occupational Safety and Health Standards for the Construction Industry (Title 29, Code of Federal Regulations, Part 1926, published in Volume 39, Number 122, Part II, June 24, 1974, Federal Register), and revisions thereto as adopted by N.C.G.S. 95-126 through 155.
- g. The CM shall designate a responsible person of his organization as safety officer/inspector to inspect the project site for unsafe health and safety hazards, to report these hazards to the contractor for correction, and whose duties also include accident prevention on the project, and to provide other safety and health measures on the project site as required by the terms and conditions of the contract. The name of the safety inspector shall be made known to the designer and owner at the time of the preconstruction conference and in all cases prior to any work starting on the project.
- h. In the event of an emergency affecting the safety of life, the protection of work, or the safety of adjoining properties, the CM is hereby authorized to act at his own discretion, without further authorization from anyone, to prevent such threatened injury or damage. Any compensation claimed by the CM on account of such action shall be determined as provided for under Article 19(b).
- i. Any and all costs associated with correcting damage caused to adjacent properties of the construction site or staging area shall be borne by the contractor. These costs shall include but not be limited to flooding, mud, sand, stone, debris, and discharging of waste products.

ARTICLE 12 - SEDIMENTATION POLLUTION CONTROL ACT OF 1973

- a. Any land-disturbing activity performed by the CM or any Principal Trade or Specialty Contractor in connection with the project shall comply with all erosion control measures set

forth in the contract documents and any additional measures which may be required in order to ensure that the project is in full compliance with the Sedimentation Pollution Control Act of 1973, as implemented by Title 15, North Carolina Administrative Code, Chapter 4, Sedimentation Control, Subchapters 4A, 4B and 4C, as amended (15 N.C.A.C. 4A, 4B and 4C).

- b. Upon receipt of notice that a land-disturbing activity is in violation of said act, the CM shall be responsible for ensuring that all steps or actions necessary to bring the project in compliance with said act are promptly taken.
- c. The CM shall be responsible for defending any legal actions instituted pursuant to N.C.G.S. 113A-64 against any party or persons described in this article.
- d. To the fullest extent permitted by law, the CM shall indemnify and hold harmless the Owner, the designer and the agents, consultants and employees of the Owner and designer, from and against all claims, damages, civil penalties, losses and expenses, including, but not limited to, attorneys' fees, arising out of or resulting from the performance of work or failure of performance of work, provided that any such claim, damage, civil penalty, loss or expense is attributable to a violation of the Sedimentation Pollution Control Act. Such obligation shall not be construed to negate, abridge or otherwise reduced any other right or obligation of indemnity which would otherwise exist as to any party or persons described in this article.

ARTICLE 13 - INSPECTION OF THE WORK

- a. It is a condition of this contract that the work shall be subject to inspection during normal working hours by the designer, designated official representatives of the Owner, State Construction Office and those persons required by state law to test special work for official approval. The CM shall therefore provide safe access to the work at all times for such inspections.
- b. All instructions to the CM will be made only by or through the designer or his designated project representative. Observations made by official representatives of the Owner shall be conveyed to the designer for review and coordination prior to issuance to the CM.
- c. The CM shall perform quality control inspections on the work of Principal Trade and Specialty Contractors to guard the Owner against defects and deficiencies in the work and shall coordinate this activity with the on-site duties of the Project Designer. The CM shall advise the Project Designer of any apparent variation and/or deviation from the intent of the Contract Documents and shall take the necessary action to correct such variations and deviations.
- d. All work shall be inspected by designer, special inspector and/or State Construction Office prior to being covered by the contractor. The CM shall give a minimum two weeks notice unless otherwise agreed to by all parties. If inspection fails, after the first re-inspection all costs associated with additional re-inspections shall be borne by the CM.
- e. Where special inspection or testing is required by virtue of any state laws, instructions of the designer, specifications or codes, the CM shall give adequate notice to the Project Designer of the time set for such inspection or test, if the inspection or test will be conducted by a party other than the Project Designer. Such special tests or inspections will be made in the presence of the Project Designer, or his authorized representative, and it shall be the CM's responsibility to serve ample notice of such tests.

- f. All laboratory tests shall be paid by the Owner unless provided otherwise in the contract documents except the CM shall pay for laboratory tests to establish design mix for concrete and for additional tests to prove compliance with contract documents where materials have tested deficient except when the testing laboratory did not follow the appropriate ASTM testing procedures.
- g. Should any work be covered up or concealed prior to inspection and approval by the Project Designer and/or (SCO) such work shall be uncovered or exposed for inspection, if so requested by the Project Designer or SCO in writing. Inspection of the work will be made promptly upon notice from the CM. All cost involved in uncovering, repairing, replacing, recovering and restoring to design condition, the work that has been covered or concealed will be paid by the CM.

ARTICLE 14 - CONSTRUCTION SUPERVISION AND SCHEDULE

- a. On-site representatives of the CM shall manage the work of the Principal Trade and Specialty Contractors and coordinate the work with the activities of the Owner and Project Designer to complete the project with the Owner's objectives of cost, time and quality. Throughout the progress of the work, the CM shall maintain a competent and adequate full-time staff approved by the Owner and Project Designer. It is understood that the designated and approved on-site representative of the CM will remain on the job and in responsible charge as long as those persons remain employed by the CM unless otherwise requested or agreed to by the Owner. The CM shall establish an on-site organization with appropriate lines of authority to act on behalf of the CM. Instructions, directions or notices given to the designated on-site authority shall be as binding as if given to the CM. However, directions, instructions, and notices shall be confirmed in writing.
- b. The CM shall examine and study the drawings and specifications and fully understand the project design, and shall provide constant and efficient supervision to the work. Should he discover any discrepancies of any sort in the drawings or specifications, he shall report them to the designer without delay. He will not be held responsible for discrepancies in the drawings and/or specifications, but shall be held responsible to report them should they become known to him.
- c. The CM shall call and preside over monthly job site progress conferences. All Principal Trade and Specialty Contractors shall be represented at these job progress conferences by both home office and project personnel. The CM shall require attendance from other subcontractors and material suppliers who can contribute toward maintaining required job progress. It shall be the principal purpose of these meetings, or conferences, to effect coordination, cooperation and assistance in every practical way toward the end of maintaining progress of the project on schedule and to complete the project within the specified contract time. The CM shall be prepared to assess progress of the work and to recommend remedial measures for correction of progress as may be appropriate. The CM with assistance from the Designer shall be the coordinator of the conferences and shall preside as chairman. The CM shall turn over a copy of his daily reports to the Designer and Owner at the job site progress conference. Owner will determine daily report format.
- d. The CM shall employ an engineer or a land surveyor licensed in the State of North Carolina to lay out the work and to establish a bench mark nearby in a location where same will not be disturbed and where direct instruments sights may be taken.

- e. Prior to bidding, it shall be the responsibility of the CM to prepare an electronic and paper copy of a preliminary critical path method (CPM) schedule and submit such schedule to the Project Designer for his review and comment in sufficient time to allow revisions prior to inserting said schedule into the Principal Trade and Specialty Contractors' bid packages. After contract award but prior to thirty (30) days from the date of the notice to proceed, the CM shall obtain from the Principal Trade and Specialty Contractors their respective work activities and integrate them into a project construction schedule in CPM form. The resulting CPM schedule shall show all salient features of the work required for construction of the project from start to finish within the time allotted by the contract. The time in days between the CM's early completion date and the contractual completion date is project float time and shall be used as such by the CM unless amended by change order. The CM shall submit to the Project Designer an electronic and paper copy of the final CPM schedule after contracts are executed but within fifteen (15) days prior to the written notice to proceed. The Project Designer after reviewing and commenting on the project CPM schedule shall submit it to the Owner for approval. No application for payment will be processed until the project CPM schedule is approved by the Owner. No monthly application for payment will be processed without the submission of an electronic and paper copy of the CPM schedule attached.
- f. The CPM schedule shall be a complete computer generated network analysis showing the complete sequence of construction activities, identifying the work of separate stages and other logically grouped activities, indicating early and late start and early and late finish dates, float duration and a complete logic. Monthly updates will show the estimated completion of each activity.
- g. The CM shall distribute to the principal trade and specialty contractors the approved project CPM schedule and shall display same at the job site.
- h. The CM shall maintain the project CPM schedule, making monthly adjustments, updates, corrections, etc., which are necessary to finish the project within the time allotted by the contract. In doing so, the CM shall keep the designer as well as all Principal Trade and Specialty Contractors fully informed as to all changes and updates to the schedule. The CM shall submit to the Project Designer a monthly report of the status of all work activities. The monthly status report shall show the actual work completed to date in comparison with the original amount of work scheduled. If the work is behind schedule, the CM must indicate in writing what measures are being taken to bring the work back on schedule and ensure that the contract completion date is not exceeded. If the work is greater than thirty (30) days behind schedule and no legitimate requests for time extensions are in process, then the CM shall prepare and submit to the Project Designer a recovery schedule for review and approval. Failure of the CM to abide by the directives in this paragraph will give the Owner cause to exercise the remedies set forth in Article 29 of the General Conditions and pursue any other legal remedies allowed it by law.

ARTICLE 15 – {NOT USED}

ARTICLE 16 - PRINCIPAL TRADE AND SPECIALTY CONTRACTS AND CONTRACTORS

- a. Principal Trade and Specialty Contractors shall be pre-qualified by the CM. The prequalification criteria shall be determined by the Owner and CM to address quality, performance, the time specified in the bids for performance of the contract, the cost of construction oversight, time for completion, capacity to perform, and any other factors deemed appropriate by the Owner and/or CM. Basic qualification information from Principal Trade and Specialty Contractors shall be requested on the standard State of North Carolina

Prequalification Form approved by the State Building Commission. Only pre-qualified contractors are allowed to bid to and contract with the CM on a project.

- b. All bids for Principal Trade and Specialty Contracts shall be publicly advertised and shall be opened publicly in a public venue, and once opened, shall be public records under N.C.G.S. 132. The CM shall award the contract to the lowest responsible, responsive bidder, taking into consideration quality, performance, the time specified in the bids for performance of the contract, the time for completion, compliance with N.C.G.S. 143-128.2, and other factors deemed appropriate by the Owner and advertised as part of the bid solicitation. When contracts are awarded pursuant to this section, the Owner shall provide for a dispute resolution procedure as provided by N.C.G.S. 143-128(f1). Once Principal Trade and Specialty Contractors are in place, the CM shall provide copies of the contracts to the Project Designer and also provide a list of equipment and material suppliers.
- c. A CM may perform a portion of the work only if (a) bidding produces no responsible, responsive bidder for that portion of the work, or (b) the lowest responsible, responsive bidder will not execute a contract for the bid portion of the work, or the Principal Trade or Specialty Contractor defaults and a prequalified replacement cannot be obtained in a timely manner, and (c) the Owner approves performance of the work by the CM.
- d. The Designer will furnish to any Principal Trade or Specialty Contractor, upon request, evidence regarding amounts of money paid to the CM on account of the work of the Principal Trade or Specialty Contractor.
- e. The CM is and remains fully responsible for his own acts or omissions as well as those of any Principal Trade or Specialty Contractor or of any employee of either. The CM agrees that no contractual relationship exists between the Principal Trade and Specialty Contractors and the Owner in regard to the contract, and that the Principal Trade and Specialty Contractors act on this work as an agent or employee of the CM.

ARTICLE 17 - CONSTRUCTION MANAGER AND SUBCONTRACTOR RELATIONSHIPS

The CM agrees that the terms of these contract documents shall apply equally to each Principal Trade and Specialty Contractor as to the CM, and the CM agrees to take such action as may be necessary to bind each Principal Trade and Specialty Contractor to these terms. The CM further agrees to conform to the Code of Ethical Conduct as adopted by the Associated General Contractors of America, Inc., with respect to CM-subcontractor relationships, and that payments to Principal Trade and Specialty Contractors shall be made in accordance with the provisions of N.C.G.S. 143-134.1 titled "Interest on final payments due to prime contractors: payments to subcontractors".

- a. On all public construction contracts which are let by a board or governing body of the state government or any political subdivision thereof, except contracts let by the Department of Transportation pursuant to N.C. G.S. 136-28.1, the balance due the CM shall be paid in full within 45 days after respective prime contracts of the project have been accepted by the Owner, certified by the architect, engineer or designer to be completed in accordance with terms of the plans and specifications, or occupied by the Owner and used for the purpose for which the project was constructed, whichever occurs first. Provided, however, that whenever the architect or consulting engineer in charge of the project determines that delay in completion of the project in accordance with terms of the plans and specifications is the fault of the CM, the project may be occupied and used for the purposes for which it was constructed without payment of any interest on amounts withheld past the 45 day limit. Should final

payment to the CM beyond the date such contracts have been certified to be completed by the Project Designer, accepted by the Owner, or occupied by the Owner and used for the purposes for which the project was constructed, be delayed by more than 45 days, said CM shall be paid interest, beginning on the 46th day, at the rate of one percent (1%) per month or fraction thereof unless a lower rate is agreed upon on such unpaid balance as may be due. In addition to the above final payment provisions, periodic payments due the CM during construction shall be paid in accordance with the payment provisions of the contract documents or said CM shall be paid interest on any such unpaid amount at the rate stipulated above for delayed final payments. Such interest shall begin on the date the payment is due and continue until the date on which payment is made. Such due date may be established by the terms of the contract. Funds for payment of such interest on state-owned projects shall be obtained from the current budget of the owning department, institution or agency. Where a conditional acceptance of a contract exists, and where the Owner is retaining a reasonable sum pending correction of such conditions, interest on such reasonable sum shall not apply.

- b. Within seven days of receipt by the CM of each periodic or final payment, the CM shall pay the Principal Trade and Specialty Contractors based on work completed or service provided under their contract with the CM. Should any periodic or final payment to a Principal Trade or Specialty Contractor be delayed by more than seven days after receipt of periodic or final payment by the CM, the CM shall pay the Principal Trade or Specialty Contractor interest, beginning on the eighth day, at the rate of one percent (1%) per month or fraction thereof on such unpaid balance as may be due.
- c. The percentage of retainage on payments made by the CM to the Principal Trade and Specialty Contractors shall not exceed the percentage of retainage on payments made by the Owner to the CM. Any percentage of retainage on payments made by the CM to the Principal Trade or Specialty Contractors that exceeds the percentage of retainage on payments made by the Owner to the CM shall be subject to interest to be paid by the CM to the Principal Trade or Specialty Contractor at the rate of one percent (1%) per month or fraction thereof.
- d. Nothing in this section shall prevent the CM at the time of application and certification to the Owner from withholding application and certification to the Owner for payment to a Principal Trade or Specialty Contractor for unsatisfactory job progress; defective construction not remedied; disputed work; third-party claims filed or reasonable evidence that claim will be filed; failure of the Principal Trade or Specialty Contractor to make timely payments for labor, equipment and materials; damage to CM or another subcontractor; reasonable evidence that a Principal Trade or Specialty Contract cannot be completed for the unpaid balance of the subcontract sum; or a reasonable amount for retainage not to exceed the initial percentage retained by Owner.

ARTICLE 18 - DESIGNER'S STATUS

- a. The Project Designer shall provide liaison and necessary inspection of the work to ensure compliance with plans and specifications. He is the agent of the Owner only for the purpose of constructing this work and to the extent stipulated in the contract documents. He has authority to stop work or to order work removed, or to order corrections of faulty work where such action may be necessary to assure successful completion of the work.
- b. The Project Designer is the impartial interpreter of the contract documents, and, as such, he shall exercise his powers under the contract to enforce faithful performance by both the Owner and the CM, taking sides with neither.

- c. Should the Project Designer cease to be employed on the work for any reason whatsoever, then the Owner shall employ a competent replacement who shall assume the status of the former Project Designer.
- d. The Project Designer will make periodic inspections of the project at intervals appropriate to the stage of construction. He will inspect the progress, the quality and the quantity of the work.
- e. The Project Designer and the Owner shall have access to the work whenever it is in preparation and progress during normal working hours. The CM shall provide facilities for such access so the Designer may perform his functions under the contract documents.
- f. Based on the Project Designer's inspections and evaluations of the project, the Project Designer shall issue interpretations, directives and decisions as may be necessary to assist the CM in the administration of the project. His decisions relating to artistic effect and technical matters shall be final, provided such decisions are within the limitations of the contract. The CM's decisions, however, relating to means and methods, and administration of the contracts the CM holds are final.

ARTICLE 19 - CHANGES IN THE WORK

- a. The Owner may have changes made in the work covered by the contract. These changes will not invalidate and will not relieve or release the CM from any guarantee given by him pertinent to the contract provisions. These changes will not affect the validity of the guarantee bond and will not relieve the surety or sureties of said bond. All extra work shall be executed under conditions of the original contract.
- b. Except in an emergency endangering life or property, no change shall be made by the contractor except upon receipt of approved change order or written field order from the designer, countersigned by the owner and the state construction office authorizing such change. No claim for adjustments of the contract price shall be valid unless this procedure is followed.

A field order, transmitted by fax or hand- delivered, may be used where the change involved impacts the critical path of the work. A formal change order shall be issued as expeditiously as possible.

The CM may be requested to make a change to the work by the Project Designer and Owner where such work is to be funded by the CM Contingency or Project Reserve that is part of the GMP contract. Such a change must be documented in the same manner as a Change Order and must be authorized in writing by the Project Designer and Owner by a Field Change document.

In the event of emergency endangering life or property, the CM may be directed to proceed on a time and material basis whereupon the CM shall proceed and keep accurately on such form as may be required, a correct account of costs together with all proper invoices, payrolls and supporting data. Upon completion of the work the change order will be prepared as outlined under either Method "c(1)" or Method "c(2)" or both.

- c. In determining the values of changes, either additive or deductive, the CM and Principal Trade and Specialty Contractors are restricted to the use of the following methods:
 - 1. Where the extra work involved is covered by unit prices quoted in the proposal, the value of the change shall be computed by application of unit prices based on quantities,

estimated or actual as agreed of the items involved, except in such cases where a quantity exceeds the estimated quantity allowance in the contract by one hundred percent (100%) or more. In such cases, either party may elect to proceed under subparagraph c2 herein. If neither party elects to proceed under c2, then unit prices shall apply.

2. The contracting parties shall negotiate and agree upon the equitable value of the change prior to issuance of the change order, and the change order shall stipulate the corresponding lump sum adjustment to the contract price.
- d. Under Paragraph "b" and Methods "c(2)" above, the allowances for overhead and profit combined for a Principal Trade or Specialty Contractor and all multi-tier subcontractors shall not exceed fifteen percent (15%) of net cost of the work. No allowance for overhead and profit will be allowed for the CM until the change orders aggregate to a sum in excess of five percent (5%) of the Cost of the Work portion of the GMP. Once this threshold is met the CM may add an overhead & profit allowance not to exceed four percent (4%) of the net cost of the change order. Change orders to the GMP which authorize additional phases of a project without a change in scope of the originally intended project will not be considered in establishing the threshold for additional CM overhead & profit. Under Method "c (1)", no additional allowances shall be made for overhead and profit. In the case of deductible change orders, under Method "c(2)" and Paragraph (b) above, the contractor shall include no less than five percent (5%) profit, but no allowances for overhead.
- e. The term "net cost" as used herein shall mean the difference between all proper cost additions and deductions. The "cost" as used herein shall be limited to the following:
 1. The actual costs of materials and supplies incorporated or consumed as part of the project;
 2. The actual costs of labor expended on the project site;
 3. The actual costs of labor burden, limited to the costs of social security (FICA) and Medicare/Medicaid taxes; unemployment insurance costs; health/dental/vision insurance premiums; paid employee leave for holidays, vacation, sick leave, and/or petty leave, not to exceed a total of 30 days per year; retirement contributions; worker's compensation insurance premiums; and the costs of general liability insurance when premiums are computed based on payroll amounts; the total of which shall not exceed thirty percent (30%) of the actual costs of labor;
 4. The actual costs of rental for tools, excluding hand tools; equipment; machinery; and temporary facilities required for the project;
 5. The actual costs of premiums for bonds, insurance, permit fees and sales or use taxes related to the project.

Overtime and extra pay for holidays and weekends may be a cost item only to the extent approved by the Owner.

- f. Should concealed conditions be encountered in the performance of the work below grade, or should concealed or unknown conditions in an existing structure be at variance with the conditions indicated by the contract documents, the contract sum and time for completion may be equitably adjusted by change order upon claim by either party made within thirty (30) days after the condition has been identified. The cost of such change shall be arrived at by one of the foregoing methods.

All change orders shall be supported by a breakdown showing method of arriving at net cost as defined above.

- g. In all change orders, the procedure will be for the Project Designer to request proposals for the change order work in writing. The CM will require the Principal Trade and Specialty Contractors to provide such proposals and supporting data in suitable format and will review and approve such change orders prior to submission to the designer. The Project Designer shall verify correctness. Within fourteen (14) days after receipt of the CM's proposal, the Project Designer shall prepare the change order and forward to the CM for his signature or otherwise respond, in writing, to the CM's proposal. Within seven (7) days after receipt of the change order executed by the CM, the Project Designer shall, certify the change order by his signature, and forward the change order and all supporting data to the Owner for the Owner's signature. The Owner shall execute the change order and forward to the State Construction Office for final approval, within seven (7) days of receipt. The State Construction Office shall act on the change order within seven (7) days. Upon approval by the State Construction Office, one copy remains with the State Construction Office, and the remaining copies are sent to the Project Designer for distribution to the Owner(s), CM and the surety. In case of emergency or extenuating circumstances, approval of changes may be obtained verbally by telephone or field orders approved by all parties, then shall be substantiated in writing as outlined under normal procedure.
- h. At the time of signing a change order, the CM shall be required to certify as follows:

"I certify that my bonding company will be notified forthwith that my contract has been changed by the amount of this change order, and that a copy of the approved change order will be mailed upon receipt by me to my surety."
- i. A change order, when issued, shall be full compensation, or credit, for the work included, omitted or substituted. It shall show on its face the adjustment in time for completion of the project as a result of the change in the work.
- j. If, during the progress of the work, the Owner requests a change order and the CM's terms are unacceptable, the Owner, with the approval of the State Construction Office, may require the CM to perform such work on a time and material basis in accordance with paragraph "b" above. Without prejudice, nothing in this paragraph shall preclude the Owner from performing or to have performed that portion of the work requested in the change order.

ARTICLE 20 - CLAIMS FOR EXTRA COST

- a. Should the CM consider that as a result of any instructions given in any form by the designer, he is entitled to extra cost above that stated in the contract, he shall give written notice thereof to the designer within seven (7) days without delay. The written notice shall be a stand-alone document, shall clearly state that a claim for extra cost is being made, and shall provide a detailed justification for the extra cost. The CM shall not proceed with the work affected until further advised, except in emergency involving the safety of life or property, which condition is covered in Article 19(b) and Article 11(h). No claims for extra compensation will be considered unless the claim is so made. The Designer shall render a written decision within seven (7) days of receipt of claim.
- b. The CM shall not act on instructions received by him from persons other than the Project Designer, and any claims for extra compensation or extension of time on account of such instruction will not be honored. The Project Designer will not be responsible for misunderstandings claimed by the CM of verbal instructions which have not been confirmed in writing, and in no case shall instructions be interpreted as permitting a departure from the

contract documents unless such instruction is confirmed in writing and supported by a properly authorized change order.

- c. Should a claim for extra compensation that complies with the requirements of (a) above by the CM be denied by the Project Designer or Owner, and cannot be resolved by a representative of the State Construction Office, the CM may request a mediation in connection with N.C.G.S. 143-128(f1) in the dispute resolution rules adopted by the State Building Commission (1 N.C.A.C. 30H .0101 through .1001). If the CM is unable to resolve its claims as a result of mediation, then the CM may pursue his claim in accordance with the provisions of N.C.G.S. 143-135.3, or G.S. 143-135.6 where Community Colleges are the owner, and the following:
 1. A CM who has not completed a contract with a state agency or institution for construction or repair work and who has not received the amount he claims is due under the contract may submit a verified written claim to the Director of the State Construction Office of the Department of Administration for the amount the CM claims is due. The Director may deny, allow or compromise the claim, in whole or in part. A claim under this subsection is not a contested case under N.C.G.S. Chapter 150B.
 2.
 - (a) A CM who has completed a contract with a State agency or institution for construction or repair work and who has not received the amount he claims is due under the contract may submit a verified written claim to the Director of the State Construction Office of the Department of Administration for the amount the CM claims is due. The claim shall be submitted within sixty (60) days after the CM receives a final statement of the board's disposition of his claim and shall state the factual basis for the claim.
 - (b) The Director shall investigate a submitted claim within ninety (90) days of receiving the claim, or within any longer time period upon which the Director and the CM agree. The CM may appear before the Director, either in person or through counsel, to present facts and arguments in support of his claim. The Director may allow, deny or compromise the claim, in whole or in part. The Director shall give the CM a written statement of the Director's decision on the CM's claim.
 - (c) A CM who is dissatisfied with the Director's decision on a claim submitted under this subsection may commence a contested case on the claim under Chapter 150B of the General Statutes. The contested case shall be commenced within sixty (60) days of receiving the Director's written statement of the decision.
 - (d) As to any portion of a claim that is denied by the Director, the CM may, in lieu of the procedures set forth in the preceding subsection of this section, within six (6) months of receipt of the Director's final decision, institute a civil action for the sum he claims to be entitled to under the contract by filing a verified complaint and the issuance of a summons in the Superior Court of Wake County or in the superior court of any county where the work under the contract was performed. The procedure shall be the same as in all civil actions except that all issues shall be tried by the judge, without a jury.

ARTICLE 21 - MINOR CHANGES IN THE WORK

The Project Designer will have the authority to order minor changes in the work not involving an adjustment in the contract sum or time for completion, and not inconsistent with the intent of the contract documents. Such changes shall be effected by written order, copied to the State Construction Office, and shall be binding on the Owner and the CM.

ARTICLE 22 - UNCORRECTED FAULTY WORK

Should the correction of faulty or damaged work be considered inadvisable or inexpedient by the Owner and the Project Designer, the Owner shall be reimbursed by the CM. A change order will be issued to reflect a reduction in the contract sum.

ARTICLE 23 - TIME OF COMPLETION, DELAYS, EXTENSION OF TIME

- a. The final completion date will be as determined by the Owner, Designer and CM during the pre-construction phase of the project and will be incorporated into the contract for construction services between the Owner and the CM.
- b. The CM shall commence work to be performed under this agreement on a date to be specified in a written Notice to Proceed from the Project Designer and shall fully complete all work hereunder within the time of completion specified. For each day in excess of the above number of days, the CM shall pay the Owner the sum stated as liquidated damages reasonably estimated in advance to cover the losses to be incurred by the Owner by reason of failure of the CM to complete the work within the time specified, such time being in the essence of this contract and a material consideration thereof. Should the work be delayed by both the owner and contractor, liquidated damages shall be apportioned to reflect the delays of each party. In the case of concurrent delays, contractor caused delays shall be accounted for before owner and designer caused delays.
- c. If the CM is delayed at any time in the progress of his work by any act or negligence of the Owner or the Project Designer, or by any employee of either; by changes ordered in the work; by labor disputes at the project site; by abnormal weather conditions not reasonably anticipated for the locality where the work is performed; by unavoidable casualties; by any causes beyond the contractor's control; or by any other causes which the designer and Owner determine may justify the delay, then the contract time may be extended by change order for the time which the designer and Owner may determine is reasonable.

Time extensions will not be granted for rain, wind, snow or other natural phenomena of normal intensity for the locality where work is performed. For purpose of determining extent of delay attributable to unusual weather phenomena, a determination shall be made by comparing the weather for the contract period involved with the average of the preceding five (5) year climatic range during the same time interval based on the National Oceanic and Atmospheric Administration National Weather Service statistics for the locality where work is performed and on daily weather logs kept on the job site by the CM reflecting the effect of the weather on progress of the work and initialed by the designer's representative. No weather delays shall be considered after the building is dried in unless work claimed to be delayed is on the critical path of the baseline schedule or approved updated schedule. Time extensions for weather delays, acts of God, labor disputes, fire, delays in transportation, unavoidable casualties or other delays which are beyond the control of the Owner do not entitle the Contractor to compensable damages for delays. Any contractor claim for compensable damages for delays is limited to delays caused solely by the owner or its agents. Contractor caused delays shall be accounted for before owner or designer caused delays in the case of concurrent delays.

- d. Request for extension of time shall be made in writing to the designer, copies to the owner and SCO, within twenty (20) days following cause of delay. In case of continuing cause for delay, the CM shall notify the designer copies to the owner and SCO, of the delay within twenty (20) days of the beginning of the delay and only one claim is necessary.
- e. The CM shall notify his surety in writing of extension of time granted.
- f. No claim shall be allowed on account of failure of the Project Designer to furnish drawings or instructions until twenty (20) days after demand for such drawings and/or instructions. See Article 5c. Demand must be in written form clearly stating the potential for delay unless the drawings or instructions are provided. Any delay granted will begin after the twenty (20) day demand period is concluded.

ARTICLE 24 - PARTIAL UTILIZATION/BENEFICIAL OCCUPANCY

- a. The Owner may desire to occupy or utilize all or a portion of the project when the work is substantially complete.
- b. Should the owner request a utilization of a building or portion thereof, the designer shall perform a designer final inspection of area after being notified by the contractor that the area is ready for such. After the contractor has completed designer final inspection punch list and the designer has verified, then the designer shall schedule a beneficial occupancy inspection at a time and date acceptable to the owner, contractor(s) and State Construction Office. If beneficial occupancy is granted by the State Construction Office, in such areas the following will be established:
 - 1. The beginning of guarantees and warranties period for the equipment necessary to support. in the area.
 - 2. The owner assumes all responsibilities for utility costs for entire building.
 - 3. Contractor will obtain consent of surety.
 - 4. Contractor will obtain endorsement from insurance company permitting beneficial occupancy.
- c. The Owner shall have the right to exclude the CM from any part of the project which the Project Designer has so certified to be substantially complete, but the Owner will allow the CM reasonable access to complete or correct work to bring it into compliance with the contract.
- d. Occupancy by the Owner under this article will in no way relieve the CM from his contractual requirement to complete the project within the specified time. The contractor will not be relieved of liquidated damages because of beneficial occupancy. The designer may prorate liquidated damages based on the percentage of project occupied.

ARTICLE 25 - FINAL INSPECTION, ACCEPTANCE, AND PROJECT CLOSEOUT

- a. Upon notification from the CM that the project is complete and ready for inspection, the Project Designer shall make a designer final inspection to verify that the project is complete and ready for SCO final inspection. Prior to SCO final inspection, the CM shall ensure that all items requiring corrective measures noted at the designer final inspection are complete.

The Project Designer shall schedule an SCO final inspection at a time and date acceptable to the Owner, the CM and the State Construction Office.

- b. At the SCO final inspection, the designer and his consultants shall, if job conditions warrant, record a list of items that are found to be incomplete or not in accordance with the contract documents. At the conclusion of the SCO final inspection, the designer and State Construction Office representative shall make the following determinations:
 - 1. That the project is completed and accepted.
 - 2. That the project is accepted subject to the correction of the list of discrepancies (punch list). All punch list items must be completed within thirty (30) days of SCO final inspection or the Owner may invoke Article 28, Owner's Right to Do Work.
 - 3. That the project is not complete and another date for a final inspection will be established.
- c. Within fourteen (14) days of acceptance per Paragraph c1 or within fourteen (14) days after completion of punch list per Paragraph c2 above, the Project Designer shall certify the work and issue applicable certificate(s) of compliance.
- d. Any discrepancies listed or discovered after the date of SCO final inspection and acceptance under Paragraphs c1 or c2 above shall be handled in accordance with Article 42.
- e. The date of acceptance will establish the following:
 - 1. The beginning of guarantees and warranties period.
 - 2. The date on which the CM's insurance coverage for public liability, property damage and builder's risk may be terminated.
 - 3. That no liquidated damages (if applicable) shall be assessed after this date.
 - 4. The termination date of utility cost to the CM (if applicable).
- f. Prior to issuance of final acceptance date, the contractor shall have his authorized representatives visit the project and give full instructions to the designated personnel regarding operating, maintenance, care, and adjustment of all equipment and special construction elements. In addition, the contractor shall provide to the owner a complete instructional video (media format acceptable to the owner) on the operation, maintenance, care and adjustment of all equipment and special construction elements.

ARTICLE 26 - CORRECTION OF WORK BEFORE FINAL PAYMENT

- a. Any work, materials, fabricated items or other parts of the work which have been condemned or declared not in accordance with the contract by the designer shall be promptly removed from the work site by the CM, and shall be immediately replaced by new work in accordance with the contract at no additional cost to the Owner. Work or property of the Owner, damaged or destroyed by virtue of such faulty work, shall be made good at the expense of the CM.
- b. Correction of condemned work described above shall commence within twenty-four (24) hours after receipt of notice from the Project Designer, and shall make satisfactory progress until completed.

- c. Should the CM fail to proceed with the required corrections, then the Owner may complete the work in accordance with the provisions of Article 28.

ARTICLE 27 - CORRECTION OF WORK AFTER FINAL PAYMENT

See Article 35, Performance Bond and Payment Bond, and Article 42, Guarantee. Neither the final certificate, final payment, occupancy of the premises by the Owner, nor any provision of the contract, nor any other act or instrument of the Owner, nor the Project Designer, shall relieve the CM from responsibility for negligence, or faulty material or workmanship, or failure to comply with the drawings and specifications. The CM shall correct or make good any defects due thereto and repair any damage resulting therefrom, which may appear during the guarantee period following final acceptance of the work except as stated otherwise under Article 42, Guarantee. The Owner will report any defects as they may appear to the CM and establish a time limit for completion of corrections by the CM. The Owner will be the judge as to the responsibility for correction of defects.

ARTICLE 28 - OWNER'S RIGHT TO DO WORK

If, during the progress of the work or during the period of guarantee, the CM fails to prosecute the work properly or to perform any provision of the contract, the Owner, after seven (7) days written notice sent by certified mail, return receipt requested, to the CM from the designer, may perform or have performed that portion of the work. The cost of the work may be deducted from any amounts due or to become due to the CM, such action and cost of same having been first approved by the Project Designer. Should the cost of such action of the Owner exceed the amount due or to become due the CM, then the CM or his surety, or both, shall be liable for and shall pay to the Owner the amount of said excess.

ARTICLE 29 - ANNULMENT OF CONTRACT

If the CM fails to begin the work under the contract within the time specified or fails to establish a GMP or obtain bids from or enter into contracts with qualified Principal Trade or Specialty Contractors within the GMP, or the progress of the work is not maintained on schedule, or the work is not completed within the time above specified, or fails to perform the work with sufficient workmen and equipment or with sufficient materials to ensure the prompt completion of said work, or shall perform the work unsuitably or shall discontinue the prosecution of the work, or if the CM shall become insolvent or be declared bankrupt or commit any act of bankruptcy or insolvency, or allow any final judgment to stand against him unsatisfied for a period of forty-eight (48) hours, or shall make an assignment for the benefit of creditors, or for any other cause whatsoever shall not carry on the work in an acceptable manner, the Owner may give notice in writing, sent by certified mail, return receipt requested, to the CM and his surety of such delay, neglect or default, specifying the same, and if the CM within a period of seven(7) days after such notice shall not proceed in accordance therewith, then the Owner shall, declare this contract in default, and, thereupon, the surety shall promptly take over the work and complete the performance of this contract in the manner and within the time frame specified. In the event the surety shall fail to take over the work to be done under this contract within seven(7) days after being so notified and notify the Owner in writing, sent by certified mail, return receipt requested, that he is taking the same over and stating that he will diligently pursue and complete the same, the Owner shall have full power and authority, without violating the contract, to take the prosecution of the work out of the hands of said CM, to appropriate or use any or all contract materials and equipment on the grounds as may be suitable and acceptable and may enter into an agreement, either by public letting or negotiation, for the completion of said contract according to the terms and provisions thereof or use such other methods as in his opinion shall be required for the completion of said contract in an acceptable manner. All costs and charges incurred by the Owner, together with the costs of completing the

work under contract, shall be deducted from any monies due or which may become due said CM and surety. In case the expense so incurred by the Owner shall be less than the sum which would have been payable under the contract, if it had been completed by said CM, then the said CM and surety shall be entitled to receive the difference, but in case such expense shall exceed the sum which would have been payable under the contract, then the CM and the surety shall be liable and shall pay to the Owner the amount of said excess.

ARTICLE 30 – CONSTRUCTION MANAGER’S RIGHT TO STOP WORK OR TERMINATE THE CONTRACT

- a. Should the work be stopped by order of a court having jurisdiction, or by order of any other public authority for a period of three months, due to cause beyond the fault or control of the CM, or if the Owner should fail or refuse to make payment on account of a certificate issued by the designer within forty-five (45) days after receipt of same, then the CM, after fifteen (15) days' written notice sent by certified mail, return receipt requested, to the Owner and the designer, may suspend operations on the work or terminate the contract.
- b. The Owner shall be liable to the CM for the cost of all materials delivered and work performed on this contract plus ten (10) percent overhead and profit and shall make such payment. The designer shall be the judge as to the correctness of such payment.

ARTICLE 31 - REQUEST FOR PAYMENT

- a. Not later than the fifth day of the month, the CM shall submit to the designer a request for payment for work done during the previous month. The request shall be in the form agreed upon between the CM and the designer, but shall show substantially the value of work done and materials delivered to the site during the period since the last payment, and shall sum up the financial status of the contract with the following information:
 1. Total of contract including change orders.
 2. Value of work completed to date.
 3. Less five percent (5%) retainage, provided however, that after fifty percent (50%) of the CM's work has been satisfactorily completed on schedule, with approval of the owner and the State Construction Office and written consent of the surety, further requirements for retainage will be waived only so long as work continues to be completed satisfactorily and on schedule.
 4. Less previous payments.
 5. Current amount due.
- b. Prior to submitting the first payment request, the CM shall prepare a schedule showing a breakdown of the contract price into values of the various parts of the GMP contract. The Cost of the Work breakdown will be arranged so as to facilitate payments to the Principal Trade and Specialty Contractors in accordance with Article 17. The combined CM Construction Management Fee, Bonds & Insurance, CM Contingency, and Project Reserve (if any) will be shown on the Schedule of values as separate lines. The values for the CM Contingency and Project Reserve (if any) will move to appropriate lines within the Cost of the Work as those funds are committed and expended. This schedule of values will be submitted to & approved by the designer and Owner within 30 days of the Notice to Proceed.

The schedule of values shall be prepared in such form and supported by such data to substantiate its accuracy as the designer and Owner may require.

- c. Applications for payment shall be in a form agreed upon by the CM, designer and Owner and shall be prepared and supported by such data to substantiate the accuracy of the request as the designer may require.
- d. Subject to other provisions of the contract documents, the amount of each progress payment shall be computed as follows:
 - 1. Take that portion of the GMP properly allocable to completed work as determined by multiplying the percentage completion of each portion Cost of the Work by the share of the GMP allocated to that portion of the work in the schedule of values.
 - 2. Add that portion of the GMP properly allocable to materials and equipment delivered and suitably stored at the site for subsequent incorporation in the work or if approved in advance by the Owner, suitably stored off site at a location agreed upon in writing.
 - 3. Subtract the aggregate of previous payments made by the Owner.
 - 4. Subtract the amount, in any, by which the CM has been previously overpaid, as evidenced by the Owner's review of the CM's documentation.
 - 5. Subtract amounts, if any, for which the Project Designer has withheld or nullified a certificate of payment.
 - 6. Subtract retainage as per paragraph (h) below.
 - 7. Add the amount due for the CM Construction Management Fee calculated on the basis the percentage completion of the project or on a schedule of payment negotiated with the Owner less fifteen percent (15%) and less previous payments for CM Construction Management Fee.
- e. Payment allocated to Principal Trade and Specialty Contractors shall be subject to five percent (5%) retainage, provided, however that after fifty percent (50%) of the Cost of the Work has been satisfactorily completed on schedule, with the approval of the Owner and the State Construction Office and with written consent of the surety, further requirements for retainage will be waived only so long as work continues to be completed satisfactorily and on schedule. The balance of the CM Construction Management Fee shall be held by the Owner until satisfactory completion and close out of the project. Satisfactory completion and close out of the project means that the Owner and Project Designer are satisfied that the project has been completed in accordance with the plans and specifications and within the GMP, all general conditions of the contract pertaining to close out have been satisfied, and all Principal Trade and Specialty Contractors have satisfactorily completed their respective contracts. No retainage will be held for the cost of Bonds and Insurance
- f. Payment may be sought for materials or equipment that have been customized or fabricated specifically for this project ("Stored Materials") as provided herein.
 - 1. When payment is made on account of Stored Materials, such materials must be stored on the project site or on the Owner's property. The request for payment shall be accompanied by invoices or bills of sale or other evidence to establish the owner's title to such materials and equipment. Such Stored Materials shall not be removed from the owner's property.

2. Should the space for storage on the project site or on the Owner's property be limited, the CM, at their option, shall be permitted to store such materials or equipment in a warehouse, or warehouses upon special approval, located in North Carolina within one hundred and twenty (120) miles of the project site or at the point of manufacture if located in the United States. Raw materials or commodity products including but not limited to piping, conduit, CMU, metal studs, tile, and gypsum board may not be submitted. To utilize this storage option:
 - (a) The need for offsite stored materials shall be presented by the CM, and approved by the Owner in writing, during the preconstruction phase of the project. The CM shall include the stored materials plan in their GMP (or pGMP if applicable) proposal for SCO approval. Unique circumstances requiring offsite Stored Materials that arise during the construction phase may be considered with approval by the Owner and the State Construction Office.
 - (b) The CM shall obtain the written consent of their bonding and insurance companies, designer, Owner, and the State Construction Office as to the specific storage facility to be used.
 - (c) The CM shall establish title to the Stored Materials in the name of the Owner, supported by a warehouse receipt, which shall unconditionally give the Owner the right to remove the Stored Materials at any time.
 - (d) The warehouse receipt shall contain an inventory of the Stored Materials. Additionally, the CM shall provide the Owner with a detailed inventory of all materials stored, including invoices, and a detailed description sufficient to identify the Stored Materials, including the location in the storage facility, such that the Designer or Owner can confirm the location and condition of the Stored Materials at any time.
 - (e) The CM shall establish and verify that the Stored Materials are not being commingled with materials from other projects or any other materials.
 - (f) The CM shall provide proof of insurance covering the Stored Materials against casualty, inclement weather, and theft, including but not limited to damage and loss in transit, which shall identify the Owner as a beneficiary.
 - (g) The CM shall provide evidence that satisfactory measures are being taken by the storage facility to protect against theft, casualty, or deterioration of the Stored Materials.
 - (h) Stored Materials shall not be stored more than 180 calendar days between purchase and incorporation into the project. Special circumstances may be considered with approval by the Owner and the State Construction Office.
 - (i) The total aggregate value of Stored Materials in storage at any time shall not exceed 25% of the CM's contracted cost of work amount for the project.
 - (j) Stored Materials shall not be moved except for transportation to the project site, or with written consent of the Owner.
3. In all instances, responsibility for Stored Materials shall remain with the CM regardless of ownership or title until the Project has been accepted. Any delays associated with the

storage or transport of the Stored Materials, including but not limited to damage, fire, flood, theft, and bankruptcy, are the responsibility of the CM.

4. Payment for Stored Materials shall be conditioned on the Designer's representation that it has inspected the materials and equipment and found it to be free of defects and otherwise in conformity with the Specifications and Contract Documents, and on satisfactory evidence of the Contractor's compliance with this Article. The means and methods of the Designer's inspection under this Article are in the discretion of the Designer.
- g. In the event of beneficial occupancy, retainage of funds due the CM may be reduced with the approval of the State Construction Office to an equitable amount to cover the list of items to be completed or corrected. Retainage may not be reduced to less than two and one-half (2 1/2) times the estimated value of the work to be completed or corrected. Reduction of retainage must be with the consent and approval of the CM's bonding company.

ARTICLE 32 - CERTIFICATES OF PAYMENT AND FINAL PAYMENT

- a. Within five (5) days from receipt of request for payment from the CM, the designer shall issue and forward to the Owner a certificate for payment. This certificate shall indicate the amount requested or as approved by the designer. If the certificate is not approved by the designer, he shall state in writing to the CM and the Owner his reasons for withholding payment.
- b. No certificate issued or payment made shall constitute an acceptance of the work or any part thereof. The making and acceptance of final payment shall constitute a waiver of all claims by the Owner except:
 1. Claims arising from unsettled liens or claims against the CM.
 2. Faulty work or materials appearing after final payment.
 3. Failure of the contractor to perform the work in accordance with drawings and specifications, such failure appearing after payment.
 4. As conditioned in the performance bond and payment bond.
- c. The making and acceptance of final payment shall constitute a waiver of all claims by the CM except those claims previously made and remaining unsettled (Article 20(c)).
- d. Prior to submitting request for final payment to the designer for approval, the CM shall fully comply with all requirements specified in the "project closeout" section of the specifications. These requirements include but are not limited to the following:
 1. Submittal of Product and Operating Manuals, Warranties and Bonds, Guarantees, Maintenance Agreements, As-Built Drawings, Certificates of Inspection or Approval from agencies having jurisdiction. (The designer must approve the Manuals prior to delivery to the Owner).
 2. Transfer of required attic stock material and all keys in an organized manner.
 3. Record of Owner's training.
 4. Resolution of any final inspection discrepancies.
 5. Granting access to the CM's records, if the State Auditor, the Owner's internal auditors, or the

Joint Legislative Commission on Governmental Operations have made a request for such access pursuant to Article 52.

- e. The CM shall forward to the designer, the final application for payment along with the following documents:
 - 1. List of minority business subcontractors and material suppliers showing breakdown of contracts amounts and total actual payments to subcontractors and material suppliers.
 - 2. Affidavit of Release of Liens.
 - 3. Affidavit from CM of payment to material suppliers and subcontractors. (See Article 36).
 - 4. Consent of Surety to Final Payment.
 - 5. Certificates of state agencies required by state law.
- f. The designer will not authorize final payment until the work under contract has been certified by Project Designer, certificates of compliance issued, and the CM has complied with the closeout requirements. The designer shall forward the CM's final application for payment to the Owner along with respective certificate(s) of compliance required by law.

ARTICLE 33 - PAYMENTS WITHHELD

- a. The designer with the approval of the State Construction Office may withhold payment for the following reasons:
 - 1. Faulty work not corrected.
 - 2. The unpaid balance on the contract is insufficient to complete the work in the judgment of the designer.
 - 3. To provide for sufficient contract balance to cover liquidated damages that will be assessed against the CM.
- b. The Secretary of the Department of Administration may authorize the withholding of payment for the following reasons:
 - 1. Claims filed against the CM or evidence that a claim will be filed.
 - 2. Evidence that Principal Trade or Specialty Contractors have not been paid.
- c. The Owner may withhold all or a portion of CM's Project Management Fee costs set forth in the approved schedule of values, if CM has failed to comply with: (1) a request to access its records by the State Auditor, the Owner's internal auditors, or the Joint Legislative Commission on Governmental Operations pursuant to Article 52; (2) a request for a plan of action and/or recovery schedule under Article 14.j or provide The Owner; (3) a request to provide an electronic copies of Contractor's baseline schedule, updates with all logic used to create the schedules in the original format of the scheduling software; and (4) Contractor's failure to have its Superintendent on the Project full-time.
- d. When grounds for withholding payments have been removed, payment will be released. Delay of payment due the CM without cause will make owner liable for payment of interest to the CM in accordance with G.S. 143-134.1. As provided in G.S.143-134.1(e) the owner shall not be liable for interest on payments withheld by the owner for unsatisfactory job progress,

defective construction not remedied, disputed work, or third-party claims filed against the owner or reasonable evidence that a third-party claim will be filed.

ARTICLE 34 - MINIMUM INSURANCE REQUIREMENTS

The work under this contract shall not commence until all required insurance and verifying certificates of insurance have been obtained and documentation has been approved in writing by the Owner. A cancellation endorsement shall be provided for all required policies that contains a provision that coverages afforded under the policy will not be cancelled, reduced in amount or coverages eliminated until at least thirty (30) days after giving written notice, has been delivered or mailed to the insured and the Owner, of such alteration or cancellation.

a. Worker's Compensation and Employer's Liability

The CM shall ensure that it and all Principal Trade and Specialty Contractors shall provide and maintain, during the life of the contract, workmen's compensation insurance, as required by law, as well as employer's liability coverage with minimum limits of \$100,000.

b. Public Liability and Property Damage

The CM shall ensure that it and all Principal Trade and Specialty Contractors shall provide and maintain, during the life of the contract, comprehensive general liability insurance, including coverage for premises operations, independent contractors, completed operations, products and contractual exposures, as shall protect such contractors from claims arising out of any bodily injury, including accidental death, as well as from claims for property damages which may arise from operations under this contract, whether such operations be by the contractor or by any subcontractor, or by anyone directly or indirectly employed by either of them and the minimum limits of such insurance shall be as follows:

Bodily Injury:	\$500,000 per occurrence
Property Damage:	\$100,000 per occurrence / \$300,000 aggregate

In lieu of limits listed above, a \$500,000 combined single limit shall satisfy both conditions.

Such coverage for completed operations must be maintained for at least two (2) years following final acceptance of the work performed under the contract.

c. Property Insurance (Builder's Risk/Installation Floater)

The CM shall ensure that it and all Principal Trade and Specialty Contractors shall purchase and maintain property insurance during the life of this contract, upon the entire work at the site to the full insurable value thereof. This insurance shall include the interests of the Owner, the CM, and subcontractors in the work and shall insure against the perils of fire, extended coverage, and vandalism and malicious mischief. If the Owner is damaged by failure of the CM to purchase or maintain such insurance, then the CM shall bear all reasonable costs properly attributable thereto; the CM shall effect and maintain similar property insurance on portions of the work stored off the site when request for payment per articles so includes such portions.

d. Deductible

Any deductible, if applicable to loss covered by insurance provided, is to be borne by the CM and/or the Principal Trade or Specialty Contractor as applicable.

e. Other Insurance

The CM shall ensure that it and all Principal Trade and Specialty Contractors shall obtain such additional insurance as may be required by the Owner or by the General Statutes of North Carolina including motor vehicle insurance, in amounts not less than the statutory limits.

f. Proof of Carriage

The CM shall ensure that it and all Principal Trade and Specialty Contractors shall furnish the Owner with satisfactory proof of carriage of the insurance required before written approval is granted by the Owner.

ARTICLE 35 - PERFORMANCE BOND AND PAYMENT BOND

- a. The CM shall furnish a performance bond and payment bond executed by a surety company authorized to do business in North Carolina. The bonds shall be in the full contract amount, which shall be in the amount of the GMP for the entire project. Bonds shall be executed in the form bound with the specifications
- b. All bonds shall be countersigned by an authorized agent of the bonding company who is licensed to do business in North Carolina.

ARTICLE 36 - CONTRACTOR'S AFFIDAVIT

The final payment of retained amount due the CM on account of the contract shall not become due until the CM has furnished to the Owner through the designer an affidavit signed, sworn and notarized to the effect that all payments for materials, services or subcontracted work to Principal Trade and Specialty Contractors in connection with his contract have been satisfied, and that no claims or liens exist against the CM in connection with this contract. In the event that the CM cannot obtain similar affidavits from the Principal Trade and Specialty Contractors to protect the CM and the Owner from possible liens or claims against the subcontractor, the CM shall state in his affidavit that no claims or liens exist against any subcontractor to the best of his (the CM's) knowledge, and if any appear afterward, the CM shall save the Owner harmless.

ARTICLE 37 - ASSIGNMENTS

The CM shall not assign any portion of this contract nor subcontract in its entirety. Except as may be required under terms of the performance bond or payment bond, no funds or sums of money due or become due the CM under the contract may be assigned.

ARTICLE 38 - USE OF PREMISES

- a. The CM shall confine his apparatus, the storage of materials and the operations of his workmen to limits indicated by law, ordinances, permits or directions of the designer and shall not exceed those established limits in his operations.
- b. The CM shall not load or permit any part of the structure to be loaded with a weight that will endanger its safety.
- c. The CM shall enforce the designer's and owner's instructions regarding signs, advertisements, fires and smoking.
- d. No firearms, any type of alcoholic beverages or drugs (other than those prescribed by a physician) will be permitted at the job site.

ARTICLE 39 - CUTTING, PATCHING AND DIGGING

- a. The CM shall ensure that all cutting, fitting or patching that may be required to make the work come together properly and fit it to receive or be received by work of other contractors shown upon or reasonably implied by the drawings and specifications for the completed structure, as the designer may direct.
- b. Any cost brought about by defective or ill-timed work shall be borne by the party responsible therefor.
- c. No Principal Trade or Specialty Contractor shall endanger any work of another such contractor by cutting, digging or other means, nor shall he cut or alter the work of any other such contractor without the consent of the designer and the affected contractor(s).

ARTICLE 40 - UTILITIES, STRUCTURES, SIGNS

- a. The CM shall provide necessary and adequate facilities for water, electricity, gas, oil, sewer, and other utility services, which may be necessary and required for completion of the project. If the Owner specifies that the CM is to pay all utilities, any permanent meters installed shall be listed in the CM's name until his work is fully accepted by the Owner. As stipulated in the Supplementary General Conditions, the Owner may: (1) pay utilities cost directly, (2) require the CM to pay all utilities cost, (3) or reimburse the CM for the actual cost of utilities. The Owner or CM, as applicable, may recover actual costs of metered utilities from the responsible party should delays occur in project completion. Coordination of the work of the utility companies during construction is the sole responsibility of the CM.
- b. If applicable Meters shall be relisted in the Owner's name on the day following completion and acceptance of the CM's work, and the Owner shall pay for services used after that date.
- c. Prior to the operation of permanent systems, the CM will provide temporary power, lighting, water, and heat to maintain space temperature above freezing, as required for construction operations.
- d. The CM shall ensure that the permanent building systems are in sufficient readiness for furnishing temporary climatic control at the time a building is enclosed and secured. The HVAC systems shall maintain climatic control throughout the enclosed portion of the building sufficient to allow completion of the interior finishes of the building. A building shall be considered enclosed and secured when windows, doorways (exterior, mechanical, and electrical equipment rooms), and hardware are installed; and other openings have protection, which will provide reasonable climatic control. The appropriate time to start the mechanical systems and climatic condition shall be jointly determined by the CM and the designer. Use of the equipment in this manner shall in no way affect the warranty requirements of the CM.
- e. The CM shall coordinate the work so that the building's permanent power wiring distribution system shall be in sufficient readiness to provide power as required by the HVAC contractor for temporary climatic control.
- f. The CM shall coordinate the work so that the building's permanent lighting system shall be ready at the time interior painting and finishing begins and shall provide adequate lighting in those areas where interior painting and finishing is being performed.
- g. The CM shall be responsible for his permanently fixed service facilities and systems in use during progress of the work. The following procedures shall be strictly adhered to:
 - 1. Prior to acceptance of work by the State Construction Office, the CM shall coordinate the

removal and replacement of any parts of the permanent building systems damaged through use during construction.

2. Temporary filters as recommended by the equipment manufacturer in order to keep the equipment and ductwork clean and free of dust and debris shall be installed in each of the heating and air conditioning units and at each return grille during construction. New filters shall be installed in each unit prior to the Owner's acceptance of the work.
 3. Extra effort shall be maintained to keep the building and the site adjacent to the building clean and under no circumstances shall air systems be operated if finishing and site work operations are creating dust in excess of what would be considered normal if the building were occupied.
 4. It shall be understood that any warranty on equipment presented to the Owner shall extend from the day of final acceptance by the Owner. The cost of warranting the equipment during operation in the finishing stages of construction shall be borne by the contractor whose system is utilized.
 5. The CM shall ensure that all lamps are in proper working condition at the time of final project acceptance.
- h. The CM shall provide, if required and where directed, a shed for toilet facilities and shall furnish and install in this shed all water closets required for a complete and adequate sanitary arrangement. These facilities will be available to other contractors on the job and shall be kept in a neat and sanitary condition at all times. Chemical toilets are acceptable.
 - i. The CM shall, if required by the Supplementary General Conditions and where directed, erect a temporary field office, complete with lights, telephone, heat and air conditioning. A portion of this office shall be partitioned off, of sufficient size, for the use of a resident inspector, should the designer so direct.
 - j. On multi-story construction projects, the CM shall either provide or ensure that temporary elevators, lifts, or other necessary special equipment is available for the general use of all contractors. The cost for such elevators, lifts or other special equipment and the operation thereof shall either be included in the CM Construction Management Fee or specified as part of the work of a Principal Trade or Specialty Contractor and paid for as a part of the Cost of the Work.
 - k. The CM will erect one sign on the project if required. The sign shall be of sound construction, and shall be neatly lettered with black letters on white background. The sign shall bear the name of the project, and the CM's name, and the name of the designer and consultants. Directional signs may be erected on the Owner's property subject to approval of the Owner with respect to size, style and location of such directional signs. Such signs may bear the name of the contractor and a directional symbol. No other signs will be permitted except by permission of the Owner.

ARTICLE 41 - CLEANING UP

- a. The CM shall ensure that the building and surrounding area is reasonably free from rubbish at all times, and shall remove debris from the site on a timely basis or when directed to do so by the designer. The CM shall provide an on-site refuse container(s) for the use of all Principal Trade and Specialty Contractors. The CM shall ensure that each Principal Trade and Specialty Contractor removes their rubbish and debris from the building on a daily basis. The CM shall ensure that the building is broom cleaned as required to minimize dust and dirt accumulation.

- b. The CM shall provide and maintain suitable all-weather access to the building.
- c. Before final inspection and acceptance of the building, the CM shall ensure that all portions of the work are clean, including glass, hardware, fixtures, masonry, tile and marble (using no acid), clean and wax all floors as specified, and completely prepare the building for use by the Owner, with no cleaning required by the Owner.

ARTICLE 42 - GUARANTEE

- a. The CM shall unconditionally guarantee materials and workmanship against patent defects arising from faulty materials, faulty workmanship or negligence for a period of twelve (12) months following the date of final acceptance of the work or beneficial occupancy and shall replace such defective materials or workmanship without cost to the Owner.
- b. Where items of equipment or material carry a manufacturer's warranty for any period in excess of twelve (12) months, then the manufacturer's warranty shall apply for that particular piece of equipment or material. The CM shall replace such defective equipment or materials, without cost to the Owner, within the manufacturer's warranty period.
- c. Additionally, the Owner may bring an action for latent defects caused by the negligence of the CM, which is hidden or not readily apparent to the Owner at the time of beneficial occupancy or final acceptance, whichever occurred first, in accordance with applicable law.
- d. Guarantees for roof, equipment, materials, and supplies shall be stipulated in the specifications sections governing such roof, equipment, materials, or supplies.

ARTICLE 43 - CODES AND STANDARDS

Wherever reference is given to codes, standard specifications or other data published by regulating agencies including, but not limited to, national electrical codes, North Carolina State Building Codes, federal specifications, ASTM specifications, various institute specifications, etc., it shall be understood that such reference is to the latest edition including addenda published prior to the date of the contract documents.

ARTICLE 44 - INDEMNIFICATION

To the fullest extent permitted by law, the CM shall indemnify and hold harmless the Owner, the designer and the agents, consultants and employees of the Owner and designer, from and against all claims, damages, losses and expenses, including, but not limited to, attorneys' fees, arising out of or resulting from the performance or failure of performance of the work, provided that any such claim, damage, loss or expense (1) is attributable to bodily injury, sickness, disease or death, or to injury to or destruction of tangible property (other than the work itself) including the loss of use resulting therefrom, and (2) is caused in whole or in part by any negligent act or omission of the CM, the CM's subcontractor, or the agents of either the CM or the CM's subcontractor. Such obligation shall not be construed to negate, abridge or otherwise reduce any other right or obligation of indemnity which would otherwise exist as to any party or person described in this article.

ARTICLE 45 - TAXES

- a. Federal excise taxes do not apply to materials entering into state work (Internal Revenue Code, Section 3442(3)).

- b. Federal transportation taxes do not apply to materials entering into state work (Internal Revenue Code, Section 3475(b) as amended).
- c. North Carolina sales tax and use tax, as required by law, do apply to materials entering into state work and such costs shall be included in the bid proposal and contract sum.
- d. Local option sales and use taxes, as required by law, do apply to materials entering into state work as applicable and such costs shall be included in the bid proposal from Principal Trade and specialty Contractors and contract sum.
- e. Accounting Procedures for Refund of County Sales & Use Tax

Amount of county sales and use tax paid per CM's statements:

CM's performing contracts for state agencies shall ensure that the Principal Trade and Specialty Contractors provide information to allow the CM to give the state agency for whose project the materials, supplies, fixtures and/or equipment was purchased a signed statement containing the information listed in N.C.G.S. 105-164.14(e).

The Department of Revenue has agreed that in lieu of obtaining copies of sales receipts from contractors, an agency may obtain a certified statement from the contractors setting forth the date, the type of property and the cost of the property purchased from each vendor, the county in which the vendor made the sale and the amount of local sales and use taxes paid thereon. If the property was purchased out-of-state, the county in which the property was delivered should be listed. The contractor should also be notified that the certified statement may be subject to audit.

In the event the contractors make several purchases from the same vendor, such certified statement must indicate the invoice numbers, the inclusive dates of the invoices, the total amount of the invoices, the counties, and the county sales and use taxes paid thereon.

Name of taxing county: The position of a sale is the retailer's place of business located within a taxing county where the vendor becomes contractually obligated to make the sale. Therefore, it is important that the county tax be reported for the county of sale rather than the county of use.

When property is purchased from out-of-state vendors and the county tax is charged, the county should be identified where delivery is made when reporting the county tax.

Such statement must also include the cost of any tangible personal property withdrawn from the contractor's warehouse stock and the amount of county sales or use tax paid thereon by the CM.

Contractors are not to include any tax paid on supplies, tools and equipment which they use to perform their contracts and should include only those building materials, supplies, fixtures and equipment which actually become a part of or annexed to the building or structure.

ARTICLE 46 - EQUAL OPPORTUNITY CLAUSE

The non-discrimination clause contained in Section 202 (Federal) Executive Order 11246, as amended by Executive Order 11375, relative to equal employment opportunity for all persons without regard to race, color, religion, sex or national origin, and the implementing rules and regulations prescribed by the Secretary of Labor, are incorporated herein.

ARTICLE 47 - EMPLOYMENT OF INDIVIDUALS WITH DISABILITIES

The CM agrees not to discriminate against any employee or applicant for employment because of physical or mental handicap in regard to any position for which the employee or applicant is qualified. The CM agrees to take affirmative action to employ, advance in employment and otherwise treat qualified handicapped individuals without discrimination based upon their physical or mental handicap in all employment practices.

ARTICLE 48 - ASBESTOS-CONTAINING MATERIALS (ACM)

The State of North Carolina has attempted to address all asbestos-containing materials that are to be disturbed in the project. However, there may be other asbestos-containing materials in the work areas that are not to be disturbed and do not create an exposure hazard. Construction Managers are reminded of the requirements of instructions under General Conditions of the Contract, titled Examination of Conditions. Statute 130A, Article 19, amended August 3, 1989, established the Asbestos Hazard Management Program that controls asbestos abatement in North Carolina. The latest edition of Guideline Criteria for Asbestos Abatement from the State Construction Office is to be incorporated in all asbestos abatement projects for the Capital Improvement Program.

ARTICLE 49 - MINORITY BUSINESS PARTICIPATION

N.C.G.S. 143-128.2 establishes a ten percent (10%) goal for participation by minority businesses in total value of work for each State building project and requires documentation of good faith efforts for meeting that goal. The document, Guidelines for Recruitment and Selection of Minority Businesses for Participation in State Construction Contracts including Affidavits and Appendix F are hereby incorporated into and made a part of this contract.

The CM shall identify and define contract packages (the value of which shall total to at least ten percent (10%) of the GMP) that remove barriers to participation commonly experienced by Historically Underutilized Businesses and Minority Business Enterprises as those terms are defined in North Carolina General Statute 143-128.2, hereinafter referred to as Reduced Barrier Packages (RBP). Such contract packages will be submitted to the Owner for review. As an example, RBP's may require no performance or payment bond, or may offer the participation of the CM as a guarantor or surety in the financing of material purchases by the Principal Trade and/or Specialty Contractors, provided that the CM may condition such financing participation upon the issuance of joint checks or other similar arrangements to allow the CM to verify that timely payments are made to suppliers furnishing credit. The CM may propose other and/or additional provisions for reducing barriers to participation.

The Owner shall require the CM to submit a plan for compliance with N.C.G.S.143-128.2 by approval by the Owner prior to soliciting bids for the Principal Trade and Specialty Contracts. The CM and Principal Trade and Specialty Contractors shall make a good faith effort to recruit and select minority businesses for participation in contracts pursuant to N.C.G.S. 143-128.2.

ARTICLE 50 – CONTRACTOR EVALUATION

The CM's overall work performance on the project shall be fairly evaluated in accordance with the State Building Commission policy and procedures, for determining qualifications to compete for future capital improvement projects for institutions and agencies of the State of North Carolina. In addition to final evaluation, interim evaluation may be prepared during the progress of project. The document, Construction Manager Evaluation Procedures, is hereby incorporated and made a part of this contract. The Owner may request the CM's comments to evaluate the designer.

ARTICLE 51 – GIFTS

Pursuant to N.C. Gen. Stat. § 133-32, it is unlawful for any vendor or contractor (i.e. architect, bidder, contractor, construction manager, design professional, engineer, subcontractor, supplier, vendor, etc.), to make gifts or to give favors to any State employee. This prohibition covers those vendors and contractors who: (1) have a contract with a governmental agency; or (2) have performed under such a contract within the past year; or (3) anticipate bidding on such a contract in the future. For additional information regarding the specific requirements and exemptions, vendors and contractors are encouraged to review G.S. Sec. 133-32.

During the construction of the Project, the Contractor is prohibited from making gifts to any of the Owner's employees, Owner's project representatives (architect, engineers, construction manager and their employees), employees of the State Construction Office and/or any other State employee that may have any involvement, influence, responsibilities, oversight, management and/or duties that pertain to and/or relate to the contract administration, financial administration and/or disposition of claims arising from and/or relating to the Contract and/or Project.

ARTICLE 52 – AUDITING-ACCESS TO PERSONS AND RECORDS

- a. In accordance with N.C. General Statute 147-64.7, the State Auditor shall have access to Contractor's officers, employees, agents and/or other persons in control of and/or responsible for the Contractor's records that relate to this Contracts for purposes of conducting audits under the referenced statute. The Owner's internal auditors shall also have the right to access and copy the Contractor's records relating to the Contract and Project during the term of the Contract and within two years following the completion of the Project/close-out of the Contract to verify accounts, accuracy, information, calculations and/or data affecting and/or relating to Contractor's requests for payment, requests for change orders, change orders, claims for extra work, requests for time extensions and related claims for delay/extended general conditions costs, claims for lost productivity, claims for loss efficiency, claims for idle equipment or labor, claims for price/cost escalation, pass-through claims of subcontractors and/or suppliers, and/or any other type of claim for payment or damages from Owner and/or its project representatives.
- b. The following entities may audit the records of this contract during and after the term of the contract to verify accounts and data affecting fees or performance:
 1. The State Auditor.
 2. The internal auditors of the affected department, agency or institution.
 3. The Joint Legislative Commission on Governmental Operations and legislative employees whose primary responsibility is to provide professional or administrative services to the Commission.
- c. The Joint Legislative Commission on Governmental Operations has the authority to:
 1. Study the efficiency, economy and effectiveness of any non-State entity receiving public funds.
 2. Evaluate the implementation of public policies, as articulated by enacted law, administrative rule, executive order, policy, or local ordinance, by any non-State entity receiving public funds.

3. Investigate possible instances of misfeasance, malfeasance, nonfeasance, mismanagement, waste, abuse, or illegal conduct by officers and employees of a non-State entity receiving, directly or indirectly, public funds, as it relates to the officer's or employee's responsibilities regarding the receipt of public funds.
4. Receive reports as required by law or as requested by the Commission.
5. Access and review
 - (a) Any documents or records related to any contract awarded by a State agency, including the documents and records of the contractor, that the Commission determines will assist in verifying accounts or will contain data affecting fees or performance; and
 - (b) Any records related to any subcontract of a contract awarded by a State agency that is utilized to fulfill the contract, including, but not limited to (i) records related to the drafting and approval of the subcontract, and (ii) documents and records of the contractor or subcontractor that the Commission determines will assist in verifying accounts or will contain data affecting fees or performance.
- d. The Joint Legislative Commission on Governmental Operations has the power to:
 1. Compel access to any document or system of records held by a non-State entity receiving, directly or indirectly, public funds, to the extent the documents relate to the receipt, purpose or implementation of a program or service paid for with public funds.
 2. Compel attendance of any officer or employee of any non-State entity receiving public funds, provided the officer or employee is responsible for implementing a program or providing a service paid for with public funds.
- e. Unless prohibited by federal law, the Commission and Commission staff in the discharge of their duties under this Article shall be provided access to any building or facility owned or leased by a non-State entity receiving public funds provided (i) the building or facility is used to implement a program or provide a service paid for with public funds and (ii) the access is reasonably related to the receipt, purpose, or implementation of a program or service paid for with public funds.
- f. Any confidential information obtained by the Commission shall remain confidential and is not a public record as defined in G.S. 132-1.
- g. Any document or information obtained or produced by Commission staff in furtherance of staff's duties to the Commission is confidential and is not a public record as defined in G.S. 132-1.
- h. A person who conceals, falsifies, or refuses to provide to the Commission any document, information, or access to any building or facility as required by this Article with the intent to mislead, impede, or interfere with the Commission's discharge of its duties under this Article shall be guilty of a Class 2 misdemeanor.

ARTICLE 53 – NORTH CAROLINA FALSE CLAIMS ACT

The North Carolina False Claims Act ("NCFCA"), N.C Gen. Stat. § 1-605 through 1-618,

applies to this Contract. The Contractor should familiarize itself with the entire NCFCA and should seek the assistance of an attorney if it has any questions regarding the NCFCA and its applicability to any requests, demands and/or claims for payment it submits to the State through the contracting state agency, institution, university or community college.

The purpose of the NCFCA “is to deter persons from knowingly causing or assisting in causing the State to pay claims that are false or fraudulent and to provide remedies in the form of treble damages and civil penalties when money is obtained from the State by reason of a false or fraudulent claim.” (Section 1-605(b).) A contractor’s liability under the NCFCA may arise from, but is not limited to: requests for payment, invoices, billing, claims for extra work, requests for change orders, requests for time extensions, claims for delay damages/extended general conditions costs, claims for loss productivity, claims for loss efficiency, claims for idle equipment or labor, claims for price/cost escalation, pass-through claims of subcontractors and/or suppliers, documentation used to support any of the foregoing requests or claims, and/or any other request for payment from the State through the contracting state agency, institution, university or community college. The parts of the NCFCA that are most likely to be enforced with respect to this type of contract are as follows:

- A “claim” is “[a]ny request or demand, whether under a contract or otherwise, for money or property and whether or not the State has title to the money or property that (i) is presented to an officer, employee, or agent of the State or (ii) is made to a contractor ... if the money or property is to be spent or used on the State's behalf or to advance a State program or interest and if the State government: (a) provides or has provided any portion of the money or property that is requested or demanded; or (b) will reimburse such contractor ... for any portion of the money or property which is requested or demanded.” (Section 1-606(2).)
- "Knowing" and "knowingly." – Whenever a person, with respect to information, does any of the following: (a) Has actual knowledge of the information; (b) Acts in deliberate ignorance of the truth or falsity of the information; and/or (c) Acts in reckless disregard of the truth or falsity of the information. (Section 1-606(4).) Proof of specific intent to defraud is not required. (Section 1-606(4).)
- "Material" means having a natural tendency to influence, or be capable of influencing, the payment or receipt of money or property. (Section 1-606(4).)
- Liability. – “Any person who commits any of the following acts shall be liable to the State for three times the amount of damages that the State sustains because of the act of that person[:] ... (1) Knowingly presents or causes to be presented a false or fraudulent claim for payment or approval. (2) Knowingly makes, uses, or causes to be made or used, a false record or statement material to a false or fraudulent claim. (3) Conspires to commit a violation of subdivision (1), (2) ...” (Section 1-607(a)(1), (2).)
- The NCFCA shall be interpreted and construed so as to be consistent with the federal False Claims Act, 31 U.S.C. § 3729, et seq., and any subsequent amendments to that act. (Section 1-616(c).)

Finally, the contracting state agency, institution, university or community college may refer any suspected violation of the NCFCA by the Contractor to the Attorney General's Office for investigation. Under Section 1-608(a), the Attorney General is responsible for investigating any violation of NCFCA, and may bring a civil action against the Contractor under the NCFCA. The Attorney General's investigation and any civil action relating thereto are independent and not subject to any dispute resolution provision set forth in this Contract. (See Section 1-608(a).)

ARTICLE 54 – TERMINATION FOR CONVENIENCE

- a. Owner may at any time and for any reason terminate CM's services and work at Owner's convenience. Upon receipt of such notice, CM shall, unless the notice directs otherwise, immediately discontinue the work and placing of orders for materials, facilities and supplies in connection with the performance of this Agreement.
- b. Upon such termination, CM shall be entitled to payment only as follows: (1) the actual cost of the work completed in conformity with this Agreement; plus, (2) such other costs actually incurred by CM as are permitted by the prime contract and approved by Owner; (3) plus ten percent (10%) of the cost of the work referred to in subparagraph (1) above for overhead and profit. There shall be deducted from such sums as provided in this subparagraph the amount of any payments made to CM prior to the date of the termination of this Agreement. CM shall not be entitled to any claim or claim of lien against Owner for any additional compensation or damages in the event of such termination and payment.

Supplementary General Conditions

Article 1 –DEFINTIONS

Paragraph "a": Add the following to the end of the paragraph: "The Geotechnical Technical Report does not constitute part of the Contract Documents but is included for reference."

Add the following **Subparagraph c.** "c. Add "the designers are Little Diversified Architectural Consulting – Architect and Structural Engineer; CMTA – Mechanical, Electrical, and Plumbing Engineers; CLH design, p.a. – Civil Engineer; and Surface 678 – Landscape Architect".

Add the following **Subparagraph h.** "h. "The project name is University of North Carolina at Wilmington Housing Village Phase 3."

Add the following **Subparagraph u.** "u. Project Identification: All correspondence, reports, schedules, applications for payment, fax items, etc. shall contain proper title of project, code, item and SCO ID numbers, typical,"

Paragraph "cc": Add the following new paragraph: "Latest edition" shall mean the current printed version of the "2018 North Carolina Building Code" issued up to 30 calendar days prior to date of receipt of bids, unless specified otherwise.

Paragraph "dd": Add the following new paragraph: "Drawings" or "plans" shall mean the drawings enumerated in the contract documents, as well as all the information in the detail manual (when applicable), addenda, and designer-prepared field drawings and clarification drawings.

Paragraph "ee": Add the following new paragraph: "Specifications" mean this project manual and addenda thereto.

ARTICLE 2- INTENT AND EXECUTION OF THE DOCUMENTS

Paragraph "a": Add the following new sub-paragraphs:

1. These drawings and specifications represent the general dimensional and aesthetic requirements for various "in place" materials required to produce an acceptable to the owner for his intended use.
2. It is the intent of these drawings and specifications to provide an Office /Classroom Building and associated appurtenances that are structurally sound and conforming to at least the minimum requirements of the North Carolina State Building Code.
3. The Contractor shall make all reasonable efforts to achieve this intent. If any detail shown on these drawings appears inconsistent with this intent, in the opinion of the Contractor, he shall notify the Designer in writing of his opinion and await instructions from the Designer before proceeding with the work.
4. Where more detailed information is needed, or when an interpretation of the contract documents is required, the Contractor shall refer the matter in writing to the Designer prior to proceeding with the work. The Designer shall furnish the Contractor an interpretation in writing.
5. If the Contractor discovers errors, inconsistencies, discrepancies or omissions in the contract documents, the Contractor shall inform the Designer of such condition prior to proceeding with the work.
6. If the Contractor discovers errors, inconsistencies, discrepancies or omissions in the contract documents prior to bid, the Contractor shall request clarifications from the Designer and shall include in the bid price all work required to deliver a fully operational and ready to use system.
7. If inconsistencies, discrepancies or contradictions in the Contract Documents are discovered after the bid, the Contractor shall be deemed by submittal of his bid, to have bid the most costly as to labor, materials, duration, sequence and method of construction to provide the work."

ARTICLE 3 - CLARIFICATION AND DETAIL DRAWINGS

Paragraph "a": Add the following to the end of the paragraph: "If errors, inconsistencies or discrepancies in the contract documents are discovered by the Contractor, the Contractor shall inform the designer of such condition prior to proceeding with the work. The designer shall furnish the Contractor written clarification in a reasonable time, so as not to impact the progress of the work."

ARTICLE 5 - SHOP DRAWINGS, SUBMITTALS, SAMPLE DATA

Paragraph "c": Add the following new paragraph: "This schedule must account for any resubmittals required to obtain approval from the Project Designer and Owner."

Paragraph "d": Add the following new paragraph: "No time extension will be granted for delays caused due to failure of the Contractor to properly review shop drawings prior to submittal to the Project Designer. All shop drawings shall indicate how materials relate to conditions of the project. Standard manufacturer's drawings that do not show how and where material is to be used will not be reviewed by the Project Designer. Shop drawings shall not be reproductions of contract documents. Coordination drawings are required in accordance with Article 14."

Article 8-MATERIALS, EQUIPMENT, AND EMPLOYEES

Add the following to **Subparagraph f**: "f. "The designer is the judge of equivalency of materials, products, equipment, assemblies, or installation methods proposed by the Contractor as equivalent to those specified," **Paragraph "g":** Add the following to the end of the paragraph: "All construction personnel shall be respectful to all University of North Carolina at Wilmington staff and students. Any disrespect, harassment, unwelcome comments or advances from any construction personnel toward any staff member or student shall constitute sufficient grounds for University of North Carolina at Wilmington to request removal of any specific individuals from this project. Such action taken by the Owner shall not constitute grounds for a delay claim. The Owner will not be responsible for any delays caused to the project due to any individual being removed from the project. Project superintendents shall be held accountable for any incident of this nature."

ARTICLE 10- PERMITS, INSPECTIONS, FEES, REGULATIONS

Paragraph "f": Add the following paragraph: Notify UNCW EH&S a minimum of one day in advance prior to performing work requiring a Hot Work Permit. "

ARTICLE 11- PROTECTION OF WORK, PROPERTY, AND THE PUBLIC

Paragraph "j": Add the following paragraph: "In case emergency contact is required, the Contractor shall furnish the Owner with names, pager numbers, and telephone numbers (day and night) of the project manager and superintendent. The numbers shall remain current for the duration of the project and shall be updated as required."

Paragraph "k": Add the following paragraph: "The Owner will provide security as it deems prudent and necessary for its own protection. The Contractor shall be responsible for security and safety of the project within the project limits, including on-site materials. The Contractor and the Owner shall meet on a regular basis as required but not less than weekly to coordinate safety and security issues."

Paragraph "l": Add the following paragraph: "The Owner will conduct normal operations during the duration of the project. Unless otherwise stated, the campus buildings will be occupied and will operate on a normal schedule. This means that the Contractor will be required to schedule work around regular operations, special events, visitors and staff requirements. The Contractor shall coordinate with the Owner's representative to minimize any disruptions to the functions of the College."

ARTICLE 12- SEDIMENTATION POLLUTION CONTROL ACT OF 1973

Paragraph "e": Add the following new paragraph: "The Contractor shall comply with the following requirements: Equipment utilized during the construction activity on a site must be operated and maintained in a manner as to prevent the potential or actual pollution of the surface or ground waters. Fuels, lubricants,

coolants, and hydraulic fluids, or any other petroleum products, shall not be discharged on the ground or into surface waters. Spent fluids shall be disposed of in a manner so as not to enter the waters, surface or ground, and in accordance with applicable state and federal disposal regulations. Any spilled fluids shall be cleaned up to the extent practicable and disposed of in a manner so as not to allow their entry into the waters, surface or ground, storm sewers, or drains on private or public property. Herbicide, pesticide, and fertilizer usage during the construction activity shall be restricted to those Materials approved by EPA and shall be used in accordance with label instructions. All wastes composed of construction materials shall be disposed of in accordance with NC General Statutes, Chapter 130A, Article 9- Solid Waste Management, and rules governing the disposal of solid waste (NC Administrative Code Section 15A NCAC 13B)." **Paragraph "f":** Add the following new paragraph: "Minimum Monitoring and Reporting Requirements

1. All sedimentation and erosion control of facilities shall be inspected by the Contractor at least once every seven calendar days and within 24 hours after any storm event of greater than 0.5 inches of rain per 24- hour period.
2. Storm water runoff discharges shall be inspected by visual observation for color, foam, outfall, staining, visible sheens, dry weather flows and muddy water (at the frequency described above) to evaluate the effectiveness of the pollution control facilities or practices. If any visible off-site sedimentation is leaving the site, corrective action shall be taken to reduce the discharge of sediments.
3. The Contractor shall submit to the Owner a written report of weekly inspections. In accordance with NCDEQ requirements and utilizing the self-inspection and monitoring forms. Visible sedimentation found off the site shall be recorded with a brief explanation as to the measures taken to prevent future releases as well as any measures taken to clean up the sediment that has left the site. This record shall be made available to Department of Environmental Management or authorized agent upon request.
4. **Paragraph "g":** Add the following new paragraph: "Maintenance and Inspections the Contractor shall keep all erosion controls devices and materials in good repair. If inspections required by this permit identify a need for maintenance of control measures, modifications or additions to control measures, or corrective actions to control sediment or other pollutants these actions must be performed as soon as possible and before the next storm event to maintain the effectiveness of the control measures. The Owner reserves the right to deduct the cost of maintenance, modifications, additions or corrective actions from the Contractor's application for payment.
5. The owner's representative may periodically evaluate the project for compliance with these requirements."

Article 14-CONSTRUCTION, SUPERVISION, and SCHEDULE

Revise **Subparagraph e** to read as follows: "e. " In such case, the engineer or land surveyor shall coordinate the project benchmark with known campus benchmarks."

ARTICLE 15 – SEPARATE CONTRACTS AND CONTRACTOR RELATIONSHIPS

Paragraph "g": Add the following new paragraph: E-Verify Compliance: Pursuant to Session Law 2013- 418, Contractor shall fully comply with the U.S. Department of Homeland Security employee legal status E Verify requirements for itself and all its subcontractors. Owner requires an affidavit attesting to Contractor's compliance. Violation of the provision, unless timely cured, shall constitute a breach of contract.

ARTICLE 23 -TIME of COMPLETION. DELAYS. EXTENSION.

Paragraph "g": Add the following new paragraph: All final close out documentation, including record drawings shall be submitted to the Owner within 90 days of the Final Inspection by the Owner.

Paragraph "h": Add the following new paragraph: "Time. The CM shall commence work to be performed under this agreement on a date to be specified in a written order from the designer and shall fully complete all work within 596 consecutive calendar days (to be adjusted with notice to proceed to meet August 10, 2027) to Beneficial Occupancy that includes a mutually agreed upon allowance of time for the owner installation of furnishings.

Paragraph "i": Add the following new paragraph: "Liquidated Damages. For each day in excess of the above number of days, the CM shall pay to the Owner the sum of \$150 PER BED per non-occupied pre-rented bed/resident per calendar day as liquidated damages reasonably estimated in advance to cover the losses to be incurred by the Owner by reason of failure of said CM to complete the work within the time specified, such time being in the essence of this contract and a material consideration thereof."

Paragraph "j": Add the following new paragraph: "Working hours: The Contractor shall establish a working hour and date schedule and submit to the Owner's representative for approval. Any deviations from this schedule shall be requested from and approved by the Owner at least five (5) workdays in advance.

1. The Contractor shall agree to additional restrictions on working hours and days as may be enforced by the Owner during certain periods of the year such as, but not limited to, the week of final exams and move in for each semester.
2. Working hours: 7:00 am to 6:00 pm. Hours may change due to University needs.

ARTICLE 31 REQUEST for PAYMENT

Add the following: "f. Contractor shall submit to the Designer a request for payment on AIA Document G702 unless otherwise approved by the Designer"

ARTICLE 38 – USE OF PREMISES

Paragraph "e": Add the following new paragraph: "Storage of construction materials shall be limited to the staging area, as defined in the contract documents."

Paragraph "f": Add the following new paragraph: "Where equipment must cross walks, landscaping areas, or ramps, the Contractor shall provide $\frac{3}{4}$ " plywood sheets for protection of these areas. Cross walks, landscaping areas, or ramps damaged by construction activity shall be repaired or replaced." **Paragraph "g":** Add the following new paragraph: "The construction site and staging areas as well as Owner's adjacent campus areas shall be kept free of trash, litter, and debris at all times."

Paragraph "h": Add the following new paragraph: "Grass in the construction site shall be mowed as often as required to maintain a neat appearance. Tree protection shall extend at least to the drip line of the trees to be protected. Unless otherwise shown on the drawings, minimum tree protection shall include four-foot landscaping fencing supported with steel stakes four foot on center. All areas under the drip line of trees are off limits to vehicular traffic unless protected by plywood."

Paragraph "i": Add the following new paragraph: "Landscape protection when required, shall be installed prior to the initial grading stage. No storage of any kind, access, or activity of any kind will be permitted inside the landscaping protection areas."

Paragraph "k": Add the following new paragraph: "When required by the drawings, a construction fence shall be installed. The fence shall be construction of heavy-duty chain link material, with

screening fabric or privacy slats, and have a minimum height of six feet and it shall have a continuous top tubular rail. Swing gates shall be included at all and every access to the enclosed area."

ARTICLE 39 - CUTTING AND PATCHING

Paragraph "d": Add the following new paragraph: "All cutting, and patching required to perform the work, and to install the specified products under a particular contract shall be performed under that particular contract. All patching work shall be made by craftsmen skilled in the required work on who may already be engaged on the project. All painting within previously painted areas shall be painted by the contract which caused the need for this painting, unless new finishes have been scheduled. All painting shall be by skilled painters who may already be engaged on the project."

ARTICLE 40 -UTILITIES. STRUCTURES. SIGNS.

Subparagraph "a" to read as follows:

"The contractor shall provide necessary and adequate facilities for water, electricity, gas, oil sewer, and other utility services which may be necessary and required for completion of the project. The University owns the water, sewer, gas, telephone and electrical utilities on campus. The contractor shall arrange for and provide all appurtenances necessary for the provision of temporary services, including connections to existing utilities. Temporary telephone service shall be obtained and paid for by the contractor through the University's telecommunications department. Connections for all other utilities shall be performed under the supervision of Physical Plant personnel. In all cases, the contractor shall give a minimum of 72 hours' notice for the connection of all utilities.

The Contractor shall provide temporary electric, gas and water meters on University-owned utility services to the building. The University will read the meters on a monthly basis and will pay for the cost of consumption for these utilities. The University reserves the right to back charge the contractor if the University finds negligence in the use of utilities.

Charges for telephone and data utilities will be charged to the contractor directly by UNCW

Telecommunications Department on a monthly basis. Contractor is advised to confirm current telephone and data rates with UNCW Telecommunications Department (910 962-4019).

Add the following to **item j.**: "General Contractor shall provide his own office facility including telephone and facsimile machines required at location on site approved by the Architect and Owner. The Office shall be weather-tight with lighting, electrical outlets, heating, cooling equipment and equipped with sturdy furniture, drawing rack and drawing display table. The office shall also include a desk and telephone/data outlet. General Contractor's office shall be large enough for his own use and for use as a coordination office to include meeting space with table and chairs for 16 people. Portable toilets must be provided on site. The Owner's toilet facilities shall not be used at any time during the project."

Paragraph "m": Add the following new paragraph: "It is imperative that Owner's utilities and other services be maintained at all times except for scheduled interruptions. Any necessary utility interruptions shall be approved by the Owner's Representative at least three weeks in advance. If necessary, work shall be performed at night, over the weekend, or during holidays. No extra payment will be made for such work. When utility services cannot be interrupted for the length of time required, the Contractor shall make provisions for temporary services. Pedestrian traffic around the construction limits must be maintained in a

clean and safe condition at all times.”

ARTICLE 42 – GUARANTEE

Add the following: “e. All warranty periods to be begin at “Final Acceptance” date rather than at the “Substantial Completion “date.”

ARTICLE 45 – TAXES

Add the following: "e. Contractors shall submit monthly with their request for payment, a signed statement containing the amount of sales and use tax paid by the Contractor for that particular billing period on the documents included in the project specifications.”

End of Supplementary General Conditions

STATE OF NORTH CAROLINA
COUNTY SALES AND USE TAX REPORT
SUMMARY TOTALS AND CERTIFICATION

CONTRACTOR: _____

Page 1 of _____

PROJECT: _____

FOR PERIOD: _____

	TOTAL FOR COUNTY OF:	TOTAL FOR COUNTY OF:	TOTAL FOR COUNTY OF:	TOTAL FOR COUNTY OF:	TOTAL FOR COUNTY OF:	TOTAL FOR COUNTY OF:	TOTAL ALL COUNTIES
CONTRACTOR							
SUBCONTRACTOR(S)*							
COUNTY TOTAL							

* Attach subcontractor(s) report(s)

** Must balance with Detail Sheet(s)

I certify that the above figures do not include any tax paid on supplies, tools and equipment which were used to perform this contract and only includes those building materials, supplies, fixtures and equipment which actually became a part of or annexed to the building or structure. I certify that, to the best of my knowledge, the information provided here is true, correct, and complete.

Sworn to and subscribed before me,

This the _____ day of _____, 20____

Signed

Notary Public

My Commission Expires: _____

Print or Type Name of Above

Seal

NOTE:

This certified statement may be subject to audit.

STATE OF NORTH CAROLINA SALES AND USE TAX REPORT DETAIL

CONTRACTOR: _____

Page 2 of

SUBCONTRACTOR _____

FOR PERIOD: _____

PROJECT: _____

PURCHASE DATE	VENDOR NAME	INVOICE NUMBER	TYPE OF PROPERTY	INVOICE TOTAL	COUNTY TAX PAID	COUNTY OF SALE *
				\$	\$	
				TOTAL:	\$	

* If this is an out-of-state vendor, the County of Sale should be the county to which the merchandise was shipped.

GUIDELINES FOR RECRUITMENT AND SELECTION OF MINORITY BUSINESSES FOR PARTICIPATION IN STATE CONSTRUCTION CONTRACTS

In accordance with G.S. 143-128.2 (effective January 1, 2002) these guidelines establish goals for minority participation in single-prime bidding, separate-prime bidding, construction manager at risk, and alternative contracting methods, on State construction projects in the amount of \$300,000 or more. The legislation provides that the State shall have a verifiable ten percent (10%) goal for participation by minority businesses in the total value of work for each project for which a contract or contracts are awarded. These requirements are published to accomplish that end.

SECTION A: INTENT

It is the intent of these guidelines that the State of North Carolina, as awarding authority for construction projects, and the contractors and subcontractors performing the construction contracts awarded shall cooperate and in good faith do all things legal, proper and reasonable to achieve the statutory goal of ten percent (10%) for participation by minority businesses in each construction project as mandated by GS 143-128.2. Nothing in these guidelines shall be construed to require contractors or awarding authorities to award contracts or subcontracts to or to make purchases of materials or equipment from minority-business contractors or minority-business subcontractors who do not submit the lowest responsible, responsive bid or bids.

SECTION B: DEFINITIONS

1. Minority - a person who is a citizen or lawful permanent resident of the United States and who is:
 - a. Black, that is, a person having origins in any of the black racial groups in Africa;
 - b. Hispanic, that is, a person of Spanish or Portuguese culture with origins in Mexico, South or Central America, or the Caribbean Islands, regardless of race;
 - c. Asian American, that is, a person having origins in any of the original peoples of the Far East, Southeast Asia and Asia, the Indian subcontinent, the Pacific Islands;
 - d. American Indian, that is, a person having origins in any of the original peoples of North America; or
 - e. Female
2. Minority Business - means a business:
 - a. In which at least fifty-one percent (51%) is owned by one or more minority persons, or in the case of a corporation, in which at least fifty-one percent (51%) of the stock is owned by one or more minority persons or socially and economically disadvantaged individuals; and
 - b. Of which the management and daily business operations are controlled by one or more of the minority persons or socially and economically disadvantaged individuals who own it.
3. Socially and economically disadvantaged individual - means the same as defined in 15 U.S.C. 637. "Socially disadvantaged individuals are those who have been subjected to racial or ethnic prejudice or cultural bias because of their identity as a member of a group without regard to their individual qualities". "Economically disadvantaged individuals are those socially disadvantaged individuals whose ability to compete in the free enterprise system has been impaired due to diminished capital and credit opportunities as compared to others in the same business area who are not socially disadvantaged".
4. Public Entity - means State and all public subdivisions and local governmental units.
5. Owner - The State of North Carolina, through the Agency/Institution named in the contract.
6. Designer - Any person, firm, partnership, or corporation, which has contracted with the State of North Carolina to perform architectural or engineering, work.
7. Bidder - Any person, firm, partnership, corporation, association, or joint venture seeking to be awarded a public contract or subcontract.

8. Contract - A mutually binding legal relationship or any modification thereof obligating the seller to furnish equipment, materials or services, including construction, and obligating the buyer to pay for them.
9. Contractor - Any person, firm, partnership, corporation, association, or joint venture which has contracted with the State of North Carolina to perform construction work or repair.
10. Subcontractor - A firm under contract with the prime contractor or construction manager at risk for supplying materials or labor and materials and/or installation. The subcontractor may or may not provide materials in his subcontract.

SECTION C: RESPONSIBILITIES

1. Office for Historically Underutilized Businesses, Department of Administration (hereinafter referred to as HUB Office).

The HUB Office has established a program, which allows interested persons or businesses qualifying as a minority business under G.S. 143-128.2, to obtain certification in the State of North Carolina procurement system. The information provided by the minority businesses will be used by the HUB Office to:

- a. Identify those areas of work for which there are minority businesses, as requested.
- b. Make available to interested parties a list of prospective minority business contractors and subcontractors.
- c. Assist in the determination of technical assistance needed by minority business contractors.

In addition to being responsible for the certification/verification of minority businesses that want to participate in the State construction program, the HUB Office will:

- (1) Maintain a current list of minority businesses. The list shall include the areas of work in which each minority business is interested.
- (2) Inform minority businesses on how to identify and obtain contracting and subcontracting opportunities through the State Construction Office and other public entities.
- (3) Inform minority businesses of the contracting and subcontracting process for public construction building projects.
- (4) Work with the North Carolina trade and professional organizations to improve the ability of minority businesses to compete in the State construction projects.
- (5) The HUB Office also oversees the minority business program by:
 - a. Monitoring compliance with the program requirements.
 - b. Assisting in the implementation of training and technical assistance programs.
 - c. Identifying and implementing outreach efforts to increase the utilization of minority businesses.
 - d. Reporting the results of minority business utilization to the Secretary of the Department of Administration, the Governor, and the General Assembly.

2. State Construction Office

The State Construction Office will be responsible for the following:

- a. Furnish to the HUB Office a minimum of twenty-one days prior to the bid opening the following:
 - (1) Project description and location;
 - (2) Locations where bidding documents may be reviewed;
 - (3) Name of a representative of the owner who can be contacted during the advertising period to advise who the prospective bidders are;
 - (4) Date, time and location of the bid opening.
 - (5) Date, time and location of prebid conference, if scheduled.
- b. Attending scheduled prebid conference, if necessary, to clarify requirements of the general statutes regarding minority-business participation, including the bidders' responsibilities.

- c. Reviewing the apparent low bidders' statutory compliance with the requirements listed in the proposal, that must be complied with, if the bid is to be considered as responsive, prior to award of contracts. The State reserves the right to reject any or all bids and to waive informalities.
- d. Reviewing of minority business requirements at Preconstruction conference.
- e. Monitoring of contractors' compliance with minority business requirements in the contract documents during construction.
- f. Provide statistical data and required reports to the HUB Office.
- g. Resolve any protest and disputes arising after implementation of the plan, in conjunction with the HUB Office.

3. Owner

Before awarding a contract, owner shall do the following:

- a. Develop and implement a minority business participation outreach plan to identify minority businesses that can perform public building projects and to implement outreach efforts to encourage minority business participation in these projects to include education, recruitment, and interaction between minority businesses and non-minority businesses.
- b. Attend the scheduled prebid conference.
- c. At least 10 days prior to the scheduled day of bid opening, notify minority businesses that have requested notices from the public entity for public construction or repair work and minority businesses that otherwise indicated to the Office for Historically Underutilized Businesses an interest in the type of work being bid or the potential contracting opportunities listed in the proposal. The notification shall include the following:
 - 1. A description of the work for which the bid is being solicited.
 - 2. The date, time, and location where bids are to be submitted.
 - 3. The name of the individual within the owner's organization who will be available to answer questions about the project.
 - 4. Where bid documents may be reviewed.
 - 5. Any special requirements that may exist.
- d. Utilize other media, as appropriate, likely to inform potential minority businesses of the bid being sought.
- e. Maintain documentation of any contacts, correspondence, or conversation with minority business firms made in an attempt to meet the goals.
- f. Review, jointly with the designer, all requirements of G.S. 143-128.2(c) and G.S. 143-128.2(f) – (i.e. bidders' proposals for identification of the minority businesses that will be utilized with corresponding total dollar value of the bid and affidavit listing good faith efforts, or affidavit of self-performance of work, if the contractor will perform work under contract by its own workforce) - prior to recommendation of award to the State Construction Office.
- g. Evaluate documentation to determine good faith effort has been achieved for minority business utilization prior to recommendation of award to State Construction Office.
- h. Review prime contractors' pay applications for compliance with minority business utilization commitments prior to payment.
- i. Make documentation showing evidence of implementation of Owner's responsibilities available for review by State Construction Office and HUB Office, upon request

4. Designer

Under the single-prime bidding, separate prime bidding, construction manager at risk, or alternative contracting method, the designer will:

- a. Attend the scheduled prebid conference to explain minority business requirements to the prospective bidders.
- b. Assist the owner to identify and notify prospective minority business prime and subcontractors of potential contracting opportunities.
- c. Maintain documentation of any contacts, correspondence, or conversation with minority business firms made in an attempt to meet the goals.
- d. Review jointly with the owner, all requirements of G.S. 143-128.2(c) and G.S.143-128.2(f) – (i.e. bidders' proposals for identification of the minority businesses that will be utilized with

corresponding total dollar value of the bid and affidavit listing Good Faith Efforts, or affidavit of self-performance of work, if the contractor will perform work under contract by its own workforce) - prior to recommendation of award.

- e. During construction phase of the project, review “MBE Documentation for Contract Payment” – (Appendix E) for compliance with minority business utilization commitments. Submit Appendix E form with monthly pay applications to the owner and forward copies to the State Construction Office.
- f. Make documentation showing evidence of implementation of Designer’s responsibilities available for review by State Construction Office and HUB Office, upon request.

5. Prime Contractor(s), CM at Risk, and Its First-Tier Subcontractors

Under the single-prime bidding, the separate-prime bidding, construction manager at risk and alternative contracting methods, contractor(s) will:

- a. Attend the scheduled prebid conference.
- b. Identify or determine those work areas of a subcontract where minority businesses may have an interest in performing subcontract work.
- c. At least ten (10) days prior to the scheduled day of bid opening, notify minority businesses of potential subcontracting opportunities listed in the proposal. The notification will include the following:
 - (1) A description of the work for which the subbid is being solicited.
 - (2) The date, time and location where subbids are to be submitted.
 - (3) The name of the individual within the company who will be available to answer questions about the project.
 - (4) Where bid documents may be reviewed.
 - (5) Any special requirements that may exist, such as insurance, licenses, bonds and financial arrangements.

If there are more than three (3) minority businesses in the general locality of the project who offer similar contracting or subcontracting services in the specific trade, the contractor(s) shall notify three (3), but may contact more, if the contractor(s) so desires.

- d. During the bidding process, comply with the contractor(s) requirements listed in the proposal for minority participation.
- e. Identify on the bid, the minority businesses that will be utilized on the project with corresponding total dollar value of the bid and affidavit listing good faith efforts as required by G.S. 143-128.2(c) and G.S. 143-128.2(f).
- f. Make documentation showing evidence of implementation of PM, CM-at-Risk and First-Tier Subcontractor responsibilities available for review by State Construction Office and HUB Office, upon request.
- g. Upon being named the apparent low bidder, the Bidder shall provide one of the following: (1) an affidavit (Affidavit C) that includes a description of the portion of work to be executed by minority businesses, expressed as a percentage of the total contract price, which is equal to or more than the applicable goal; (2) if the percentage is not equal to the applicable goal, then documentation of all good faith efforts taken to meet the goal. Failure to comply with these requirements is grounds for rejection of the bid and award to the next lowest responsible and responsive bidder.
- h. The contractor(s) shall identify the name(s) of minority business subcontractor(s) and corresponding dollar amount of work on the schedule of values. The schedule of values shall be provided as required in Article 31 of the General Conditions of the Contract to facilitate payments to the subcontractors.
- i. The contractor(s) shall submit with each monthly pay request(s) and final payment(s), “MBE Documentation for Contract Payment” – (Appendix E), for designer’s review.
- j. During the construction of a project, at any time, if it becomes necessary to replace a minority business subcontractor, immediately advise the owner, State Construction Office, and the Director of the HUB Office in writing, of the circumstances involved. The prime contractor shall make a good faith effort to replace a minority business subcontractor with another minority business subcontractor.

- k. If during the construction of a project additional subcontracting opportunities become available, make a good faith effort to solicit subbids from minority businesses.
- l. It is the intent of these requirements apply to all contractors performing as prime contractor and first tier subcontractor under construction manager at risk on state projects.

6. Minority Business Responsibilities

While minority businesses are not required to become certified in order to participate in the State construction projects, it is recommended that they become certified and should take advantage of the appropriate technical assistance that is made available. In addition, minority businesses who are contacted by owners or bidders must respond promptly whether or not they wish to submit a bid.

SECTION 4: DISPUTE PROCEDURES

It is the policy of this state that disputes that involves a person's rights, duties or privileges, should be settled through informal procedures. To that end, minority business disputes arising under these guidelines should be resolved as governed under G.S. 143-128(g).

SECTION 5: These guidelines shall apply upon promulgation on state construction projects. Copies of these guidelines may be obtained from the Department of Administration, State Construction Office, (physical address) 301 North Wilmington Street, Suite 450, NC Education Building, Raleigh, North Carolina, 27601-2827, (mail address) 1307 Mail Service Center, Raleigh, North Carolina, 27699-1307, phone (919) 807-4100, Website: www.nc-sco.com

SECTION 6: In addition to these guidelines, there will be issued with each construction bid package provisions for contractual compliance providing minority business participation in the state construction program.

MINORITY BUSINESS CONTRACT PROVISIONS (CONSTRUCTION)

APPLICATION:

The **Guidelines for Recruitment and Selection of Minority Businesses for Participation in State Construction Contracts** are hereby made a part of these contract documents. These guidelines shall apply to all contractors regardless of ownership. Copies of these guidelines may be obtained from the Department of Administration, State Construction Office, (physical address) 301 North Wilmington Street, Suite 450, NC Education Building, Raleigh, North Carolina, 27601-2827, (mail address) 1307 Mail Service Center, Raleigh, North Carolina, 27699-1307, phone (919) 807-4100, Website: <http://www.nc-sco.com>

MINORITY BUSINESS SUBCONTRACT GOALS:

The goals for participation by minority firms as subcontractors on this project have been set at 10%.

The bidder must identify on its bid, the minority businesses that will be utilized on the project with corresponding total dollar value of the bid and affidavit (Affidavit A) listing good faith efforts or affidavit (Affidavit B) of self-performance of work, if the bidder will perform work under contract by its own workforce, as required by G.S. 143-128.2(c) and G.S. 143-128.2(f).

The lowest responsible, responsive bidder must provide Affidavit C, that includes a description of the portion of work to be executed by minority businesses, expressed as a percentage of the total contract price, which is equal to or more than the applicable goal.

OR

Provide Affidavit D, that includes a description of the portion of work to be executed by minority businesses, expressed as a percentage of the total contract price, **with documentation of Good Faith Effort, if the percentage is not equal to the applicable goal.**

OR

Provide Affidavit B, which includes sufficient information for the State to determine that the bidder does not customarily subcontract work on this type project.

The above information must be provided as required. Failure to submit these documents is grounds for rejection of the bid.

MINIMUM COMPLIANCE REQUIREMENTS:

All written statements, affidavits or intentions made by the Bidder shall become a part of the agreement between the Contractor and the State for performance of this contract. Failure to comply with any of these statements, affidavits or intentions, or with the minority business Guidelines shall constitute a breach of the contract. A finding by the State that any information submitted either prior to award of the contract or during the performance of the contract is inaccurate, false or incomplete, shall also constitute a breach of the contract. Any such breach may result in termination of the contract in accordance with the termination provisions contained in the contract. It shall be solely at the option of the State whether to terminate the contract for breach.

In determining whether a contractor has made Good Faith Efforts, the State will evaluate all efforts made by the Contractor and will determine compliance in regard to quantity, intensity, and results of these efforts. Good Faith Efforts include:

- (1) Contacting minority businesses that reasonably could have been expected to submit a quote and that were known to the contractor or available on State or local government maintained lists at least 10 days before the bid or proposal date and notifying them of the nature and scope of the work to be performed.
- (2) Making the construction plans, specifications and requirements available for review by prospective minority businesses, or providing these documents to them at least 10 days before the bid or proposals are due.
- (3) Breaking down or combining elements of work into economically feasible units to facilitate minority participation.
- (4) Working with minority trade, community, or contractor organizations identified by the Office for Historically Underutilized Businesses and included in the bid documents that provide assistance in recruitment of minority businesses.
- (5) Attending any prebid meetings scheduled by the public owner.
- (6) Providing assistance in getting required bonding or insurance or providing alternatives to bonding or insurance for subcontractors.
- (7) Negotiating in good faith with interested minority businesses and not rejecting them as unqualified without sound reasons based on their capabilities. Any rejection of a minority business based on lack of qualification should have the reasons documented in writing.
- (8) Providing assistance to an otherwise qualified minority business in need of equipment, loan capital, lines of credit, or joint pay agreements to secure loans, supplies, or letters of credit, including waiving credit that is ordinarily required. Assisting minority businesses in obtaining the same unit pricing with the bidder's suppliers in order to help minority businesses in establishing credit.
- (9) Negotiating joint venture and partnership arrangements with minority businesses in order to increase opportunities for minority business participation on a public construction or repair project when possible.
- (10) Providing quick pay agreements and policies to enable minority contractors and suppliers to meet cash-flow demands.

APPENDIX E

MBE DOCUMENTATION FOR CONTRACT PAYMENTS

Prime Contractor/Architect: _____

Address & Phone: _____

Project Name: _____

Pay Application #: _____ Period: _____

The following is a list of payments made to Minority Business Enterprises on this project for the above-mentioned period.

MBE FIRM NAME	* INDICATE TYPE OF MBE	AMOUNT PAID THIS MONTH	TOTAL PAYMENTS TO DATE	TOTAL AMOUNT COMMITTED

*Minority categories: Black, African American (B), Hispanic (H), Asian American (A), American Indian (I), Female (F), Social and Economically Disadvantage (D)

Date: _____ Approved/Certified By: _____

Name

Title

Signature

SUBMIT WITH EACH PAY REQUEST & FINAL PAYMENT

Identification of HUB Certified/ Minority Business Participation

I, _____
(Name of Bidder)

do hereby certify that on this project, we will use the following HUB Certified/ minority business as construction subcontractors, vendors, suppliers or providers of professional services.

Firm Name, Address and Phone #

Work Type

*Minority
Category

****HUB**
Certified
(Y/N)

[illegible]

*Minority categories: Black, African American (**B**), Hispanic (**H**), Asian American (**A**) American Indian (**I**), Female (**F**) Socially and Economically Disadvantaged (**D**)

**** HUB Certification with the state HUB Office required to be counted toward state participation goals.**

The total value of minority business contracting will be (\$)_____.

State of North Carolina AFFIDAVIT A – Listing of Good Faith Efforts

County of _____

(Name of Bidder)

Affidavit of _____

I have made a good faith effort to comply under the following areas checked:

Bidders must earn at least 50 points from the good faith efforts listed for their bid to be considered responsive. (1 NC Administrative Code 30 I.0101)

- ☐ **1 – (10 pts)** Contacted minority businesses that reasonably could have been expected to submit a quote and that were known to the contractor, or available on State or local government maintained lists, at least 10 days before the bid date and notified them of the nature and scope of the work to be performed.
- ☐ **2 --(10 pts)** Made the construction plans, specifications and requirements available for review by prospective minority businesses, or providing these documents to them at least 10 days before the bids are due.
- ☐ **3 – (15 pts)** Broken down or combined elements of work into economically feasible units to facilitate minority participation.
- ☐ **4 – (10 pts)** Worked with minority trade, community, or contractor organizations identified by the Office of Historically Underutilized Businesses and included in the bid documents that provide assistance in recruitment of minority businesses.
- ☐ **5 – (10 pts)** Attended prebid meetings scheduled by the public owner.
- ☐ **6 – (20 pts)** Provided assistance in getting required bonding or insurance or provided alternatives to bonding or insurance for subcontractors.
- ☐ **7 – (15 pts)** Negotiated in good faith with interested minority businesses and did not reject them as unqualified without sound reasons based on their capabilities. Any rejection of a minority business based on lack of qualification should have the reasons documented in writing.
- ☐ **8 – (25 pts)** Provided assistance to an otherwise qualified minority business in need of equipment, loan capital, lines of credit, or joint pay agreements to secure loans, supplies, or letters of credit, including waiving credit that is ordinarily required. Assisted minority businesses in obtaining the same unit pricing with the bidder's suppliers in order to help minority businesses in establishing credit.
- ☐ **9 – (20 pts)** Negotiated joint venture and partnership arrangements with minority businesses in order to increase opportunities for minority business participation on a public construction or repair project when possible.
- ☐ **10 - (20 pts)** Provided quick pay agreements and policies to enable minority contractors and suppliers to meet cash-flow demands.

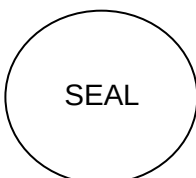
The undersigned, if apparent low bidder, will enter into a formal agreement with the firms listed in the Identification of Minority Business Participation schedule conditional upon scope of contract to be executed with the Owner. Substitution of contractors must be in accordance with GS143-128.2(d) Failure to abide by this statutory provision will constitute a breach of the contract.

The undersigned hereby certifies that he or she has read the terms of the minority business commitment and is authorized to bind the bidder to the commitment herein set forth.

Date: _____ Name of Authorized Officer: _____

Signature: _____

Title: _____



State of _____, County of _____

Subscribed and sworn to before me this _____ day of _____ 20____

Notary Public _____

My commission expires _____

**State of North Carolina --AFFIDAVIT B-- Intent to Perform Contract
with Own Workforce.**

County of _____

Affidavit of _____

(Name of Bidder)

I hereby certify that it is our intent to perform 100% of the work required for the _____

_____ contract.

(Name of Project)

In making this certification, the Bidder states that the Bidder does not customarily subcontract elements of this type project, and normally performs and has the capability to perform and will perform all elements of the work on this project with his/her own current work forces; and

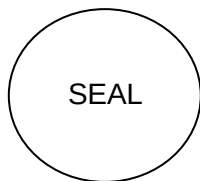
The Bidder agrees to provide any additional information or documentation requested by the owner in support of the above statement. The Bidder agrees to make a Good Faith Effort to utilize minority suppliers where possible.

The undersigned hereby certifies that he or she has read this certification and is authorized to bind the Bidder to the commitments herein contained.

Date: _____ Name of Authorized Officer: _____

Signature: _____

Title: _____



State of _____, County of _____

Subscribed and sworn to before me this _____ day of _____ 20____

Notary Public _____

My commission expires _____

State of North Carolina - AFFIDAVIT C - Portion of the Work to be Performed by HUB Certified/Minority Businesses

County of _____

(Note this form is to be submitted only by the apparent lowest responsible, responsive bidder.)

If the portion of the work to be executed by HUB certified/minority businesses as defined in GS143-128.2(g) and 128.4(a),(b),(e) is equal to or greater than 10% of the bidders total contract price, then the bidder must complete this affidavit.
This affidavit shall be provided by the apparent lowest responsible, responsive bidder within **72 hours** after notification of being low bidder.

Affidavit of _____ I do hereby certify that on the _____
(Name of Bidder)

(Project Name)
Project ID# _____ Amount of Bid \$ _____

I will expend a minimum of _____% of the total dollar amount of the contract with minority business enterprises. Minority businesses will be employed as construction subcontractors, vendors, suppliers or providers of professional services. Such work will be subcontracted to the following firms listed below. Attach additional sheets if required

Name and Phone Number	*Minority Category	**HUB Certified Y/N	Work Description	Dollar Value

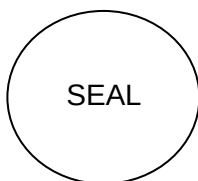
*Minority categories: Black, African American (**B**), Hispanic (**H**), Asian American (**A**) American Indian (**I**), Female (**F**) Socially and Economically Disadvantaged (**D**)

**** HUB Certification with the state HUB Office required to be counted toward state participation goals.**

Pursuant to GS143-128.2(d), the undersigned will enter into a formal agreement with Minority Firms for work listed in this schedule conditional upon execution of a contract with the Owner. Failure to fulfill this commitment may constitute a breach of the contract.

The undersigned hereby certifies that he or she has read the terms of this commitment and is authorized to bind the bidder to the commitment herein set forth.

Date: _____ Name of Authorized Officer: _____



Signature: _____

Title: _____

State of _____, County of _____

Subscribed and sworn to before me this _____ day of _____ 20____

Notary Public _____

My commission expires _____

State of North Carolina AFFIDAVIT D – Good Faith Efforts

County of _____

(Note this form is to be submitted only by the apparent lowest responsible, responsive bidder.)

If the goal of 10% participation by HUB Certified/ minority business **is not** achieved, the Bidder shall provide the following documentation to the Owner of his good faith efforts:

Affidavit of _____ I do hereby certify that on the _____
(Name of Bidder)

Project ID# _____ (Project Name) Amount of Bid \$ _____

I will expend a minimum of _____% of the total dollar amount of the contract with HUB certified/ minority business enterprises. Minority businesses will be employed as construction subcontractors, vendors, suppliers or providers of professional services. Such work will be subcontracted to the following firms listed below. (Attach additional sheets if required)

Name and Phone Number	*Minority Category	**HUB Certified Y/N	Work Description	Dollar Value

*Minority categories: Black, African American (**B**), Hispanic (**H**), Asian American (**A**) American Indian (**I**), Female (**F**) Socially and Economically Disadvantaged (**D**)

**** HUB Certification with the state HUB Office required to be counted toward state participation goals.**

Examples of documentation that may be required to demonstrate the Bidder's good faith efforts to meet the goals set forth in these provisions include, but are not necessarily limited to, the following:

- Copies of solicitations for quotes to at least three (3) minority business firms from the source list provided by the State for each subcontract to be let under this contract (if 3 or more firms are shown on the source list). Each solicitation shall contain a specific description of the work to be subcontracted, location where bid documents can be reviewed, representative of the Prime Bidder to contact, and location, date and time when quotes must be received.
- Copies of quotes or responses received from each firm responding to the solicitation.
- A telephone log of follow-up calls to each firm sent a solicitation.
- For subcontracts where a minority business firm is not considered the lowest responsible sub-bidder, copies of quotes received from all firms submitting quotes for that particular subcontract.
- Documentation of any contacts or correspondence to minority business, community, or contractor organizations in an attempt to meet the goal.
- Copy of pre-bid roster
- Letter documenting efforts to provide assistance in obtaining required bonding or insurance for minority business.
- Letter detailing reasons for rejection of minority business due to lack of qualification.
- Letter documenting proposed assistance offered to minority business in need of equipment, loan capital, lines of credit, or joint pay agreements to secure loans, supplies, or letter of credit, including waiving credit that is ordinarily required.

Failure to provide the documentation as listed in these provisions may result in rejection of the bid and award to the next lowest responsible and responsive bidder.

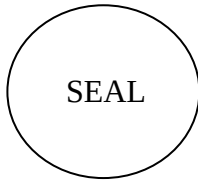
Pursuant to GS143-128.2(d), the undersigned will enter into a formal agreement with Minority Firms for work listed in this schedule conditional upon execution of a contract with the Owner. Failure to fulfill this commitment may constitute a breach of the contract.

The undersigned hereby certifies that he or she has read the terms of this commitment and is authorized to bind the bidder to the commitment herein set forth.

Date: _____ Name of Authorized Officer: _____

Signature: _____

Title: _____



State of _____, County of _____

Subscribed and sworn to before me this _____ day of _____ 20____

Notary Public _____

My commission expires _____

FORM OF PERFORMANCE BOND

Date of Contract: _____

Date of Execution: _____

Name of Principal
(Contractor) _____

Name of Surety : _____

Name of Contracting
Body : _____

Amount of Bond : _____

Project _____

KNOW ALL MEN BY THESE PRESENTS, that we, the principal and surety above named, are held and firmly bound unto the above named contracting body, hereinafter called the contracting body, in the penal sum of the amount stated above for the payment of which sum well and truly to be made, we bind, ourselves, our heirs, executors, administrators, and successors, jointly and severally, firmly by these presents.

THE CONDITION OF THIS OBLIGATION IS SUCH, that whereas the principal entered into a certain contract with the contracting body, identified as shown above and hereto attached:

NOW, THEREFORE, if the principal shall well and truly perform and fulfill all the undertakings, covenants, terms, conditions and agreements of said contract during the original term of said contract and any extensions thereof that may be granted by the contracting body, with or without notice to the surety, and during the life of any guaranty required under the contract, and shall also well and truly perform and fulfill all the undertakings, covenants, terms, conditions and agreements of any and all duly authorized modifications of said contract that may hereafter be made, notice of which modifications to the surety being hereby waived, then, this obligation to be void; otherwise to remain in full force and virtue.

IN WITNESS WHEREOF, the above-bounden parties have executed this instrument under their several seals on the date indicated above, the name and corporate seal of each corporate party being hereto affixed and these presents duly signed by its undersigned representative, pursuant to authority of its governing body.

Executed in _____ counterparts .

Witness :

Contractor: (Trade or Corporate Name)

(Proprietorship or Partnership)

By : _____

Attest: (Corporation)

Title : _____
(Owner, Partner, or Corp.
Pres. or Vice Pres. only)

By : _____

Title : _____
(Corp. Sec. or Asst. Sec.. only)

(Corporate Seal)

(Surety Company)

Witness :

By : _____

Title : _____
(Attorney in Fact)

Countersigned :

(Surety Corporate Seal)

(N.C. Licensed Resident Agent)

Name and Address-Surety Agency

Surety Company Name and N.C.
Regional or Branch Office Address

FORM OF PAYMENT BOND

Date of Contract: _____

Date of Execution: _____

Name of Principal
(Contractor) _____

Name of Surety : _____

Name of Contracting
Body : _____

Amount of Bond : _____

Project _____

KNOW ALL MEN BY THESE PRESENTS, that we, the principal and surety above named, are held and firmly bound unto the above named contracting body, hereinafter called the contracting body, in the penal sum of the amount stated above for the payment of which sum well and truly to be made, we bind ourselves, our heirs, executors, administrators, and successors, jointly and severally, firmly by these presents.

THE CONDITION OF THIS OBLIGATION IS SUCH, that whereas the principal entered into a certain contract with the contracting body identified as shown above and hereto attached:

NOW, THEREFORE, if the principal shall promptly make payment to all persons supplying labor/material in the prosecution of the work provided for in said contract, and any and all duly authorized modifications of said contract that may hereafter be made, notice of which modifications to the surety being hereby waived, then this obligation to be void; otherwise to remain in full force and virtue.

IN WITNESS WHEREOF, the above-bounden parties have executed this instrument under their several seals on the date indicated above, the name and corporate seal of each corporate party being hereto affixed and these presents duly signed by its undersigned representative, pursuant to authority of its governing body.

Executed in _____ counterparts .

Witness :

(Proprietorship or Partnership)

Attest: (Corporation)

By : _____

Title : _____
(Corp. Sec. or Asst. Sec.. only)

(Corporate Seal)

Witness :

Countersigned :

(N.C. Licensed Resident Agent)

Name and Address-Surety Agency

Surety Company Name and N.C.
Regional or Branch Office Address

Contractor: (Trade or Corporate Name)

By : _____

Title : _____
(Owner, Partner, or Corp.
Pres. or Vice Pres. only)

(Surety Company)

By : _____

Title : _____
(Attorney in Fact)

(Surety Corporate Seal)

Sheet for Attaching Power of Attorney

Sheet for Attaching Insurance Certificates

APPROVAL OF THE ATTORNEY GENERAL

**CERTIFICATION BY THE OFFICE OF STATE
BUDGET AND MANAGEMENT**

Provision for the payment of money to fall due and payable by the

under this agreement has been provided for by allocation made and is available for the purpose of carrying out this agreement.

This _____ day of _____ 20____.

Signed _____
Budget Officer

SECTION 01 10 00 - SUMMARY

PART 1 GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A Section Includes:
 - 1. Project information.
 - 2. Work covered by Contract Documents.
 - 3. Owner-furnished products.
 - 4. Access to site.
 - 5. Work restrictions.
 - 6. Specification and Drawing conventions.

1.3 PROJECT INFORMATION

- A Project Identification: University of North Carolina at Wilmington Housing Village Phase 3.
 - 1. Project Location: 601 South College Road, Wilmington, North Carolina 28403.
- B Owner: University of North Carolina at Wilmington.
 - 1. Owner's Representative: Kelli Jordan.
- C Architect: Little Diversified Architectural Consulting, 410 Blackwell Street – Suite 10, Durham, North Carolina 27701.
 - 1. Architect's Representative: Eric Schoenagel.
- D Architect's Consultants: The following design professionals have prepared portions of the Contract Documents:
 - 1. Structural: Little Diversified Architectural Consulting.
 - a. Representative: Carl Schuett.
 - 2. Mechanical, Electrical, Plumbing: CMTA.
 - a. Mechanical Representative: Dan Knox.
 - b. Electrical Representative: Jake DeJohn.
 - c. Plumbing: Dan Knox.
 - 3. Civil: CLH design, p.a.
 - a. Representative: Kyle Smith.
 - 4. Landscape: Surface 678.
 - a. Representative: Brian Vaughn.
- E Web-Based Project Software: Project software will be used for purposes of managing communication and documents during the construction stage.
 - 1. See Section 01 31 00 Project Management and Coordination for requirements for using web-based Project software.

1.4 WORK COVERED BY CONTRACT DOCUMENTS

- A The work of the Project is defined by the Contract Documents and consists of the following:
 - 1. Construction of a new Student Housing building.
- B Type of Contract:
 - 1. Project will be constructed under a single prime contract.
- C United States Sanctions on Russia: In support of the US Sanctions on Russia, the use of products and materials from Russian companies or companies on Russian sanctions list, or that are associated with the Russian Government, are prohibited from use.

1.5 WORK UNDER OWNER'S SEPARATE CONTRACTS

- A Work with Separate Contractors: Cooperate fully with Owner's separate contractors, so work on those contracts may be carried out smoothly, without interfering with or delaying work under this Contract or other contracts. Coordinate the Work of this Contract with work performed under Owner's separate contracts.

1.6 ACCESS TO SITE

- A Restricted Use of Site: Contractor shall have limited use of Project site for construction operations as indicated on Drawings by the Contract limits and as indicated by requirements of this Section.
- B Limits on Use of Site: Limit use of Project site to areas within the Contract limits indicated. Do not disturb portions of Project site beyond areas in which the Work is indicated.
 - 1. Limits on Use of Site: Confine construction operations to areas indicated.
 - 2. Driveways, Walkways and Entrances: Keep driveways loading areas, and entrances serving premises clear and available to Owner, Owner's employees, and emergency vehicles at all times. Do not use these areas for parking or for storage of materials.
 - a. Schedule deliveries to minimize use of driveways and entrances by construction operations.
 - b. Schedule deliveries to minimize space and time requirements for storage of materials and equipment on-site.
- C Condition of Existing Grounds: Maintain portions of existing grounds, landscaping, and hardscaping affected by construction operations throughout construction period. Repair damage caused by construction operations.

1.7 WORK RESTRICTIONS

- A Work Restrictions, General: Comply with restrictions on construction operations.
 - 1. Comply with limitations on use of public streets and with other requirements of authorities having jurisdiction.
- B On-Site Work Hours: Limit work to normal business working hours as required by Authority Having Jurisdiction, Monday through Friday, unless otherwise indicated.
- C Existing Utility Interruptions: Do not interrupt utilities serving facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging for temporary utility services according to requirements indicated:
 - 1. Notify Owner not less than 3 days in advance of proposed utility interruptions.
 - 2. Obtain Owner's written permission before proceeding with utility interruptions.
- D Noise, Vibration, and Odors: Coordinate operations that may result in high levels of noise and vibration, odors, or other disruption to Owner occupancy with Owner.
 - 1. Notify Owner not less than 3 days in advance of proposed disruptive operations.
 - 2. Obtain Owner's written permission before proceeding with disruptive operations.
- E Nonsmoking Building: Smoking is not permitted within the building or within 50 feet of entrances, operable windows, or outdoor-air intakes.
- F Restricted Substances: Use of tobacco products and other controlled substances on Project site is not permitted.

1.8 SPECIFICATION AND DRAWING CONVENTIONS

- A Specification Content: The Specifications use certain conventions for the style of language and the intended meaning of certain terms, words, and phrases when used in particular situations. These conventions are as follows:
 - 1. Imperative mood and streamlined language are generally used in the Specifications. The words "shall," "shall be," or "shall comply with," depending on the context, are implied where a colon (:) is used within a sentence or phrase.
 - 2. Specification requirements are to be performed by Contractor unless specifically stated otherwise.
- B Division 01 General Requirements: Requirements of Sections in Division 01 apply to the Work of all Sections in the Specifications.

- C Drawing Coordination: Requirements for materials and products identified on Drawings are described in detail in the Specifications. One or more of the following are used on Drawings to identify materials and products:
1. Terminology: Materials and products are identified by the typical generic terms used in the individual Specifications Sections.
 2. Abbreviations: Materials and products are identified by abbreviations scheduled on the Drawings.
 3. Keynoting: Materials and products are identified by reference keynotes referencing Specification Section numbers found in this Project Manual.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION 01 10 00

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SECTION 01 23 00 - ALTERNATES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section includes administrative and procedural requirements for alternates.

1.3 DEFINITIONS

- A. Alternate: An amount proposed by bidders and stated on the Bid Form for certain work defined in the bidding requirements that may be added to or deducted from the base bid amount if the Owner decides to accept a corresponding change either in the amount of construction to be completed or in the products, materials, equipment, systems, or installation methods described in the Contract Documents.
 - 1. Alternates described in this Specification Section are part of the Work only if enumerated in the Agreement.
 - 2. The cost or credit for each alternate is the net addition to or deduction from the Contract Sum to incorporate alternates into the Work. No other adjustments are made to the Contract Sum.

1.4 PROCEDURES

- A. Coordination: Revise 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 incidental to or required for a complete installation whether or not indicated as part of alternate.
- B. Execute accepted alternates under the same conditions as other work of the Contract.
- C. Schedule: A schedule of alternates is included at the end of this Section. Specification Sections referenced in schedule contain requirements for materials necessary to achieve the work described under each alternate.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 SCHEDULE OF ALTERNATES

- A. Alternate No. 1: Porcelain Tile – Lobby 1201 and 1220.
 - 1. Base Bid: Provide LVT as specified in Section 09 65 19 Resilient Tile Flooring and as indicated in the Finish Material Schedule on the Drawings.
 - 2. Alternate: Provide porcelain tile as specified in Section 09 30 00 Tiling and as indicated in the Finish Material Schedule on the Drawings in lieu of LVT flooring.
- B. Alternate No. 2: Terrazzo – Lobby 1201 and 1220.
 - 1. Base Bid: Provide LVT as specified in Section 09 65 19 Resilient Tile Flooring and as indicated in the Finish Material Schedule on the Drawings.
 - 2. Alternate: Provide terrazzo flooring as specified in Section 09 66 23 Resinous Matrix Terrazzo Flooring and as indicated on the Drawings in lieu of LVT Flooring.
- C. Alternate No. 3: Porcelain Tile – Kitchen Lounge 1209 and Corridor C1200
 - 1. Base Bid: Provide LVT as specified in Section 09 65 19 Resilient Tile Flooring and as indicated in the Finish Material Schedule on the Drawings.

2. Alternate: Provide porcelain tile as specified in Section 09 30 00 Tiling and as indicated in the Finish Material Schedule on the Drawings in lieu of LVT flooring.
- D. Alternate No. 4: Terrazzo – Kitchen Lounge 1209 and Corridor C1200.
1. Base Bid: Provide LVT as specified in Section 09 65 19 Resilient Tile Flooring and as indicated in the Finish Material Schedule on the Drawings.
 2. Alternate: Provide terrazzo flooring as specified in Section 09 66 23 Resinous Matrix Terrazzo Flooring and as indicated on the Drawings in lieu of LVT Flooring.
- E. Alternate No. 5: Sound-Absorbing Wall Units – Kitchen Lounge 1209.
1. Base Bid: Provide paint finish to installed gypsum board walls as specified in Section 09 91 23 Interior Painting and as indicated on the Drawings.
 2. Alternate: Provide sound-absorbing wall units on installed gypsum board walls as specified in Section 09 84 33 Sound Absorbing Wall Units and as indicated on the Drawings in lieu of paint finish.
- F. Alternate No. 6: Porcelain Tile – Restrooms 1207 and 1215.
1. Base Bid: Provide resinous flooring as specified in Section 09 67 23 Resinous Flooring and as indicated in the Finish Material Schedule on the Drawings.
 2. Alternate: Provide porcelain tile as specified in Section 09 30 00 Tiling and as indicated in the Finish Material Schedule on the Drawings in lieu of resinous flooring.
- G. Alternate No. 7: Wall Covering – TV Lounge 2209.
1. Base Bid: Provide paint finish to installed gypsum board walls as specified in Section 09 91 23 Interior Painting and as indicated on the Drawings.
 2. Alternate: Provide wall covering on installed gypsum board walls as specified in Section 09 72 00 Wall Coverings and as indicated on the Drawings in lieu of paint finish.
- H. Alternate No. 8: Plastic-Laminate Wall Cladding – Learning Commons 1201, Lobby Entry 1220.
1. Base Bid: Provide gypsum board walls as indicated on the Drawings.
 2. Alternate: Provide panels as specified in Section 06 42 19 Plastic-Laminate-Faced Wood Paneling and as indicated on the Drawings.
- I. Alternate No. 9: Plastic-Laminate Wall Cladding – Elevator Lobbies, Floors 2 through 5.
1. Base Bid: Provide paint finish to installed gypsum board walls as specified in Section 09 91 23 Interior Painting and as indicated on the Drawings.
 2. Alternate: Provide panels as specified in Section 06 42 19 Plastic-Laminate-Faced Wood Paneling and as indicated on the Drawings.
- J. Alternate No. 10: Acoustical Panel Ceiling – Learning Commons 1210
1. Base Bid: Provide acoustic panel ceiling APC-1 as specified in Section 09 51 13 Acoustic Panel Ceilings and as indicated in the Finish Material Schedule on the Drawings.
 2. Alternate: Provide acoustic panel ceiling APC-3 as specified in Section 09 51 13 Acoustic Panel Ceilings and as indicated in the Finish Material Schedule on the Drawings.
- K. Alternate No. 11: Sound Absorbing Ceiling Units – TV Lounge 2209
1. Base Bid: Provide acoustic panel ceiling APC-1 as specified in Section 09 51 13 Acoustic Panel Ceilings and as indicated in the Finish Material Schedule on the Drawings.
 2. Alternate: Provide acoustic baffles as specified in Section 09 84 36 Sound Absorbing Ceiling Units and as indicated in the Finish Material Schedule on the Drawings in lieu of acoustical panel ceilings.
- L. Alternate No. 12: Acoustical Mat Underlayment.
1. Base Bid: LVT installed with no acoustical underlayment.
 2. Alternate: Provide acoustical mat underlayment as specified in Section 09 65 19 Resilient Tile Flooring.
- M. Alternate No. 13: Motor-Operated Roller Shades – Learning Commons.
1. Base Bid: Provide manual roller shades in the Learning Commons as specified in Section 12 24 13 Roller Window Shades and as indicated on the Drawings.

2. Alternate: Provide motor-operated roller shades in the Learning Commons as specified in Section 12 24 13 Roller Window Shades and as indicated on the Drawings in lieu of manual roller shades.
- N. Alternate No. 14: Solid-Surface Countertop, Apron, and Splashes.
1. No change at Level 1 and 2 public restrooms 1207, 1215, 2205, 2217; and double sink vanities in typical residential bathrooms which are to be solid surface.
 2. Base Bid: Wall hung sinks where indicated on the Drawings.
 3. Alternate: Provide solid surface countertop, apron, and splashes as specified in Section 12 36 61 Solid Surfacing Countertops and in the Finish Material Schedule on the Drawings in lieu of wall hung sinks where indicated.
- O. Alternate No. 15: Solid-Surface Material Window Stools.
1. Base Bid: Provide 1 inch by 4 inch finger-joined pine window stools as indicated on the Drawings.
 2. Alternate: Provide solid surface material window stools as specified in Section 12 36 61 Solid Surfacing Countertops and in the Finish Material Schedule on the Drawings in lieu of wood window stools.
- P. Alternate No. 16: PVC Corner Guards.
1. Base Bid: No corner guards
 2. Alternate: Provide PVC corner guards as indicated in the on the Drawings
- Q. Alternate No. 17: Impact-Resistant Gypsum Board.
1. Base Bid: Provide mold-resistant gypsum board as specified in Section 09 29 00 Gypsum Board and where indicated on the Drawings.
 2. Alternate: Provide impact-resistant gypsum board as specified in Section 09 29 00 Gypsum Board up to 4 feet vertically above the finished floor in the corridors in lieu of mold-resistant gypsum board from floor to ceiling.
- R. Alternate No. 18: Resinous Flooring – Laundry Room.
1. Base Bid: Provide LVT as specified in Section 09 65 19 Resilient Tile Flooring and as indicated in the Finish Material Schedule on the Drawings.
 2. Alternate: Provide resinous flooring as specified in Section 09 67 23 Resinous Flooring in lieu of LVT.
- S. Alternate No. 19: Cooling Towers.
1. Base Bid: Provide one cooling tower.
 2. Alternate: Provide two cooling units in lieu of single cooling tower.
- T. Alternate No. 20: HVAC Controls.
1. Base Bid: Provide factory-installed HVAC controls.
 2. Alternate: Provide field-installed HVAC controls in lieu of factory-installed controls.
- U. Alternate No. 21: Outside Air Duct Insulation – Levels 1 through 5.
1. Base Bid: No outside air duct insulation in Levels 1 through 5; attic duct to be insulated.
 2. Alternate: Provide outside air duct insulation.
- V. Alternate No. 22: Planting and Hardscape, Alternate No. 1.
1. Base Bid: Provide base bid landscape including pavers specified in Section 32 14 43 Porous Unit Paving.
 2. Alternate: Provide planting and hardscape including pavers specified in Section 32 14 43 Porous Unit Paving in lieu of base bid landscape.
- W. Alternate No. 23: Planting and Hardscape, Alternate No. 2.
1. Base Bid: Provide base bid landscape including pavers specified in Section 32 14 43 Porous Unit Paving.
 2. Alternate: Provide planting and hardscape including pavers specified in Section 32 14 43 Porous Unit Paving in lieu of base bid landscape.

- X. Alternate No. 24: GFRC Column Wraps and Fascia Components.
1. Base Bid: Provide FRP column wraps and fascia components as specified in Section 06 61 00 Architectural Fiberglass Fabrications.
 2. Alternate: Provide GFRC column wraps and fascia components as specified in Section 03 49 00 Glass-Fiber-Reinforced Concrete (GFRC)
- Y. Alternate No. 25: Cast Stone Residential Window Framing, Above Learning Commons.
1. Base Bid: Provide brick as specified in Section 04 20 00 Unit Masonry and as indicated on the Drawings.
 2. Alternate: Provide cast stone residential window framing as specified in Section 04 72 00 Cast Stone Masonry and as indicated on the Drawings in lieu of brick.

3.2 OWNER-PREFERRED ALTERNATES

- A. Alternate No. 1: Produce documents in AutoCAD 2008, or newer version AutoCAD software.
- B. Alternate No. 2: Door Hardware, Owner-Preferred Alternates: Provide the following door hardware components (model and manufacturer) as specified in Section 08 71 00 Door Hardware.

Name	Model	Manufacturer
Continuous Geared Hinge: Full Mortise Aluminum Geared Continuous Hinge (exterior door w/card reader)	Select SL 11 HD-8TWP	Allegion
Exit Device	Von Duprin Wide Stile Push Pad 98/99 Series	Allegion
Key system (cylinders & cores)	Schlage Everest 29SL 7-pin SFIC	Allegion
Locks, Latches and Bolts	Schlage, series L9000, Grade 1	Allegion
Electric Mortise lock, no panic hardware required, interior card reader door	Best 45HW-Less Core-TDEU-14J-IDH-24V-PR + 40H-VITH-626	Allegion
Padlocks	Schlage KS41F1200 x less core x 2" shackle	Allegion
ADA Operators (low Energy Electro-Mechanical Automatic Operators)	LCN 4630/4640 series	Allegion
Keyed removable mullions (between pair doors)	Von Duprin KR4954/9954 series, and shall include stabilizer kits	Allegion
Power Transfers	Von Duprin - 2 wire EPT-2 10 wire EPT-10	Allegion
Closers	LCN 1 4010/4111 EDA Series	Allegion
Power Supplies	Von Duprin PS914 900-4RL	Allegion
Interior Door with card reader, w/ electric mortise lock	Best 45HW-7-LESS CORE-TDEU-14-J-626-IDH-24V-PR + 40H-VITH-626	Allegion

Entry Door with card reader and auto operator	Von Duprin QEL-RX-LC 98-NL/NL-OP. Auto-operator w/ actuators. Door position switch	Allegion
Entry Door with card reader	Von Duprin QEL-RX-LC 98-NL/NL-OP	Allegion

- C. Alternate No. 3: Machine Room-Less Electric Traction Passenger Elevator, Owner-Preferred Alternate: Provide "Gen3 Edge" as manufactured by Otis Elevator Company.
- D. Alternate No. 4: Fire Suppression Equipment Components, Owner-Preferred Alternate: Provide fire pump controllers as manufactured by Eaton Cutler-Hammer.
- E. Alternate No. 5: Fire Suppression Equipment Components, Owner-Preferred Alternate: Provide oxygen monitors (221R) as manufactured by Advanced Micro Systems.
- F. Alternate No. 6: HVAC Components, Owner-Preferred Alternates: Provide the following HVAC components.

BTU Meters and communications	Onicon System 10, LonWorks communication, F-3500 Electromagnetic Flow Meter	Onicon, LonWorks, F-3500
Building Automation System	ESC (Honeywell)	Honeywell
Control Valve and Dampers	Series 9000	Tamco
Campus Energy Management Control System	N4 platform with Energy Analytics software	Tridium Niagara
Cooling Towers - Large	To match project requirements	Marley, B.A.C
Compressor	To match project requirements	Turbocor
Gas Meters	Onicon in-line insertion meter with D-100 Display	Onicon
Condensing Boilers	To match project requirements	Fulton, Lochinvar

- G. Alternate No. 7: Electrical Equipment Components, Owner-Preferred Alternate: Provide diesel emergency engine generator as manufactured by Caterpillar.
- H. Alternate No. 8: Electronic Safety and Security, Owner-Preferred Alternates: Provide the following electronic safety components.

Addressable Fire Alarm System	3030 with FMM-1 Monitor Module	Notifier
Addressable Fire Alarm will be wireless/cellular connection	Starlink dual cellular Model SLE-LTEVI-FIRE	Napco
Addressable Fire Alarm System	Notifier 3030 with FMM-1 Monitor Module	
Addressable Fire Alarm will be wireless/cellular connection	Napco Starlink dual cellular Model SLE-LTEVI-FIRE	

Physical Access Control System (PACS)	Lenel OnGuard (S2)	Lenel
Video Management System (VMS)	Genetec Security Center	Genetec
Access Control Reader (Hardwired)	SIGNO-T3 (Part number ending in 00PVFG)	HID
Video Equipment	Cameras	Axis
Access Control - Hinges	Hinge model BB1199 or BB1191	Hager
Access Control - Power Supplies	Model PS914-4RL	Von Duprin
Access Control - Cameras	Lenel OnGuard	
Data Surge Protector (Inline)	DTK-MRJPOES	Ditek
Data Surge Protector (Head End)	DTK-RMNETS series	Ditek

- I. Alternate No. 9: Termiticide, Owner-Preferred Alternate: Provide "Termidor" termiticide as manufactured by BASF and as specified in Section 31 31 16 Termite Control.
- J. Alternate No. 10: Fire Hydrants, Owner-Preferred Alternate: Provide fire hydrants as manufactured by Mueller.
- K. Alternate No. 11: Landscape Irrigation System, Owner-Preferred Alternate: Provide landscape irrigation system by Hunter Industries and as specified in Section 32 84 00 Planting Irrigation.
- L. Alternate No. 12: AED Cabinet, Owner-Preferred Alternate: Provide defibrillator cabinet as manufactured by ZOLL Industries and specified in Section 10 43 00 Emergency Aid Specialties to house Owner-provided AED unit.
- M. Alternate No. 13: Emergency Call Station, Owner-Preferred Alternate: Provide Emergency Call Station by CALL 24, Wireless call box system S-Series Mark III C24.

END OF SECTION 01 23 00

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January 15, 2026

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Housing Village Phase 3
Complete Package - Construction Documents

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SECTION 01 25 00 - SUBSTITUTION PROCEDURES

PART 1 GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A Section includes administrative and procedural requirements for substitutions.

1.3 DEFINITIONS

- A Substitutions: Changes in products, materials, equipment, and methods of construction from those required by the Contract Documents and proposed by Contractor.
 - 1. Substitutions for Cause: Changes proposed by Contractor that are required due to changed Project conditions, such as unavailability of product, regulatory changes, or unavailability of required warranty terms.
 - 2. Substitutions for Convenience: Changes proposed by Contractor or Owner that are not required in order to meet other Project requirements but may offer advantage to Contractor or Owner.

1.4 ACTION SUBMITTALS

- A Substitution Requests: Submit three copies of each request for consideration. Identify product or fabrication or installation method to be replaced. Include Specification Section number and title and Drawing numbers and titles.
 - 1. Substitution Request Form: Use CSI Form 13.1A.
 - 2. Documentation: Show compliance with requirements for substitutions and the following, as applicable:
 - a. Statement indicating why specified product or fabrication or installation cannot be provided, if applicable.
 - b. Coordination of information, including a list of changes or revisions needed to other parts of the Work and to construction performed by Owner and separate contractors that will be necessary to accommodate proposed substitution.
 - c. Detailed comparison of significant qualities of proposed substitutions with those of the Work specified. Include annotated copy of applicable Specification Section. Significant qualities may include attributes, such as performance, weight, size, durability, visual effect, sustainable design characteristics, warranties, and specific features and requirements indicated. Indicate deviations, if any, from the Work specified.
 - d. Product Data, including drawings and descriptions of products and fabrication and installation procedures.
 - e. Samples, where applicable or requested.
 - f. Certificates and qualification data, where applicable or requested.
 - g. List of similar installations for completed projects, with project names and addresses, and names and addresses of architects and owners.
 - h. Material test reports from a qualified testing agency, indicating and interpreting test results for compliance with requirements indicated.
 - i. Research reports evidencing compliance with 2018 North Carolina State Building Code.
 - j. Detailed comparison of Contractor's construction schedule using proposed substitutions with products specified for the Work, including effect on the overall Contract Time. If specified product or method of construction cannot be provided within the Contract Time, include letter from manufacturer, on manufacturer's letterhead, stating date of receipt of purchase order, lack of availability, or delays in delivery.
 - k. Cost information, including a proposal of change, if any, in the Contract Sum.

- I. Contractor's certification that proposed substitution complies with requirements in the Contract Documents, except as indicated in substitution request, is compatible with related materials and is appropriate for applications indicated.
 - m. Contractor's waiver of rights to additional payment or time that may subsequently become necessary because of failure of proposed substitution to produce indicated results.
 - 3. Architect's Action: If necessary, Architect will request additional information or documentation for evaluation within seven days of receipt of a request for substitution. Architect will notify Contractor of acceptance or rejection of proposed substitution within 15 days of receipt of request, or seven days of receipt of additional information or documentation, whichever is later.
 - a. Forms of Acceptance: Change Order, Construction Change Directive, or Architect's Supplemental Instructions for minor changes in the Work.
 - b. Use product specified if Architect does not issue a decision on use of a proposed substitution within time allocated.

1.5 QUALITY ASSURANCE

- A Compatibility of Substitutions: Investigate and document compatibility of proposed substitution with related products and materials. Engage a qualified testing agency to perform compatibility tests recommended by manufacturers.

1.6 PROCEDURES

- A Coordination: Revise or adjust affected work as necessary to integrate work of the approved substitutions.

1.7 SUBSTITUTIONS

- A Substitutions for Cause: Submit requests for substitution immediately on discovery of need for change, but not later than 15 days prior to time required for preparation and review of related submittals.
 - 1. Conditions: Architect will consider Contractor's request for substitution 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:
 - a. Requested substitution is consistent with the Contract Documents and will produce indicated results.
 - b. Substitution request is fully documented and properly submitted.
 - c. Requested substitution will not adversely affect Contractor's construction schedule.
 - d. Requested substitution has received necessary approvals of authorities having jurisdiction.
 - e. Requested substitution is compatible with other portions of the Work.
 - f. Requested substitution has been coordinated with other portions of the Work.
 - g. Requested substitution provides specified warranty.
 - h. If requested substitution involves more than one contractor, requested substitution has been coordinated with other portions of the Work, is uniform and consistent, is compatible with other products, and is acceptable to all contractors involved.
- B Substitutions for Convenience: Architect will consider requests for substitution if received prior to the opening of bids. Requests received within 30 days after the Notice to Proceed may be considered or rejected at discretion of Architect, request received after that time will be rejected.
 - 1. Conditions: Architect will consider Contractor's request for substitution 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:

- a. Requested substitution offers Owner a substantial advantage in cost, time, energy conservation, or other considerations, after deducting additional responsibilities Owner must assume. Owner's additional responsibilities may include compensation to Architect for redesign and evaluation services, increased cost of other construction by Owner, and similar considerations.
- b. Requested substitution does not require extensive revisions to the Contract Documents.
- c. Requested substitution is consistent with the Contract Documents and will produce indicated results.
- d. Substitution request is fully documented and properly submitted.
- e. Requested substitution will not adversely affect Contractor's construction schedule.
- f. Requested substitution has received necessary approvals of authorities having jurisdiction.
- g. Requested substitution is compatible with other portions of the Work.
- h. Requested substitution has been coordinated with other portions of the Work.
- i. Requested substitution provides specified warranty.
- j. If requested substitution involves more than one contractor, requested substitution has been coordinated with other portions of the Work, is uniform and consistent, is compatible with other products, and is acceptable to all contractors involved.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION 01 25 00

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SUBSTITUTION REQUEST

(After the Bidding/Negotiating Phase)

Project: _____ Substitution Request Number: _____

From: _____
To: _____ Date: _____

A/E Project Number: _____
Re: _____ Contract For: _____

Specification Title: _____ Description: _____
Section: _____ Page: _____ Article/Paragraph: _____

Proposed Substitution: _____
Manufacturer: _____ Address: _____ Phone: _____
Trade Name: _____ Model No.: _____
Installer: _____ Address: _____ Phone: _____

History: ☐ New product ☐ 1-4 years old ☐ 5-10 years old ☐ More than 10 years old

Differences between proposed substitution and specified product: _____

☐ Point-by-point comparative data attached — REQUIRED BY A/E

Reason for not providing specified item: _____

Similar Installation:

Project: _____ Architect: _____
Address: _____ Owner: _____
_____ Date Installed: _____

Proposed substitution affects other parts of Work: ☐ No ☐ Yes; explain _____

Savings to Owner for accepting substitution: _____ (\$ _____).

Proposed substitution changes Contract Time: ☐ No ☐ Yes [Add] [Deduct] _____ days.

Supporting Data Attached: ☐ Drawings ☐ Product Data ☐ Samples ☐ Tests ☐ Reports ☐ _____

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SECTION 01 26 00 - CONTRACT MODIFICATION PROCEDURES

PART 1 GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A Section includes administrative and procedural requirements for handling and processing Contract modifications.

1.3 MINOR CHANGES IN THE WORK

- A Architect will issue supplemental instructions authorizing minor changes in the Work, not involving adjustment to the Contract Sum or the Contract Time, on AIA Document G710.

1.4 PROPOSAL REQUESTS

- A Owner-Initiated Proposal Requests: Architect will issue a detailed description of proposed changes in the Work that may require adjustment to the Contract Sum or the Contract Time. If necessary, the description will include supplemental or revised Drawings and Specifications.
 - 1. Work Change Proposal Requests issued by Architect are not instructions either to stop work in progress or to execute the proposed change.
 - 2. Within time specified in Proposal Request or 20 days, when not otherwise specified, after receipt of Proposal Request, submit a quotation estimating cost adjustments to the Contract Sum and the Contract Time necessary to execute the change.
 - a. Include a list of quantities of products required or eliminated and unit costs, with total amount of purchases and credits to be made. If requested, furnish survey data to substantiate quantities.
 - b. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
 - c. Include costs of labor and supervision directly attributable to the change.
 - d. Include an updated Contractor's construction schedule that indicates the effect of the change, including, but not limited to, changes in activity duration, start and finish times, and activity relationship. Use available total float before requesting an extension of the Contract Time.
 - e. Quotation Form: Use forms acceptable to Architect.
- B Contractor-Initiated Proposals: If latent or changed conditions require modifications to the Contract, Contractor may initiate a claim by submitting a request for a change to Architect.
 - 1. Include a statement outlining reasons for the change and the effect of the change on the Work. Provide a complete description of the proposed change. Indicate the effect of the proposed change on the Contract Sum and the Contract Time.
 - 2. Include a list of quantities of products required or eliminated and unit costs, with total amount of purchases and credits to be made. If requested, furnish survey data to substantiate quantities.
 - 3. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
 - 4. Include costs of labor and supervision directly attributable to the change.
 - 5. Include an updated Contractor's construction schedule that indicates the effect of the change, including, but not limited to, changes in activity duration, start and finish times, and activity relationship. Use available total float before requesting an extension of the Contract Time.
 - 6. Comply with requirements in Section 01 25 00 "Substitution Procedures" if the proposed change requires substitution of one product or system for product or system specified.
- C Proposal Request Form: Use AIA Document G709 for Proposal Requests.

1.5 ADMINISTRATIVE CHANGE ORDERS

- A Unit-Price Adjustment: See Section 01 22 00 "Unit Prices" for administrative procedures for preparation of Change Order Proposal for adjusting the Contract Sum to reflect measured scope of unit-price work.

1.6 CHANGE ORDER PROCEDURES

- A On Owner's approval of a Work Change Proposal Request, Architect will issue a Change Order for signatures of Owner and Contractor on AIA Document G701.

1.7 CONSTRUCTION CHANGE DIRECTIVE

- A Construction Change Directive: Architect may issue a Construction Change Directive on AIA Document G714. Construction Change Directive instructs Contractor to proceed with a change in the Work, for subsequent inclusion in a Change Order.
 - 1. Construction Change Directive contains a complete description of change in the Work. It also designates method to be followed to determine change in the Contract Sum or the Contract Time.
- B Documentation: Maintain detailed records on a time and material basis of work required by the Construction Change Directive.
 - 1. After completion of change, submit an itemized account and supporting data necessary to substantiate cost and time adjustments to the Contract.

END OF SECTION 01 26 00

SECTION 01 29 00 - PAYMENT PROCEDURES

PART 1 GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A Section includes administrative and procedural requirements necessary to prepare and process Applications for Payment.

1.3 DEFINITIONS

- A Schedule of Values: A statement furnished by Contractor allocating portions of the Contract Sum to various portions of the Work and used as the basis for reviewing Contractor's Applications for Payment.

1.4 SCHEDULE OF VALUES

- A Coordination: Coordinate preparation of the schedule of values with preparation of Contractor's construction schedule.
 - 1. Coordinate line items in the schedule of values with items required to be indicated as separate activities in Contractor's construction schedule. Include the following:
 - a. Application for Payment forms with continuation sheets.
 - b. Submittal schedule.
 - c. Items required to be indicated as separate activities in Contractor's construction schedule.
 - 2. Submit the schedule of values to Architect at earliest possible date, but no later than seven days before the date scheduled for submittal of initial Applications for Payment.
 - 3. Subschedules for Separate Elements of Work: Where the Contractor's construction schedule defines separate elements of the Work, provide subschedules showing values coordinated with each element.
- B Format and Content: Use Project Manual table of contents as a guide to establish line items for the schedule of values. Provide at least one line item for each Specification Section.
 - 1. Identification: Include the following Project identification on the schedule of values:
 - a. Project name and location.
 - b. Name of Architect.
 - c. Architect's Project number.
 - d. Contractor's name and address.
 - e. Date of submittal.
 - 2. Arrange the schedule of values in tabular form, with separate columns to indicate the following for each item listed:
 - a. Related Specification Section or Division.
 - b. Description of the Work.
 - c. Name of subcontractor.
 - d. Name of manufacturer or fabricator.
 - e. Name of supplier.
 - f. Change Orders (numbers) that affect value.
 - g. Dollar value of the following, as a percentage of the Contract Sum to nearest one-hundredth percent, adjusted to total 100 percent. Round dollar amounts to whole dollars, with total equal to Contract Sum.
 - 1) Labor.
 - 2) Materials.
 - 3) Equipment.

3. Provide a breakdown of the Contract Sum in enough detail to facilitate continued evaluation of Applications for Payment and progress reports. Provide multiple line items for principal subcontract amounts in excess of five percent of the Contract Sum.
4. Provide a separate line item in the schedule of values for each part of the Work where Applications for Payment may include materials or equipment purchased or fabricated and stored, but not yet installed.
 - a. Differentiate between items stored on-site and items stored off-site. If required, include evidence of insurance.
5. Provide separate line items in the schedule of values for initial cost of materials, for each subsequent stage of completion, and for total installed value of that part of the Work.
6. Allowances: Provide a separate line item in the schedule of values for each allowance. Show line-item value of unit-cost allowances, as a product of the unit cost, multiplied by measured quantity. Use information indicated in the Contract Documents to determine quantities.
7. Each item in the schedule of values and Applications for Payment shall be complete. Include total cost and proportionate share of general overhead and profit for each item.
 - a. Temporary facilities and other major cost items that are not direct cost of actual work-in-place may be shown either as separate line items in the schedule of values or distributed as general overhead expense, at Contractor's option.
8. Schedule Updating: Update and resubmit the schedule of values before the next Applications for Payment when Change Orders or Construction Change Directives result in a change in the Contract Sum.

1.5 APPLICATIONS FOR PAYMENT

- A Each Application for Payment following the initial Application for Payment shall be consistent with previous applications and payments as certified by Architect and paid for by Owner.
 1. Initial Application for Payment, Application for Payment at time of Final Acceptance, and final Application for Payment involve additional requirements.
- B Payment Application Times: The date for each progress payment is indicated in the Agreement between Owner and Contractor. The period of construction work covered by each Application for Payment is the period indicated in the Agreement.
 1. Submit draft copy of Application for Payment seven days prior to due date for review by Architect.
- C Application for Payment Forms: Use AIA Document G702 and AIA Document G703 as form for Applications for Payment.
- D Application Preparation: Complete every entry on form. Notarize and execute by a person authorized to sign legal documents on behalf of Contractor. Architect will return incomplete applications without action.
 1. Entries shall match data on the schedule of values and Contractor's construction schedule. Use updated schedules if revisions were made.
 2. Include amounts for work completed following previous Application for Payment, whether or not payment has been received. Include only amounts for work completed at time of Application for Payment.
 3. Include amounts of Change Orders and Construction Change Directives issued before last day of construction period covered by application.
 4. Indicate separate amounts for work being carried out under Owner-requested project acceleration.
- E Stored Materials: Include in Application for Payment amounts applied for materials or equipment purchased or fabricated and stored, but not yet installed. Differentiate between items stored on-site and items stored off-site.
 1. Provide certificate of insurance, evidence of transfer of title to Owner, and consent of surety to payment for stored materials.
 2. Provide supporting documentation that verifies amount requested, such as paid invoices. Match amount requested with amounts indicated on documentation; do not include overhead and profit on stored materials.

3. Provide summary documentation for stored materials indicating the following:
 - a. Value of materials previously stored and remaining stored as of date of previous Applications for Payment.
 - b. Value of previously stored materials put in place after date of previous Application for Payment and on or before date of current Application for Payment.
 - c. Value of materials stored since date of previous Application for Payment and remaining stored as of date of current Application for Payment.
- F Transmittal: Submit signed and notarized original copies of each Application for Payment to Architect by a method ensuring receipt within 24 hours. One copy shall include waivers of lien and similar attachments if required.
 1. Transmit each copy with a transmittal form listing attachments and recording appropriate information about application.
- G Waivers of Mechanic's Lien: With each Application for Payment, submit waivers of mechanic's lien from entities lawfully entitled to file a mechanic's lien arising out of the Contract and related to the Work covered by the payment.
 1. Submit partial waivers on each item for amount requested in previous application, after deduction for retainage, on each item.
 2. When an application shows completion of an item, submit conditional final or full waivers.
 3. Owner reserves the right to designate which entities involved in the Work must submit waivers.
 4. Submit final Application for Payment with or preceded by conditional final waivers from every entity involved with performance of the Work covered by the application who is lawfully entitled to a lien.
 5. Waiver Forms: Submit executed waivers of lien on forms acceptable to Owner.
- H Initial Application for Payment: Administrative actions and submittals that must precede or coincide with submittal of first Application for Payment include the following:
 1. List of subcontractors.
 2. Schedule of values.
 3. Contractor's construction schedule (final).
 4. Products list (final).
 5. Sustainable design action plans, including preliminary project materials cost data.
 6. Schedule of unit prices.
 7. Submittal schedule (final).
 8. List of Contractor's staff assignments.
 9. List of Contractor's principal consultants.
 10. Copies of building permits.
 11. Copies of authorizations and licenses from authorities having jurisdiction for performance of the Work.
 12. Initial progress report.
 13. Report of preconstruction conference.
 14. Certificates of insurance and insurance policies.
 15. Performance and payment bonds.
 16. Data needed to acquire Owner's insurance.
- I Application for Payment at Final Acceptance: After Architect issues the Certificate of Final Acceptance, submit an Application for Payment showing 100 percent completion for portion of the Work claimed as substantially complete.
 1. Include documentation supporting claim that the Work is substantially complete and a statement showing an accounting of changes to the Contract Sum.
 2. This application shall reflect Certificate(s) of Final Acceptance issued previously for Owner occupancy of designated portions of the Work.
- J Final Payment Application: After completing Project closeout requirements, submit final Application for Payment with releases and supporting documentation not previously submitted and accepted, including, but not limited, to the following:
 1. Evidence of completion of Project closeout requirements.

2. Insurance certificates for products and completed operations where required and proof that taxes, fees, and similar obligations were paid.
3. Updated final statement, accounting for final changes to the Contract Sum.
4. AIA Document G706.
5. AIA Document G706A.
6. AIA Document G707.
7. Evidence that claims have been settled.
8. Final meter readings for utilities, a measured record of stored fuel, and similar data as of date of Final Acceptance or when Owner took possession of and assumed responsibility for corresponding elements of the Work.
9. Final liquidated damages settlement statement.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION 01 29 00

SECTION 01 31 00 - PROJECT MANAGEMENT AND COORDINATION

PART 1 GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A Section includes administrative provisions for coordinating construction operations on Project including, but not limited to, the following:
 - 1. General coordination procedures.
 - 2. Coordination drawings.
 - 3. RFIs.
 - 4. Digital project management procedures.
 - 5. Project meetings.
- B Each contractor shall participate in coordination requirements. Certain areas of responsibility are assigned to a specific contractor.

1.3 DEFINITIONS

- A RFI: Request for Information. Request from Owner, Architect, or Contractor seeking information required by or clarifications of the Contract Documents.

1.4 INFORMATIONAL SUBMITTALS

- A Subcontract List: Prepare a written summary identifying individuals or firms proposed for each portion of the Work, including those who are to furnish products or equipment fabricated to a special design. Include the following information in tabular form:
 - 1. Name, address, telephone number, and email address of entity performing subcontract or supplying products.
 - 2. Number and title of related Specification Section(s) covered by subcontract.
 - 3. Drawing number and detail references, as appropriate, covered by subcontract.
- B Key Personnel Names: Within 15 days of starting construction operations, submit a list of key personnel assignments, including superintendent and other personnel in attendance at Project site. Identify individuals and their duties and responsibilities; list addresses and cellular telephone numbers and e-mail addresses. Provide names, addresses, and telephone numbers of individuals assigned as alternates in the absence of individuals assigned to Project.
 - 1. Post copies of list in project meeting room, in temporary field office, in web-based Project software directory, and in prominent location inbuilt facility. Keep list current at all times.

1.5 GENERAL COORDINATION PROCEDURES

- A Coordination: Coordinate construction operations included in different Sections of the Specifications to ensure efficient and orderly installation of each part of the Work. Coordinate construction operations included in different Sections that depend on each other for proper installation, connection, and operation.
 - 1. Schedule construction operations in sequence required to obtain the best results where installation of one part of the Work depends on installation of other components, before or after its own installation.
 - 2. Coordinate installation of different components to ensure maximum performance and accessibility for required maintenance, service, and repair.
 - 3. Make adequate provisions to accommodate items scheduled for later installation.
- B Prepare memoranda for distribution to each party involved, outlining special procedures required for coordination. Include such items as required notices, reports, and list of attendees at meetings.

1. Prepare similar memoranda for Owner and separate contractors if coordination of their Work is required.
- C Administrative Procedures: Coordinate scheduling and timing of required administrative procedures with other construction activities and scheduled activities of other contractors to avoid conflicts and to ensure orderly progress of the Work. Such administrative activities include, but are not limited to, the following:
 1. Preparation of Contractor's construction schedule.
 2. Preparation of the schedule of values.
 3. Installation and removal of temporary facilities and controls.
 4. Delivery and processing of submittals.
 5. Progress meetings.
 6. Preinstallation conferences.
 7. Project closeout activities.
 8. Startup and adjustment of systems.

1.6 COORDINATION DRAWINGS

- A Coordination Drawings, General: Prepare coordination drawings according to requirements in individual Sections, and additionally where installation is not completely indicated on Shop Drawings, where limited space availability necessitates coordination, or if coordination is required to facilitate integration of products and materials fabricated or installed by more than one entity.
 1. Content: Project-specific information, drawn accurately to a scale large enough to indicate and resolve conflicts. Do not base coordination drawings on standard printed data. Include the following information, as applicable:
 - a. Use applicable Drawings as a basis for preparation of coordination drawings. Prepare sections, elevations, and details as needed to describe relationship of various systems and components.
 - b. Coordinate the addition of trade-specific information to coordination drawings in a sequence that best provides for coordination of the information and resolution of conflicts between installed components before submitting for review.
 - c. Indicate functional and spatial relationships of components of architectural, structural, civil, mechanical, and electrical systems.
 - d. Indicate space requirements for routine maintenance and for anticipated replacement of components during the life of the installation.
 - e. Show location and size of access doors required for access to concealed dampers, valves, and other controls.
 - f. Indicate required installation sequences.
 - g. Indicate dimensions shown on Drawings. Specifically note dimensions that appear to be in conflict with submitted equipment and minimum clearance requirements. Provide alternative sketches to Architect indicating proposed resolution of such conflicts. Minor dimension changes and difficult installations will not be considered changes to the Contract.
- B Coordination Drawing Organization: Organize coordination drawings as follows:
 1. Floor Plans and Reflected Ceiling Plans: Show architectural and structural elements, and mechanical, plumbing, fire-protection, fire-alarm, and electrical Work. Show locations of visible ceiling-mounted devices relative to acoustical ceiling grid. Supplement plan drawings with section drawings where required to adequately represent the Work.
 2. Plenum Space: Indicate subframing for support of ceiling and wall systems, mechanical and electrical equipment, and related Work. Locate components within plenums to accommodate layout of light fixtures and other components indicated on Drawings. Indicate areas of conflict between light fixtures and other components.
 3. Mechanical Rooms: Provide coordination drawings for mechanical rooms showing plans and elevations of mechanical, plumbing, fire-protection, fire-alarm, and electrical equipment; access locations and access sizes including size and direction of door swings; and connection points for ductwork, conduit, piping, etc.

4. Structural Penetrations: Indicate penetrations and openings required for all disciplines.
5. Slab Edge and Embedded Items: Indicate slab edge locations and sizes and locations of embedded items for metal fabrications, sleeves, anchor bolts, bearing plates, angles, door floor closers, slab depressions for floor finishes, curbs and housekeeping pads, and similar items.
6. Mechanical and Plumbing Work: Show the following:
 - a. Sizes and bottom elevations of ductwork, piping, and conduit runs, including insulation, bracing, flanges, and support systems.
 - b. Dimensions of major components, such as dampers, valves, diffusers, access doors, cleanouts and electrical distribution equipment.
 - c. Fire-rated enclosures around ductwork.
 - d. Locations of fan powered and/or VAV boxes and required access; show walls and ensure continuity of sound walls.
7. Electrical Work: Show the following:
 - a. Runs of vertical and horizontal conduit 1-1/4 inches in diameter and larger.
 - b. Light fixture, exit light, emergency battery pack, smoke detector, and other fire-alarm locations.
 - c. Panel board, switch board, switchgear, transformer, busway, generator, and motor-control center locations.
 - d. Location of pull boxes and junction boxes, dimensioned from column center lines.
 - e. Light fixture locations and elevations above finished floor for items not located in a suspended finished ceiling; mounting locations for light fixtures.
8. Fire-Protection System: Show the following:
 - a. Locations of standpipes, mains piping, branch lines, pipe drops, and sprinkler heads.
9. Review: Architect will review coordination drawings to confirm that in general the Work is being coordinated, but not for the details of the coordination, which are Contractor's responsibility. If Architect determines that coordination drawings are not being prepared in sufficient scope or detail, or are otherwise deficient, Architect will so inform Contractor, who shall make suitable modifications and resubmit.
10. Coordination Drawing Prints: Prepare coordination drawing prints according to requirements in Section 01 33 00 Submittal Procedures.
- C Coordination Digital Data Files: Prepare coordination digital data files according to the following requirements:
 1. File Preparation Format:
 - a. Same digital data software program, version, and operating system as original Drawings.
 2. File Submittal Format: Submit or post coordination drawing files using format same as file preparation format and PDF format.
 3. CAD File Incorporation: Develop and incorporate coordination drawing files into CAD established for Project.
 - a. Perform conflict analysis as part of preparation of coordination drawings. Resolve component conflicts prior to submittal. Indicate where conflict resolution requires modification of design requirements by Architect.

1.7 REQUEST FOR INFORMATION (RFI)

- A General: Immediately on discovery of the need for additional information, clarification, or interpretation of the Contract Documents, Contractor shall prepare and submit an RFI in the form specified.
 1. Architect will return without response those RFIs submitted to Architect by other entities controlled by Contractor.
 2. Coordinate and submit RFIs in a prompt manner so as to avoid delays in Contractor's work or work of subcontractors.
- B Content of the RFI: Include a detailed, legible description of item needing information or interpretation and the following:

1. Project name.
 2. Project number.
 3. Date.
 4. Name of Contractor.
 5. Name of Architect.
 6. RFI number, numbered sequentially.
 7. RFI subject.
 8. Specification Section number and title and related paragraphs, as appropriate.
 9. Drawing number and detail references, as appropriate.
 10. Field dimensions and conditions, as appropriate.
 11. Contractor's suggested resolution. If Contractor's suggested resolution impacts the Contract Time or the Contract Sum, Contractor shall state impact in the RFI.
 12. Contractor's signature.
 13. Attachments: Include sketches, descriptions, measurements, photos, Product Data, Shop Drawings, coordination drawings, and other information necessary to fully describe items needing interpretation.
 - a. Include dimensions, thicknesses, structural grid references, and details of affected materials, assemblies, and attachments on attached sketches.
- C RFI Forms: Software-generated form with substantially the same content as indicated above, acceptable to Architect.
1. Attachments shall be electronic files in PDF format.
- D Architect's Action: Architect will review each RFI, determine action required, and respond. Allow seven working days for Architect's response for each RFI. RFIs received by Architect after 1:00 p.m. will be considered as received the following working day.
1. The following Contractor-generated RFIs will be returned without action:
 - a. Requests for approval of submittals.
 - b. Requests for approval of substitutions.
 - c. Requests for approval of Contractor's means and methods.
 - d. Requests for coordination information already indicated in the Contract Documents.
 - e. Requests for adjustments in the Contract Time or the Contract Sum.
 - f. Requests for interpretation of Architect's actions on submittals.
 - g. Incomplete RFIs or inaccurately prepared RFIs.
 2. Architect's action may include a request for additional information, in which case Architect's time for response will date from time of receipt by Architect of additional information.
 3. Architect's action on RFIs that may result in a change to the Contract Time or the Contract Sum may be eligible for Contractor to submit Change Proposal according to Section 01 26 00 "Contract Modification Procedures."
 - a. If Contractor believes the RFI response warrants change in the Contract Time or the Contract Sum, notify Architect in writing within 10 days of receipt of the RFI response.
- E RFI Log: Prepare, maintain, and submit a tabular log of RFIs organized by the RFI number. Submit log weekly. Software log with not less than the following:
1. Project name.
 2. Name and address of Contractor.
 3. Name and address of Architect.
 4. RFI number including RFIs that were returned without action or withdrawn.
 5. RFI description.
 6. Date the RFI was submitted.
 7. Date Architect's response was received.
 8. Identification of related Minor Change in the Work, Construction Change Directive, and Proposal Request, as appropriate.
 9. Identification of related Field Order, Work Change Directive, and Proposal Request, as appropriate.

- F On receipt of Architect's action, update the RFI log and immediately distribute the RFI response to affected parties. Review response and notify Architect within seven days if Contractor disagrees with response.

1.8 PROJECT WEB SITE

- A Web-Based Project Software: Provide, administer, and use Architect's web-based Project software site, Newforma, for purposes of hosting and managing Project communication and documentation until Final Acceptance.

1. Web-based Project software site includes, at a minimum, the following features:
 - a. Compilation of Project data, including Contractor, subcontractors, Architect, architect's consultants, Owner, and other entities involved in Project. Include names of individuals and contact information.
 - b. Access control for each entity for each workflow process, to determine entity's digital rights to create, modify, view, and print documents.
 - c. Document workflow planning, allowing customization of workflow between project entities.
 - d. Creation, logging, tracking, and notification for Project communications required in other Specification Sections, including, but not limited to, RFIs, submittals, Minor Changes in the Work, Construction Change Directives, and Change Orders.
 - e. Track status of each Project communication in real time, and log time and date when responses are provided.
 - f. Procedures for handling PDFs or similar file formats, allowing markups by each entity. Provide security features to lock markups against changes once submitted.
 - g. Processing and tracking of payment applications.
 - h. Processing and tracking of contract modifications.
 - i. Creating and distributing meeting minutes.
 - j. Document management for Drawings, Specifications, and coordination drawings, including revision control.
 - k. Management of construction progress photographs.
 - l. Mobile device compatibility, including smartphones and tablets.

1.9 PROJECT MEETINGS

- A General: Schedule and conduct meetings and conferences at Project site unless otherwise indicated.

1. Attendees: Inform participants and others involved, and individuals whose presence is required, of date and time of each meeting. Notify Owner and Architect of scheduled meeting dates and times a minimum of 10 working days prior to meeting.
2. Agenda: Prepare the meeting agenda. Distribute the agenda to all invited attendees.
3. Minutes: Entity responsible for conducting meeting will record significant discussions and agreements achieved. Distribute the meeting minutes to everyone concerned, including Owner and Architect, within three days of the meeting.

- B Preconstruction Conference: Schedule and conduct a preconstruction conference before starting construction, at a time convenient to Owner and Architect, but no later than 15 days after execution of the Agreement.

1. Attendees: Authorized representatives of Owner, Architect, and their consultants; Contractor and its superintendent; major subcontractors; suppliers, representative from the State Construction Office; and other concerned parties shall attend the conference. Participants at the conference shall be familiar with Project and authorized to conclude matters relating to the Work.
2. Agenda: Discuss items of significance that could affect progress, including the following:
 - a. Responsibilities and personnel assignments.
 - b. Tentative construction schedule.
 - c. Phasing.
 - d. Critical work sequencing and long lead items.

- e. Designation of key personnel and their duties.
 - f. Lines of communications.
 - g. Use of web-based Project software.
 - h. Procedures for processing field decisions and Change Orders.
 - i. Procedures for RFIs.
 - j. Procedures for testing and inspecting.
 - k. Procedures for processing Applications for Payment.
 - l. Distribution of the Contract Documents.
 - m. Submittal procedures.
 - n. Preparation of Record Documents.
 - o. Use of the premises.
 - p. Work restrictions.
 - q. Working hours.
 - r. Owner's occupancy requirements.
 - s. Responsibility for temporary facilities and controls.
 - t. Procedures for moisture and mold control.
 - u. Procedures for disruptions and shutdowns.
 - v. Construction waste management and recycling.
 - w. Parking availability.
 - x. Office, work, and storage areas.
 - y. Equipment deliveries and priorities.
 - z. First aid.
 - aa. Security.
 - bb. Progress cleaning.
3. Minutes: Entity responsible for conducting meeting will record and distribute meeting minutes.
- C Preinstallation Conferences: Conduct a preinstallation conference at Project site before each construction activity when required by other sections and when required for coordination with other construction.
- 1. Attendees: Installer and representatives of manufacturers and fabricators involved in or affected by the installation and its coordination or integration with other materials and installations that have preceded or will follow, shall attend the meeting. Advise Architect of scheduled meeting dates.
 - 2. Agenda: Review progress of other construction activities and preparations for the particular activity under consideration, including requirements for the following:
 - a. Contract Documents.
 - b. Options.
 - c. Related RFIs.
 - d. Related Change Orders.
 - e. Purchases.
 - f. Deliveries.
 - g. Submittals.
 - h. Review of mockups.
 - i. Possible conflicts.
 - j. Compatibility requirements.
 - k. Time schedules.
 - l. Weather limitations.
 - m. Manufacturer's written instructions.
 - n. Warranty requirements.
 - o. Compatibility of materials.
 - p. Acceptability of substrates.
 - q. Temporary facilities and controls.
 - r. Space and access limitations.
 - s. Regulations of authorities having jurisdiction.
 - t. Testing and inspecting requirements.

- u. Installation procedures.
- v. Coordination with other work.
- w. Required performance results.
- x. Protection of adjacent work.
- y. Protection of construction and personnel.
- 3. Record significant conference discussions, agreements, and disagreements, including required corrective measures and actions.
- 4. Reporting: Distribute minutes of the meeting to each party present and to other parties requiring information.
- 5. Do not proceed with installation if the conference cannot be successfully concluded. Initiate whatever actions are necessary to resolve impediments to performance of the Work and reconvene the conference at earliest feasible date.
- D Project Closeout Conference: Schedule and conduct a project closeout conference, at a time convenient to Owner and Architect, but no later than 90 days prior to the scheduled date of Final Acceptance.
 - 1. Conduct the conference to review requirements and responsibilities related to Project closeout.
 - 2. Attendees: Authorized representatives of Owner, Architect, and their consultants; Contractor and its superintendent; major subcontractors; suppliers; and other concerned parties shall attend the meeting. Participants at the meeting shall be familiar with Project and authorized to conclude matters relating to the Work.
 - 3. Agenda: Discuss items of significance that could affect or delay Project closeout, including the following:
 - a. Preparation of Record Documents.
 - b. Procedures required prior to inspection for Final Acceptance and for final inspection for acceptance.
 - c. Procedures for completing and archiving web-based Project software site data files.
 - d. Submittal of written warranties.
 - e. Requirements for preparing operations and maintenance data.
 - f. Requirements for delivery of material samples, attic stock, and spare parts.
 - g. Requirements for demonstration and training.
 - h. Preparation of Contractor's punch list.
 - i. Procedures for processing Applications for Payment at Final Acceptance and for final payment.
 - j. Submittal procedures.
 - k. Coordination of separate contracts.
 - l. Owner's partial occupancy requirements.
 - m. Installation of Owner's furniture, fixtures, and equipment.
 - n. Responsibility for removing temporary facilities and controls.
 - 4. Minutes: Entity conducting meeting will record and distribute meeting minutes.
- E Progress Meetings: Conduct progress meetings at regular intervals.
 - 1. Coordinate dates of meetings with preparation of payment requests.
 - 2. Attendees: In addition to representatives of Owner, and Architect, each contractor, subcontractor, supplier, and other entity concerned with current progress or involved in planning, coordination, or performance of future activities shall be represented at these meetings. All participants at the meeting shall be familiar with Project and authorized to conclude matters relating to the Work.
 - 3. Agenda: Review and correct or approve minutes of previous progress meeting. Review other items of significance that could affect progress. Include topics for discussion as appropriate to status of Project.

- a. Contractor's Construction Schedule: Review progress since the last meeting. Determine whether each activity is on time, ahead of schedule, or behind schedule, in relation to Contractor's construction schedule. Determine how construction behind schedule will be expedited; secure commitments from parties involved to do so. Discuss whether schedule revisions are required to ensure that current and subsequent activities will be completed within the Contract Time.
 - 1) Review schedule for next period.
- b. Review present and future needs of each entity present, including the following:
 - 1) Interface requirements.
 - 2) Sequence of operations.
 - 3) Resolution of component conflicts.
 - 4) Status of submittals.
 - 5) Deliveries.
 - 6) Off-site fabrication.
 - 7) Access.
 - 8) Site use.
 - 9) Temporary facilities and controls.
 - 10) Progress cleaning.
 - 11) Quality and work standards.
 - 12) Status of correction of deficient items.
 - 13) Field observations.
 - 14) Status of RFIs.
 - 15) Status of Proposal Requests.
 - 16) Pending changes.
 - 17) Status of Change Orders.
 - 18) Pending claims and disputes.
 - 19) Documentation of information for payment requests.
- 4. Minutes: Entity responsible for conducting the meeting will record and distribute the meeting minutes to each party present and to parties requiring information.
 - a. Schedule Updating: Revise Contractor's construction schedule after each progress meeting where revisions to the schedule have been made or recognized. Issue revised schedule concurrently with the report of each meeting.
- F Coordination Meetings: Conduct Project coordination meetings at regular intervals. Project coordination meetings are in addition to specific meetings held for other purposes, such as progress meetings and preinstallation conferences.
 - 1. Attendees: In addition to representatives of Owner, and Architect, each contractor, subcontractor, supplier, and other entity concerned with current progress or involved in planning, coordination, or performance of future activities shall be represented at these meetings. All participants at the meetings shall be familiar with Project and authorized to conclude matters relating to the Work.
 - 2. Agenda: Review and correct or approve minutes of the previous coordination meeting. Review other items of significance that could affect progress. Include topics for discussion as appropriate to status of Project.
 - a. Combined Contractor's Construction Schedule: Review progress since the last coordination meeting. Determine whether each contract is on time, ahead of schedule, or behind schedule, in relation to combined Contractor's construction schedule. Determine how construction behind schedule will be expedited; secure commitments from parties involved to do so. Discuss whether schedule revisions are required to ensure that current and subsequent activities will be completed within the Contract Time.
 - b. Schedule Updating: Revise combined Contractor's construction schedule after each coordination meeting where revisions to the schedule have been made or recognized. Issue revised schedule concurrently with report of each meeting.
 - c. Review present and future needs of each contractor present, including the following:

- 1) Interface requirements.
 - 2) Sequence of operations.
 - 3) Resolution of component conflicts.
 - 4) Status of submittals.
 - 5) Deliveries.
 - 6) Off-site fabrication.
 - 7) Access.
 - 8) Site use.
 - 9) Temporary facilities and controls.
 - 10) Work hours.
 - 11) Hazards and risks.
 - 12) Progress cleaning.
 - 13) Quality and work standards.
 - 14) Status of RFIs.
 - 15) Proposal Requests.
 - 16) Change Orders.
 - 17) Pending changes.
3. Reporting: Record meeting results and distribute copies to everyone in attendance and to others affected by decisions or actions resulting from each meeting.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION 01 31 00

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SECTION 01 32 00 - CONSTRUCTION PROGRESS DOCUMENTATION

PART 1 GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A Section includes administrative and procedural requirements for documenting the progress of construction during performance of the Work, including the following:
 - 1. Startup construction schedule.
 - 2. Contractor's Construction Schedule.
 - 3. Construction schedule updating reports.
 - 4. Daily construction reports.
 - 5. Material location reports.
 - 6. Site condition reports.
 - 7. Unusual event reports.

1.3 DEFINITIONS

- A Activity: A discrete part of a project that can be identified for planning, scheduling, monitoring, and controlling the construction Project. Activities included in a construction schedule consume time and resources.
 - 1. Critical Activity: An activity on the critical path that must start and finish on the planned early start and finish times.
 - 2. Predecessor Activity: An activity that precedes another activity in the network.
 - 3. Successor Activity: An activity that follows another activity in the network.
- B Cost Loading: The allocation of the schedule of values for completing an activity as scheduled. The sum of costs for all activities must equal the total Contract Sum.
- C CPM: Critical path method, which is a method of planning and scheduling a construction project where activities are arranged based on activity relationships. Network calculations determine when activities can be performed and the critical path of Project.
- D Critical Path: The longest connected chain of interdependent activities through the network schedule that establishes the minimum overall Project duration and contains no float.
- E Event: The starting or ending point of an activity.
- F Float: The measure of leeway in starting and completing an activity.
 - 1. Float time is not for the exclusive use or benefit of either Owner or Contractor, but is a jointly owned, expiring Project resource available to both parties as needed to meet schedule milestones and Contract completion date.
 - 2. Free float is the amount of time an activity can be delayed without adversely affecting the early start of the successor activity.
 - 3. Total float is the measure of leeway in starting or completing an activity without adversely affecting the planned Project completion date.
- G Resource Loading: The allocation of manpower and equipment necessary for completing an activity as scheduled.

1.4 INFORMATIONAL SUBMITTALS

- A Format for Submittals: Submit required submittals in the following format:
 - 1. PDF file.
 - 2. Two paper copies of sufficient size to display entire period or schedule, as required.
- B Startup construction schedule.
 - 1. Submittal of cost-loaded, startup construction schedule will not constitute approval of schedule of values for cost-loaded activities.

- C Startup Network Diagram: Of size required to display entire network for entire construction period. Show logic ties for activities.
- D Contractor's Construction Schedule: Initial schedule, of size required to display entire schedule for entire construction period.
 - 1. Submit a working digital copy of schedule, using software indicated, and labeled to comply with requirements for submittals.
- E CPM Reports: Concurrent with CPM schedule, submit each of the following reports. Format for each activity in reports shall contain activity number, activity description, cost and resource loading, original duration, remaining duration, early start date, early finish date, late start date, late finish date, and total float in calendar days.
 - 1. Activity Report: List of activities sorted by activity number and then early start date, or actual start date if known.
 - 2. Logic Report: List of preceding and succeeding activities for each activity, sorted in ascending order by activity number and then by early start date, or actual start date if known.
 - 3. Total Float Report: List of activities sorted in ascending order of total float.
 - 4. Earnings Report: Compilation of Contractor's total earnings from the Notice to Proceed until most recent Application for Payment.
- F Construction Schedule Updating Reports: Submit with Applications for Payment.
- G Daily Construction Reports: Submit at weekly intervals.
- H Material Location Reports: Submit at monthly intervals.
- I Site Condition Reports: Submit at time of discovery of differing conditions.
- J Unusual Event Reports: Submit at time of unusual event.
- K Qualification Data: For scheduling consultant.

1.5 QUALITY ASSURANCE

- A Scheduling Consultant Qualifications: An experienced specialist in CPM scheduling and reporting, with capability of producing CPM reports and diagrams within 24 hours of Architect's request.
- B Prescheduling Conference: Conduct conference at Project site to comply with requirements in Section 01 31 00 "Project Management and Coordination." Review methods and procedures related to the preliminary construction schedule and Contractor's Construction Schedule, including, but not limited to, the following:
 - 1. Review software limitations and content and format for reports.
 - 2. Verify availability of qualified personnel needed to develop and update schedule.
 - 3. Discuss constraints, including work stages, area separations, interim milestones, and partial Owner occupancy.
 - 4. Review delivery dates for Owner-furnished products.
 - 5. Review schedule for work of Owner's separate contracts.
 - 6. Review submittal requirements and procedures.
 - 7. Review time required for review of submittals and resubmittals.
 - 8. Review requirements for tests and inspections by independent testing and inspecting agencies.
 - 9. Review time required for Project closeout and Owner startup procedures.
 - 10. Review and finalize list of construction activities to be included in schedule.
 - 11. Review procedures for updating schedule.

1.6 COORDINATION

- A Coordinate Contractor's Construction Schedule with the schedule of values, submittal schedule, progress reports, payment requests, and other required schedules and reports.
 - 1. Secure time commitments for performing critical elements of the Work from entities involved.
 - 2. Coordinate each construction activity in the network with other activities and schedule them in proper sequence.

1.7 CONTRACTOR'S CONSTRUCTION SCHEDULE, GENERAL

- A Computer Scheduling Software: Prepare schedules using current version of a program that has been developed specifically to manage construction schedules.
 - 1. Use Scheduling component of Project website software specified in Section 01 31 00 "Project Management and Coordination," for current Windows operating system.
- B Scheduling Consultant: Engage a consultant to provide planning, evaluation, and reporting using CPM scheduling.
 - 1. In-House Option: Owner may waive requirement to retain a consultant if Contractor employs skilled personnel with experience in CPM scheduling and reporting techniques. Submit qualifications.
 - 2. Meetings: Scheduling consultant shall attend all meetings related to Project progress, alleged delays, and time impact.
- C Time Frame: Extend schedule from date established for the Notice to Proceed to date of final completion.
 - 1. Contract completion date shall not be changed by submission of a schedule that shows an early completion date, unless specifically authorized by Change Order.
- D Activities: Treat each floor or separate area as a separate numbered activity for each main element of the Work. Comply with the following:
 - 1. Activity Duration: Define activities so no activity is longer than 20 days, unless specifically allowed by Architect.
 - 2. Procurement Activities: Include procurement process activities for the following long lead items and major items, requiring a cycle of more than 60 days, as separate activities in schedule. Procurement cycle activities include, but are not limited to, submittals, approvals, purchasing, fabrication, and delivery.
 - a. Elevators.
 - b. Other items to be determined.
 - 3. Submittal Review Time: Include review and resubmittal times indicated in Section 01 33 00 "Submittal Procedures" in schedule. Coordinate submittal review times in Contractor's Construction Schedule with submittal schedule.
 - 4. Commissioning Time: Include no fewer than 15 days for commissioning.
 - 5. Final Acceptance: Indicate completion in advance of date established for Final Acceptance, and allow time for Architect's administrative procedures necessary for certification of Final Acceptance.
 - 6. Punch List and Final Completion: Include not more than 30 days for completion of punch list items and final completion.
- E Constraints: Include constraints and work restrictions indicated in the Contract Documents and as follows in schedule, and show how the sequence of the Work is affected.
 - 1. Phasing: Arrange list of activities on schedule by phase.
 - 2. Work under More Than One Contract: Include a separate activity for each contract.
 - 3. Work by Owner: Include a separate activity for each portion of the Work performed by Owner.
 - 4. Products Ordered in Advance: Include a separate activity for each product. Include delivery date indicated in Section 01 10 00 "Summary." Delivery dates indicated stipulate the earliest possible delivery date.
 - 5. Owner-Furnished Products: Include a separate activity for each product. Include delivery date indicated in Section 01 10 00 "Summary." Delivery dates indicated stipulate the earliest possible delivery date.
 - 6. Work Restrictions: Show the effect of the following items on the schedule:
 - a. Coordination with existing construction.
 - b. Limitations of continued occupancies.
 - c. Uninterruptible services.
 - d. Partial occupancy before Final Acceptance.
 - e. Use-of-premises restrictions.
 - f. Provisions for future construction.
 - g. Seasonal variations.

- h. Environmental control.
- 7. Work Stages: Indicate important stages of construction for each major portion of the Work, including, but not limited to, the following:
 - a. Subcontract awards.
 - b. Pre-construction tests and inspections.
 - c. Submittals.
 - d. Purchases.
 - e. Mockups.
 - f. Fabrication.
 - g. Sample testing.
 - h. Deliveries.
 - i. Installation.
 - j. Tests and inspections.
 - k. Adjusting.
 - l. Curing.
 - m. Startup and placement into final use and operation.
- 8. Construction Areas: Identify each major area of construction for each major portion of the Work. Indicate where each construction activity within a major area must be sequenced or integrated with other construction activities to provide for the following:
 - a. Structural completion.
 - b. Temporary enclosure and space conditioning.
 - c. Permanent space enclosure.
 - d. Completion of mechanical installation.
 - e. Completion of electrical installation.
 - f. Final Acceptance.
- F Milestones: Include milestones indicated in the Contract Documents in schedule, including, but not limited to, the Notice to Proceed, Final Acceptance, and final completion, and the following interim milestones:
 - 1. Temporary enclosure and space conditioning.
- G Cost Correlation: Superimpose a cost correlation timeline, indicating planned and actual costs. On the line, show planned and actual dollar volume of the Work performed as of planned and actual dates used for preparation of payment requests.
 - 1. See Section 01 29 00 "Payment Procedures" for cost reporting and payment procedures.
- H Upcoming Work Summary: Prepare summary report indicating activities scheduled to occur or commence prior to submittal of next schedule update. Summarize the following issues:
 - 1. Unresolved issues.
 - 2. Unanswered Requests for Information.
 - 3. Rejected or unreturned submittals.
 - 4. Notations on returned submittals.
 - 5. Pending modifications affecting the Work and the Contract Time.
- I Contractor's Construction Schedule Updating: At monthly intervals, update schedule to reflect actual construction progress and activities. Issue schedule seven days before each regularly scheduled progress meeting.
 - 1. Revise schedule immediately after each meeting or other activity where revisions have been recognized or made. Issue updated schedule concurrently with the report of each such meeting.
 - 2. Include a report with updated schedule that indicates every change, including, but not limited to, changes in logic, durations, actual starts and finishes, and activity durations.
 - 3. As the Work progresses, indicate final completion percentage for each activity.
- J Recovery Schedule: When periodic update indicates the Work is 14 or more calendar days behind the current approved schedule, submit a separate recovery schedule indicating means by which Contractor intends to regain compliance with the schedule. Indicate changes to working hours, working days, crew sizes, equipment required to achieve compliance, and date by which recovery will be accomplished.

- K Distribution: Distribute copies of approved schedule to Architect, Owner, separate contractors, testing and inspecting agencies, and other parties identified by Contractor with a need-to-know schedule responsibility.
1. Post copies in Project meeting rooms and temporary field offices.
 2. When revisions are made, distribute updated schedules to the same parties and post in the same locations. Delete parties from distribution when they have completed their assigned portion of the Work and are no longer involved in performance of construction activities.

1.8 STARTUP CONSTRUCTION SCHEDULE

- A Gantt-Chart Schedule: Submit startup, horizontal, Gantt-chart-type construction schedule within seven days of date established for the Notice of Award.
- B Preparation: Indicate each significant construction activity separately. Identify first workday of each week with a continuous vertical line. Outline significant construction activities for first 90 days of construction. Include skeleton diagram for the remainder of the Work and a cash requirement prediction based on indicated activities.

1.9 CPM SCHEDULE REQUIREMENTS

- A General: Prepare network diagrams using AON (activity-on-node) format.
- B Startup Network Diagram: Submit diagram within 14 days of date established for the Notice to Proceed. Outline significant construction activities for the first 90 days of construction. Include skeleton diagram for the remainder of the Work and a cash requirement prediction based on indicated activities.
- C CPM Schedule: Prepare Contractor's Construction Schedule using a time-scaled CPM network analysis diagram for the Work.
1. Develop network diagram in sufficient time to submit CPM schedule so it can be accepted for use no later than 60 days after date established for the Notice to Proceed.
 - a. Failure to include any work item required for performance of this Contract shall not excuse Contractor from completing all work within applicable completion dates.
 2. Conduct educational workshops to train and inform key Project personnel, including subcontractors' personnel, in proper methods of providing data and using CPM schedule information.
 3. Establish procedures for monitoring and updating CPM schedule and for reporting progress. Coordinate procedures with progress meeting and payment request dates.
 4. Use "one workday" as the unit of time for individual activities. Indicate nonworking days and holidays incorporated into the schedule to coordinate with the Contract Time.
- D CPM Schedule Preparation: Prepare a list of all activities required to complete the Work. Using the startup network diagram, prepare a skeleton network to identify probable critical paths.
1. Activities: Indicate the estimated time duration, sequence requirements, and relationship of each activity in relation to other activities. Include estimated time frames for the following activities:
 - a. Preparation and processing of submittals.
 - b. Mobilization and demobilization.
 - c. Purchase of materials.
 - d. Delivery.
 - e. Fabrication.
 - f. Utility interruptions.
 - g. Installation.
 - h. Work by Owner that may affect or be affected by Contractor's activities.
 - i. Testing and inspection.
 - j. Punch list and final completion.
 - k. Activities occurring following final completion.
 2. Critical Path Activities: Identify critical path activities, including those for interim completion dates. Scheduled start and completion dates shall be consistent with Contract milestone dates.

3. Processing: Process data to produce output data on a computer-drawn, time-scaled network. Revise data, reorganize activity sequences, and reproduce as often as necessary to produce the CPM schedule within the limitations of the Contract Time.
4. Format: Mark the critical path. Locate the critical path near center of network; locate paths with most float near the edges.
 - a. Subnetworks on separate sheets are permissible for activities clearly off the critical path.
- E Contract Modifications: For each proposed contract modification and concurrent with its submission, prepare a time-impact analysis using a network fragment to demonstrate the effect of the proposed change on the overall Project schedule.
- F Initial Issue of Schedule: Prepare initial network diagram from a sorted activity list indicating straight "early start-total float." Identify critical activities. Prepare tabulated reports showing the following:
 1. Contractor or subcontractor and the Work or activity.
 2. Description of activity.
 3. Main events of activity.
 4. Immediate preceding and succeeding activities.
 5. Early and late start dates.
 6. Early and late finish dates.
 7. Activity duration in workdays.
 8. Total float or slack time.
 9. Average size of workforce.
 10. Dollar value of activity (coordinated with the schedule of values).
- G Schedule Updating: Concurrent with making revisions to schedule, prepare tabulated reports showing the following:
 1. Identification of activities that have changed.
 2. Changes in early and late start dates.
 3. Changes in early and late finish dates.
 4. Changes in activity durations in workdays.
 5. Changes in the critical path.
 6. Changes in total float or slack time.
 7. Changes in the Contract Time.
- H Value Summaries: Prepare two cumulative value lists, sorted by finish dates.
 1. In first list, tabulate activity number, early finish date, dollar value, and cumulative dollar value.
 2. In second list, tabulate activity number, late finish date, dollar value, and cumulative dollar value.
 3. In subsequent issues of both lists, substitute actual finish dates for activities completed as of list date.
 4. Prepare list for ease of comparison with payment requests; coordinate timing with progress meetings.
 - a. In both value summary lists, tabulate "actual percent complete" and "cumulative value completed" with total at bottom.
 - b. Submit value summary printouts one week before each regularly scheduled progress meeting.

1.10 REPORTS

- A Daily Construction Reports: Prepare a daily construction report recording the following information concerning events at Project site:
 1. List of subcontractors at Project site.
 2. List of separate contractors at Project site.
 3. Approximate count of personnel at Project site.
 4. Equipment at Project site.
 5. Material deliveries.

6. High and low temperatures and general weather conditions, including presence of rain or snow.
 7. Testing and inspection.
 8. Accidents.
 9. Meetings and significant decisions.
 10. Unusual events.
 11. Stoppages, delays, shortages, and losses.
 12. Meter readings and similar recordings.
 13. Emergency procedures.
 14. Orders and requests of authorities having jurisdiction.
 15. Change Orders received and implemented.
 16. Construction Change Directives received and implemented.
 17. Services connected and disconnected.
 18. Equipment or system tests and startups.
 19. Partial completions and occupancies.
 20. Final Acceptances authorized.
- B Material Location Reports: At monthly intervals, prepare and submit a comprehensive list of materials delivered to and stored at Project site. List shall be cumulative, showing materials previously reported plus items recently delivered. Include with list a statement of progress on and delivery dates for materials or items of equipment fabricated or stored away from Project site. Indicate the following categories for stored materials:
1. Material stored prior to previous report and remaining in storage.
 2. Material stored prior to previous report and since removed from storage and installed.
 3. Material stored following previous report and remaining in storage.
- C Site Condition Reports: Immediately on discovery of a difference between site conditions and the Contract Documents, prepare and submit a detailed report. Submit with a Request for Information. Include a detailed description of the differing conditions, together with recommendations for changing the Contract Documents.
- D Unusual Event Reports: When an event of an unusual and significant nature occurs at Project site, whether or not related directly to the Work, prepare and submit a special report. List chain of events, persons participating, responses by Contractor's personnel, evaluation of results or effects, and similar pertinent information. Advise Owner in advance when these events are known or predictable.
1. Submit unusual event reports directly to Owner within one day(s) of an occurrence. Distribute copies of report to parties affected by the occurrence.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION 01 32 00

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SECTION 01 32 33 - PHOTOGRAPHIC DOCUMENTATION

PART 1 GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A Section includes administrative and procedural requirements for the following:
 - 1. Final completion construction photographs.

1.3 INFORMATIONAL SUBMITTALS

- A Key Plan: Submit key plan of Project site and building with notation of vantage points marked for location and direction of each photograph. Indicate elevation or story of construction. Include same information as corresponding photographic documentation.
- B Digital Photographs: Submit image files within three days of taking photographs.
 - 1. Submit photos on CD-ROM or thumb-drive by or uploading to web-based project software site. Include copy of key plan indicating each photograph's location and direction.
 - 2. Identification: Provide the following information with each image description in file metadata tag:
 - a. Name of Project.
 - b. Name and contact information for photographer.
 - c. Name of Architect.
 - d. Name of Contractor.
 - e. Date photograph was taken.
 - f. Description of location, vantage point, and direction.
 - g. Unique sequential identifier keyed to accompanying key plan.

1.4 QUALITY ASSURANCE

- A Photographer Qualifications: An individual who has been regularly engaged as a professional photographer of construction projects for not less than three years.

1.5 FORMATS AND MEDIA

- A Digital Photographs: Provide color images in JPG format, produced by a digital camera with minimum sensor size of 12 megapixels, and at an image resolution of not less than 3200 by 2400 pixels. Use flash in low light levels or backlit conditions.
- B Digital Images: Submit digital media as originally recorded in the digital camera, without alteration, manipulation, editing, or modifications using image-editing software.
- C Metadata: Record accurate date and time from camera.
- D File Names: Name media files with date and sequential numbering suffix.

1.6 CONSTRUCTION PHOTOGRAPHS

- A General: Take photographs with maximum depth of field and in focus.
 - 1. Maintain key plan with each set of construction photographs that identifies each photographic location.
- B Final Completion Construction Photographs: Take 20 or more photographs after date of Final Acceptance for submission as Project Record Documents. Architect will inform photographer of desired vantage points.
- C Additional Photographs: Architect may request photographs in addition to periodic photographs specified.
 - 1. Three days' notice will be given, where feasible.
 - 2. In emergency situations, take additional photographs within 24 hours of request.

3. Circumstances that could require additional photographs include, but are not limited to, the following:
 - a. Special events planned at Project site.
 - b. Immediate follow-up when on-site events result in construction damage or losses.
 - c. Photographs to be taken at fabrication locations away from Project site. These photographs are not subject to unit prices or unit-cost allowances.
 - d. Final Acceptance of a major phase or component of the Work.
 - e. Extra record photographs at time of final acceptance.
 - f. Owner's request for special publicity photographs.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION 01 32 33

SECTION 01 33 00 - SUBMITTAL PROCEDURES

PART 1 GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A This Section includes administrative and procedural requirements for submitting Shop Drawings, Product Data, Samples, and other miscellaneous submittals.

1.3 DEFINITIONS

- A Action Submittals: Written and graphic information and physical samples that require Architect's responsive action. Action submittals are those submittals indicated in individual Specification Sections as "action submittals."
- B Informational Submittals: Written and graphic information and physical samples that do not require Architect's responsive action. Submittals may be rejected for not complying with requirements. Informational submittals are those submittals indicated in individual Specification Sections as "informational submittals."

1.4 SUBMITTAL SCHEDULE

- A Submittal Schedule: Submit, as an action submittal, a list of submittals, arranged in chronological order by dates required by construction schedule. Include time required for review, ordering, manufacturing, fabrication, and delivery when establishing dates. Include additional time required for making corrections or revisions to submittals noted by Architect and additional time for handling and reviewing submittals required by those corrections.
 - 1. Coordinate submittal schedule with list of subcontracts, the schedule of values, and Contractor's construction schedule.
 - 2. Initial Submittal: Submit concurrently with startup construction schedule. Include submittals required during the first 60 days of construction. List those submittals required to maintain orderly progress of the Work and those required early because of long lead time for manufacture or fabrication.
 - 3. Final Submittal: Submit concurrently with the first complete submittal of Contractor's construction schedule.
 - a. Submit revised submittal schedule to reflect changes in current status and timing for submittals.
 - 4. Format: Arrange the following information in a tabular format:
 - a. Scheduled date for first submittal.
 - b. Specification Section number and title.
 - c. Submittal Category: Action; informational.
 - d. Name of subcontractor.
 - e. Description of the Work covered.
 - f. Scheduled date for Architect's final release or approval.
 - g. Scheduled dates for purchasing.
 - h. Scheduled date of fabrication.
 - i. Scheduled dates for installation.
 - j. Activity or event number.

1.5 SUBMITTAL FORMATS

- A Submittal Information: Include the following information in each submittal:
 - 1. Project name.
 - 2. Date.
 - 3. Name of Architect.

4. Name of Contractor.
 5. Name of firm or entity that prepared submittal.
 6. Names of subcontractor, manufacturer, and supplier.
 7. Unique submittal number, including revision identifier. Include Specification Section number with sequential alphanumeric identifier; and alphanumeric suffix for resubmittals.
 8. Category and type of submittal.
 9. Submittal purpose and description.
 10. Number and title of Specification Section, with paragraph number and generic name for each of multiple items.
 11. Drawing number and detail references, as appropriate.
 12. Indication of full or partial submittal.
 13. Location(s) where product is to be installed, as appropriate.
 14. Other necessary identification.
 15. Remarks.
 16. Signature of transmitter.
- B Options: Identify options requiring selection by Architect.
- C Deviations and Additional Information: On each submittal, clearly indicate deviations from requirements in the Contract Documents, including minor variations and limitations; include relevant additional information and revisions, other than those requested by Architect on previous submittals. Indicate by highlighting on each submittal or noting on attached separate sheet.
- D Submittals for Web-Based Project Software: Prepare submittals as PDF files, or other format indicated by the Architect's software website, Newforma.

1.6 SUBMITTAL PROCEDURES

- A Prepare and submit submittals required by individual Specification Sections. Types of submittals are indicated in individual Specification Sections.
1. Web-Based Project Software: Prepare submittals in PDF form, and upload to Architect's Newforma website. Enter required data in web-based software site to fully identify submittal.
- B Coordination: Coordinate preparation and processing of submittals with performance of construction activities.
1. Coordinate each submittal with fabrication, purchasing, testing, delivery, other submittals, and related activities that require sequential activity.
 2. Submit all submittal items required for each Specification Section concurrently unless partial submittals for portions of the Work are indicated on approved submittal schedule.
 3. Submit action submittals and informational submittals required by the same Specification Section as separate packages under separate transmittals.
 4. Coordinate transmittal of different types of submittals for related parts of the Work so processing will not be delayed because of need to review submittals concurrently for coordination.
 - a. Architect reserves the right to withhold action on a submittal requiring coordination with other submittals until related submittals are received.
- C Submittals Schedule: Comply with requirements in Division 01 Section "Construction Progress Documentation" for list of submittals and time requirements for scheduled performance of related construction activities.
1. Final Submittals to be completed prior to 50 percent application of payment approval.
- D 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 authorized because of failure to transmit submittals enough in advance of the Work to permit processing, including resubmittals.
1. Initial Review: Allow 20 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.
 2. Intermediate Review: If intermediate submittal is necessary, process it in same manner as initial submittal.

3. Resubmittal Review: Allow 20 days for review of each resubmittal.
4. Sequential Review: Where sequential review of submittals by Architect's consultants, Owner, or other parties is indicated, allow 20 days for initial review of each submittal.
5. Concurrent Consultant Review: Where the Contract Documents indicate that submittals may be transmitted simultaneously to Architect and to Architect's consultants, allow 20 days for review of each submittal. Submittal will be returned to Architect before being returned to Contractor.
 - a. Submit one copy of submittal to concurrent reviewer in addition to specified number of copies to Architect.
- E Resubmittals: Make resubmittals in same form and quantities as initial submittal.
 1. Note date and content of previous submittal.
 2. Note date and content of revision in label or title block and clearly indicate extent of revision.
 3. Resubmit submittals until they are marked with approval notation from Architect's action stamp.
- F Distribution: Furnish copies of final submittals to manufacturers, subcontractors, suppliers, fabricators, installers, authorities having jurisdiction, and others as necessary for performance of construction activities. Show distribution on transmittal forms.
- G Use for Construction: Use only final action submittals that are marked with approval notation from Architect action stamp.

PART 2 PRODUCTS

2.1 ACTION SUBMITTALS

- A General: Prepare and submit Action Submittals required by individual Specification Sections.
 1. Prepare submittals as PDF files, or other format indicated by web-based Project management software website.
- B Product Data: Collect information into a single submittal for each element of construction and type of product or equipment.
 1. If information must be specially prepared for submittal because standard printed data are not suitable for use, submit as Shop Drawings, not as Product Data.
 2. Mark each copy of each submittal to show which products and options are applicable.
 3. Include the following information, as applicable:
 - a. Manufacturer's written recommendations.
 - b. Manufacturer's product specifications.
 - c. Manufacturer's installation instructions.
 - d. Standard color charts.
 - e. Statement of compliance with specified referenced standards.
 - f. Manufacturer's catalog cuts.
 - g. Wiring diagrams showing factory-installed wiring.
 - h. Printed performance curves.
 - i. Operational range diagrams.
 - j. Mill reports.
 - k. Standard product operating and maintenance manuals.
 - l. Compliance with recognized trade association standards.
 - m. Compliance with recognized testing agency standards.
 - n. Testing of recognized testing agency.
 - o. Application of testing agency labels and seals.
 - p. Notation of coordination requirements.
 - q. Availability and delivery time information.
- C Shop Drawings: Prepare Project-specific information, drawn accurately to scale. Do not base Shop Drawings on reproductions of the Contract Documents or standard printed data.
 1. Preparation: Fully illustrate requirements in the Contract Documents. Include the following information, as applicable:
 - a. Dimensions.

- b. Identification of products.
 - c. Fabrication and installation drawings.
 - d. Roughing-in and setting diagrams.
 - e. Wiring diagrams showing field-installed wiring, including power, signal, and control wiring.
 - f. Shop work manufacturing instructions.
 - g. Templates and patterns.
 - h. Schedules.
 - i. Design calculations.
 - j. Compliance with specified standards.
 - k. Notation of coordination requirements.
 - l. Notation of dimensions established by field measurement.
 - m. Relationship and attachment to adjoining construction clearly indicated.
 - n. Seal and signature of professional engineer if specified.
- 2. Wiring Diagrams: Differentiate between manufacturer-installed and field-installed wiring.
 - 3. Submittals for Web-Based Project Software: Prepare submittals as PDF files, or other format indicated by web-based Project management software website.
 - 4. CAD Incorporation: Develop and incorporate Shop Drawing files into CAD established for Project.
 - a. Coordination Drawings: Comply with requirements in Division 01 Section "Project Management and Coordination."
- D Samples: Submit physical units of materials or products, including the following:
- 1. Transmit Samples that contain multiple, related components, such as accessories together in one submittal package.
 - 2. Preparation: Mount, display, or package Samples in manner specified to facilitate review of qualities indicated. Prepare Samples to match Architect's sample where so indicated. Attach label on unexposed side that includes the following:
 - a. Project name and submittal number.
 - b. Generic description of Sample.
 - c. Product name and name of manufacturer.
 - d. Sample source.
 - e. Number and title of applicable Specification Section.
 - f. Specification paragraph number and generic name of each item.
 - 3. Web-Based Project Management Software: Prepare submittals in PDF form, and upload to web-based Project software website. Enter required data in web-based software site to fully identify submittal.
 - 4. Paper Transmittal: Include paper transmittal, including complete submittal information indicated and the following:
 - a. Size limitations.
 - b. Compliance with recognized standards.
 - c. Availability.
 - d. Delivery time.
 - 5. Submit Samples for review of kind, color, pattern, and texture for a 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. If variation in color, pattern, texture, or other characteristic is inherent in the product represented by a Sample, submit at least three sets of paired units that show approximate limits of the variations.
 - b. Refer to individual Specification Sections for requirements for Samples that illustrate workmanship, fabrication techniques, details of assembly, connections, operation, and similar construction characteristics.
 - 6. Disposition: Maintain sets of approved Samples at Project site, available for quality-control comparisons throughout the course of construction activity. Sample sets may be used to determine final acceptance of construction associated with each set.

- a. Samples not incorporated into the Work, or otherwise designated as Owner's property, are the property of Contractor.
- 7. Samples for Initial Selection: Submit manufacturer's color charts consisting of units or sections of units showing the full range of colors, textures, and patterns available.
 - a. Number of Samples: Submit one full set(s) of available choices where color, pattern, texture, or similar characteristics are required to be selected from manufacturer's product line. Architect will return submittal with options selected.
- 8. Samples for Verification: Submit full-size units or Samples of size indicated, prepared from the same material to be used for the Work, cured and finished in manner specified, and physically identical with the product proposed for use, and that show full range of color and texture variations expected. Samples include, but are not limited to, the following: partial sections of manufactured or fabricated components; small cuts or containers of materials; complete units of repetitively used materials; swatches showing color, texture, and pattern; color range sets; and components used for independent testing and inspection.
 - a. Number of Samples: Submit three sets of Samples. Architect will retain two Sample sets; remainder will be returned. Mark up and retain one returned Sample set as a project record Sample.
- E Product Schedule or List: Prepare a written summary indicating types of products required for the Work and their intended location. Include the following information in tabular form:
 - 1. Type of product. Include unique identifier for each product.
 - 2. Manufacturer and product name, and model number if applicable.
 - 3. Number and name of room or space.
 - 4. Location within room or space.
- F Submittals Schedule: Comply with requirements in Division 01 Section "Construction Progress Documentation."
- G Application for Payment: Comply with requirements in Division 01 Section "Payment Procedures."
- H Schedule of Values: Comply with requirements in Division 01 Section "Payment Procedures."
- I Subcontract List: Prepare a written summary identifying individuals or firms proposed for each portion of the Work, including those who are to furnish products or equipment fabricated to a special design. Include the following information in tabular form:
 - 1. Name, address, and telephone number of entity performing subcontract or supplying products.
 - 2. Number and title of related Specification Section(s) covered by subcontract.
 - 3. Drawing number and detail references, as appropriate, covered by subcontract.

2.2 INFORMATIONAL SUBMITTALS

- A General: Prepare and submit Informational Submittals required by other Specification Sections.
 - 1. Prepare submittals as PDF files, or other format indicated by web-based Project management software website.
 - 2. Certificates and Certifications: Provide a notarized statement that includes signature of entity responsible for preparing certification. Certificates and certifications shall be signed by an officer or other individual authorized to sign documents on behalf of that entity.
- B Contractor's Construction Schedule: Comply with requirements in Division 01 Section "Construction Progress Documentation."
- C Qualification Data: Prepare written information that demonstrates capabilities and experience of firm or person. Include lists of completed projects with project names and addresses, names and addresses of architects and owners, and other information specified.
- D Product Certificates: Prepare written statements on manufacturer's letterhead certifying that product complies with requirements.
- E Welding Certificates: Prepare written certification that welding procedures and personnel comply with requirements. Submit record of Welding Procedure Specification (WPS) and Procedure Qualification Record (PQR) on AWS forms. Include names of firms and personnel certified.
- F Installer Certificates: Prepare written statements on manufacturer's letterhead certifying that Installer complies with requirements and, where required, is authorized for this specific Project.

- G Manufacturer Certificates: Prepare written statements on manufacturer's letterhead certifying that manufacturer complies with requirements. Include evidence of manufacturing experience where required.
- H Material Certificates: Prepare written statements on manufacturer's letterhead certifying that material complies with requirements.
- I Material Test Reports: Prepare reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting test results of material for compliance with requirements.
- J Pre-construction Test Reports: Prepare reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of tests performed before installation of product, for compliance with performance requirements.
- K Compatibility Test Reports: Prepare reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of compatibility tests performed before installation of product. Include written recommendations for primers and substrate preparation needed for adhesion.
- L Field Test Reports: Prepare reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of field tests performed either during installation of product or after product is installed in its final location, for compliance with requirements.
- M Product Test Reports: Prepare written reports indicating current product produced by manufacturer complies with requirements. Base reports on evaluation of tests performed by manufacturer and witnessed by a qualified testing agency, or on comprehensive tests performed by a qualified testing agency.
- N Research/Evaluation Reports: Prepare written evidence, from a model code organization acceptable to authorities having jurisdiction, that product complies with building code in effect for Project. Include the following information:
 - 1. Name of evaluation organization.
 - 2. Date of evaluation.
 - 3. Time period when report is in effect.
 - 4. Product and manufacturers' names.
 - 5. Description of product.
 - 6. Test procedures and results.
 - 7. Limitations of use.
- O Maintenance Data: Prepare written and graphic instructions and procedures for operation and normal maintenance of products and equipment. Comply with requirements in Division 1 Section "Closeout Procedures."
- P Design Data: Prepare written and graphic information, including, but not limited to, performance and design criteria, list of applicable codes and regulations, and calculations. Include list of assumptions and other performance and design criteria and a summary of loads. Include load diagrams if applicable. Provide name and version of software, if any, used for calculations. Include page numbers.
- Q Manufacturer's Instructions: Prepare written or published information that documents manufacturer's recommendations, guidelines, and procedures for installing or operating a product or equipment. Include name of product and name, address, and telephone number of manufacturer. Include the following, as applicable:
 - 1. Preparation of substrates.
 - 2. Required substrate tolerances.
 - 3. Sequence of installation or erection.
 - 4. Required installation tolerances.
 - 5. Required adjustments.
 - 6. Recommendations for cleaning and protection.
- R Manufacturer's Field Reports: Prepare written information documenting factory-authorized service representative's tests and inspections. Include the following, as applicable:
 - 1. Name, address, and telephone number of factory-authorized service representative making report.

2. Statement on condition of substrates and their acceptability for installation of product.
 3. Statement that products at Project site comply with requirements.
 4. Summary of installation procedures being followed, whether they comply with requirements and, if not, what corrective action was taken.
 5. Results of operational and other tests and a statement of whether observed performance complies with requirements.
 6. Statement whether conditions, products, and installation will affect warranty.
 7. Other required items indicated in individual Specification Sections.
- S Insurance Certificates and Bonds: Prepare written information indicating current status of insurance or bonding coverage. Include name of entity covered by insurance or bond, limits of coverage, amounts of deductibles, if any, and term of the coverage.

2.3 DELEGATED DESIGN SERVICES

- A Performance and Design Criteria: Where professional design services or certifications by a design professional are specifically required of Contractor by the Contract Documents, provide products and systems complying with specific performance and design criteria indicated.
1. If criteria indicated are insufficient to perform services or certification required, submit a written request for additional information to Architect.
- B Delegated Design Services Certification: As part of the submittal requirements for Shop Drawings, Product Data, and other required submittals, submit digitally signed PDF file of certificate, signed and sealed by the responsible design professional, for each product and system specifically assigned to Contractor to be designed or certified by a design professional.
1. Indicate that products and systems comply with performance and design criteria in the Contract Documents. Include list of codes, loads, and other factors used in performing these services.
- C CAD Incorporation: Incorporate delegated design drawing and data files into CAD established for Project.
1. Prepare delegated design drawings in the following format: Same digital data software program, version, and operating system as original Drawings.

PART 3 EXECUTION

3.1 CONTRACTOR'S REVIEW

- A Action Submittals and Informational Submittals: Review each submittal and check for coordination with other Work of the Contract and for compliance with the Contract Documents. Note corrections and field dimensions. Mark with approval stamp before submitting to Architect.
- B Contractor's Approval: Indicate Contractor's approval for each submittal with a uniform approval stamp. Include name of reviewer, date of Contractor's approval, and statement certifying that submittal has been reviewed, checked, and approved for compliance with the Contract Documents.
1. Architect will not review submittals received from Contractor that do not have Contractor's review and approval.

3.2 ARCHITECT'S ACTION

- A General: Architect will not review submittals that do not bear Contractor's approval stamp and will return them without action.
- B Action Submittals: Architect will review each submittal, indicate corrections or revisions required, and return. Architect will stamp each submittal with an action stamp and will mark stamp appropriately to indicate action, as follows:
1. Reviewed.
 2. Furnish as Corrected.
 3. Rejected.
 4. Revise and Resubmit.

- C Informational Submittals: Architect will review each submittal and will not return it, or will return it if it does not comply with requirements. Architect will forward each submittal to appropriate party.
- D Partial submittals prepared for a portion of the Work will be reviewed when use of partial submittals has received prior approval from Architect.
- E Incomplete submittals are unacceptable, will be considered nonresponsive, and will be returned for resubmittal without review.
- F Architect will discard submittals received from sources other than Contractor.
- G Submittals not required by the Contract Documents will be returned by Architect without action.

END OF SECTION 01 33 00

SECTION 01 40 00 - QUALITY REQUIREMENTS

PART 1 GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A Section includes administrative and procedural requirements for quality assurance and quality control.
- B Testing and inspection services are required to verify compliance with requirements specified or indicated. These services do not relieve Contractor of responsibility for compliance with the Contract Document requirements.
 - 1. Specific quality-assurance and quality-control requirements for individual work results are specified in their respective Specification Sections. Requirements in individual Sections may also cover production of standard products.
 - 2. Specified tests, inspections, and related actions do not limit Contractor's other quality-assurance and quality-control procedures that facilitate compliance with the Contract Document requirements.
 - 3. Requirements for Contractor to provide quality-assurance and quality-control services required by Architect, Owner, or authorities having jurisdiction are not limited by provisions of this Section.
 - 4. Specific test and inspection requirements are not specified in this Section.

1.3 DEFINITIONS

- A Experienced: When used with an entity or individual, "experienced" unless otherwise further described means having successfully completed a minimum of five previous projects similar in nature, size, and extent to this Project; being familiar with special requirements indicated; and having complied with requirements of authorities having jurisdiction.
- B Field Quality-Control Tests: Tests and inspections that are performed on-site for installation of the Work and for completed Work.
- C Installer/Applicator/Erector: Contractor or another entity engaged by Contractor as an employee, Subcontractor, or Sub-subcontractor, to perform a particular construction operation, including installation, erection, application, assembly, and similar operations.
 - 1. Use of trade-specific terminology in referring to a trade or entity does not require that certain construction activities be performed by accredited or unionized individuals, or that requirements specified apply exclusively to specific trade(s).
- D Mockups: Full-size physical assemblies that are constructed on-site in their actual final location as part of permanent construction. Mockups are constructed to verify selections made under Sample submittals; to demonstrate aesthetic effects and qualities of materials and execution; to review coordination, testing, or operation; to show interface between dissimilar materials; and to demonstrate compliance with specified installation tolerances. Mockups are not Samples. Unless otherwise indicated, approved mockups establish the standard by which the Work will be judged.
- E Preconstruction Testing: Tests and inspections performed specifically for Project before products and materials are incorporated into the Work, to verify performance or compliance with specified criteria.
- F Product Tests: Tests and inspections that are performed by a nationally recognized testing laboratory (NRTL) according to 29 CFR 1910.7, by a testing agency accredited according to NIST's National Voluntary Laboratory Accreditation Program (NVLAP), or by a testing agency qualified to conduct product testing and acceptable to authorities having jurisdiction, to establish product performance and compliance with specified requirements.
- G Source Quality-Control Tests: Tests and inspections that are performed at the source; for example, plant, mill, factory, or shop.

- H Testing Agency: An entity engaged to perform specific tests, inspections, or both. Testing laboratory shall mean the same as testing agency.
- I Quality-Assurance Services: Activities, actions, and procedures performed before and during execution of the Work to guard against defects and deficiencies and substantiate that proposed construction will comply with requirements.
- J Quality-Control Services: Tests, inspections, procedures, and related actions during and after execution of the Work to evaluate that actual products incorporated into the Work and completed construction comply with requirements. Contractor's quality-control services do not include contract administration activities performed by Architect.

1.4 DELEGATED-DESIGN SERVICES

- A Performance and Design Criteria: Where professional design services or certifications by a design professional are specifically required of Contractor by the Contract Documents, provide products and systems complying with specific performance and design criteria indicated.
 - 1. If criteria indicated are not sufficient to perform services or certification required, submit a written request for additional information to Architect.
- B Delegated Design Services Statement: Submit a statement signed and sealed by the responsible design professional licensed in the State of North Carolina, for each product and system specifically assigned to Contractor to be designed or certified by a qualified design professional, indicating that the products and systems are in compliance with performance and design criteria indicated. Include list of codes, loads, and other factors used in performing these services.

1.5 CONFLICTING REQUIREMENTS

- A Conflicting Standards and Other Requirements: If compliance with two or more standards or requirements are specified and the standards or requirements establish different or conflicting requirements for minimum quantities or quality levels, comply with the most stringent requirement. Refer conflicting requirements that are different, but apparently equal, to Architect for direction before proceeding.
- B Minimum Quantity or Quality Levels: The quantity or quality level shown or specified shall be the minimum provided or performed. The actual installation may comply exactly with the minimum quantity or quality specified, or it may exceed the minimum within reasonable limits. To comply with these requirements, indicated numeric values are minimum or maximum, as appropriate, for the context of requirements. Refer uncertainties to Architect for a decision before proceeding.

1.6 ACTION SUBMITTALS

- A Shop Drawings: For integrated exterior mockups.
 - 1. Include plans, sections, and elevations, indicating materials and size of mockup construction.
 - 2. Indicate manufacturer and model number of individual components.
 - 3. Provide axonometric drawings for conditions difficult to illustrate in two dimensions.
- B Delegated-Design Services Submittal: In addition to Shop Drawings, Product Data, and other required submittals, submit a statement signed and sealed by the responsible design professional, for each product and system specifically assigned to Contractor to be designed or certified by a design professional, indicating that the products and systems are in compliance with performance and design criteria indicated. Include list of codes, loads, and other factors used in performing these services.

1.7 INFORMATIONAL SUBMITTALS

- A Contractor's Quality-Control Plan: For quality-assurance and quality-control activities and responsibilities.
- B Qualification Data: For Contractor's quality-control personnel.
- C Contractor's Statement of Responsibility: When required by authorities having jurisdiction, submit copy of written statement of responsibility submitted to authorities having jurisdiction before starting work on the following systems:

1. Seismic-force-resisting system, designated seismic system, or component listed in the Statement of Special Inspections.
 2. Main wind-force-resisting system or a wind-resisting component listed in the Statement of Special Inspections.
- D Testing Agency Qualifications: For testing agencies specified in "Quality Assurance" Article to demonstrate their capabilities and experience. Include proof of qualifications in the form of a recent report on the inspection of the testing agency by a recognized authority.
- E Schedule of Tests and Inspections: Prepare in tabular form and include the following:
1. Specification Section number and title.
 2. Entity responsible for performing tests and inspections.
 3. Description of test and inspection.
 4. Identification of applicable standards.
 5. Identification of test and inspection methods.
 6. Number of tests and inspections required.
 7. Time schedule or time span for tests and inspections.
 8. Requirements for obtaining samples.
 9. Unique characteristics of each quality-control service.
- F Reports: Prepare and submit certified written reports and documents as specified.
- G Permits, Licenses, and Certificates: For Owner's record, submit copies of permits, licenses, certifications, inspection reports, releases, jurisdictional settlements, notices, receipts for fee payments, judgments, correspondence, records, and similar documents established for compliance with standards and regulations bearing on performance of the Work.

1.8 CONTRACTOR'S QUALITY-CONTROL PLAN

- A Quality-Control Plan, General: Submit quality-control plan within 20 days of Notice of Award, and not less than five days prior to preconstruction conference. Submit in format acceptable to Architect. Identify personnel, procedures, controls, instructions, tests, records, and forms to be used to carry out Contractor's quality-assurance and quality-control responsibilities. Coordinate with Contractor's Construction Schedule.
- B Quality-Control Personnel Qualifications: Engage qualified personnel trained and experienced in managing and executing quality-assurance and quality-control procedures similar in nature and extent to those required for Project.
1. Project quality-control manager may also serve as Project superintendent.
- C Submittal Procedure: Describe procedures for ensuring compliance with requirements through review and management of submittal process. Indicate qualifications of personnel responsible for submittal review.
- D Testing and Inspection: In quality-control plan, include a comprehensive schedule of Work requiring testing or inspection, including the following:
1. Contractor-performed tests and inspections including Subcontractor-performed tests and inspections. Include required tests and inspections and Contractor-elected tests and inspections. Distinguish source quality-control tests and inspections from field quality-control tests and inspections.
 2. Special inspections required by authorities having jurisdiction and indicated on the Statement of Special Inspections.
 3. Owner-performed tests and inspections indicated in the Contract Documents.
- E Continuous Inspection of Workmanship: Describe process for continuous inspection during construction to identify and correct deficiencies in workmanship in addition to testing and inspection specified. Indicate types of corrective actions to be required to bring work into compliance with standards of workmanship established by Contract requirements and approved mockups.
- F Monitoring and Documentation: Maintain testing and inspection reports including log of approved and rejected results. Include work Architect has indicated as nonconforming or defective. Indicate corrective actions taken to bring nonconforming work into compliance with requirements. Comply with requirements of authorities having jurisdiction.

1.9 REPORTS AND DOCUMENTS

- A Test and Inspection Reports: Prepare and submit certified written reports specified in other Sections. Include the following:
1. Date of issue.
 2. Project title and number.
 3. Name, address, telephone number, and email address of testing agency.
 4. Dates and locations of samples and tests or inspections.
 5. Names of individuals making tests and inspections.
 6. Description of the Work and test and inspection method.
 7. Identification of product and Specification Section.
 8. Complete test or inspection data.
 9. Test and inspection results and an interpretation of test results.
 10. Record of temperature and weather conditions at time of sample taking and testing and inspection.
 11. Comments or professional opinion on whether tested or inspected Work complies with the Contract Document requirements.
 12. Name and signature of laboratory inspector.
 13. Recommendations on retesting and reinspecting.
- B Manufacturer's Technical Representative's Field Reports: Prepare written information documenting manufacturer's technical representative's tests and inspections specified in other Sections. Include the following:
1. Name, address, telephone number, and email address of technical representative making report.
 2. Statement on condition of substrates and their acceptability for installation of product.
 3. Statement that products at Project site comply with requirements.
 4. Summary of installation procedures being followed, whether they comply with requirements and, if not, what corrective action was taken.
 5. Results of operational and other tests and a statement of whether observed performance complies with requirements.
 6. Statement whether conditions, products, and installation will affect warranty.
 7. Other required items indicated in individual Specification Sections.
- C Factory-Authorized Service Representative's Reports: Prepare written information documenting manufacturer's factory-authorized service representative's tests and inspections specified in other Sections. Include the following:
1. Name, address, telephone number, and email address of factory-authorized service representative making report.
 2. Statement that equipment complies with requirements.
 3. Results of operational and other tests and a statement of whether observed performance complies with requirements.
 4. Statement whether conditions, products, and installation will affect warranty.
 5. Other required items indicated in individual Specification Sections.

1.10 QUALITY ASSURANCE

- A General: Qualifications paragraphs in this article establish the minimum qualification levels required; individual Specification Sections specify additional requirements.
- B Manufacturer Qualifications: A firm experienced in manufacturing products or systems similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units. As applicable, procure products from manufacturers able to meet qualification requirements, warranty requirements, and technical or factory-authorized service representative requirements.
- C Fabricator Qualifications: A firm experienced in producing products similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.

- D Installer Qualifications: A firm or individual experienced in installing, erecting, applying, or assembling work similar in material, design, and extent to that indicated for this Project, whose work has resulted in construction with a record of successful in-service performance.
- E Professional Engineer Qualifications: A professional engineer who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing engineering services of the kind indicated. Engineering services are defined as those performed for installations of the system, assembly, or product that are similar in material, design, and extent to those indicated for this Project.
- F Specialists: Certain Specification Sections require that specific construction activities shall be performed by entities who are recognized experts in those operations. Specialists shall satisfy qualification requirements indicated and shall be engaged for the activities indicated.
 - 1. Requirements of authorities having jurisdiction shall supersede requirements for specialists.
- G Testing Agency Qualifications: An NRTL, an NVLAP, or an independent agency with the experience and capability to conduct testing and inspection indicated, as documented according to ASTM E329; and with additional qualifications specified in individual Sections; and, where required by authorities having jurisdiction, that is acceptable to authorities.
- H Manufacturer's Technical Representative Qualifications: An authorized representative of manufacturer who is trained and approved by manufacturer to observe and inspect installation of manufacturer's products that are similar in material, design, and extent to those indicated for this Project.
- I Factory-Authorized Service Representative Qualifications: An authorized representative of manufacturer who is trained and approved by manufacturer to inspect installation of manufacturer's products that are similar in material, design, and extent to those indicated for this Project.
- J Preconstruction Testing: Where testing agency is indicated to perform preconstruction testing for compliance with specified requirements for performance and test methods, comply with the following:
 - 1. Contractor responsibilities include the following:
 - a. Provide test specimens representative of proposed products and construction.
 - b. Submit specimens in a timely manner with sufficient time for testing and analyzing results to prevent delaying the Work.
 - c. Provide sizes and configurations of test assemblies, mockups, and laboratory mockups to adequately demonstrate capability of products to comply with performance requirements.
 - d. Build site-assembled test assemblies and mockups using installers who will perform same tasks for Project.
 - e. When testing is complete, remove test specimens and test assemblies, and mockups; do not reuse products on Project.
 - 2. Testing Agency Responsibilities: Submit a certified written report of each test, inspection, and similar quality-assurance service to Architect, with copy to Contractor. Interpret tests and inspections and state in each report whether tested and inspected work complies with or deviates from the Contract Documents.

1.11 QUALITY CONTROL

- A Owner Responsibilities: Where quality-control services are indicated as Owner's responsibility, Owner will engage a qualified testing agency to perform these services.
 - 1. Owner will furnish Contractor with names, addresses, and telephone numbers of testing agencies engaged and a description of types of testing and inspection they are engaged to perform.
 - 2. Payment for these services will be made from testing and inspection allowances, as authorized by Change Orders.
 - 3. Costs for retesting and reinspecting construction that replaces or is necessitated by work that failed to comply with the Contract Documents will be charged to Contractor, and the Contract Sum will be adjusted by Change Order.

- B Contractor Responsibilities: Tests and inspections not explicitly assigned to Owner are Contractor's responsibility. Perform additional quality-control activities, whether specified or not, to verify and document that the Work complies with requirements.
1. Unless otherwise indicated, provide quality-control services specified and those required by authorities having jurisdiction. Perform quality-control services required of Contractor by authorities having jurisdiction, whether specified or not.
 2. Engage a qualified testing agency to perform quality-control services.
 - a. Contractor shall not employ same entity engaged by Owner, unless agreed to in writing by Owner.
 3. Notify testing agencies at least 24 hours in advance of time when Work that requires testing or inspection will be performed.
 4. Where quality-control services are indicated as Contractor's responsibility, submit a certified written report, in duplicate, of each quality-control service.
 5. Testing and inspection requested by Contractor and not required by the Contract Documents are Contractor's responsibility.
 6. Submit additional copies of each written report directly to authorities having jurisdiction, when they so direct.
 7. Provide Backflow Prevention Assembly Test Report to local authorities having jurisdiction and provides a copy Architect.
- C Retesting/Reinspecting: Regardless of whether original tests or inspections were Contractor's responsibility, provide quality-control services, including retesting and reinspecting, for construction that replaced Work that failed to comply with the Contract Documents.
- D Testing Agency Responsibilities: Cooperate with Architect and Contractor in performance of duties. Provide qualified personnel to perform required tests and inspections.
1. Notify Architect and Contractor promptly of irregularities or deficiencies observed in the Work during performance of its services.
 2. Determine the locations from which test samples will be taken and in which in-situ tests are conducted.
 3. Conduct and interpret tests and inspections and state in each report whether tested and inspected work complies with or deviates from requirements.
 4. Submit a certified written report, in duplicate, of each test, inspection, and similar quality-control service through Contractor.
 5. Do not release, revoke, alter, or increase the Contract Document requirements or approve or accept any portion of the Work.
 6. Do not perform duties of Contractor.
- E Manufacturer's Field Services: Where indicated, engage a factory-authorized service representative to inspect field-assembled components and equipment installation, including service connections. Report results in writing as specified in Section 01 33 00 "Submittal Procedures."
- F Manufacturer's Technical Services: Where indicated, engage a manufacturer's technical representative to observe and inspect the Work. Manufacturer's technical representative's services include participation in preinstallation conferences, examination of substrates and conditions, verification of materials, observation of Installer activities, inspection of completed portions of the Work, and submittal of written reports.
- G Associated Contractor Services: Cooperate with agencies and representatives performing required tests, inspections, and similar quality-control services, and provide reasonable auxiliary services as requested. Notify agency sufficiently in advance of operations to permit assignment of personnel. Provide the following:
1. Access to the Work.
 2. Incidental labor and facilities necessary to facilitate tests and inspections.
 3. Adequate quantities of representative samples of materials that require testing and inspection. Assist agency in obtaining samples.
 4. Facilities for storage and field curing of test samples.
 5. Delivery of samples to testing agencies.

6. Preliminary design mix proposed for use for material mixes that require control by testing agency.
7. Security and protection for samples and for testing and inspection equipment at Project site.
- H Coordination: Coordinate sequence of activities to accommodate required quality-assurance and quality-control services with a minimum of delay and to avoid necessity of removing and replacing construction to accommodate testing and inspection.
 1. Schedule times for tests, inspections, obtaining samples, and similar activities.
- I Schedule of Tests and Inspections: Prepare a schedule of tests, inspections, and similar quality-control services required by the Contract Documents as a component of Contractor's quality-control plan. Coordinate and submit concurrently with Contractor's Construction Schedule. Update as the Work progresses.
 1. Distribution: Distribute schedule to Owner, Architect, testing agencies, and each party involved in performance of portions of the Work where tests and inspections are required.

1.12 SPECIAL TESTS AND INSPECTIONS

- A Special Tests and Inspections: Conducted by a qualified testing agency and special inspector as required by authorities having jurisdiction, as indicated in individual Specification Sections and in the Statement of Special Inspections as indicated on Structural Drawings, and as follows:
 1. Verifying that manufacturer maintains detailed fabrication and quality-control procedures and reviewing the completeness and adequacy of those procedures to perform the Work.
 2. Notifying Architect and Contractor promptly of irregularities and deficiencies observed in the Work during performance of its services.
 3. Submitting a certified written report of each test, inspection, and similar quality-control service to Architect with copy to Contractor and to authorities having jurisdiction.
 4. Submitting a final report of special tests and inspections at Final Acceptance, which includes a list of unresolved deficiencies.
 5. Interpreting tests and inspections and stating in each report whether tested and inspected work complies with or deviates from the Contract Documents.
 6. Retesting and reinspecting corrected work.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION

3.1 TEST AND INSPECTION LOG

- A Test and Inspection Log: Prepare a record of tests and inspections. Include the following:
 1. Date test or inspection was conducted.
 2. Description of the Work tested or inspected.
 3. Date test or inspection results were transmitted to Architect.
 4. Identification of testing agency or special inspector conducting test or inspection.
- B Maintain log at Project site. Post changes and revisions as they occur. Provide access to test and inspection log for Architect's reference during normal working hours.
 1. Submit log at Project closeout as part of Project Record Documents.

3.2 REPAIR AND PROTECTION

- A General: On completion of testing, inspection, sample taking, and similar services, repair damaged construction and restore substrates and finishes.
 1. Provide materials and comply with installation requirements specified in other Specification Sections or matching existing substrates and finishes. Restore patched areas and extend restoration into adjoining areas with durable seams that are as invisible as possible. Comply with the Contract Document requirements for cutting and patching in Section 01 73 00 "Execution."
- B Protect construction exposed by or for quality-control service activities.

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- C Repair and protection are Contractor's responsibility, regardless of the assignment of responsibility for quality-control services.

END OF SECTION 01 40 00

SECTION 01 42 00 - REFERENCES

PART 1 GENERAL

1.1 RELATED DOCUMENTS

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

1.2 DEFINITIONS

- A General: Basic Contract definitions are included in the Conditions of the Contract.
- B "Approved": When used to convey Architect's action on Contractor's submittals, applications, and requests, "approved" is limited to Architect's duties and responsibilities as stated in the Conditions of the Contract.
- C "Directed": A command or instruction by Architect. Other terms including "requested," "authorized," "selected," "required," and "permitted" have the same meaning as "directed."
- D "Indicated": Requirements expressed by graphic representations or in written form on Drawings, in Specifications, and in other Contract Documents. Other terms including "shown," "noted," "scheduled," and "specified" have the same meaning as "indicated."
- E "Regulations": Laws, ordinances, statutes, and lawful orders issued by authorities having jurisdiction, and rules, conventions, and agreements within the construction industry that control performance of the Work.
- F "Furnish": Supply and deliver to Project site, ready for unloading, unpacking, assembly, installation, and similar operations.
- G "Install": Operations at Project site including unloading, temporarily storing, unpacking, assembling, erecting, placing, anchoring, applying, working to dimension, finishing, curing, protecting, cleaning, and similar operations.
- H "Provide": Furnish and install, complete and ready for the intended use.
- I "Project Site": Space available for performing construction activities. The extent of Project site is shown on Drawings and may or may not be identical with the description of the land on which Project is to be built.

1.3 INDUSTRY STANDARDS

- A Applicability of Standards: Unless the Contract Documents include more stringent requirements, applicable construction industry standards have the same force and effect as if bound or copied directly into the Contract Documents to the extent referenced. Such standards are made a part of the Contract Documents by reference.
- B Publication Dates: Comply with standards in effect as of date of the Contract Documents unless otherwise indicated.
- C Copies of Standards: Each entity engaged in construction on Project should be familiar with industry standards applicable to its construction activity. Copies of applicable standards are not bound with the Contract Documents.
 - 1. Where copies of standards are needed to perform a required construction activity, obtain copies directly from publication source.

1.4 ABBREVIATIONS AND ACRONYMS

- A 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."
- B Code Agencies: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities.
- C Federal Government Agencies: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities.

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- D Standards and Regulations: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the standards and regulations.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION 01 42 00

SECTION 01 50 00 - TEMPORARY FACILITIES AND CONTROLS

PART 1 GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A Section includes requirements for temporary utilities, support facilities, and security and protection facilities.

1.3 REFERENCES

- A Acronyms and Abbreviations:
 - 1. ADA: Americans With Disabilities Act.
 - 2. AHJ: Authority (Authorities) Having Jurisdiction.
 - 3. USDOJ: United States Department of Justice.
 - 4. EPA: Environmental Protection Agency.
 - 5. HEPA: High Efficiency Particulate Air Filter.

1.4 USE CHARGES

- A Installation, removal and use charges for temporary facilities shall be included in the Contract Sum unless otherwise indicated. Allow other entities engaged in the Project to use temporary services and facilities without cost, including, but not limited to, Owner's construction forces, Architect, occupants of Project, testing agencies, and the AHJ.
- B Sewer Service: Owner will pay sewer-service use charges for sewer usage by all entities for construction operations.
- C Water Service: Owner will pay water-service use charges for water used by all entities for construction operations.
- D Electric Power Service: Owner will pay electric-power-service use charges for electricity used by all entities for construction operations.
- E Data Service: Provide connectivity, both land line and wireless throughout the construction site.

1.5 INFORMATIONAL SUBMITTALS

- A Site Utilization Plan: Show temporary facilities, temporary utility lines and connections, staging areas, construction site entrances, vehicle circulation, and parking areas for construction personnel, pedestrian safety and accessibility, roadway closures for public rights of way, and site security measures including barriers/fencing location(s).
- B Implementation and Termination Schedule: Within 15 days of date established for commencement of the Work, submit schedule indicating implementation and termination dates of each temporary utility.
- C Project Identification and Temporary Signs: Show fabrication and installation details, including plans, elevations, details, layouts, typestyles, graphic elements, and message content.
- D Erosion- and Sedimentation-Control Plan: Show compliance with requirements of EPA Construction General Permit or AHJ, whichever is more stringent.
- E Fire-Safety Program: Show compliance with requirements of NFPA 241 and AHJ. Indicate Contractor personnel responsible for management of fire-prevention program.
- F Moisture- and Mold-Protection Plan: Describe procedures and controls for protecting materials and construction from water absorption and damage and mold. Describe delivery, handling, storage, installation, and protection provisions for materials subject to water absorption or water damage.
 - 1. Indicate procedures for discarding water-damaged materials, protocols for mitigating water intrusion into completed Work, and requirements for replacing water-damaged Work.

2. Indicate sequencing of work that requires water, such as sprayed fire-resistive materials, plastering, and terrazzo grinding, and describe plans for dealing with water from these operations. Show procedures for verifying that wet construction has dried sufficiently to permit installation of finish materials.
3. Indicate methods to be used to avoid trapping water in finished work.
- G Dust- and HVAC-Control Plan: Submit coordination drawing and narrative that indicates the dust- and HVAC-control measures proposed for use, proposed locations, and proposed time frame for their operation. Include the following:
 1. Locations of dust-control partitions at each phase of work.
 2. HVAC system isolation schematic drawing.
 3. Location of proposed air-filtration system discharge.
 4. Waste-handling procedures.
 5. Other dust-control measures.
 6. Protections that may be required for adjacent buildings affected by the construction activities such as air intakes, exterior equipment, etc.
- H Noise and Vibration Control Plan: Identify construction activities that may impact the occupancy and use of existing spaces within the building or adjacent existing buildings, occupied by Owner. For most activities, the Owner will require compliance with the Town of Chapel Hill Noise Ordinance. Include the following:
 1. Methods used to meet the goals and requirements of Owner.
 2. Concrete cutting method(s) to be used.
 3. Location of construction devices on the site.
 4. Show compliance with the use and maintenance of quieted construction devices for the duration of the Project.
 5. Indicate activities that may disturb building occupants and that are planned to be performed during non-standard working hours as coordinated with Owner.
 6. Indicate locations of sensitive equipment areas or other areas requiring special attention as identified by Owner. Indicate means for complying with Owner's requirements.

1.6 QUALITY ASSURANCE

- A Electric Service: Comply with NECA, NEMA, and UL standards and regulations for temporary electric service. Install service to comply with NFPA 70.
- B Tests and Inspections: Arrange for AHJ to test and inspect each temporary utility before use. Obtain required certifications and permits.
- C Accessible Temporary Egress: Comply with applicable provisions in the USDOJ publication 2010 ADA Standards for Accessible Design and ICC A117.1 – 2009.

1.7 PROJECT CONDITIONS

- A Temporary Use of Permanent Facilities: Engage installer of each permanent service to assume responsibility for operation, maintenance, and protection of each permanent service during its use as a construction facility before Owner's acceptance, regardless of previously assigned responsibilities.

PART 2 PRODUCTS

2.1 MATERIALS

- A Chain-Link Fencing: At least 2-inch, 0.148-inch-thick, galvanized-steel, chain-link fabric fencing; at least 6 feet high with galvanized-steel pipe posts; at least 2-3/8-inch outside diameter line posts and 2-7/8-inch outside diameter corner and pull posts, with 1-5/8-inch outside diameter top rails.
- B Fencing Windscreen Privacy Screen: Polyester fabric scrim with grommets for attachment to chain-link fence, sized to height of fence, in color selected by Architect from manufacturer's standard colors.
- C Polyethylene Sheet: Reinforced, fire-resistive sheet, at least 10-mil thickness, with flame-spread rating of 15 or less per ASTM E 84 and passing NFPA 701 Test Method 2.

- D Dust-Control Adhesive-Surface Walk-Off Mats: Provide at least 36 by 60 inch mats.
- E Insulation: Unfaced mineral-fiber blanket, manufactured from rock wool; with flame-spread and smoke-developed indexes of no more than 25 and 50, respectively.

2.2 TEMPORARY FACILITIES

- A Field Offices: Coordinate with Owner for space availability for the following:
 - 1. Contractor provided prefabricated or mobile units with serviceable finishes, temperature controls, and foundations adequate for normal loading.
- B Common-Use Field Office: Of sufficient size to accommodate needs of Owner, Architect, and construction personnel office activities and to accommodate Project meetings specified in other Division 01 Sections. Keep office clean and orderly. Furnish and equip offices as follows:
 - 1. Furniture required for Project-site documents including file cabinets, plan tables, plan racks, and bookcases.
 - 2. Conference room of sufficient size to accommodate meetings of 20 individuals. Provide electrical power service and 120-V ac duplex receptacles, with no fewer than one receptacle on each wall. Furnish room with conference table, chairs, and 4-foot-square tack and marker boards.
 - 3. Drinking water and private toilet.
 - 4. Heating and cooling equipment necessary to maintain a uniform indoor temperature of 68 to 72 deg F.
 - 5. Lighting fixtures capable of maintaining average illumination of 20 fc at desk height.
 - 6. Provide internet connectivity for use by Architect and Owner.
 - 7. Provide projection technology for at least 90-inch screen size.
 - 8. Provide two workstations for use of Owner and Architect.
- C Storage and Fabrication Sheds: Storage and fabrication sheds are not permitted on site. Any required lay down space will be in the building under construction, covered appropriately on site, or at the Owner's off-site storage facility.
 - 1. For items stored in the building, the floor plate must be equally loaded.
 - 2. Store combustible materials apart from building.

2.3 EQUIPMENT

- A Fire Extinguishers: Portable, UL rated; with class and extinguishing agent as required by locations and classes of fire exposures.
- B HVAC Equipment: Unless Owner authorizes use of permanent HVAC system, provide vented, self-contained, liquid-propane-gas or fuel-oil heaters with individual space thermostatic control.
 - 1. Use of gasoline-burning space heaters, open-flame heaters, or salamander-type heating units is prohibited.
 - 2. Heating, Cooling, and Dehumidifying Units: Listed and labeled for type of fuel being consumed, by a qualified testing agency acceptable to AHJ, and marked for intended location and application.
 - 3. Permanent HVAC System: If Owner authorizes use of permanent HVAC system for temporary use during construction, provide filter with MERV of 8 at each return-air grille in system and remove at end of construction and clean HVAC system as required in Section 01 77 00 Closeout Procedures.
- C Air-Filtration Units: Primary and secondary HEPA-filter-equipped portable units with four-stage filtration. Provide single switch for emergency shutoff. Configure to run continuously.

PART 3 EXECUTION

3.1 TEMPORARY FACILITIES, GENERAL

- A Conservation: Coordinate construction and use of temporary facilities with consideration given to conservation of energy, water, and materials. Coordinate use of temporary utilities to minimize waste.

1. Salvage materials and equipment involved in performance of, but not actually incorporated into, the Work. See other Specification Sections for disposition of salvaged materials that are designated as Owner's property.

3.2 INSTALLATION, GENERAL

- A Locate facilities where they will serve Project adequately and result in minimum interference with performance of the Work. Relocate and modify facilities as required by progress of the Work.
- B Provide each facility ready for use when needed to avoid delay. Do not remove until facilities are no longer needed or are replaced by authorized use of completed permanent facilities.
- C Isolation of Work Areas in Occupied Facilities: Prevent dust, fumes, and odors from entering occupied area, as well as existing buildings adjacent to the Project as follows:
 1. Prior to commencing work, isolate the HVAC system in area where work is to be performed in accordance with coordination drawings.
 - a. Disconnect supply and return ductwork in work area from HVAC systems servicing occupied areas. Protect air intakes, piping, etc. on buildings adjacent to where the work is to be performed.
 - b. Maintain negative air pressure within work area, using HEPA-equipped air-filtration units, starting with commencement of temporary partition construction, and continuing until removal of temporary partitions is complete.
 2. Maintain dust partitions during the Work. Use vacuum collection attachments on dust-producing equipment. Isolate limited work within occupied areas using portable dust-containment devices.
 3. Perform daily construction cleanup and final cleanup using approved, HEPA-filter-equipped vacuum equipment.

3.3 TEMPORARY UTILITY INSTALLATION

- A General: Install temporary service.
 1. Give written advance notice to the Owner when temporary utilities will be installed.
 2. Arrange with utility company, Owner, and existing users for time when service can be interrupted, if necessary, to make connections for temporary services.
- B Sewers and Drainage: Provide temporary utilities to remove effluent lawfully.
 1. Connect temporary sewers to municipal system as directed by AHJ.
- C Water Service:
 1. Install water service and distribution piping in sizes and pressures adequate for construction.
- D Sanitary Facilities: Provide temporary toilets, wash facilities, safety shower and eyewash facilities, and drinking water for use of construction personnel. Comply with requirements of AHJ for type, number, location, operation, and maintenance of fixtures and facilities.
 1. Use of Permanent Toilets: Use of Owner's existing to remain, or new toilet facilities is not permitted.
 2. Use of Permanent Toilets: Use of Owner's existing toilet facilities to be demolished will be permitted, as long as facilities are cleaned and maintained in a condition acceptable to Owner and their use does not interrupt the Work.
- E Temporary Heating and Cooling: Provide temporary heating and cooling required by construction activities for curing or drying of completed installations or for protecting installed construction from adverse effects of low temperatures or high humidity. Select equipment that will not have a harmful effect on completed installations or elements being installed.
 1. Provide temporary dehumidification systems when required to reduce ambient and substrate moisture levels to level required to allow installation or application of finishes and their proper curing or drying.
- F Electric Power Service:
 1. Electric Power Service: Provide electric power service and distribution system of sufficient size, capacity, and power characteristics required for construction operations.
 - a. Install electric power service underground unless otherwise indicated.
 - b. Connect temporary service to Owner's existing power source, as directed by Owner.

- G Lighting: Provide temporary lighting with local switching that provides adequate illumination for construction operations, observations, inspections, and traffic conditions.
 - 1. Install and operate temporary lighting that fulfills security and protection requirements without operating entire system.
- H Telephone Service: Provide temporary telephone service in common-use facilities for use by all construction personnel. Install WiFi cell phone access equipment and one land-based telephone line for each field office.
 - 1. Provide additional telephone lines for the following:
 - 2. At each telephone, post a list of important telephone numbers.
 - a. Police and fire departments.
 - b. Ambulance service.
 - c. Contractor's home office.
 - d. Contractor's emergency after-hours telephone number.
 - e. Architect's office.
 - f. Engineers' offices.
 - g. Owner's office.
 - h. Principal subcontractors' field and home offices.
- I Electronic Communication Service: Provide secure WiFi wireless connection to internet with provisions for access by Architect and Owner.
- J Project Computer: Provide a desktop computer in the primary field office adequate for use by Architect and Owner to access Project electronic documents and maintain electronic communications. Equip computer with not less than the following:
 - 1. Processor: Intel Core i5 or i7.
 - 2. Memory: 16 gigabytes.
 - 3. Disk Storage: 1 -terabyte hard-disk drive and combination DVD-RW/CD-RW drive.
 - 4. Display: 24-inch monitor with 256-Mb dedicated video RAM.
 - 5. Full-size keyboard and mouse.
 - 6. Network Connectivity: 10/100BaseT Ethernet.
 - 7. Operating System: Microsoft Windows 10 Professional.
 - 8. Productivity Software:
 - a. Microsoft Office Professional, 2013 or higher, including Word, Excel, and Outlook.
 - b. Adobe Reader DC, or approved equal.
 - c. WinZip 10.0 or higher, or approved equal.
 - 9. Printer: "All-in-one" unit equipped with printer server, combining color printing, photocopying, scanning, and faxing, or separate units for each of these three functions.
 - 10. Internet Service: Broadband modem, router, and ISP, equipped with hardware firewall, providing minimum 10.0 -Mbps upload and 50 -Mbps download speeds at each computer.
 - 11. Internet Security: Integrated software, providing software firewall, virus, spyware, phishing, and spam protection in a combined application.
 - 12. Backup: External hard drive, at least 2 terabytes, with automated backup software providing daily backups.

3.4 SUPPORT FACILITIES INSTALLATION

- A General: Comply with the following:
 - 1. Provide construction for temporary offices, shops, and sheds located within construction area or within 30 feet of building lines that is noncombustible according to ASTM E 136. Comply with NFPA 241.
 - a. Where approved by Owner, utilize designated area within existing building for temporary field offices.
 - 2. Maintain support facilities until Architect schedules Final Acceptance inspection. Remove before Final Acceptance. Personnel remaining after Final Acceptance will be permitted to use permanent facilities, under conditions acceptable to Owner.

- B Temporary Roads and Paved Areas: Construct and maintain temporary roads and paved areas adequate for construction operations. Locate temporary roads and paved areas within construction limits indicated on Drawings.
 - 1. Provide dust-control treatment that is nonpolluting and nontracking. Reapply treatment as required to minimize dust.
- C Traffic Controls: Comply with requirements of AHJ.
 - 1. Protect existing site improvements to remain including curbs, pavement, and utilities.
 - 2. Maintain access for fire-fighting equipment and access to fire hydrants.
- D Parking: Provide temporary offsite parking areas for construction personnel.
- E Storage and Staging: Provide temporary offsite area if designated areas of Project site for storage and staging needs are not sufficient.
- F Dewatering Facilities and Drains: Comply with requirements of AHJ. Maintain Project site, excavations, and construction free of water.
 - 1. Dispose of rainwater in a lawful manner that will not result in flooding Project or adjoining properties or endanger permanent Work or temporary facilities.
 - 2. Remove snow and ice as required to minimize accumulations.
- G Project Signs: Provide Project signs as indicated. Unauthorized signs are not permitted.
 - 1. Identification Signs: Provide Project identification signs as indicated on Drawings.
 - 2. Temporary Signs: Provide other signs as indicated and as required to inform public and individuals seeking entrance to Project.
 - a. Provide temporary, directional signs for construction personnel and visitors.
 - b. Provide sign indicating that Fire Arms are Prohibited on State Construction Job Site.
 - 3. Maintain and touch up signs so they are legible at all times.
- H Waste Disposal Facilities: Comply with requirements specified in Section 01 74 19 Construction Waste Management and Disposal.
- I Lifts and Hoists: Provide facilities necessary for hoisting materials and personnel.
 - 1. Truck cranes and similar devices used for hoisting materials are considered "tools and equipment" and not temporary facilities.
- J Existing Elevator Use: Use of Owner's existing elevators will be permitted, provided elevators are cleaned and maintained in a condition acceptable to Owner. At Final Acceptance, restore elevators to condition existing before initial use, including replacing worn cables, guide shoes, and similar items of limited life.
 - 1. Do not load elevators beyond their rated weight capacity.
 - 2. Provide protective coverings, barriers, devices, signs, or other procedures to protect elevator car and entrance doors and frame. If, despite such protection, elevators become damaged, engage elevator Installer to restore damaged work, so no evidence remains of correction work. Return items that cannot be refinished in field to the shop, make required repairs and refinish entire unit, or provide new units as required.
- K Existing Stair Usage: Use of Owner's existing stairs will be permitted, provided stairs are cleaned and maintained in a condition acceptable to Owner. At Final Acceptance, restore stairs to condition existing before initial use.
 - 1. Provide protective coverings, barriers, devices, signs, or other procedures to protect stairs and to maintain means of egress. If stairs become damaged, restore damaged areas, so no evidence remains of correction work.

3.5 SECURITY AND PROTECTION FACILITIES INSTALLATION

- A Protection of Existing Facilities: Protect existing vegetation, equipment, structures, utilities, and other improvements at Project site and on adjacent properties, except those indicated to be removed or altered. Repair damage to existing facilities.
 - 1. Where access to adjacent properties is required in order to affect protection of existing facilities, obtain written permission from adjacent property owner to access property for that purpose.

- B Environmental Protection: Provide protection, operate temporary facilities, and conduct construction as required to comply with environmental regulations and that minimize possible air, waterway, and subsoil contamination or pollution or other undesirable effects.
- C Temporary Erosion and Sedimentation Control: Comply with requirements of EPA Construction General Permit or AHJ, whichever is more stringent, and requirements specified in Section 31 10 00 Site Clearing.
- D Stormwater Control: Comply with requirements of AHJ. Provide barriers in and around excavations and subgrade construction to prevent flooding by runoff of stormwater from heavy rains.
- E Tree and Plant Protection: Install temporary fencing located as indicated or outside the drip line of trees to protect vegetation from damage from construction operations. Protect tree root systems from damage, flooding, and erosion.
- F Pest Control: Engage pest-control service to recommend practices to minimize attraction and harboring of rodents, roaches, and other pests and to perform extermination and control procedures at regular intervals so Project will be free of pests and their residues at Final Acceptance. Perform control operations lawfully, using materials approved by AHJ.
- G Site Enclosure Fence: Before construction operations begin, furnish and install site enclosure fence in a manner that will prevent people from easily entering site except by entrance gates.
 - 1. Extent of Fence: As required to enclose entire Project site or portion determined sufficient to accommodate construction operations.
 - 2. Maintain security by limiting number of keys and restricting distribution to authorized personnel. Furnish one set of keys to Owner.
- H Security Enclosure and Lockup: Install temporary enclosure around partially completed areas of construction. Provide lockable entrances to prevent unauthorized entrance, vandalism, theft, and similar violations of security. Lock entrances at end of each workday.
- I Barricades, Warning Signs, and Lights: Comply with requirements of AHJ for erecting structurally adequate barricades, including warning signs and lighting.
- J Temporary Egress: Maintain temporary egress from existing occupied facilities as indicated and as required by AHJ.
- K Covered Walkway: Erect protective covered walkway for passage of individuals through or adjacent to Project site. Coordinate with entrance gates, other facilities, and obstructions. Comply with regulations of AHJ.
 - 1. Provide overhead decking, protective enclosure walls, handrails, barricades, warning signs, exit signs, lights, safe and well-drained walkways, and similar provisions for protection and safe passage.
 - 2. Paint and maintain appearance of walkway for duration of the Work.
- L Temporary Enclosures: Provide temporary enclosures for protection of construction, in progress and completed, from exposure, foul weather, other construction operations, and similar activities. Provide temporary weathertight enclosure for building exterior.
 - 1. Where heating or cooling is needed and permanent enclosure is incomplete, insulate temporary enclosures.
- M Temporary Partitions: Provide floor-to-ceiling dustproof partitions to limit dust and dirt migration and to separate areas occupied by Owner from fumes and noise.
 - 1. Construct dustproof partitions with gypsum wallboard with joints taped on occupied side, and fire-retardant-treated plywood on construction operations side.
 - 2. Construct dustproof partitions with two layers of 6-mil polyethylene sheet on each side. Cover floor with two layers of 6-mil polyethylene sheet, extending sheets 18 inches up the sidewalls. Overlap and tape full length of joints. Cover floor with fire-retardant-treated plywood.
 - a. Construct vestibule and airlock at each entrance through temporary partition with not less than 48 inches between doors. Maintain water-dampened foot mats in vestibule.
 - 3. Where fire-resistance-rated temporary partitions are indicated or are required by AHJ, construct partitions according to the rated assemblies.
 - 4. Insulate partitions to control noise transmission to occupied areas.

5. Seal joints and perimeter. Equip partitions with gasketed dustproof doors and security locks where openings are required.
 6. Protect air-handling equipment.
 7. Provide walk-off mats at each entrance through temporary partition.
- N Temporary Fire Protection: Install and maintain temporary fire-protection facilities of types needed to protect against reasonably predictable and controllable fire losses. Comply with NFPA 241; manage fire-prevention program.
1. Prohibit smoking in construction areas. Comply with additional limits on smoking specified in other Sections.
 2. Supervise welding operations, combustion-type temporary heating units, and similar sources of fire ignition according to requirements of AHJ.
 3. Develop and supervise an overall fire-prevention and -protection program for personnel at Project site. Review needs with local fire department and establish procedures to be followed. Instruct personnel in methods and procedures. Post warnings and information.
 4. Provide temporary standpipes and hoses for fire protection. Hang hoses with a warning sign stating that hoses are for fire-protection purposes only and are not to be removed. Match hose size with outlet size and equip with suitable nozzles.

3.6 MOISTURE AND MOLD CONTROL

- A Moisture and Mold Protection: Protect stored materials and installed Work in accordance with Moisture and Mold Protection Plan.
- B Exposed Construction Period: Before installation of weather barriers, when materials are subject to wetting and exposure and to airborne mold spores, protect as follows:
1. Protect porous materials from water damage.
 2. Protect stored and installed material from flowing or standing water.
 3. Keep porous and organic materials from coming into prolonged contact with concrete.
 4. Remove standing water from decks.
 5. Keep deck openings covered or dammed.
- C Partially Enclosed Construction Period: After installation of weather barriers but before full enclosure and conditioning of building, when installed materials are still subject to infiltration of moisture and ambient mold spores, protect as follows:
1. Do not load or install drywall or other porous materials or components, or items with high organic content, into partially enclosed building.
 2. Keep interior spaces reasonably clean and protected from water damage.
 3. Periodically collect and remove waste containing cellulose or other organic matter.
 4. Discard or replace water-damaged material.
 5. Do not install material that is wet.
 6. Discard and replace stored or installed material that begins to grow mold.
 7. Perform work in a sequence that allows wet materials adequate time to dry before enclosing the material in gypsum board or other interior finishes.
- D Controlled Construction Period: After completing and sealing of the building enclosure but prior to the full operation of permanent HVAC systems, maintain as follows:
1. Control moisture and humidity inside building by maintaining effective dry-in conditions.
 2. Use temporary or permanent HVAC system to control humidity within ranges specified for installed and stored materials.
 3. Comply with manufacturer's written instructions for temperature, relative humidity, and exposure to water limits.
 - a. Hygroscopic materials that may support mold growth, including wood and gypsum-based products, that become wet during the course of construction and remain wet for 48 hours are considered defective and require replacing.
 - b. Measure moisture content of materials that have been exposed to moisture during construction operations or after installation. Record readings beginning at time of exposure and continuing daily for 48 hours. Identify materials containing moisture levels higher than allowed. Report findings in writing to Architect.

- c. Remove and replace materials that cannot be completely restored to their manufactured moisture level within 48 hours.

3.7 OPERATION, TERMINATION, AND REMOVAL

- A Supervision: Enforce strict discipline in use of temporary facilities. To minimize waste and abuse, limit availability of temporary facilities to essential and intended uses.
- B Maintenance: Maintain facilities in good operating condition until removal.
 - 1. Maintain operation of temporary enclosures, heating, cooling, humidity control, ventilation, and similar facilities on a 24-hour basis where required to achieve indicated results and to avoid possibility of damage.
- C Temporary Facility Changeover: Do not change over from using temporary security and protection facilities to permanent facilities until Final Acceptance.
- D Termination and Removal: Remove each temporary facility when need for its service has ended, when it has been replaced by authorized use of a permanent facility, or no later than Final Acceptance. Complete or, if necessary, restore permanent construction that may have been delayed because of interference with temporary facility. Repair damaged Work, clean exposed surfaces, and replace construction that cannot be satisfactorily repaired.
 - 1. Materials and facilities that constitute temporary facilities are property of Contractor. Owner reserves right to take possession of Project identification signs.
 - 2. Remove temporary roads and paved areas not intended for or acceptable for integration into permanent construction. Where area is intended for landscape development, remove soil and aggregate fill that do not comply with requirements for fill or subsoil. Remove materials contaminated with road oil, asphalt and other petrochemical compounds, and other substances that might impair growth of plant materials or lawns. Repair or replace street paving, curbs, and sidewalks at temporary entrances, as required by AHJ.
 - 3. At Final Acceptance, repair, renovate, and clean permanent facilities used during construction period. Comply with final cleaning requirements specified in Section 01 77 00 Closeout Procedures.

END OF SECTION 01 50 00

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SECTION 01 60 00 - PRODUCT REQUIREMENTS

PART 1 GENERAL

1.1 SUMMARY

- A Section includes administrative and procedural requirements for selection of products for use in Project; product delivery, storage, and handling; manufacturers' standard warranties on products; special warranties; and comparable products.

1.2 DEFINITIONS

- A Products: Items obtained for incorporating into the Work, whether purchased for Project or taken from previously purchased stock. The term "product" includes the terms "material," "equipment," "system," and terms of similar intent.
 - 1. Named Products: Items identified by manufacturer's product name, including make or model number or other designation shown or listed in manufacturer's published product literature that is current as of date of the Contract Documents.
 - 2. New Products: Items that have not previously been incorporated into another project or facility. Products salvaged or recycled from other projects are not considered new products.
 - 3. Comparable Product: Product by named manufacturer that is demonstrated and approved through the comparable product submittal process described in "Comparable Products" Article, to have the indicated qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics that equal or exceed those of specified product.
- B Basis-of-Design Product Specification: A specification in which a single manufacturer's product is named and accompanied by the words "basis-of-design product," including make or model number or other designation. Published attributes and characteristics of the basis-of-design product establish salient characteristics of products for purposes of evaluating comparable products.
- C Subject to Compliance with Requirements: Where the phrase "Subject to compliance with requirements" introduces a product selection procedure in an individual Specification Section, provide products qualified under the specified product procedure. In the event that a named product or product by a named manufacturer does not meet the other requirements of the specifications, select another named product or product from another named manufacturer that does meet the requirements of the specifications; Submit a substitution request, if applicable.
- D Comparable Product Request Submittal: An action submittal requesting consideration of a comparable product, including the following information:
 - 1. Identification of basis-of-design product or fabrication or installation method to be replaced, including Specification Section number and title and Drawing numbers and titles.
 - 2. Data indicating compliance with the requirements specified in "Comparable Products" Article.
- E Basis-of-Design Product Specification Submittal: An action submittal complying with requirements in Section 01 33 00 "Submittal Procedures."
- F Substitution: Refer to Section 01 25 00 "Substitution Procedures" for definition and limitations on substitutions.

1.3 QUALITY ASSURANCE

- A Compatibility of Options: If Contractor is given option of selecting between two or more products for use on Project, select product compatible with products previously selected, even if previously selected products were also options.
- B Identification of Products: Except for required labels and operating data, do not attach or imprint manufacturer or product names or trademarks on exposed surfaces of products or equipment that will be exposed to view in occupied spaces or on the exterior.
 - 1. Labels: Locate required product labels and stamps on a concealed surface, or, where required for observation following installation, on a visually accessible surface that is inconspicuous.

2. Equipment Nameplates: Provide a permanent nameplate on each item of service- or power-operated equipment. Locate on a visually accessible but inconspicuous surface. Include information essential for operation, including the following:
 - a. Name of product and manufacturer.
 - b. Model and serial number.
 - c. Capacity.
 - d. Speed.
 - e. Ratings.
3. See individual identification Sections in Divisions 21, 22, 23, and 26 for additional equipment identification requirements.

1.4 COORDINATION

- A Modify or adjust affected work as necessary to integrate work of approved comparable products and approved substitutions.

1.5 PRODUCT DELIVERY, STORAGE, AND HANDLING

- A Deliver, store, and handle products using means and methods that will prevent damage, deterioration, and loss, including theft and vandalism. Comply with manufacturer's written instructions.
- B Delivery and Handling:
 1. Schedule delivery to minimize long-term storage at Project site and to prevent overcrowding of construction spaces.
 2. 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.
 3. Deliver products to Project site in an undamaged condition in manufacturer's original sealed container or other packaging system, complete with labels and instructions for handling, storing, unpacking, protecting, and installing.
 4. Inspect products on delivery to determine compliance with the Contract Documents and to determine that products are undamaged and properly protected.
- C Storage:
 1. Store products to allow for inspection and measurement of quantity or counting of units.
 2. Store materials in a manner that will not endanger Project structure.
 3. Store products that are subject to damage by the elements, under cover in a weathertight enclosure above ground, with ventilation adequate to prevent condensation.
 4. Protect foam plastic from exposure to sunlight, except to extent necessary for period of installation and concealment.
 5. Comply with product manufacturer's written instructions for temperature, humidity, ventilation, and weather-protection requirements for storage.
 6. Protect stored products from damage and liquids from freezing.
 7. Provide a secure location and enclosure at Project site for storage of materials and equipment by Owner's construction forces. Coordinate location with Owner.

1.6 PRODUCT WARRANTIES

- A Warranties specified in other Sections shall be in addition to, and run concurrent with, other warranties required by the Contract Documents. Manufacturer's disclaimers and limitations on product warranties do not relieve Contractor of obligations under requirements of the Contract Documents.
 1. Manufacturer's Warranty: Written warranty furnished by individual manufacturer for a particular product and specifically endorsed by manufacturer to Owner.
 2. Special Warranty: Written warranty required by the Contract Documents to provide specific rights for Owner.
- B Special Warranties: Prepare a written document that contains appropriate terms and identification, ready for execution.

1. Manufacturer's Standard Form: Modified to include Project-specific information and properly executed.
 2. Specified Form: When specified forms are included with the Specifications, prepare a written document using indicated form properly executed.
 3. See other Sections for specific content requirements and particular requirements for submitting special warranties.
- C Submittal Time: Comply with requirements in Section 01 77 00 "Closeout Procedures."

PART 2 PRODUCTS

2.1 PRODUCT SELECTION PROCEDURES

- A General Product Requirements: Provide products that comply with the Contract Documents, are undamaged and, unless otherwise indicated, are new at time of installation.
1. Provide products complete with accessories, trim, finish, fasteners, and other items needed for a complete installation and indicated use and effect.
 2. Standard Products: If available, and unless custom products or nonstandard options are specified, provide standard products of types that have been produced and used successfully in similar situations on other projects.
 3. Owner reserves the right to limit selection to products with warranties meeting requirements of the Contract Documents.
 4. Where products are accompanied by the term "as selected," Architect will make selection.
 5. Where products are accompanied by the term "match sample," sample to be matched is Architect's.
 6. Descriptive, performance, and reference standard requirements in the Specifications establish salient characteristics of products.
 7. Or Equal: For products specified by name and accompanied by the term "or equal," "or approved equal," or "or approved," comply with requirements in Section 01 25 00 "Substitution Procedures" to obtain approval for use of an unnamed product.
 - a. Submit additional documentation required by Architect in order to establish equivalency of proposed products. Unless otherwise indicated, evaluation of "or equal" product status is by Architect, whose determination is final.
- B Product Selection Procedures:
1. Sole Product: Where Specifications name a single manufacturer and product, provide the named product that complies with requirements. Substitutions for Contractor's convenience will be considered unless otherwise indicated.
 - a. Sole product may be indicated by the phrase: "Subject to compliance with requirements, provide the following: ..."
 2. Sole Manufacturer/Source: Where Specifications name a single manufacturer or source, provide a product by the named manufacturer or source that complies with requirements. Substitutions for Contractor's convenience will be considered unless otherwise indicated.
 - a. Sole manufacturer/source may be indicated by the phrase: "Subject to compliance with requirements, provide products by the following: ..."
 3. Limited List of Products: Where Specifications include a list of names of both manufacturers and products, provide one of the products listed that complies with requirements. Substitutions for Contractor's convenience will be considered unless otherwise indicated.
 - a. Limited list of products may be indicated by the phrase: "Subject to compliance with requirements, provide one of the following: ..."
 4. Limited List of Manufacturers: Where Specifications include a list of manufacturers' names, provide a product by one of the manufacturers listed that complies with requirements. Substitutions for Contractor's convenience will be considered unless otherwise indicated.
 - a. Limited list of manufacturers is indicated by the phrase: "Subject to compliance with requirements, provide products by one of the following: ..."

5. Basis-of-Design Product: Where Specifications name a product, or refer to a product indicated on Drawings, and include a list of manufacturers, provide the specified or indicated product or a comparable product by one of the other named manufacturers. Drawings and Specifications indicate sizes, profiles, dimensions, and other characteristics that are based on the product named. Comply with requirements in "Comparable Products" Article for consideration of an unnamed product by one of the other named manufacturers.
 - a. For approval of products by unnamed manufacturers, comply with requirements in Section 01 25 00 "Substitution Procedures" for substitutions for convenience.
- C Visual Matching Specification: Where Specifications require "match Architect's sample," provide a product that complies with requirements and matches Architect's sample. Architect's decision will be final on whether a proposed product matches.
 1. If no product available within specified category matches and complies with other specified requirements, comply with requirements in Section 01 25 00 "Substitution Procedures" for proposal of product.
- D Visual Selection Specification: Where Specifications include the phrase "as selected by Architect from manufacturer's full range" or similar phrase, select a product that complies with requirements. Architect will select color, gloss, pattern, density, or texture from manufacturer's product line that includes both standard and premium items.

2.2 COMPARABLE PRODUCTS

- A Conditions for Consideration of Comparable Products: Architect will consider Contractor's request for comparable product when the following conditions are satisfied. If the following conditions are not satisfied, Architect may return requests without action, except to record noncompliance with the following requirements:
 1. Evidence that proposed product does not require revisions to the Contract Documents, is consistent with the Contract Documents, will produce the indicated results, and is compatible with other portions of the Work.
 2. Detailed comparison of significant qualities of proposed product with those of the named basis-of-design product. Significant product qualities include attributes such as type, function, in-service performance and physical properties, weight, dimension, durability, visual characteristics, and other specific features and requirements.
 3. Evidence that proposed product provides specified warranty.
 4. List of similar installations for completed projects with project names and addresses and names and addresses of architects and owners, if requested.
 5. Samples, if requested.
- B Architect's Action on Comparable Products Submittal: If necessary, Architect will request additional information or documentation for evaluation within seven days of receipt of a request for a comparable product. Architect will notify Contractor of approval or rejection of proposed comparable product within 15 days of receipt of request, or seven days of receipt of additional information or documentation, whichever is later.
 1. Architect's Approval of Submittal: Marked with approval notation from Architect's action stamp. See Section 01 33 00 "Submittal Procedures."
 2. Use product specified if Architect does not issue a decision on use of a comparable product request within time allocated.
- C Submittal Requirements, Single-Step Process: When acceptable to Architect, incorporate specified submittal requirements of individual Specification Section in combined submittal for comparable products. Approval by Architect of Contractor's request for use of comparable product and of individual submittal requirements will also satisfy other submittal requirements.

PART 3 EXECUTION (NOT USED)

END OF SECTION 01 60 00

SECTION 01 73 00 - EXECUTION

PART 1 GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A Section includes general administrative and procedural requirements governing execution of the Work including, but not limited to, the following:
 1. Construction layout.
 2. Field engineering and surveying.
 3. Installation of the Work.
 4. Cutting and patching.
 5. Coordination of Owner-installed products.
 6. Progress cleaning.
 7. Starting and adjusting.
 8. Protection of installed construction.

1.3 DEFINITIONS

- A Cutting: Removal of in-place construction necessary to permit installation or performance of subsequent work.
- B Patching: Fitting and repair work required to restore construction to original conditions after installation of subsequent work.

1.4 PREINSTALLATION MEETINGS

- A Cutting and Patching Conference: Conduct conference at Project site.
 1. Prior to commencing work requiring cutting and patching, review extent of cutting and patching anticipated and examine procedures for ensuring satisfactory result from cutting and patching work. Require representatives of each entity directly concerned with cutting and patching to attend, including the following:
 - a. Contractor's superintendent.
 - b. Trade supervisor responsible for cutting operations.
 - c. Trade supervisor(s) responsible for patching of each type of substrate.
 - d. Mechanical, electrical, and utilities subcontractors' supervisors, to the extent each trade is affecting by cutting and patching operations.
 2. Review areas of potential interference and conflict. Coordinate procedures and resolve potential conflicts before proceeding.

1.5 INFORMATIONAL SUBMITTALS

- A Qualification Data: For professional engineer.
- B Certificates: Submit certificate signed by professional engineer certifying that location and elevation of improvements comply with requirements.
- C Cutting and Patching Plan: Submit plan describing procedures at least 10 days prior to the time cutting and patching will be performed. Include the following information:
 1. Extent: Describe reason for and extent of each occurrence of cutting and patching.
 2. Changes to In-Place Construction: Describe anticipated results. Include changes to structural elements and operating components as well as changes in building appearance and other significant visual elements.
 3. Products: List products to be used for patching and firms or entities that will perform patching work.
 4. Dates: Indicate when cutting and patching will be performed.

5. Utilities and Mechanical and Electrical Systems: List services and systems that cutting and patching procedures will disturb or affect. List services and systems that will be relocated and those that will be temporarily out of service. Indicate length of time permanent services and systems will be disrupted.
 - a. Include description of provisions for temporary services and systems during interruption of permanent services and systems.
- D Landfill Receipts: Submit copy of receipts issued by a landfill facility, licensed to accept hazardous materials, for hazardous waste disposal.
- E Certified Surveys: Submit two copies signed by land surveyor and/or professional engineer.
- F Final Property Survey: Submit 10 copies showing the Work performed and record survey data.

1.6 QUALITY ASSURANCE

- A Land Surveyor Qualifications: A professional land surveyor who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing land-surveying services of the kind indicated.
- B Cutting and Patching: Comply with requirements for and limitations on cutting and patching of construction elements.
 1. Structural Elements: When cutting and patching structural elements, notify Architect of locations and details of cutting and await directions from Architect before proceeding. Shore, brace, and support structural elements during cutting and patching. Do not cut and patch structural elements in a manner that could change their load-carrying capacity or increase deflection.
 2. Operational Elements: Do not cut and patch operating elements and related components in a manner that results in reducing their capacity to perform as intended or that results in increased maintenance or decreased operational life or safety. Operational elements include the following:
 - a. Primary operational systems and equipment.
 - b. Fire separation assemblies.
 - c. Air or smoke barriers.
 - d. Fire-suppression systems.
 - e. Plumbing piping systems.
 - f. Mechanical systems piping and ducts.
 - g. Control systems.
 - h. Communication systems.
 - i. Fire-detection and -alarm systems.
 - j. Conveying systems.
 - k. Electrical wiring systems.
 - l. Operating systems of special construction.
 3. Other Construction Elements: Do not cut and patch other construction elements or components in a manner that could change their load-carrying capacity, that results in reducing their capacity to perform as intended, or that results in increased maintenance or decreased operational life or safety. Other construction elements include but are not limited to the following:
 - a. Water, moisture, or vapor barriers.
 - b. Membranes and flashings.
 - c. Exterior curtain-wall construction.
 - d. Sprayed fire-resistive material.
 - e. Equipment supports.
 - f. Piping, ductwork, vessels, and equipment.
 - g. Noise- and vibration-control elements and systems.
 4. Visual Elements: Do not cut and patch construction in a manner that results in visual evidence of cutting and patching. Do not cut and patch exposed construction in a manner that would, in Architect's opinion, reduce the building's aesthetic qualities. Remove and replace construction that has been cut and patched in a visually unsatisfactory manner.

- C Manufacturer's Installation Instructions: Obtain and maintain on-site manufacturer's written recommendations and instructions for installation of products and equipment.

1.7 WARRANTY

- A Existing Warranties: Remove, replace, patch, and repair materials and surfaces cut or damaged during cutting and patching operations, by methods and with materials so as not to void existing warranties.

PART 2 PRODUCTS

2.1 MATERIALS

- A General: Comply with requirements specified in other Sections.
 - 1. For projects requiring compliance with sustainable design and construction practices and procedures, use products for patching that comply with sustainable design requirements.
- B In-Place Materials: Use materials for patching identical to in-place materials. For exposed surfaces, use materials that visually match in-place adjacent surfaces to the fullest extent possible.
 - 1. If identical materials are unavailable or cannot be used, use materials that, when installed, will provide a match acceptable to Architect for the visual and functional performance of in-place materials.

PART 3 EXECUTION

3.1 EXAMINATION

- A Existing Conditions: The existence and location of underground and other utilities and construction indicated as existing are not guaranteed. Before beginning sitework, investigate and verify the existence and location of underground utilities, mechanical and electrical systems, and other construction affecting the Work.
 - 1. Before construction, verify the location and invert elevation at points of connection of sanitary sewer, storm sewer, and water-service piping; underground electrical services; and other utilities.
 - 2. Furnish location data for work related to Project that must be performed by public utilities serving Project site.
- B Examination and Acceptance of Conditions: Before proceeding with each component of the Work, examine substrates, areas, and conditions, with Installer or Applicator present where indicated, for compliance with requirements for installation tolerances and other conditions affecting performance. Record observations.
 - 1. Examine roughing-in for mechanical and electrical systems to verify actual locations of connections before equipment and fixture installation.
 - 2. Examine walls, floors, and roofs for suitable conditions where products and systems are to be installed.
 - 3. Verify compatibility with and suitability of substrates, including compatibility with existing finishes or primers.
- C Written Report: Where a written report listing conditions detrimental to performance of the Work is required by other Sections, include the following:
 - 1. Description of the Work.
 - 2. List of detrimental conditions, including substrates.
 - 3. List of unacceptable installation tolerances.
 - 4. Recommended corrections.
- D Proceed with installation only after unsatisfactory conditions have been corrected. Proceeding with the Work indicates acceptance of surfaces and conditions.

3.2 PREPARATION

- A Existing Utility Information: Furnish information to local utility and Owner that is necessary to adjust, move, or relocate existing utility structures, utility poles, lines, services, or other utility appurtenances located in or affected by construction. Coordinate with authorities having jurisdiction.
- B Field Measurements: Take field measurements as required to fit the Work properly. Recheck measurements before installing each product. Where portions of the Work are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication. Coordinate fabrication schedule with construction progress to avoid delaying the Work.
- C Space Requirements: Verify space requirements and dimensions of items shown diagrammatically on Drawings.
- D Review of Contract Documents and Field Conditions: Immediately on discovery of the need for clarification of the Contract Documents caused by differing field conditions outside the control of Contractor, submit a request for information to Architect according to requirements in Section 01 31 00 "Project Management and Coordination."

3.3 CONSTRUCTION LAYOUT

- A Verification: Before proceeding to lay out the Work, verify layout information shown on Drawings, in relation to the property survey and existing benchmarks. If discrepancies are discovered, notify Architect promptly.
- B General: Engage a professional engineer to lay out the Work using accepted surveying practices.
 - 1. Establish benchmarks and control points to set lines and levels at each story of construction and elsewhere as needed to locate each element of Project.
 - 2. Establish limits on use of Project site.
 - 3. Establish dimensions within tolerances indicated. Do not scale Drawings to obtain required dimensions.
 - 4. Inform installers of lines and levels to which they must comply.
 - 5. Check the location, level and plumb, of every major element as the Work progresses.
 - 6. Notify Architect when deviations from required lines and levels exceed allowable tolerances.
 - 7. Close site surveys with an error of closure equal to or less than the standard established by authorities having jurisdiction.
- C Site Improvements: Locate and lay out site improvements, including pavements, grading, fill and topsoil placement, utility slopes, and rim and invert elevations.
- D Building Lines and Levels: Locate and lay out control lines and levels for structures, building foundations, column grids, and floor levels, including those required for mechanical and electrical work. Transfer survey markings and elevations for use with control lines and levels. Level foundations and piers from two or more locations.
- E Record Log: Maintain a log of layout control work. Record deviations from required lines and levels. Include beginning and ending dates and times of surveys, weather conditions, name and duty of each survey party member, and types of instruments and tapes used. Make the log available for reference by Architect.

3.4 FIELD ENGINEERING

- A Identification: Owner will identify existing benchmarks, control points, and property corners.
- B Reference Points: Locate existing permanent benchmarks, control points, and similar reference points before beginning the Work. Preserve and protect permanent benchmarks and control points during construction operations.
 - 1. Do not change or relocate existing benchmarks or control points without prior written approval of Architect. Report lost or destroyed permanent benchmarks or control points promptly. Report the need to relocate permanent benchmarks or control points to Architect before proceeding.
 - 2. Replace lost or destroyed permanent benchmarks and control points promptly. Base replacements on the original survey control points.

- C Benchmarks: Establish and maintain a minimum of two permanent benchmarks on Project site, referenced to data established by survey control points. Comply with authorities having jurisdiction for type and size of benchmark.
 - 1. Record benchmark locations, with horizontal and vertical data, on Project Record Documents.
 - 2. Where the actual location or elevation of layout points cannot be marked, provide temporary reference points sufficient to locate the Work.
 - 3. Remove temporary reference points when no longer needed. Restore marked construction to its original condition.
- D Certified Survey: On completion of foundation walls, major site improvements, and other work requiring field-engineering services, prepare a certified survey showing dimensions, locations, angles, and elevations of construction and sitework.
- E Final Property Survey: Engage a professional engineer to prepare a final property survey showing significant features (real property) for Project. Include on the survey a certification, signed by professional engineer, that principal metes, bounds, lines, and levels of Project are accurately positioned as shown on the survey.
 - 1. Show boundary lines, monuments, streets, site improvements and utilities, existing improvements and significant vegetation, adjoining properties, acreage, grade contours, and the distance and bearing from a site corner to a legal point.
 - 2. Recording: At Final Acceptance, have the final property survey recorded by or with authorities having jurisdiction as the official "property survey."

3.5 INSTALLATION

- A General: Locate the Work and components of the Work accurately, in correct alignment and elevation, as indicated.
 - 1. Make vertical work plumb and make horizontal work level.
 - 2. Where space is limited, install components to maximize space available for maintenance and ease of removal for replacement.
 - 3. Conceal pipes, ducts, and wiring in finished areas unless otherwise indicated.
 - 4. Maintain minimum headroom clearance of 96 inches in occupied spaces and 90 inches in unoccupied spaces.
- B Comply with manufacturer's written instructions and recommendations for installing products in applications indicated.
- C Install products at the time and under conditions that will ensure the best possible results. Maintain conditions required for product performance until Final Acceptance.
- D Conduct construction operations so no part of the Work is subjected to damaging operations or loading in excess of that expected during normal conditions of occupancy.
- E Sequence the Work and allow adequate clearances to accommodate movement of construction items on site and placement in permanent locations.
- F Tools and Equipment: Where possible, select tools or equipment that minimize production of excessive noise levels.
- G Templates: Obtain and distribute to the parties involved templates for work specified to be factory prepared and field installed. Check Shop Drawings of other portions of the Work to confirm that adequate provisions are made for locating and installing products to comply with indicated requirements.
- H Attachment: Provide blocking and attachment plates and anchors and fasteners of adequate size and number to securely anchor each component in place, accurately located and aligned with other portions of the Work. Where size and type of attachments are not indicated, verify size and type required for load conditions.
 - 1. Mounting Heights: Where mounting heights are not indicated, mount components at heights directed by Architect.
 - 2. Allow for building movement, including thermal expansion and contraction.

3. Coordinate installation of anchorages. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.
- I Joints: Make joints of uniform width. Where joint locations in exposed work are not indicated, arrange joints for the best visual effect. Fit exposed connections together to form hairline joints.
- J Repair or remove and replace damaged, defective, or nonconforming Work.
 1. Comply with Section 01 77 00 "Closeout Procedures" for repairing or removing and replacing defective Work.

3.6 CUTTING AND PATCHING

- A Cutting and Patching, General: Employ skilled workers to perform cutting and patching. Proceed with cutting and patching at the earliest feasible time, and complete without delay.
 1. Cut in-place construction to provide for installation of other components or performance of other construction, and subsequently patch as required to restore surfaces to their original condition.
- B Existing Warranties: Remove, replace, patch, and repair materials and surfaces cut or damaged during installation or cutting and patching operations, by methods and with materials so as not to void existing warranties.
- C Temporary Support: Provide temporary support of work to be cut.
- D Protection: Protect in-place construction during cutting and patching to prevent damage. Provide protection from adverse weather conditions for portions of Project that might be exposed during cutting and patching operations.
- E Adjacent Occupied Areas: Where interference with use of adjoining areas or interruption of free passage to adjoining areas is unavoidable, coordinate cutting and patching according to requirements in Section 01 10 00 "Summary."
- F Existing Utility Services and Mechanical/Electrical Systems: Where existing services/systems are required to be removed, relocated, or abandoned, bypass such services/systems before cutting to prevent interruption to occupied areas.
- G Cutting: Cut in-place construction by sawing, drilling, breaking, chipping, grinding, and similar operations, including excavation, using methods least likely to damage elements retained or adjoining construction. If possible, review proposed procedures with original Installer; comply with original Installer's written recommendations.
 1. In general, use hand or small power tools designed for sawing and grinding, not hammering and chopping. Cut holes and slots neatly to minimum size required, and with minimum disturbance of adjacent surfaces. Temporarily cover openings when not in use.
 2. Finished Surfaces: Cut or drill from the exposed or finished side into concealed surfaces.
 3. Concrete and Masonry: Cut using a cutting machine, such as an abrasive saw or a diamond-core drill.
 4. Excavating and Backfilling: Comply with requirements in applicable Sections where required by cutting and patching operations.
 5. Mechanical and Electrical Services: Cut off pipe or conduit in walls or partitions to be removed. Cap, valve, or plug and seal remaining portion of pipe or conduit to prevent entrance of moisture or other foreign matter after cutting.
 6. Proceed with patching after construction operations requiring cutting are complete.
- H Patching: Patch construction by filling, repairing, refinishing, closing up, and similar operations following performance of other work. Patch with durable seams that are as invisible as practicable. Provide materials and comply with installation requirements specified in other Sections, where applicable.
 1. Inspection: Where feasible, test and inspect patched areas after completion to demonstrate physical integrity of installation.
 2. Exposed Finishes: Restore exposed finishes of patched areas and extend finish restoration into retained adjoining construction in a manner that will minimize evidence of patching and refinishing.

- a. Clean piping, conduit, and similar features before applying paint or other finishing materials.
 - b. Restore damaged pipe covering to its original condition.
 3. Floors and Walls: Where walls or partitions that are removed extend one finished area into another, patch and repair floor and wall surfaces in the new space. Provide an even surface of uniform finish, color, texture, and appearance. Remove in-place floor and wall coverings and replace with new materials, if necessary, to achieve uniform color and appearance.
 - a. Where patching occurs in a painted surface, prepare substrate and apply primer and intermediate paint coats appropriate for substrate over the patch, and apply final paint coat over entire unbroken surface containing the patch. Provide additional coats until patch blends with adjacent surfaces.
 4. Ceilings: Patch, repair, or rehang in-place ceilings as necessary to provide an even-plane surface of uniform appearance.
 5. Exterior Building Enclosure: Patch components in a manner that restores enclosure to a weathertight condition and ensures thermal and moisture integrity of building enclosure.
- I Cleaning: Clean areas and spaces where cutting and patching are performed. Remove paint, mortar, oils, putty, and similar materials from adjacent finished surfaces.

3.7 OWNER-INSTALLED PRODUCTS

- A Site Access: Provide access to Project site for Owner's construction personnel.
- B Coordination: Coordinate construction and operations of the Work with work performed by Owner's construction personnel.
 1. Construction Schedule: Inform Owner of Contractor's preferred construction schedule for Owner's portion of the Work. Adjust construction schedule based on a mutually agreeable timetable. Notify Owner if changes to schedule are required due to differences in actual construction progress.
 2. Preinstallation Conferences: Include Owner's construction personnel at preinstallation conferences covering portions of the Work that are to receive Owner's work. Attend preinstallation conferences conducted by Owner's construction personnel if portions of the Work depend on Owner's construction.

3.8 PROGRESS CLEANING

- A General: Clean Project site and work areas daily, including common areas. Enforce requirements strictly. Dispose of materials lawfully.
 1. Comply with requirements in NFPA 241 for removal of combustible waste materials and debris.
 2. Do not hold waste materials more than seven days during normal weather or three days if the temperature is expected to rise above 80 deg F.
 3. Containerize hazardous and unsanitary waste materials separately from other waste. Mark containers appropriately and dispose of legally, according to regulations.
 - a. Use containers intended for holding waste materials of type to be stored.
 4. Coordinate progress cleaning for joint-use areas where Contractor and other contractors are working concurrently.
- B Site: Maintain Project site free of waste materials and debris.
- C Work Areas: Clean areas where work is in progress to the level of cleanliness necessary for proper execution of the Work.
 1. Remove liquid spills promptly.
 2. Where dust would impair proper execution of the Work, broom-clean or vacuum the entire work area, as appropriate.
- D Installed Work: Keep installed work clean. Clean installed surfaces according to written instructions of manufacturer or fabricator of product installed, using only cleaning materials specifically recommended. If specific cleaning materials are not recommended, use cleaning materials that are not hazardous to health or property and that will not damage exposed surfaces.
- E Concealed Spaces: Remove debris from concealed spaces before enclosing the space.

- F Exposed Surfaces in Finished Areas: Clean exposed surfaces and protect as necessary to ensure freedom from damage and deterioration at time of Final Acceptance.
- G Waste Disposal: Do not bury or burn waste materials on-site. Do not wash waste materials down sewers or into waterways. Comply with waste disposal requirements in Section 01 74 19 "Construction Waste Management and Disposal."
- H During handling and installation, clean and protect construction in progress and adjoining materials already in place. Apply protective covering where required to ensure protection from damage or deterioration at Final Acceptance.
- I Clean and provide maintenance on completed construction as frequently as necessary through the remainder of the construction period. Adjust and lubricate operable components to ensure operability without damaging effects.
- J Limiting Exposures: Supervise construction operations to ensure that no part of the construction, completed or in progress, is subject to harmful, dangerous, damaging, or otherwise deleterious exposure during the construction period.

3.9 STARTING AND ADJUSTING

- A Start equipment and operating components to confirm proper operation. Remove malfunctioning units, replace with new units, and retest.
- B Adjust equipment for proper operation. Adjust operating components for proper operation without binding.
- C Test each piece of equipment to verify proper operation. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.
- D Manufacturer's Field Service: Comply with qualification requirements in Section 01 40 00 "Quality Requirements."

3.10 PROTECTION OF INSTALLED CONSTRUCTION

- A Provide final protection and maintain conditions that ensure installed Work is without damage or deterioration at time of Final Acceptance.
- B Protection of Existing Items: Provide protection and ensure that existing items to remain undisturbed by construction are maintained in condition that existed at commencement of the Work.
- C Comply with manufacturer's written instructions for temperature and relative humidity.

END OF SECTION 01 73 00

SECTION 01 74 19 - CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL

PART 1 GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A This Section includes administrative and procedural requirements for the following:
 - 1. Salvaging nonhazardous construction waste.
 - 2. Recycling nonhazardous construction waste.
 - 3. Disposing of nonhazardous construction waste.

1.3 DEFINITIONS

- A Construction Waste: Building and site improvement materials and other solid waste resulting from construction, remodeling, renovation, or repair operations. Construction waste includes packaging.
- B Disposal: Removal off-site of construction waste and subsequent sale, recycling, reuse, or deposit in landfill or incinerator acceptable to authorities having jurisdiction.
- C Recycle: Recovery of construction waste for subsequent processing in preparation for reuse.
- D Salvage: Recovery of construction waste and subsequent sale or reuse in another facility.
- E Salvage and Reuse: Recovery of construction waste and subsequent incorporation into the Work.

1.4 MATERIALS OWNERSHIP

- A Unless otherwise indicated, construction waste becomes property of Contractor.
- B Historic items, relics, antiques, and similar objects including, but not limited to, cornerstones and their contents, commemorative plaques and tablets, and other items of interest or value to Owner that may be uncovered during construction remain the property of Owner.
 - 1. Carefully salvage in a manner to prevent damage and promptly return to Owner.

1.5 ACTION SUBMITTALS

- A Waste Management Plan and Progress Reports: Submit initial Waste Management Plan within 7 days of date established for the Notice to Proceed, and monthly progress reports. Submit monthly progress reports concurrent with each Application of Payment.

1.6 INFORMATIONAL SUBMITTALS

- A Recycling and Processing Facility Records: Indicate receipt and acceptance of recyclable waste by recycling and processing facilities licensed to accept them. Include manifests, weight tickets, receipts, and invoices.
- B Landfill and Incinerator Disposal Records: Indicate receipt and acceptance of waste by landfills and incinerator facilities licensed to accept them. Include manifests, weight tickets, receipts, and invoices.
- C Qualification Data: For waste management coordinator.

1.7 QUALITY ASSURANCE

- A Waste Management Coordinator Qualifications: Experienced firm, or individual employed and assigned by General Contractor, with a record of successful waste management coordination of projects with similar requirements. Superintendent may not serve as Waste Management Coordinator.
- B Regulatory Requirements: Comply with hauling and disposal regulations of authorities having jurisdiction.

- C Waste Management Conference: Conduct conference at Project site to comply with requirements in Division 01 Section "Project Management and Coordination." Review methods and procedures related to waste management including, but not limited to, the following:
1. Review and discuss waste management plan including responsibilities of Waste Management Coordinator.
 2. Review requirements for documenting quantities of each type of waste and its disposition.
 3. Review and finalize procedures for materials separation and verify availability of containers and bins needed to avoid delays.
 4. Review procedures for periodic waste collection and transportation to recycling and disposal facilities.
 5. Review waste management requirements for each trade.

1.8 WASTE MANAGEMENT PLAN

- A General: Develop plan consisting of waste identification, waste reduction work plan, and cost/revenue analysis. Indicate quantities by weight or volume, but use same units of measure throughout waste management plan.
- B Waste Identification: Indicate anticipated types and quantities of construction waste generated by the Work. Include estimated quantities and assumptions for estimates.
- C Waste Reduction Work Plan: List each type of waste and whether it will be salvaged, recycled, or disposed of in landfill or incinerator. Include points of waste generation, total quantity of each type of waste, quantity for each means of recovery, and handling and transportation procedures.
1. Salvaged Materials for Reuse: For materials that will be salvaged and reused in this Project, describe methods for preparing salvaged materials before incorporation into the Work.
 2. Salvaged Materials for Donation: For materials that will be donated to individuals and organizations, include list of their names, addresses, and telephone numbers.
 3. Recycled Materials: Include list of local receivers and processors and type of recycled materials each will accept. Include names, addresses, and telephone numbers.
 4. Disposed Materials: Indicate how and where materials will be disposed of. Include name, address, and telephone number of each landfill and incinerator facility.
 5. Handling and Transportation Procedures: Include method that will be used for separating recyclable waste including sizes of containers, container labeling, and designated location on Project site where materials separation will be located.

PART 2 PRODUCTS

2.1 WASTE VENDORS

- A Subject to compliance with requirements, approved waste vendors include the following:
1. Clean Harbors.
 2. Ecoflo.
 3. EEI.
 4. Heritage.
 5. PSC.
 6. Tradebe/PCI.
 7. Lee Iron and Metal Co., Inc.
 8. NSB.
 9. Veolia.

2.2 PERFORMANCE GOALS

- A General: Achieve end-of-Project rates for salvage/recycling of as much as possible of total nonhazardous solid waste generated by the Work. Practice efficient waste management in the use of materials in the course of the Work. Use all reasonable means to divert construction waste from landfills and incinerators. Facilitate recycling and salvage of materials.

PART 3 EXECUTION

3.1 PLAN IMPLEMENTATION

- A General: Implement waste management plan as approved by Architect and University of North Carolina at Wilmington. Provide handling, containers, storage, signage, transportation, and other items as required to implement waste management plan during the entire duration of the Contract.
 - 1. Comply with Division 01 Section "Temporary Facilities and Controls" for operation, termination, and removal requirements.
- B Waste Management Coordinator: Engage a waste management coordinator to be responsible for implementing, monitoring, and reporting status of waste management work plan. Coordinator shall be present at Project site full time for duration of Project.
- C Training: Train workers, subcontractors, and suppliers on proper waste management procedures, as appropriate for the Work occurring at Project site.
 - 1. Distribute waste management plan to everyone concerned within three days of submittal return.
 - 2. Distribute waste management plan to entities when they first begin work on-site. Review plan procedures and locations established for salvage, recycling, and disposal.
- D Site Access and Temporary Controls: Conduct waste management operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.
 - 1. Designate and label specific areas on Project site necessary for separating materials that are to be salvaged, recycled, reused, donated, and sold.

3.2 RECYCLING CONSTRUCTION WASTE, GENERAL

- A General: Recycle paper and beverage containers used by on-site workers.
- B Recycling Incentives: Revenues, savings, rebates, tax credits, and other incentives received for recycling waste materials shall accrue to Contractor.
- C Preparation of Waste: Prepare and maintain recyclable waste materials according to recycling or reuse facility requirements. Maintain materials free of dirt, adhesives, solvents, petroleum contamination, and other substances deleterious to the recycling process.
- D Procedures: Separate recyclable waste from other waste materials, trash, and debris. Separate recyclable waste by type at Project site to the maximum extent practical.
 - 1. Provide appropriately marked containers or bins for controlling recyclable waste until they are removed from Project site. Include list of acceptable and unacceptable materials at each container and bin.
 - a. Inspect containers and bins for contamination and remove contaminated materials if found.
 - 2. Stockpile processed materials on-site without intermixing with other materials. Place, grade, and shape stockpiles to drain surface water. Cover to prevent windblown dust.
 - 3. Stockpile materials away from construction area. Do not store within drip line of remaining trees.
 - 4. Store components off the ground and protect from the weather.
 - 5. Remove recyclable waste off Owner's property and transport to recycling receiver or processor.

3.3 RECYCLING CONSTRUCTION WASTE

- A Packaging:
 - 1. Cardboard and Boxes: Break down packaging into flat sheets. Bundle and store in a dry location.
 - 2. Polystyrene Packaging: Separate and bag materials.
 - 3. Pallets: As much as possible, require deliveries using pallets to remove pallets from Project site. For pallets that remain on-site, break down pallets into component wood pieces and comply with requirements for recycling wood.

- 4. Crates: Break down crates into component wood pieces and comply with requirements for recycling wood.
- B Gypsum Board: Stack large clean pieces on wood pallets or in container and store in a dry location.
- C Paint: Seal containers and store by type.

3.4 DISPOSAL OF WASTE

- A General: Except for items or materials to be salvaged, recycled, or otherwise reused, remove waste materials from Project site and legally dispose of them in a landfill or incinerator acceptable to authorities having jurisdiction.
 - 1. Except as otherwise specified, do not allow waste materials that are to be disposed of accumulate on-site.
 - 2. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.
- B Burning: Do not burn waste materials.
- C Disposal: Transport waste materials off Owner's property and legally dispose of them.

END OF SECTION 01 74 19

SECTION 01 77 00 - CLOSEOUT PROCEDURES

PART 1 GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A Section includes administrative and procedural requirements for Contract closeout, including, but not limited to, the following:
 1. Final Acceptance procedures.
 2. Final completion procedures.
 3. Warranties.
 4. Final cleaning.

1.3 DEFINITIONS

- A List of Incomplete Items: Contractor-prepared list of items to be completed or corrected, prepared for the Architect's use prior to Architect's inspection, to determine if the Work is substantially complete.

1.4 ACTION SUBMITTALS

- A Product Data: For each type of cleaning agent.
- B Contractor's List of Incomplete Items: Initial submittal at Final Acceptance.
- C Certified List of Incomplete Items: Final submittal at Final Completion.

1.5 CLOSEOUT SUBMITTALS

- A Certificates of Release: From authorities having jurisdiction.
- B Certificate of Insurance: For continuing coverage.
- C Field Report: For pest-control inspection.

1.6 MAINTENANCE MATERIAL SUBMITTALS

- A Schedule of Maintenance Material Items: For maintenance material submittal items required by other Sections.

1.7 FINAL ACCEPTANCE PROCEDURES

- A Contractor's List of Incomplete Items: Prepare and submit a list of items to be completed and corrected (Contractor's "punch list"), indicating the value of each item on the list and reasons why the Work is incomplete.
- B Submittals Prior to Final Acceptance: Complete the following a minimum of 10 days prior to requesting inspection for determining date of Final Acceptance. List items below that are incomplete at time of request.
 1. Certificates of Release: Obtain and submit releases from authorities having jurisdiction, permitting Owner unrestricted use of the Work and access to services and utilities. Include occupancy permits, operating certificates, and similar releases.
 2. Submit closeout submittals specified in other Division 01 Sections, including Project Record Documents, operation and maintenance manuals, damage or settlement surveys, property surveys, and similar final record information.
 3. Submit closeout submittals specified in individual Sections, including specific warranties, workmanship bonds, maintenance service agreements, final certifications, and similar documents.
 4. Submit maintenance material submittals specified in individual Sections, including tools, spare parts, extra materials, and similar items, and deliver to location designated by Architect. Label with manufacturer's name and model number.

- a. Schedule of Maintenance Material Items: Prepare and submit schedule of maintenance material submittal items, including name and quantity of each item and name and number of related Specification Section. Obtain Architect's signature for receipt of submittals.
5. Submit testing, adjusting, and balancing records.
- C Procedures Prior to Final Acceptance: Complete the following a minimum of 10 days prior to requesting inspection for determining date of Final Acceptance. List items below that are incomplete at time of request.
 1. Advise Owner of pending insurance changeover requirements.
 2. Make final changeover of permanent locks and deliver keys to Owner. Advise Owner's personnel of changeover in security provisions.
 3. Complete startup and testing of systems and equipment.
 4. Perform preventive maintenance on equipment used prior to Final Acceptance.
 5. Instruct Owner's personnel in operation, adjustment, and maintenance of products, equipment, and systems. Submit demonstration and training video recordings specified in Section 01 79 00 "Demonstration and Training."
 6. Advise Owner of changeover in utility services.
 7. Participate with Owner in conducting inspection and walkthrough with local emergency responders.
 8. Terminate and remove temporary facilities from Project site, along with mockups, construction tools, and similar elements.
 9. Complete final cleaning requirements.
 10. Touch up paint and otherwise repair and restore marred exposed finishes to eliminate visual defects.
- D Inspection: Submit a written request for inspection to determine Final Acceptance a minimum of 10 days prior to date the Work will be completed and ready for final inspection and tests. On receipt of request, Architect will either proceed with inspection or notify Contractor of unfulfilled requirements. Architect will prepare the Certificate of Final Acceptance after inspection or will notify Contractor of items, either on Contractor's list or additional items identified by Architect, that must be completed or corrected before certificate will be issued.
 1. Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected.
 2. Results of completed inspection will form the basis of requirements for Final Completion.

1.8 FINAL COMPLETION PROCEDURES

- A Submittals Prior to Final Completion: Before requesting final inspection for determining Final Completion, complete the following:
 1. Submit a final Application for Payment in accordance with Section 01 29 00 "Payment Procedures."
 2. Certified List of Incomplete Items: Submit certified copy of Architect's Final Acceptance inspection list of items to be completed or corrected (punch list), endorsed and dated by Architect. Certified copy of the list shall state that each item has been completed or otherwise resolved for acceptance.
 3. Certificate of Insurance: Submit evidence of final, continuing insurance coverage complying with insurance requirements.
 4. Submit pest-control final inspection report.
 5. Submit Contractor's General Warranty form.
 6. Submit Asbestos-Free Warranty form.
 7. Submit Final Completion photographic documentation.
- B Inspection: Submit a written request for final inspection to determine acceptance a minimum of 10 days prior to date the Work will be completed and ready for final inspection and tests. On receipt of request, Architect will either proceed with inspection or notify Contractor of unfulfilled requirements.

1. Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected.
- C State Construction Office (SCO) Final Inspection: Submit a written request for SCO final inspection to determine acceptance a minimum of 10 days prior to date the Work will be completed and ready for final inspection and tests. Architect will coordinate with the State Construction Office, Contractor and Owner for date SCO final inspection will occur. Architect will proceed with inspection with SCO Representative, Owner and Contractor present. Architect will prepare a final Certificate for Payment after inspection or will notify Contractor of construction that must be completed or corrected before certificate will be issued.
 1. Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected.

1.9 LIST OF INCOMPLETE ITEMS

- A Organization of List: Include name and identification of each space and area affected by construction operations for incomplete items and items needing correction including, if necessary, areas disturbed by Contractor that are outside the limits of construction.
 1. Organize list of spaces in sequential order, starting with exterior areas first and proceeding from lowest floor to highest floor, listed by room or space number.
 2. Organize items applying to each space by major element, including categories for ceilings, individual walls, floors, equipment, and building systems.
 3. Include the following information at the top of each page:
 - a. Project name.
 - b. Date.
 - c. Name of Architect.
 - d. Name of Contractor.
 - e. Page number.

1.10 SUBMITTAL OF PROJECT WARRANTIES

- A Time of Submittal: Submit written warranties on request of Architect for designated portions of the Work where warranties are indicated to commence on dates other than date of Final Acceptance, or when delay in submittal of warranties might limit Owner's rights under warranty.
- B Partial Occupancy: Submit properly executed warranties within 15 days of completion of designated portions of the Work that are completed and occupied or used by Owner during construction period by separate agreement with Contractor.
- C Organize warranty documents into an orderly sequence based on the table of contents of Project Manual.
- D Warranty Electronic File: Provide warranties and bonds in PDF format. Assemble complete warranty and bond submittal package into a single electronic PDF file with bookmarks enabling navigation to each item. Provide bookmarked table of contents at beginning of document.
 1. Submit on digital media acceptable to Architect.

PART 2 PRODUCTS

2.1 MATERIALS

- A Cleaning Agents: Use cleaning materials and agents recommended by manufacturer or fabricator of the surface to be cleaned. Do not use cleaning agents that are potentially hazardous to health or property or that might damage finished surfaces.

PART 3 EXECUTION

3.1 FINAL CLEANING

- A General: Perform final cleaning. Conduct cleaning and waste-removal operations to comply with local laws and ordinances and Federal and local environmental and antipollution regulations.

- B Cleaning: Employ experienced workers or professional cleaners for final cleaning. Clean each surface or unit to condition expected in an average commercial building cleaning and maintenance program. Comply with manufacturer's written instructions.
1. Complete the following cleaning operations before requesting inspection for certification of Final Acceptance for entire Project or for a designated portion of Project:
 - a. Clean Project site of rubbish, waste material, litter, and other foreign substances.
 - b. Sweep paved areas broom clean. Remove petrochemical spills, stains, and other foreign deposits.
 - c. Rake grounds that are not planted, mulched, or paved to a smooth, even-textured surface.
 - d. Remove tools, construction equipment, machinery, and surplus material from Project site.
 - e. Remove snow and ice to provide safe access to building.
 - f. Clean exposed exterior and interior hard-surfaced finishes to a dirt-free condition, free of stains, films, and similar foreign substances. Avoid disturbing natural weathering of exterior surfaces. Restore reflective surfaces to their original condition.
 - g. Remove debris and surface dust from limited-access spaces, including roofs, plenums, shafts, trenches, equipment vaults, manholes, attics, and similar spaces.
 - h. Clean flooring, removing debris, dirt, and staining; clean according to manufacturer's recommendations.
 - i. Vacuum and mop concrete.
 - j. Vacuum carpet and similar soft surfaces, removing debris and excess nap; clean according to manufacturer's recommendations if visible soil or stains remain.
 - k. Clean transparent materials, including mirrors and glass in doors and windows. Remove glazing compounds and other noticeable, vision-obscuring materials. Polish mirrors and glass, taking care not to scratch surfaces.
 - l. Remove labels that are not permanent.
 - m. Wipe surfaces of mechanical and electrical equipment, elevator equipment, and similar equipment. Remove excess lubrication, paint and mortar droppings, and other foreign substances.
 - n. Clean plumbing fixtures to a sanitary condition, free of stains, including stains resulting from water exposure.
 - o. Replace disposable air filters and clean permanent air filters. Clean exposed surfaces of diffusers, registers, and grills.
 - p. Clean ducts, blowers, and coils if units were operated without filters during construction or that display contamination with particulate matter on inspection.
 - q. Clean luminaires, lamps, globes, and reflectors to function with full efficiency.
 - r. Clean strainers.
 - s. Leave Project clean and ready for occupancy.
- C Pest Control: Comply with pest control requirements in Section 01 50 00 "Temporary Facilities and Controls." Prepare written report.

END OF SECTION 01 77 00

SECTION 01 78 23 - OPERATION AND MAINTENANCE DATA

PART 1 GENERAL

1.1 SUMMARY

- A Section includes administrative and procedural requirements for preparing operation and maintenance manuals, including the following:
 - 1. Operation and maintenance documentation directory manuals.
 - 2. Emergency manuals.
 - 3. Systems and equipment operation manuals.
 - 4. Systems and equipment maintenance manuals.
 - 5. Product maintenance manuals.

1.2 DEFINITIONS

- A System: An organized collection of parts, equipment, or subsystems united by regular interaction.
- B Subsystem: A portion of a system with characteristics similar to a system.

1.3 CLOSEOUT SUBMITTALS

- A Submit operation and maintenance manuals indicated. Provide content for each manual as specified in individual Specification Sections, and as reviewed and approved at the time of Section submittals. Submit reviewed manual content formatted and organized as required by this Section.
 - 1. Architect will comment on whether content of operation and maintenance submittals is acceptable.
 - 2. Where applicable, clarify and update reviewed manual content to correspond to revisions and field conditions.
- B Format: Submit operation and maintenance manuals in the following format:
 - 1. Submit on digital media acceptable to Architect. Enable reviewer comments on draft submittals.
- C Initial Manual Submittal: Submit draft copy of each manual at least 15 days before commencing demonstration and training. Architect will comment on whether general scope and content of manual are acceptable.
- D Final Manual Submittal: Submit each manual in final form prior to requesting inspection for Final Acceptance and at least 15 days before commencing demonstration and training. Architect will return copy with comments.
 - 1. Correct or revise each manual to comply with Architect's comments. Submit copies of each corrected manual within 15 days of receipt of Architect's comments and prior to commencing demonstration and training.
- E Comply with Section 01 77 00 "Closeout Procedures" for schedule for submitting operation and maintenance documentation.

1.4 FORMAT OF OPERATION AND MAINTENANCE MANUALS

- A Manuals, Electronic Files: Submit manuals in the form of a multiple file composite electronic PDF file for each manual type required.
 - 1. Electronic Files: Use electronic files prepared by manufacturer where available. Where scanning of paper documents is required, configure scanned file for minimum readable file size.
 - 2. File Names and Bookmarks: Bookmark individual documents based on file names. Name document files to correspond to system, subsystem, and equipment names used in manual directory and table of contents. Group documents for each system and subsystem into individual composite bookmarked files, then create composite manual, so that resulting bookmarks reflect the system, subsystem, and equipment names in a readily navigated file tree. Configure electronic manual to display bookmark panel on opening file.

1.5 REQUIREMENTS FOR EMERGENCY, OPERATION, AND MAINTENANCE MANUALS

- A Organization of Manuals: Unless otherwise indicated, organize each manual into a separate section for each system and subsystem, and a separate section for each piece of equipment not part of a system. Each manual shall contain the following materials, in the order listed:
 - 1. Title page.
 - 2. Table of contents.
 - 3. Manual contents.
- B Title Page: Include the following information:
 - 1. Subject matter included in manual.
 - 2. Name and address of Project.
 - 3. Name and address of Owner.
 - 4. Date of submittal.
 - 5. Name and contact information for Contractor.
 - 6. Name and contact information for Architect.
 - 7. Names and contact information for major consultants to the Architect that designed the systems contained in the manuals.
 - 8. Cross-reference to related systems in other operation and maintenance manuals.
- C Table of Contents: List each product included in manual, identified by product name, indexed to the content of the volume, and cross-referenced to Specification Section number in Project Manual.
 - 1. If operation or maintenance documentation requires more than one volume to accommodate data, include comprehensive table of contents for all volumes in each volume of the set.
- D Manual Contents: Organize into sets of manageable size. Arrange contents alphabetically by system, subsystem, and equipment. If possible, assemble instructions for subsystems, equipment, and components of one system into a single file.
- E Identification: In the documentation directory and in each operation and maintenance manual, identify each system, subsystem, and piece of equipment with same designation used in the Contract Documents. If no designation exists, assign a designation according to ASHRAE Guideline 4, "Preparation of Operating and Maintenance Documentation for Building Systems."

1.6 OPERATION AND MAINTENANCE DOCUMENTATION DIRECTORY MANUAL

- A Operation and Maintenance Documentation Directory: Prepare a separate manual that provides an organized reference to emergency, operation, and maintenance manuals. List items and their location to facilitate ready access to desired information. Include the following:
 - 1. List of Systems and Subsystems: List systems alphabetically. Include references to operation and maintenance manuals that contain information about each system.
 - 2. List of Equipment: List equipment for each system, organized alphabetically by system. For pieces of equipment not part of system, list alphabetically in separate list.
 - 3. Tables of Contents: Include a table of contents for each emergency, operation, and maintenance manual.

1.7 EMERGENCY MANUALS

- A Emergency Manual: Assemble a complete set of emergency information indicating procedures for use by emergency personnel and by Owner's operating personnel for types of emergencies indicated.
- B Content: Organize manual into a separate section for each of the following:
 - 1. Type of emergency.
 - 2. Emergency instructions.
 - 3. Emergency procedures.
- C Type of Emergency: Where applicable for each type of emergency indicated below, include instructions and procedures for each system, subsystem, piece of equipment, and component:
 - 1. Fire.
 - 2. Flood.

3. Gas leak.
 4. Water leak.
 5. Power failure.
 6. Water outage.
 7. System, subsystem, or equipment failure.
 8. Chemical release or spill.
- D Emergency Instructions: Describe and explain warnings, trouble indications, error messages, and similar codes and signals. Include responsibilities of Owner's operating personnel for notification of Installer, supplier, and manufacturer to maintain warranties.
- E Emergency Procedures: Include the following, as applicable:
1. Instructions on stopping.
 2. Shutdown instructions for each type of emergency.
 3. Operating instructions for conditions outside normal operating limits.
 4. Required sequences for electric or electronic systems.
 5. Special operating instructions and procedures.

1.8 SYSTEMS AND EQUIPMENT OPERATION MANUALS

- A Systems and Equipment Operation Manual: Assemble a complete set of data indicating operation of each system, subsystem, and piece of equipment not part of a system. Include information required for daily operation and management, operating standards, and routine and special operating procedures.
1. Engage a factory-authorized service representative to assemble and prepare information for each system, subsystem, and piece of equipment not part of a system.
 2. Prepare a separate manual for each system and subsystem, in the form of an instructional manual for use by Owner's operating personnel.
- B Content: In addition to requirements in this Section, include operation data required in individual Specification Sections and the following information:
1. System, subsystem, and equipment descriptions. Use designations for systems and equipment indicated on Contract Documents.
 2. Performance and design criteria if Contractor has delegated design responsibility.
 3. Operating standards.
 4. Operating procedures.
 5. Operating logs.
 6. Wiring diagrams.
 7. Control diagrams.
 8. Piped system diagrams.
 9. Precautions against improper use.
 10. License requirements including inspection and renewal dates.
- C Descriptions: Include the following:
1. Product name and model number. Use designations for products indicated on Contract Documents.
 2. Manufacturer's name.
 3. Equipment identification with serial number of each component.
 4. Equipment function.
 5. Operating characteristics.
 6. Limiting conditions.
 7. Performance curves.
 8. Engineering data and tests.
 9. Complete nomenclature and number of replacement parts.
- D Operating Procedures: Include the following, as applicable:
1. Startup procedures.
 2. Equipment or system break-in procedures.
 3. Routine and normal operating instructions.
 4. Regulation and control procedures.

5. Instructions on stopping.
6. Normal shutdown instructions.
7. Seasonal and weekend operating instructions.
8. Required sequences for electric or electronic systems.
9. Special operating instructions and procedures.
- E Systems and Equipment Controls: Describe the sequence of operation, and diagram controls as installed.
- F Piped Systems: Diagram piping as installed, and identify color coding where required for identification.

1.9 SYSTEMS AND EQUIPMENT MAINTENANCE MANUALS

- A Systems and Equipment Maintenance Manuals: Assemble a complete set of data indicating maintenance of each system, subsystem, and piece of equipment not part of a system. Include manufacturers' maintenance documentation, preventive maintenance procedures and frequency, repair procedures, wiring and systems diagrams, lists of spare parts, and warranty information.
 1. Engage a factory-authorized service representative to assemble and prepare information for each system, subsystem, and piece of equipment not part of a system.
 2. Prepare a separate manual for each system and subsystem, in the form of an instructional manual for use by Owner's operating personnel.
- B Content: For each system, subsystem, and piece of equipment not part of a system, include source information, manufacturers' maintenance documentation, maintenance procedures, maintenance and service schedules, spare parts list and source information, maintenance service contracts, and warranties and bonds as described below.
- C Source Information: List each system, subsystem, and piece of equipment included in manual, identified by product name and arranged to match manual's table of contents. For each product, list name, address, and telephone number of Installer or supplier and maintenance service agent, and cross-reference Specification Section number and title in Project Manual and drawing or schedule designation or identifier where applicable.
- D Manufacturers' Maintenance Documentation: Include the following information for each component part or piece of equipment:
 1. Standard maintenance instructions and bulletins; include only sheets pertinent to product or component installed. Mark each sheet to identify each product or component incorporated into the Work. If data include more than one item in a tabular format, identify each item using appropriate references from the Contract Documents. Identify data applicable to the Work and delete references to information not applicable.
 - a. Prepare supplementary text if manufacturers' standard printed data are not available and where the information is necessary for proper operation and maintenance of equipment or systems.
 2. Drawings, diagrams, and instructions required for maintenance, including disassembly and component removal, replacement, and assembly.
 3. Identification and nomenclature of parts and components.
 4. List of items recommended to be stocked as spare parts.
- E Maintenance Procedures: Include the following information and items that detail essential maintenance procedures:
 1. Test and inspection instructions.
 2. Troubleshooting guide.
 3. Precautions against improper maintenance.
 4. Disassembly; component removal, repair, and replacement; and reassembly instructions.
 5. Aligning, adjusting, and checking instructions.
 6. Demonstration and training video recording.
- F Maintenance and Service Schedules: Include service and lubrication requirements, list of required lubricants for equipment, and separate schedules for preventive and routine maintenance and service with standard time allotment.

1. Scheduled Maintenance and Service: Tabulate actions for daily, weekly, monthly, quarterly, semiannual, and annual frequencies.
2. Maintenance and Service Record: Include manufacturers' forms for recording maintenance.
- G Spare Parts List and Source Information: Include lists of replacement and repair parts, with parts identified and cross-referenced to manufacturers' maintenance documentation and local sources of maintenance materials and related services.
- H Maintenance Service Contracts: Include copies of maintenance agreements with name and telephone number of service agent.
- I Warranties and Bonds: Include copies of warranties and bonds and lists of circumstances and conditions that would affect validity of warranties or bonds.
 1. Include procedures to follow and required notifications for warranty claims.
- J Drawings: Prepare drawings supplementing manufacturers' printed data to illustrate the relationship of component parts of equipment and systems and to illustrate control sequence and flow diagrams. Coordinate these drawings with information contained in record Drawings to ensure correct illustration of completed installation.
 1. Do not use original project record documents as part of maintenance manuals.

1.10 PRODUCT MAINTENANCE MANUALS

- A Product Maintenance Manual: Assemble a complete set of maintenance data indicating care and maintenance of each product, material, and finish incorporated into the Work.
- B Content: Organize manual into a separate section for each product, material, and finish. Include source information, product information, maintenance procedures, repair materials and sources, and warranties and bonds, as described below.
- C Source Information: List each product included in manual, identified by product name and arranged to match manual's table of contents. For each product, list name, address, and telephone number of Installer or supplier and maintenance service agent, and cross-reference Specification Section number and title in Project Manual and drawing or schedule designation or identifier where applicable.
- D Product Information: Include the following, as applicable:
 1. Product name and model number.
 2. Manufacturer's name.
 3. Color, pattern, and texture.
 4. Material and chemical composition.
 5. Reordering information for specially manufactured products.
- E Maintenance Procedures: Include manufacturer's written recommendations and the following:
 1. Inspection procedures.
 2. Types of cleaning agents to be used and methods of cleaning.
 3. List of cleaning agents and methods of cleaning detrimental to product.
 4. Schedule for routine cleaning and maintenance.
 5. Repair instructions.
- F Repair Materials and Sources: Include lists of materials and local sources of materials and related services.
- G Warranties and Bonds: Include copies of warranties and bonds and lists of circumstances and conditions that would affect validity of warranties or bonds.
 1. Include procedures to follow and required notifications for warranty claims.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION 01 78 23

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SECTION 01 78 39 - PROJECT RECORD DOCUMENTS

PART 1 GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A Section includes administrative and procedural requirements for project record documents, including the following:
 - 1. Record Drawings.
 - 2. Record Specifications.
 - 3. Record Product Data.

1.3 CLOSEOUT SUBMITTALS

- A Record Drawings: Comply with the following:
 - 1. Submit record digital data files and three set(s) of record digital data file plots.
 - 2. Plot each drawing file, whether or not changes and additional information were recorded.
- B Record Specifications: Submit annotated PDF electronic files of Project's Specifications, including addenda and contract modifications.
- C Record Product Data: Submit annotated PDF electronic files and directories of each submittal.
 - 1. Where record Product Data are required as part of operation and maintenance manuals, submit duplicate marked-up Product Data as a component of manual.

1.4 RECORD DRAWINGS

- A Record Digital Data Files: Immediately before inspection for Certificate of Final Acceptance, review marked-up record prints with Architect. When authorized, prepare a full set of corrected digital data files of the Contract Drawings, as follows:
 - 1. Format: Same digital data software program, version, and operating system as the original Contract Drawings.
 - 2. Incorporate changes and additional information previously marked on record prints. Delete, redraw, and add details and notations where applicable.
 - 3. Refer instances of uncertainty to Architect for resolution.

1.5 RECORD SPECIFICATIONS

- A Preparation: Mark Specifications to indicate the actual product installation where installation varies from that indicated in Specifications, addenda, and contract modifications.
 - 1. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.
 - 2. Mark copy with the proprietary name and model number of products, materials, and equipment furnished, including substitutions and product options selected.
 - 3. Record the name of manufacturer, supplier, Installer, and other information necessary to provide a record of selections made.
 - 4. For each principal product, indicate whether record Product Data has been submitted in operation and maintenance manuals instead of submitted as record Product Data.
 - 5. Note related Change Orders, record Product Data, and record Drawings where applicable.
- B Format: Submit record Specifications as annotated PDF electronic file.

1.6 RECORD PRODUCT DATA

- A Recording: Maintain one copy of each submittal during the construction period for project record document purposes. Post changes and revisions to project record documents as they occur; do not wait until end of Project.

- B Preparation: Mark Product Data to indicate the actual product installation where installation varies substantially from that indicated in Product Data submittal.
 - 1. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.
 - 2. Include significant changes in the product delivered to Project site and changes in manufacturer's written instructions for installation.
 - 3. Note related Change Orders, record Specifications, and record Drawings where applicable.
- C Format: Submit record Product Data as annotated PDF electronic file.
 - 1. Include record Product Data directory organized by Specification Section number and title, electronically linked to each item of record Product Data.

1.7 MAINTENANCE OF RECORD DOCUMENTS

- A Maintenance of Record Documents: Store record documents in the field office apart from the Contract Documents used for construction. Do not use project record documents for construction purposes. Maintain record documents in good order and in a clean, dry, legible condition, protected from deterioration and loss. Provide access to project record documents for Architect's reference during normal working hours.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION 01 78 39

SECTION 01 79 00 - DEMONSTRATION AND TRAINING

PART 1 GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A Section includes administrative and procedural requirements for instructing Owner's personnel, including the following:
 - 1. Demonstration of operation of systems, subsystems, and equipment.
 - 2. Training in operation and maintenance of systems, subsystems, and equipment.

1.3 INFORMATIONAL SUBMITTALS

- A Instruction Program: Submit outline of instructional program for demonstration and training, including a list of training modules and a schedule of proposed dates, times, length of instruction time, and instructors' names for each training module. Include learning objective and outline for each training module.
 - 1. Indicate proposed training modules using manufacturer-produced demonstration and training video recordings for systems, equipment, and products in lieu of video recording of live instructional module.
- B Attendance Record: For each training module, submit list of participants and length of instruction time.
- C Evaluations: For each participant and for each training module, submit results and documentation of performance-based test.

1.4 CLOSEOUT SUBMITTALS

- A Demonstration and Training Video Recordings: Submit two copies within seven days of end of each training module.
 - 1. Identification: On each copy, provide an applied label with the following information:
 - a. Name of Project.
 - b. Name and address of videographer.
 - c. Name of Architect.
 - d. Name of Contractor.
 - e. Date of video recording.
 - 2. Transcript: Prepared and bound in format matching operation and maintenance manuals. Mark appropriate identification on front and spine of each binder. Include a cover sheet with same label information as the corresponding video recording. Include name of Project and date of video recording on each page.
 - 3. At completion of training, submit complete training manual(s) for Owner's use prepared in same PDF file format required for operation and maintenance manuals specified in Section 01 78 23 "Operation and Maintenance Data."

1.5 QUALITY ASSURANCE

- A Instructor Qualifications: A factory-authorized service representative, complying with requirements in Section 01 40 00 "Quality Requirements," experienced in operation and maintenance procedures and training.
- B Videographer Qualifications: A professional videographer who is experienced photographing demonstration and training events similar to those required.
- C Preinstruction Conference: Conduct conference at Project site to comply with requirements in Section 01 31 00 "Project Management and Coordination." Review methods and procedures related to demonstration and training including, but not limited to, the following:
 - 1. Inspect and discuss locations and other facilities required for instruction.

2. Review and finalize instruction schedule and verify availability of educational materials, instructors' personnel, audiovisual equipment, and facilities needed to avoid delays.
3. Review required content of instruction.
4. For instruction that must occur outside, review weather and forecasted weather conditions and procedures to follow if conditions are unfavorable.

1.6 COORDINATION

- A Coordinate instruction schedule with Owner's operations. Adjust schedule as required to minimize disrupting Owner's operations and to ensure availability of Owner's personnel.
- B Coordinate instructors, including providing notification of dates, times, length of instruction time, and course content.
- C Coordinate content of training modules with content of approved emergency, operation, and maintenance manuals. Do not submit instruction program until operation and maintenance data has been reviewed and approved by Architect.

PART 2 PRODUCTS

2.1 INSTRUCTION PROGRAM

- A Program Structure: Develop an instruction program that includes individual training modules for each system and for equipment not part of a system, as required by individual Specification Sections.
- B Training Modules: Develop a learning objective and teaching outline for each module. Include a description of specific skills and knowledge that participant is expected to master. For each module, include instruction for the following as applicable to the system, equipment, or component:
 1. Basis of System Design, Operational Requirements, and Criteria: Include the following:
 - a. System, subsystem, and equipment descriptions.
 - b. Performance and design criteria if Contractor is delegated design responsibility.
 - c. Operating standards.
 - d. Regulatory requirements.
 - e. Equipment function.
 - f. Operating characteristics.
 - g. Limiting conditions.
 - h. Performance curves.
 2. Documentation: Review the following items in detail:
 - a. Emergency manuals.
 - b. Operations manuals.
 - c. Maintenance manuals.
 - d. Project record documents.
 - e. Identification systems.
 - f. Warranties and bonds.
 - g. Maintenance service agreements and similar continuing commitments.
 3. Emergencies: Include the following, as applicable:
 - a. Instructions on meaning of warnings, trouble indications, and error messages.
 - b. Instructions on stopping.
 - c. Shutdown instructions for each type of emergency.
 - d. Operating instructions for conditions outside of normal operating limits.
 - e. Sequences for electric or electronic systems.
 - f. Special operating instructions and procedures.
 4. Operations: Include the following, as applicable:
 - a. Startup procedures.
 - b. Equipment or system break-in procedures.
 - c. Routine and normal operating instructions.
 - d. Regulation and control procedures.

- e. Control sequences.
- f. Safety procedures.
- g. Instructions on stopping.
- h. Normal shutdown instructions.
- i. Operating procedures for emergencies.
- j. Operating procedures for system, subsystem, or equipment failure.
- k. Seasonal and weekend operating instructions.
- l. Required sequences for electric or electronic systems.
- m. Special operating instructions and procedures.
- 5. Adjustments: Include the following:
 - a. Alignments.
 - b. Checking adjustments.
 - c. Noise and vibration adjustments.
 - d. Economy and efficiency adjustments.
- 6. Troubleshooting: Include the following:
 - a. Diagnostic instructions.
 - b. Test and inspection procedures.
- 7. Maintenance: Include the following:
 - a. Inspection procedures.
 - b. Types of cleaning agents to be used and methods of cleaning.
 - c. List of cleaning agents and methods of cleaning detrimental to product.
 - d. Procedures for routine cleaning
 - e. Procedures for preventive maintenance.
 - f. Procedures for routine maintenance.
 - g. Instruction on use of special tools.
- 8. Repairs: Include the following:
 - a. Diagnosis instructions.
 - b. Repair instructions.
 - c. Disassembly; component removal, repair, and replacement; and reassembly instructions.
 - d. Instructions for identifying parts and components.
 - e. Review of spare parts needed for operation and maintenance.

PART 3 EXECUTION

3.1 PREPARATION

- A Assemble educational materials necessary for instruction, including documentation and training module. Assemble training modules into a training manual organized in coordination with requirements in Division 01 Section "Operations and Maintenance Data."

3.2 INSTRUCTION

- A Facilitator: Engage a qualified facilitator to prepare instruction program and training modules, to coordinate instructors, and to coordinate between Contractor and Owner for number of participants, instruction times, and location.
- B Engage qualified instructors to instruct Owner's personnel to adjust, operate, and maintain systems, subsystems, and equipment not part of a system.
- C Scheduling: Provide instruction at mutually agreed on times. For equipment that requires seasonal operation, provide similar instruction at start of each season.
 - 1. Schedule training with Owner, through Architect, with at least seven days' advance notice.
- D Training Location and Reference Material: Conduct training on-site in the completed and fully operational facility using the actual equipment in-place. Conduct training using final operation and maintenance data submittals.
- E Evaluation: At conclusion of each training module, assess and document each participant's mastery of module by use of a demonstration performance-based test.

- F Cleanup: Collect used and leftover educational materials and remove from Project site. Remove instructional equipment. Restore systems and equipment to condition existing before initial training use.

3.3 DEMONSTRATION AND TRAINING VIDEO RECORDINGS

- A General: Engage a qualified commercial videographer to record demonstration and training video recordings. Record each training module separately. Include classroom instructions and demonstrations, board diagrams, and other visual aids, but not student practice.
1. At beginning of each training module, record each chart containing learning objective and lesson outline.
- B Digital Video Recordings: Provide high-resolution, digital video in MPEG format, produced by a digital camera with minimum sensor resolution of 12 megapixels and capable of recording in full HD mode.
1. Submit video recordings on CD-ROM or thumb drive.
 2. File Hierarchy: Organize folder structure and file locations according to Project Manual table of contents. Provide complete screen-based menu.
 3. File Names: Utilize file names based on name of equipment generally described in video segment, as identified in Project specifications.
 4. Contractor and Installer Contact File: Using appropriate software, create a file for inclusion on the equipment demonstration and training recording that describes the following for each Contractor involved on the Project, arranged according to Project Manual table of contents:
 - a. Name of Contractor/Installer.
 - b. Business address.
 - c. Business phone number.
 - d. Point of contact.
 - e. Email address.
- C Recording: Mount camera on tripod before starting recording, unless otherwise necessary to adequately cover area of demonstration and training. Display continuous running time.
1. Film training session(s) in segments not to exceed 15 minutes.
 - a. Produce segments to present a single significant piece of equipment per segment.
 - b. Organize segments with multiple pieces of equipment to follow order of Project Manual table of contents.
 - c. Where a training session on a particular piece of equipment exceeds 15 minutes, stop filming and pause training session. Begin training session again upon commencement of new filming segment.
- D Light Levels: Verify light levels are adequate to properly light equipment. Verify equipment markings are clearly visible prior to recording.
1. Furnish additional portable lighting as required.
- E Narration: Describe scenes on video recording by audio narration by microphone while video recording is recorded. Include description of items being viewed.
- F Transcript: Provide a transcript of the narration. Display images and running time captured from videotape opposite the corresponding narration segment.
- G Preproduced Video Recordings: Provide video recordings used as a component of training modules in same format as recordings of live training.

END OF SECTION 01 79 00

SECTION 03 35 46 - CONCRETE TOPICAL TREATMENTS

PART 1 GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A Section Includes:
 - 1. Surface preparation and the application of penetrating sealer for interior horizontal concrete substrates.
 - 2. Supplementary components and accessories normally furnished or otherwise necessary for a complete application.

1.3 REFERENCES

- A Acronyms and Abbreviations:
 - 1. SCAQMD: South Coast Air Quality Management District.
 - 2. VOC: Volatile Organic Compounds.
- B Definitions:
 - 1. Manufacturer: Means the penetrating concrete sealer manufacturer unless otherwise indicated.
 - 2. Sealer: Means the penetrating concrete sealer.

1.4 ACTION SUBMITTALS

- A Product Data: For each product specified. Include the following:
 - 1. Substrate preparation requirements and application instructions.
 - 2. Current Health Product Declaration.
 - 3. Current Environmental Product Declaration.
 - 4. Indicate VOC content.

1.5 DELIVERY, STORAGE, AND HANDLING

- A Store materials not in use in tightly covered containers in well-ventilated areas with ambient temperatures continuously maintained at not less than 45 degrees Fahrenheit.
 - 1. Maintain containers in clean condition, free of foreign materials and residue.
 - 2. Remove rags and waste from storage areas daily.

1.6 COORDINATION

- A Coordination: Close areas indicated as receiving sealer to traffic during application, and after application for period of time recommended in writing by the manufacturer.

1.7 FIELD CONDITIONS

- A Apply coatings only when temperatures of surfaces indicated to be coated, relative humidity, and ambient air temperatures are within range recommended in writing by the manufacturer.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A Penetrating Concrete Floor Sealer: Deep penetrating product that chemically reacts with concrete to permanently seal, densify, and harden surfaces, and make them water resistant.
 - 1. Product (CON-1): Subject to compliance with the Contract Documents, provide one of the following.
 - a. "Euco Diamond Hard" manufactured by The Euclid Chemical Company.
 - b. "L&M Seal Hard" manufactured by LATICRETE International. Inc.

- c. "LIQUI-HARD" manufactured by W.R. Meadows, Inc.
- B Allowable VOC Content: Architectural coatings intended to be field applied must comply with SCAQMD Rule 1113 VOC limits.

PART 3 EXECUTION

3.1 EXAMINATION

- A Examine substrates and conditions, with applicator present, for compliance with conditions affecting performance of the work.
- B Verify suitability of substrates, including surface conditions and compatibility, with existing finishes and primers.
- C Do not proceed with sealer application until unsatisfactory conditions have been corrected.
 - 1. Application of sealer indicates acceptance of surfaces and conditions.

3.2 PREPARATION

- A Comply with manufacturer's written instructions.
- B Clean substrates of substances that could impair penetration of sealer, including dust, dirt, oil, and grease.
- C Concrete Substrates: Remove release agents, curing compounds, efflorescence, and chalk. Do not coat surfaces if moisture content or alkalinity of surfaces to receive sealer exceeds that permitted in manufacturer's written instructions.

3.3 APPLICATION

- A Apply sealer according to manufacturer's written instructions.
 - 1. Use applicators and techniques suited for sealer and substrate indicated.
 - 2. Protect adjacent surfaces from overspray and spills until application is completed and fully cured.
- B Do not allow sealer to puddle. Completely remove all excess sealer from concrete surface when application is complete.

3.4 REPAIRS

- A Correction: Dried excess sealer may cause a white residue to form on concrete. Remove residue by grinding or sanding, as recommended or required in writing by the manufacturer, and reapply.

END OF SECTION 03 35 46

SECTION 03 45 00 - PRECAST ARCHITECTURAL CONCRETE, LANDSCAPE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes:

- 1. Architectural precast concrete units for exterior use, finished face exposed to view:
 - a. Monumental steps and benches.

- B. Related Requirements:

- 1. Section 033000 "Cast-in-Place Concrete" for installing connection anchors in concrete.

1.3 PREINSTALLATION MEETINGS

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

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product.

- B. Sustainable Design Submittals:

- 1. Product Data: For recycled content, indicating postconsumer and preconsumer recycled content and cost.
 - 2. Product Certificates: For regional materials, indicating location of material manufacturer and point of extraction, harvest, or recovery for each raw material. Include distance to Project and cost for each regional material.

- C. Design Mixtures: For each precast concrete mixture. Include compressive strength and water-absorption tests.

- D. Shop Drawings:

- 1. Detail fabrication and installation of architectural precast concrete units.
 - 2. Indicate locations, plans, elevations, dimensions, shapes, and cross sections of each unit.
 - 3. Indicate joints, reveals, drips, chamfers, and extent and location of each surface finish.
 - 4. Indicate details at corners.
 - 5. Indicate separate face and backup mixture locations and thicknesses.
 - 6. Indicate type, size, and length of welded connections by AWS standard symbols. Detail loose and cast-in hardware and connections.

7. Indicate locations, tolerances, and details of anchorage devices to be embedded in or attached to structure or other construction.
 8. Indicate locations, extent, and treatment of dry joints if two-stage casting is proposed.
 9. Include plans and elevations showing unit location and sequence of erection for special conditions.
 10. Indicate location of each architectural precast concrete unit by same identification mark placed on panel.
 11. Indicate relationship of architectural precast concrete units to adjacent materials.
 12. If design modifications are proposed to meet performance requirements and field conditions, submit design calculations and Shop Drawings. Do not adversely affect the appearance, durability, or strength of units when modifying details or materials and maintain the general design concept.
- E. Samples: Design reference samples for initial verification of design intent, for each type of finish indicated on exposed surfaces of architectural precast concrete units, in sets of three, representative of finish, color, and texture variations expected; approximately 12 by 12 by 6 inches. Sample shall be representative of specified architectural finish, color, and texture on 5 faces with bottom hidden face matching fabricator standard finish and texture.
1. Multiple faces of architectural precast concrete units will be exposed to view as indicated in construction drawings. All exposed faces shall have consistent finish, color, and texture.
- F. Delegated-Design Submittal: For architectural precast concrete indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.
1. Show governing panel types, connections, types of reinforcement, including special reinforcement, and concrete cover on reinforcement. Indicate location, type, magnitude, and direction of loads imposed on the building structural frame from architectural precast concrete.

1.5 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For fabricator.
- B. Professional Engineer Qualifications.
- C. Material Certificates: For the following items:
1. Cementitious materials.
 2. Reinforcing materials.
 3. Admixtures.
 4. Bearing pads.
 5. Other miscellaneous components as required by delegated-design professional engineer.
- D. Material Test Reports: For aggregates.
- E. Source quality-control test reports.

1.6 QUALITY ASSURANCE

- A. Fabricator Qualifications: A firm that assumes responsibility for engineering architectural precast concrete units to comply with performance requirements. This responsibility includes preparation of Shop Drawings and comprehensive engineering analysis by a qualified professional engineer.
 - 1. Designated as a PCI-certified plant for Group A, Category A1 - Architectural Cladding and Load Bearing Units at time of bidding.
- B. Source Limitations for Precast Concrete Units: Obtain architectural precast concrete units through single source from single manufacturer.
- C. Source Limitations for Raw Materials: Obtain raw materials of a uniform quality from one source for each raw material.
- D. Engineering Responsibility: Preparation of Shop Drawings, design calculations, and other structural data by a qualified professional engineer.
- E. Professional Engineer Qualifications: A professional engineer who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing engineering services of the kind indicated. Engineering services are defined as those performed for design and installation of architectural precast concrete units similar to those indicated for this Project in material, design, and extent.
- F. Quality-Control Standard: For manufacturing procedures and testing requirements, quality-control recommendations, and dimensional tolerances for types of units required, comply with PCI MNL 117, "Manual for Quality Control for Plants and Production of Architectural Precast Concrete Products."
- G. Sample Panels: After sample approval and before fabricating architectural precast concrete units, produce a minimum of two sample panels approximately 48 x 12 x 12 inches, for review by Architect. Incorporate full-scale details of architectural features, finishes, textures, and transitions in sample panels.
 - 1. Locate panels where indicated or, if not indicated, as directed by Architect.
 - 2. Damage part of an exposed-face surface for each finish, color, and texture, and demonstrate adequacy of repair techniques proposed for repair of surface blemishes.
 - 3. After acceptance of repair technique, maintain one sample panel at manufacturer's plant and one at Project site in an undisturbed condition as a standard for judging the completed Work.
 - 4. Demolish and remove sample panels when directed.
- H. Range Samples: After sample panel approval and before fabricating architectural precast concrete units, produce a minimum of 3 sets of samples, approximately 24 x 12 x 12 inches, representing anticipated range of each color and texture on Project's units. Maintain one set of range samples at Project site, cast-stone manufacturer plant, and remaining range sample set at manufacturer's plant as color and texture approval reference.
- I. Mockups: After sample panel and range sample approval but before production of architectural precast concrete units, construct full-sized mockups to verify selections made under Sample submittals and to demonstrate aesthetic effects and to set quality standards for materials and execution.

1. Build stadium stair mockup approximately 48 inches wide by 18 inches height. Provide joint for filling with joint fillers for joint color and finishing review and approval.
2. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
3. Approved mockups may NOT become part of the completed Work.

1.7 COORDINATION

- A. Furnish loose connection hardware and anchorage items to be embedded in or attached to other construction without delaying the Work. Provide locations, setting diagrams, templates, instructions, and directions, as required, for installation.

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Deliver architectural precast concrete units in such quantities and at such times to limit unloading units temporarily on the ground or other rehandling.
- B. Support units during shipment on nonstaining shock-absorbing material.
- C. Store units with adequate dunnage and bracing and protect units to prevent contact with soil, to prevent staining, and to prevent cracking, distortion, warping or other physical damage.
- D. Place stored units so identification marks are clearly visible, and units can be inspected.
- E. Handle and transport units in a manner that avoids excessive stresses that cause cracking or damage.
- F. Lift and support units only at designated points indicated on Shop Drawings.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. General: Architectural precast concrete manufacturer shall have proven track record working with cast stone manufacturers to provide architectural precast concrete units in similar likeness to cast stone products on the same project. Architectural precast concrete manufacturer shall have capability to work with full range of aggregates, pigments, and finishing procedures to satisfy requirements of Samples.

2.2 PERFORMANCE REQUIREMENTS

- A. Delegated Design: Engage a qualified professional engineer, as defined in this Section and Section 014000 "Quality Requirements," to design architectural precast concrete units.
- B. Design Standards: Comply with ACI 318 and design recommendations of PCI MNL 120, "PCI Design Handbook - Precast and Prestressed Concrete," applicable to types of architectural precast concrete units indicated.

- C. Structural Performance: Provide architectural precast concrete units and connections capable of withstanding the following design loads within limits and under conditions indicated:
1. Loads: Delegated-design professional engineer shall design loads per current NC Building Code.
 2. Design precast concrete units and connections to maintain clearances at openings, to allow for fabrication and construction tolerances, to accommodate live-load deflection, shrinkage and creep of other structures, and other structure movements, and thermal movements as determined by Delegated-design professional engineer.

2.3 MOLD MATERIALS

- A. Molds: Rigid, dimensionally stable, non-absorptive material, warp and buckle free, that provides continuous and true precast concrete surfaces within fabrication tolerances indicated; nonreactive with concrete and suitable for producing required finishes.
1. Mold-Release Agent: Commercially produced form-release agent that does not bond with, stain or adversely affect precast concrete surfaces and does not impair subsequent surface or joint treatments of precast concrete.
- B. Form Liners: Units of face design, texture, arrangement, and configuration as required to satisfy Sample requirements. Use with manufacturer's recommended form-release agent that does not bond with, stain, or adversely affect precast concrete surfaces and does not impair subsequent surface or joint treatments of precast concrete.
- C. Surface Retarder: Chemical set retarder, capable of temporarily delaying final hardening of newly placed concrete mixture to depth of reveal specified.

2.4 REINFORCING MATERIALS

- A. Recycled Content of Steel Products: Postconsumer recycled content plus one-half of preconsumer recycled content not less than 25 percent.
- B. Reinforcing Bars: ASTM A 615/A 615M, Grade 60, deformed.
- C. Low-Alloy-Steel Reinforcing Bars: ASTM A 706/A 706M, deformed.
- D. Use galvanized or epoxy-coated reinforcement when covered with less than 1-1/2 inches precast concrete material:
1. Galvanized Reinforcing Bars: ASTM A 615/A 615M, Grade 60 or ASTM A 706/A 706M, deformed bars, with ASTM A 767/A 767M, Class II zinc coating and chromate treatment.
 2. Epoxy-Coated Reinforcing Bars: ASTM A 615/A 615M, Grade 60 or ASTM A 706/A 706M, deformed bars, or ASTM A 775/A 775M or ASTM A 934/A 934M epoxy coated.
- E. Plain-Steel Welded Wire Reinforcement: ASTM A 185/A 185M, fabricated from galvanized-steel wire into flat sheets.
- F. Deformed-Steel Welded Wire Reinforcement: ASTM A 497/A 497M, flat sheet.

- G. Epoxy-Coated-Steel Wire: ASTM A 884/A 884M, Class A coated, plain or deformed, flat sheet, Type 1 bendable or Type 2 nonbendable coating.
- H. Supports: Suspend reinforcement from back of mold or use bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars and welded wire reinforcement in place according to PCI MNL 117.

2.5 CONCRETE MATERIALS

- A. Regional Materials: Concrete shall be manufactured within 500 miles of Project site from aggregates and cementitious materials that have been extracted, harvested, or recovered, as well as manufactured, within 500 miles of Project site.
- B. Portland Cement: ASTM C 150/C 150M, Type I or Type III, gray, unless otherwise indicated or required to satisfy Sample requirements.
 - 1. For surfaces exposed to view in finished structure, use gray or white cement, of same type, brand, and mill source.
- C. Supplementary Cementitious Materials: Allowed unless supplementary cementitious materials affect finish, color, or texture and conflict with satisfying Sample requirements.
 - 1. Fly Ash: ASTM C 618, Class C or F, with maximum loss on ignition of 3 percent.
 - 2. Metakaolin: ASTM C 618, Class N.
 - 3. Silica Fume: ASTM C 1240, with optional chemical and physical requirement.
 - 4. Ground Granulated Blast-Furnace Slag: ASTM C 989, Grade 100 or 120.
 - 5. Blended Hydraulic Cement: ASTM C 595, Type IS, portland blast-furnace slag, Type IP, portland-pozzolan, Type I (PM), pozzolan-modified portland, or Type I (SM), slag-modified portland cement.
- D. Normal-Weight Aggregates: Except as modified by PCI MNL 117, ASTM C 33/C 33M, with coarse aggregates complying with Class 5S. Stockpile fine and coarse aggregates for each type of exposed finish from a single source (pit or quarry) for Project.
 - 1. Face-Mixture-Coarse Aggregates: Selected, hard, and durable; free of material that reacts with cement or causes staining; to match selected finish sample.
 - 2. Face-Mixture-Fine Aggregates: Selected, natural or manufactured sand compatible with coarse aggregate; to match approved finish sample.
- E. Coloring Admixture: ASTM C 979/C 979M, synthetic or natural mineral-oxide pigments or colored water-reducing admixtures, temperature stable, and nonfading.
- F. Water: Potable; free from deleterious material that may affect color stability, setting, or strength of concrete and complying with chemical limits of PCI MNL 117.
- G. Air-Entraining Admixture: ASTM C 260, certified by manufacturer to be compatible with other required admixtures.
- H. Chemical Admixtures: Certified by manufacturer to be compatible with other admixtures and to not contain calcium chloride, or more than 0.15 percent chloride ions or other salts by weight of admixture.
 - 1. Water-Reducing Admixtures: ASTM C 494/C 494M, Type A.

2. Retarding Admixture: ASTM C 494/C 494M, Type B.
3. Water-Reducing and Retarding Admixture: ASTM C 494/C 494M, Type D.
4. Water-Reducing and Accelerating Admixture: ASTM C 494/C 494M, Type E.
5. High-Range, Water-Reducing Admixture: ASTM C 494/C 494M, Type F.
6. High-Range, Water-Reducing and Retarding Admixture: ASTM C 494/C 494M, Type G.
7. Plasticizing Admixture: ASTM C 1017/C 1017M, Type I.
8. Plasticizing and Retarding Admixture: ASTM C 1017/C 1017M, Type II.
9. Corrosion Inhibiting Admixture: ASTM C 1582/C 1582M.

2.6 ACCESSORIES

- A. Precast Accessories: Provide clips, hangers, high-density plastic or steel shims, and other accessories required to install architectural precast concrete units.

2.7 GROUT MATERIALS

- A. Sand-Cement Grout: Portland cement, ASTM C 150/C 150M, Type I, and clean, natural sand, ASTM C 144 or ASTM C 404. Mix at ratio of 1 part cement to 2-1/2 to 3 parts sand, by volume, with minimum water required for placement and hydration. Water-soluble chloride ion content less than 0.06 percent by weight of cement when tested according to ASTM C 1218/C 1218M.

2.8 CONCRETE MIXTURES

- A. Prepare design mixtures for each type of precast concrete required.
 1. Use a single design mixture for units with more than one major face or edge exposed.
 2. Where only one face of unit is exposed use either a single design mixture or separate mixtures for face and backup.
- B. Limit use of fly ash and ground granulated blast-furnace slag to 20 percent of portland cement by weight; limit metakaolin and silica fume to 10 percent of portland cement by weight.
- C. Design mixtures may be prepared by a qualified independent testing agency or by qualified precast plant personnel at architectural precast concrete fabricator's option.
- D. Limit water-soluble chloride ions to maximum percentage by weight of cement permitted by ACI 318 or PCI MNL 117 when tested according to ASTM C 1218/C 1218M.
- E. Normal-Weight Concrete Mixtures: Proportion face and backup mixtures or full-depth mixtures, at fabricator's option by either laboratory trial batch or field test data methods according to ACI 211.1, with materials to be used on Project, to provide normal-weight concrete with the following properties:
 1. Compressive Strength (28 Days): 5000 psi minimum.
 2. Maximum Water-Cementitious Materials Ratio: 0.45.
- F. Water Absorption: 6 percent by weight or 14 percent by volume, tested according to ASTM C 642, except for boiling requirement.
- G. Add air-entraining admixture at manufacturer's prescribed rate to result in concrete at point of placement having an air content complying with PCI MNL 117.

- H. When included in design mixtures, add other admixtures to concrete mixtures according to manufacturer's written instructions.

2.9 MOLD FABRICATION

- A. Molds: Accurately construct molds, mortar tight, of sufficient strength to withstand pressures due to concrete-placement operations and temperature changes and for prestressing and detensioning operations. Coat contact surfaces of molds with release agent before reinforcement is placed. Avoid contamination of reinforcement and prestressing tendons by release agent.
1. Place form liners accurately to provide finished surface texture indicated. Provide solid backing and supports to maintain stability of liners during concrete placement. Coat form liner with form-release agent.
- B. Maintain molds to provide completed architectural precast concrete units of shapes, lines, and dimensions indicated, within fabrication tolerances specified.
1. Form joints are not permitted on faces exposed to view in the finished work.
 2. Edge and Corner Treatment: Unless otherwise noted, uniformly radiused, 1/8 inch radius.

2.10 FABRICATION

- A. All cast-in hardware shall be located to be hidden from all exposed views upon final installation of architectural precast concrete units.
- B. All reinforcement shall be designed to not conflict with site-installed handrail posts, location as noted in drawings.
- C. Cast-in Anchors, Inserts, Plates, Angles, and Other Anchorage Hardware: Fabricate anchorage hardware with sufficient anchorage and embedment to comply with design requirements. Accurately position for attachment of loose hardware, and secure in place during precasting operations. Locate anchorage hardware where it does not affect position of main reinforcement or concrete placement.
1. Weld-headed studs and deformed bar anchors used for anchorage according to AWS D1.1/D1.1M and AWS C5.4, "Recommended Practices for Stud Welding."
- D. Furnish loose hardware items including steel plates, clip angles, seat angles, anchors, dowels, cramps, hangers, and other hardware shapes for securing architectural precast concrete units to supporting and adjacent construction.
- E. Cast-in reglets, slots, holes, and other accessories in architectural precast concrete units as indicated on the Contract Drawings.
- F. Cast-in openings larger than 10 inches in any dimension. Do not drill or cut openings or prestressing strand without Architect's approval.
- G. Reinforcement: Comply with recommendations in PCI MNL 117 for fabricating, placing, and supporting reinforcement.

1. Clean reinforcement of loose rust and mill scale, earth, and other materials that reduce or destroy the bond with concrete. When damage to epoxy-coated reinforcing exceeds limits specified in ASTM A 775/A 775M, repair with patching material compatible with coating material and epoxy coat bar ends after cutting.
 2. Accurately position, support, and secure reinforcement against displacement during concrete-placement and consolidation operations. Completely conceal support devices to prevent exposure on finished surfaces.
 3. Place reinforcing steel and prestressing strands to maintain at least 3/4-inch minimum concrete cover. Increase cover requirements for reinforcing steel to 1-1/2 inches when units are exposed to corrosive environment or severe exposure conditions. Arrange, space, and securely tie bars and bar supports to hold reinforcement in position while placing concrete. Direct wire tie ends away from finished, exposed concrete surfaces.
 4. Install welded wire reinforcement in lengths as long as practicable. Lap adjoining pieces at least one full mesh spacing and wire tie laps, where required by design. Offset laps of adjoining widths to prevent continuous laps in either direction.
- H. Reinforce architectural precast concrete units to resist handling, transportation, and erection stresses and specified in-place loads.
- I. Comply with requirements in PCI MNL 117 and requirements in this Section for measuring, mixing, transporting, and placing concrete. After concrete batching, no additional water may be added.
- J. Place face mixture to a minimum thickness after consolidation of the greater of 1 inch or 1.5 times the maximum aggregate size, but not less than the minimum reinforcing cover specified.
- K. Place concrete in a continuous operation to prevent cold joints or planes of weakness from forming in precast concrete units.
1. Place backup concrete mixture to ensure bond with face-mixture concrete.
- L. Thoroughly consolidate placed concrete by internal and external vibration without dislocating or damaging reinforcement and built-in items, and minimize pour lines, honeycombing, or entrapped air voids on surfaces. Use equipment and procedures complying with PCI MNL 117.
1. Place self-consolidating concrete without vibration according to PCI TR-6, "Interim Guidelines for the Use of Self-Consolidating Concrete in Precast/Prestressed Concrete Institute Member Plants." Ensure adequate bond between face and backup concrete, if used.
- M. Comply with PCI MNL 117 for hot- and cold-weather concrete placement.
- N. Identify pickup points of architectural precast concrete units and orientation in structure with permanent markings, complying with markings indicated on Shop Drawings. Imprint or permanently mark casting date on each architectural precast concrete unit on a surface that does not show in finished structure.
- O. Cure concrete, according to requirements in PCI MNL 117, by moisture retention without heat or by accelerated heat curing using low-pressure live steam or radiant heat and moisture. Cure units until compressive strength is high enough to ensure that stripping does not have an effect on performance or appearance of final product.
- P. Discard and replace architectural precast concrete units that do not comply with requirements, including structural, manufacturing tolerance, and appearance, unless repairs meet requirements in PCI MNL 117 and Architect's approval.

2.11 FABRICATION TOLERANCES

- A. Fabricate architectural precast concrete units to shapes, lines, and dimensions indicated so each finished unit complies with PCI MNL 117 product tolerances as well as position tolerances for cast-in items.
- B. Fabricate architectural precast concrete units to shapes, lines, and dimensions indicated so each finished unit complies with the following product tolerances:
 - 1. Overall Height and Width of Units, Measured at the Face Exposed to View: As follows:
 - a. 10 feet or under, plus or minus 1/8 inch.
 - b. 10 to 20 feet, plus 1/8 inch, minus 3/16 inch.
 - c. 20 to 40 feet, plus or minus 1/4 inch.
 - 2. Overall Height and Width of Units, Measured at the Face Not Exposed to View: As follows:
 - a. 10 feet or under, plus or minus 1/4 inch.
 - b. 10 to 20 feet, plus 1/4 inch, minus 3/8 inch.
 - c. 20 to 40 feet, plus or minus 3/8 inch.
 - 3. Variation from Square or Designated Skew (Difference in Length of the Two Diagonal Measurements): Plus or minus 1/8 inch/72 inches or 1/2 inch total, whichever is greater.
 - 4. Length and Width of Block-outs and Openings within One Unit: Plus or minus 1/4 inch.
 - 5. Dimensions of Haunches: Plus or minus 1/4 inch.
 - 6. Haunch Bearing Surface Deviation from Specified Plane: Plus or minus 1/8 inch.
 - 7. Difference in Relative Position of Adjacent Haunch Bearing Surfaces from Specified Relative Position: Plus or minus 1/4 inch.
 - 8. Bowing: Plus or minus L/360, maximum 1 inch.
 - 9. Local Smoothness: 1/4 inch/10 feet.
 - 10. Warping: 1/16 inch/12 inches of distance from nearest adjacent corner.
 - 11. Dimensions of Architectural Features and Rustications: Plus or minus 1/8 inch.
- C. Position Tolerances: For cast-in items measured from datum line location, as indicated on Shop Drawings.
 - 1. Reinforcing Steel and Welded Wire Reinforcement: Plus or minus 1/4 inch where position has structural implications or affects concrete cover; otherwise, plus or minus 1/2 inch.
 - 2. Reinforcing Steel Extending out of Member: Plus or minus 1/2 inch of plan dimensions.
 - 3. Location of Rustication Joints: Plus or minus 1/8 inch.
 - 4. Location of Bearing Surface from End of Member: Plus or minus 1/4 inch.

2.12 FINISHES

- A. Exposed faces shall be free of joint marks, grain, and other obvious defects. Corners, including false joints shall be uniform, straight, and sharp. Finish exposed-face surfaces of architectural precast concrete units to match approved mockups.
- B. Finish unexposed surfaces of architectural precast concrete units with as cast finish.

2.13 SOURCE QUALITY CONTROL

- A. Quality-Control Testing: Test and inspect precast concrete according to PCI MNL 117 requirements. If using self-consolidating concrete, also test and inspect according to PCI TR-6, ASTM C 1610/C 1610M, ASTM C 1611/C 1611M, ASTM C 1621/C 1621M, and ASTM C 1712.
- B. Strength of precast concrete units is considered deficient if units fail to comply with ACI 318 requirements for concrete strength.
- C. Testing: If there is evidence that strength of precast concrete units may be deficient or may not comply with ACI 318 requirements, precaster will employ an independent testing agency to obtain, prepare, and test cores drilled from hardened concrete to determine compressive strength according to ASTM C 42/C 42M and ACI 318.
 - 1. A minimum of three representative cores shall be taken from units of suspect strength, from locations directed by Architect.
 - 2. Test cores in an air-dry condition.
 - 3. Strength of concrete for each series of three cores is considered satisfactory if average compressive strength is equal to at least 85 percent of 28-day design compressive strength and no single core is less than 75 percent of 28-day design compressive strength.
 - 4. Report test results in writing on same day that tests are performed, with copies to Architect, Contractor, and precast concrete fabricator. Test reports include the following:
 - a. Project identification name and number.
 - b. Date when tests were performed.
 - c. Name of precast concrete fabricator.
 - d. Name of concrete testing agency.
 - e. Identification letter, name, and type of precast concrete unit(s) represented by core tests; design compressive strength; type of break; compressive strength at breaks, corrected for length-diameter ratio; and direction of applied load to core in relation to horizontal plane of concrete as placed.
- D. Patching: If core test results are satisfactory and precast concrete units comply with requirements, clean and dampen core holes and solidly fill with precast concrete mixture that has no coarse aggregate, and finish to match adjacent precast concrete surfaces.
- E. Defective Units: Discard and replace recast architectural concrete units that do not comply with acceptability requirements in PCI MNL 117, including concrete strength, manufacturing tolerances, and color and texture range. Chipped, spalled, or cracked units may be repaired, subject to Architect's approval. Architect reserves the right to reject precast units that do not match approved samples, sample panels, and mockups. Replace unacceptable units with precast concrete units that comply with requirements.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine supporting structural frame or foundation and conditions for compliance with requirements for installation tolerances, bearing surface tolerances, and other conditions affecting performance of the Work.

- B. Do not install precast concrete units until supporting cast-in-place concrete has attained minimum allowable design compressive strength and supporting steel or other structure is structurally ready to receive loads from precast concrete units.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Install clips, hangers, bearing pads, and other accessories required for connecting architectural precast concrete units to supporting members and backup materials.
- B. Erect architectural precast concrete level, plumb, and square within specified allowable tolerances. Provide temporary supports and bracing as required to maintain position, stability, and alignment of units until permanent connections are completed.
 - 1. Install temporary steel or plastic spacing shims as precast concrete units are being erected. Tack weld steel shims to each other to prevent shims from separating.
 - 2. Maintain horizontal and vertical joint alignment and uniform joint width as erection progresses.
 - 3. Remove projecting lifting devices and grout fill voids within recessed lifting devices flush with surface of adjacent precast surfaces when recess is exposed.
 - 4. Unless otherwise indicated, maintain uniform joint widths of 1/4 inch.
- C. Connect architectural precast concrete units in position by bolting, welding, grouting, or as otherwise indicated on Shop Drawings. Remove temporary shims, wedges, and spacers as soon as practical after connecting and grouting are completed.
 - 1. Do not permit connections to disrupt continuity of roof flashing.
- D. Welding: Comply with applicable requirements in AWS D1.1/D1.1M and AWS D1.4/D1.4M for welding, welding electrodes, appearance, quality of welds, and methods used in correcting welding work.
 - 1. Protect architectural precast concrete units and bearing pads from damage by field welding or cutting operations, and provide noncombustible shields as required.
 - 2. Welds not specified shall be continuous fillet welds, using no less than the minimum fillet as specified by AWS.
 - 3. Clean weld-affected metal surfaces with chipping hammer followed by brushing, and apply a minimum 4.0-mil-thick coat of galvanized repair paint to galvanized surfaces according to ASTM A 780/A 780M.
 - 4. Visually inspect welds and remove, reweld, or repair incomplete and defective welds.
- E. At bolted connections, use lock washers, tack welding, or other approved means to prevent loosening of nuts after final adjustment.
 - 1. Where slotted connections are used, verify bolt position and tightness. For sliding connections, properly secure bolt but allow bolt to move within connection slot.
 - 2. For slip-critical connections, use one of the following methods to assure proper bolt pretension:
 - a. Turn-of-Nut: According to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts."

- b. Calibrated Wrench: According to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts."
 - c. Twist-off Tension Control Bolt: ASTM F 1852.
 - d. Direct-Tension Control Bolt: ASTM F 1852.
- 3. For slip-critical connections, use method and inspection procedure approved by Architect and coordinated with inspection agency.
- F. Grouting or Dry-Packing Connections and Joints: Grout connections where required or indicated. Retain flowable grout in place until hard enough to support itself. Alternatively, pack spaces with stiff dry-pack grout material, tamping until voids are completely filled. Place grout and finish smooth, level, and plumb with adjacent concrete surfaces. Promptly remove grout material from exposed surfaces before it affects finishes or hardens. Keep grouted joints damp for not less than 24 hours after initial set.

3.3 ERECTION TOLERANCES

- A. Erect architectural precast concrete units level, plumb, square, and in alignment, without exceeding the following noncumulative erection tolerances:
 - 1. Plan Location from Building Grid Datum: Plus or minus 1/8 inch.
 - 2. Plan Location from Centerline of Steel: Plus or minus 1/8 inch.
 - 3. Top Elevation from Nominal Top Elevation: Plus or minus 1/8 inch.
 - 4. Plumb in Any 10 Feet of Element Height: 1/8 inch.
 - 5. Maximum Jog in Alignment of Matching Edges: 1/8 inch.
 - 6. Joint Width (Governs over Joint Taper): Plus or minus 1/8 inch.
 - 7. Maximum Joint Taper: 1/8 inch.
 - 8. Joint Taper in 10 Feet: 1/8 inch.
 - 9. Maximum Jog in Alignment of Matching Faces: 1/8 inch.
 - 10. Differential Bowing or Camber, as Erected, between Adjacent Members of Same Design: 1/8 inch.

3.4 FIELD QUALITY CONTROL

- A. Testing Agency: Owner will engage a qualified testing agency to perform tests and inspections and prepare test reports.
- B. Visually inspect field welds and test according to ASTM E 165 or to ASTM E 709 and ASTM E 1444. High-strength bolted connections are subject to inspections.
- C. Testing agency will report test results promptly and in writing to Contractor and Architect.
- D. Repair or remove and replace work where tests and inspections indicate that it does not comply with specified requirements.
- E. Additional testing and inspecting, at Contractor's expense, shall be performed to determine compliance of replaced or additional work with specified requirements.

3.5 REPAIRS

- A. Repair architectural precast concrete units if permitted by Architect. Architect reserves the right to reject repaired units that do not comply with requirements.
- B. Mix patching materials and repair units so cured patches blend with color, texture, and uniformity of adjacent exposed surfaces and show no apparent line of demarcation between original and repaired work, when viewed in typical daylight illumination from a distance of 5 feet.
- C. Prepare and repair damaged galvanized coatings with galvanizing repair paint according to ASTM A 780/A 780M.
- D. Wire brush, clean, and paint damaged prime-painted components with same type of shop primer.
- E. Remove and replace damaged architectural precast concrete units when repairs do not comply with requirements.

3.6 CLEANING

- A. Clean surfaces of precast concrete units exposed to view.
- B. Clean mortar, plaster, weld slag, and other deleterious material from concrete surfaces and adjacent materials immediately.
- C. Clean exposed surfaces of precast concrete units after erection and completion of joint treatment to remove weld marks, other markings, dirt, and stains.
 - 1. Perform cleaning procedures, if necessary, according to precast concrete fabricator's recommendations. Protect other work from staining or damage due to cleaning operations.
 - 2. Do not use cleaning materials or processes that could change the appearance of exposed concrete finishes or damage adjacent materials.

END OF SECTION 03 45 00

SECTION 03 49 00 - GLASS-FIBER REINFORCED CONCRETE (GFRC)

PART 1 GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A Section Includes:
 - 1. Molded glass-fiber-reinforced concrete fabrications.
 - 2. Supplementary components and accessories normally furnished or otherwise necessary for a complete installation.

1.3 REFERENCES

- A Acronyms and Abbreviations:
 - 1. GFRC: Glass Fiber Reinforced Concrete.
- B Definitions:
 - 1. Design Reference Sample: Means a sample of GFRC color, finish, and texture, preapproved by Architect.

1.4 COORDINATION

- A Furnish loose connection hardware and anchorage items to be embedded in or attached to other construction without delaying the work. Provide locations, setting diagrams, templates, instructions, and directions, as required, for installation.

1.5 SUBMITTALS

- A Action Submittals:
 - 1. Product Data: For each type of product.
 - 2. Shop Drawings: Show fabrication and installation details for GFRC fabrications including the following:
 - a. Elevations, sections, and dimensions.
 - b. Finishes.
 - c. Joint and connection details.
 - d. Locations and details of connection hardware attached to structure.
 - e. Erection sequence for special conditions.
 - f. Relationship to adjacent materials.
 - 3. Samples: 3 samples of actual finished products representative of GFRC finish, color, and texture variations.
 - a. Size: Manufacturers' standard size.

1.6 QUALITY ASSURANCE

- A Qualifications:
 - 1. Manufacturer Qualifications:
 - a. Manufacturer shall have at least 10 years' experience supplying GFRC fabrications for other projects similar in scope and complexity to this Project.
 - b. Manufacturer shall have at least 10 years' experience using 3D modelling software and CNC machines for the creation of master patterns used to make molds for GFRC fabrications.
 - 2. Installer Qualifications: Installer shall have at least 5 years' experience having successfully completed projects similar in scope and complexity to this Project.

1.7 DELIVERY, STORAGE, AND HANDLING

- A Handle and transport GFRC fabrications supported on nonstaining material and with nonstaining resilient spacers between parts and supports.
- B Store GFRC fabrications off of ground on firm, level, and smooth surfaces supported on nonstaining material and with nonstaining resilient spacers between parts. Place stored fabrications so identification marks are clearly visible.

1.8 PROJECT CONDITIONS

- A Site Conditions: Verify the conditions for compliance with the requirements including environmental conditions, installation tolerances and other conditions affecting the installation and performance of GFRC fabrications. Any unsatisfactory conditions to be corrected prior to installation.
- B Field Dimensions: Verify field dimensions including those not shown on the Drawings prior to manufacturing the GFRC fabrications.

1.9 WARRANTY

- A Special Warranty: Manufacturer agrees to repair or replace components of GFRC fabrications that fail in materials or workmanship within specified warranty period.
 - 1. Failures include the following:
 - a. Structural failures, including cracking.
 - 2. Warranty Period: 2 years from date of Final Acceptance.

PART 2 PRODUCTS

2.1 GFRC FABRICATIONS, GENERAL

- A Physical Properties:
 - 1. Matrix: Portland cement, sand, and polymer
 - 2. Shell Thickness: At least 5/8-inch.
 - 3. Edge Thickness: At least 5/8-inch.
 - 4. Density: At least 134 lb/ft³.
 - 5. Weight: 6½ - 7½ lb/ft².
 - 6. Glass Fiber: At least 4 percent.
 - 7. Flexural Strength: 1,860 psi.
 - 8. Tensile Strength: 1260 psi.
 - 9. Compressive Strength: 4,000 psi.
 - 10. Coefficient of Linear Thermal Expansion: 7.6 x 10⁻⁶ in/in/deg F in accordance with ASTM D 696.
 - 11. Hardness (Abrasion): 0.37 percent.
 - 12. Thermal Conductivity: 4.3 Btu in/h/ft²/deg F (0.62 W/m²)
 - 13. Surface Burning Characteristics: In accordance with ASTM E 84.
 - a. Flame Spread: 0
 - b. Smoke Development: 0

2.2 MANUFACTURERS

- A GFRC Fabrications:
 - 1. Basis-of-Design Manufacturer: Subject to compliance with the Contract Documents design is based on products by the following.
 - a. Wilson Composites, LLC.
 - 2. Acceptable Manufacturers: Subject to compliance with the Contract Documents provide products manufactured by the basis-of-design manufacturer or by one of the following.
 - a. ARC Limited.
 - b. Classic Stone Creations.

2.3 GFRC MATERIALS

- A Obtain each GFRC material of same type, brand, and color from single source or producer.
- B Portland Cement: ASTM C 150/C 150M; Type I, or III.
- C Glass Fibers: Alkali resistant, with a minimum zirconia content of 16 percent, 1 to 2 inches long, specifically produced for use in GFRC, and complying with ASTM C 1666/C 1666M.
- D Backing Sand: Washed and dried silica, complying with composition requirements in ASTM C 144; passing a No. 20 sieve with a maximum of 2 percent passing a No. 100 sieve.
- E Facing Aggregate: ASTM C 33/C 33M, except for gradation.
- F Integral Coloring Admixture: ASTM C 979/C 979M, synthetic mineral-oxide pigments or colored water-reducing admixtures, temperature stable, nonfading, and alkali resistant.
- G Water: Potable; free from deleterious material that may affect color stability, setting, or strength of GFRC and complying with ASTM C 1602/C 1602M.
- H Polymer-Curing Admixture: Acrylic thermoplastic copolymer dispersion.

2.4 ANCHORS, CONNECTORS, AND ACCESSORIES

- A Connection Hardware: Structural brackets or shapes used to support or attach GFRC fabrications to the structure to be fabricated from corrosion resistant metal of appropriate type and gauge for the application.
- B Colored Caulk: As supplied, recommended, or required by the manufacturer.

2.5 GFRC MIXES

- A Face Mix: Proportion face mix of portland cement, facing aggregates, water, and admixtures to comply with design requirements.
- B Backing Mix: Proportion backing mix of portland cement, glass fibers, sand, water, and admixtures to comply with design requirements. Provide nominal glass-fiber content of not less than 4 percent by weight of total mix.
- C Coloring Admixture: Not to exceed 10 percent of cement weight.

2.6 FINISHES

- A Exposed faces to be free of joint marks, grain, and other obvious defects. Corners, including false joints, to be uniform, straight, and sharp.
- B Finish exposed-face surfaces of GFRC to match approved design reference sample.
- C Integral Color: As selected by the Architect.

PART 3 EXECUTION

3.1 EXAMINATION

- A Examine structure and conditions for compliance with requirements for installation tolerances, bearing surfaces, and other conditions affecting performance of the work.
- B Do not proceed with installation until unsatisfactory conditions have been corrected.
 - 1. Installation of GFRC fabrications indicates acceptance of surfaces and conditions.

3.2 INSTALLATION

- A Install fabrications in accordance with the manufacturer's written instructions, Contract Documents, and approved Shop Drawings.
- B Provide all clips, hangers and other accessories required for the work of this Specification Section and to ensure a solid and secure installation of the GFRC fabrications.
- C Provide temporary supports or bracing as required to maintain position, stability, and alignment in accordance with the approved Shop Drawings.
- D Provide joint spacing between parts as detailed for expansion and the application of joint treatment materials. Complete joint treatment, patching and cleaning in accordance to the manufacturer's recommendations.

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3.3 CLEANING AND PROTECTION

- A Perform cleaning procedures, if necessary, in accordance with the manufacturer's written instructions. Prevent damage to GFRC surfaces and staining of adjacent materials.

END OF SECTION 03 49 00

SECTION 03 54 16 - HYDRAULIC CEMENT UNDERLAYMENT

PART 1 GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A Section Includes:
 - 1. Polymer-modified, self-leveling, hydraulic cement underlayment:
 - a. For application below interior floor coverings when necessary to smooth concrete slabs; or
 - b. To cap rough, pitted, cracked, or uneven concrete where and when necessary to conform to the substrate tolerance requirements of specified finish floorings.
 - 2. Supplementary components and accessories normally furnished or otherwise necessary for a complete installation or application.

1.3 REFERENCES

- A Definitions:
 - 1. Manufacturer: Means the hydraulic cement underlayment manufacturer unless otherwise indicated.

1.4 SUBMITTALS

- A Action Submittals:
 - 1. Product Data: For each type of product; include Health Product Declaration and Environmental Product Declaration.
 - 2. Shop Drawings: Include plans indicating substrates, locations, and average depths of underlayment based on survey of substrate conditions.
- B Informational Submittals:
 - 1. Qualification Data: For installer.

1.5 QUALITY ASSURANCE

- A Installer Qualifications: Installer who is approved by manufacturer for application of underlayment products required for this Project.

1.6 FIELD CONDITIONS

- A Environmental Limitations: Comply with manufacturer's written instructions for substrate temperature, ventilation, ambient temperature and humidity, and other conditions affecting underlayment performance.
 - 1. Place hydraulic cement underlayments only when ambient temperature and temperature of substrates are between 50 and 80 deg F.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A Source Limitations: Obtain underlayment materials from single source from the same manufacturer.

2.2 HYDRAULIC CEMENT UNDERLAYMENTS

- A Hydraulic Cement Underlayment: Polymer-modified, self-leveling, hydraulic cement product that can be applied in a uniform thickness of at least 1/4 inch and that can be feathered at edges to match adjacent floor elevations.
 - 1. Manufacturers:

- a. Basis of Design Product: Subject to compliance with the Contract Documents, design is based on the following.
 - 1) "ARDEX K 13" manufactured by ARDEX Engineered Cements.
- b. Acceptable Manufacturers: Subject to compliance with the Contract Documents, provide basis-of-design product or comparable product by one of the following.
 - 1) Custom Building Products.
 - 2) Mapei Corp.
 - 3) Maxxon Corp.
- 2. Cement Binder: ASTM C 150, portland cement, or hydraulic or blended hydraulic cement as defined by ASTM C 219.
- 3. Compressive Strength: Not less than 4000 psi at 28 days when tested according to ASTM C 109.
- 4. Underlayment Additive: If recommended by manufacturer for Project conditions, resilient-emulsion product of manufacturer, formulated for use with underlayment when applied to substrate and conditions indicated.
- B Aggregate: Well-graded, washed gravel, 1/8 to 1/4 inch; or coarse sand as recommended by manufacturer.
 - 1. Provide aggregate when recommended in writing by manufacturer for underlayment thickness required.
- C Water: Potable and at a temperature of not more than 70 deg F.
- D Primer: Product of manufacturer recommended in writing for substrate, conditions, and application indicated.
- E Surface Sealer: Designed to reduce porosity as recommended by manufacturer for type of floor covering to be applied to underlayment.

PART 3 EXECUTION

3.1 EXAMINATION

- A Examine substrates, with installer present, for conditions affecting performance of the work.
- B Do not proceed with application until unsatisfactory conditions have been corrected.
 - 1. Installation of hydraulic cement underlayment indicates acceptance of surfaces and conditions.

3.2 PREPARATION

- A General: Prepare and clean substrate according to manufacturer's written instructions.
 - 1. Treat nonmoving substrate cracks according to manufacturer's written instructions to prevent cracks from telegraphing (reflecting) through underlayment.
 - 2. Fill substrate voids to prevent underlayment from leaking.
- B Concrete Substrates: Mechanically remove, according to manufacturer's written instructions, laitance, glaze, efflorescence, curing compounds, form-release agents, dust, dirt, grease, oil, and other contaminants that might impair underlayment bond. If underlayments are installed over adhesive residues, consult manufacturer for recommendations.
 - 1. Moisture Testing: Perform anhydrous calcium chloride test, ASTM F 1869. Do not proceed with installation until substrates do not exceed a moisture-vapor-emission rate of no more than 3 lb. of water/1000 sq. ft. in 24 hours.
- C Adhesion Tests: After substrate preparation, test substrate for adhesion with underlayment according to manufacturer's written instructions.

3.3 APPLICATION

- A General: Mix and apply underlayment components according to manufacturer's written instructions.
 - 1. Close areas to traffic during underlayment application and for time period after application recommended in writing by manufacturer.

2. Coordinate application of components to provide optimum adhesion to substrate and between coats.
 3. At substrate expansion, isolation, and other moving joints, allow joint of same width to continue through underlayment.
 - B Apply primer over prepared substrate at manufacturer's recommended spreading rate.
 - C Apply underlayment to produce uniform, level surface.
 1. If addition of aggregate is required for applied thickness, apply a final layer without aggregate to product surface.
 2. Feather edges to match adjacent floor elevations.
 - D Cure underlayment according to manufacturer's written instructions. Prevent contamination during application and curing processes.
 - E Do not install floor coverings over underlayment until after time period recommended in writing by manufacturer.
 - F If sealer is recommended by the manufacturer, apply surface sealer at rate recommended by manufacturer.
 - G Remove and replace underlayment areas that evidence lack of bond with substrate, including areas that emit a "hollow" sound when tapped.
- 3.4 PROTECTION
- A Protect underlayment from concentrated and rolling loads for remainder of construction period.

END OF SECTION 03 54 16

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SECTION 04 20 00 - UNIT MASONRY

PART 1 GENERAL

1.1 SUMMARY

- A Section Includes:
 - 1. Clay face brick.
 - 2. Concrete masonry units.
 - 3. Mortar and grout.
 - 4. Steel reinforcing bars.
 - 5. Masonry-joint reinforcement.
 - 6. Ties and anchors.
 - 7. Embedded flashing.
 - 8. Miscellaneous masonry accessories.
- B Products Installed but not Furnished under this Specification Section:
 - 1. Steel shelf angles for supporting unit masonry.
 - 2. Cavity wall insulation.

1.2 REFERENCES

- A Acronyms and Abbreviations:
 - 1. BIA: Brick Industry Association.
 - 2. SMACNA: Sheet Metal and Air Conditioning Contractors Association.
 - 3. TMS: The Masonry Society.
- B Definitions:
 - 1. Reinforced Masonry: Means masonry containing reinforcing steel in grouted cells.

1.3 SUBMITTALS

- A Action Submittals:
 - 1. Product Data: For each type of product; include Health Product Declaration and Environmental Product Declaration.
 - 2. Shop Drawings: For the following:
 - a. Masonry Units: Indicate sizes, profiles, coursing, and locations of special shapes.
 - b. Reinforcing Steel: Indicate bending, lap lengths, and placement of unit masonry reinforcing bars. Comply with ACI 315R. Indicate elevations of reinforced walls.
 - c. Fabricated Flashing: Detail corner units, end-dam units, and other special applications.
 - 3. Samples: For each type and color of the following:
 - a. Full-size units for each different exposed masonry unit required, showing the full range of exposed colors, textures, and dimensions to be expected in the completed construction.
 - b. Pigmented mortar. Make Samples using the same sand and mortar ingredients to be used on Project. Label Samples to indicate types and amounts of pigments used.
 - c. Weep/cavity vents.
 - d. Cavity drainage material.
 - e. Accessories embedded in the masonry.
- B Informational Submittals:
 - 1. Material Certificates: For each type of the following:
 - a. Masonry units.
 - 1) Include material test reports substantiating compliance with requirements.
 - 2) For masonry units used in structural masonry, include data and calculations establishing average net-area compressive strength of units.
 - b. Cementitious materials. Include name of manufacturer, brand name, and type.
 - c. Mortar admixtures.
 - d. Preblended, dry mortar mixes. Include description of type and proportions of ingredients.

- e. Grout mixes. Include description of type and proportions of ingredients.
- f. Reinforcing bars.
- g. Joint reinforcement.
- h. Anchors, ties, and metal accessories.
- 2. Qualification Data: For testing agency and masonry installer.
- 3. Mix Designs: For each type of mortar and grout. Include description of type and proportions of ingredients.
- 4. Cold-Weather and Hot-Weather Procedures: Detailed description of methods, materials, and equipment to be used to comply with requirements.

1.4 QUALITY ASSURANCE

- A Testing Agency Qualifications: An independent testing agency, acceptable to authorities having jurisdiction, qualified according to ASTM C 1093 to conduct the testing indicated, as documented according to ASTM E 548.
- B Preconstruction Testing Service: General Contractor will engage a third party qualified independent testing agency to perform preconstruction testing indicated below. Payment for these services will be made by General Contractor. Retesting of materials failing to meet specified requirements shall be done at Contractor's expense.
 - 1. Concrete Masonry Unit Test: For each concrete masonry unit indicated, per ASTM C 140.

1.5 DELIVERY, STORAGE, AND HANDLING

- A Store masonry units on elevated platforms in a dry location. If units are not stored in an enclosed location, cover tops and sides of stacks with waterproof sheeting, securely tied. If units become wet, do not install until they are dry.
- B Store cementitious materials on elevated platforms, under cover, and in a dry location. Do not use cementitious materials that have become damp.
- C Store aggregates where grading and other required characteristics can be maintained and contamination avoided.
- D Deliver preblended, dry mortar mix in moisture-resistant containers. Store preblended, dry mortar mix in delivery containers on elevated platforms in a dry location or in covered weatherproof dispensing silos.
- E Store masonry accessories, including metal items, to prevent corrosion and accumulation of dirt and oil.

1.6 FIELD CONDITIONS

- A Protection of Masonry: During construction, cover tops of walls, projections, and sills with waterproof sheeting at end of each day's work. Cover partially completed masonry when construction is not in progress.
 - 1. Extend cover at least 24 inches down both sides and hold cover securely in place.
- B Do not apply uniform floor or roof loads for at least 12 hours and concentrated loads for at least 3 days after building masonry walls or columns.
- C Stain Prevention: Prevent grout, mortar, and soil from staining the face of masonry to be left exposed or painted. Immediately remove grout, mortar, and soil that come in contact with such masonry.
 - 1. Protect base of walls from rain-splashed mud and from mortar splatter by coverings spread on ground and over wall surface.
 - 2. Protect sills, ledges, and projections from mortar droppings.
 - 3. Protect surfaces of window and door frames, as well as similar products with painted and integral finishes, from mortar droppings.
 - 4. Turn scaffold boards near the wall on edge at the end of each day to prevent rain from splashing mortar and dirt onto completed masonry.

- D Cold-Weather Requirements: Do not use frozen materials or materials mixed or coated with ice or frost. Do not build on frozen substrates. Remove and replace unit masonry damaged by frost or by freezing conditions. Comply with cold-weather construction requirements contained in ACI 530.1/ASCE 6/TMS 602.
 - 1. Cold-Weather Cleaning: Use liquid cleaning methods only when air temperature is 40 deg F and higher and will remain so until masonry has dried, but not less than 7 days after completing cleaning.
- E Hot-Weather Requirements: Comply with hot-weather construction requirements contained in TMS 602. Protect unit masonry work when temperature and humidity conditions produce excessive evaporation of water from mortar and grout. Provide artificial shade and wind breaks and use cooled materials as required.
 - 1. When ambient temperature exceeds 100 deg F, or 90 deg F with a wind velocity greater than 8 mph, do not spread mortar beds more than 48 inches ahead of masonry. Set masonry units within one minute of spreading mortar.

PART 2 PRODUCTS

2.1 SOURCE LIMITATIONS

- A Source Limitations for Masonry Units: Obtain exposed masonry units of a uniform texture and color, or a uniform blend within the ranges accepted for these characteristics, through one source from the same manufacturer for each product required.
- B Source Limitations for Mortar Materials: Obtain mortar ingredients of a uniform quality, including color for exposed masonry, from one manufacturer for each cementitious component and from one source or producer for each aggregate.

2.2 PERFORMANCE REQUIREMENTS

- A General: Provide unit masonry that develops the following net-area compressive strengths (f'm) at 28 days. Determine compressive strength of masonry from net-area compressive strengths of masonry units and mortar types according to Tables 1 and 2 inch ACI 530.1/ASCE 6/TMS 602.
 - 1. For Concrete Unit Masonry: f'm = 2000 psi.
- B Defective Units: Referenced masonry unit standards may allow a certain percentage of units to contain chips, cracks, or other defects exceeding limits stated. Do not use units where such defects will be exposed in the completed work and will be within 20 ft. vertically and horizontally of a walking surface.

2.3 CONCRETE MASONRY UNITS

- A General: Provide shapes indicated and as follows:
 - 1. Provide special shapes for lintels, corners, jambs, sash, control joints, headers, bonding, and other special conditions.
 - 2. Provide square-edged units for outside corners.
- B Concrete Masonry Units: Current Edition of ASTM C 90 and as follows:
 - 1. Concrete masonry units shall not contain cinders bottom ash and shall be free of organic impurities that will cause rusting, staining, or pop-outs.
 - 2. Unit Compressive Strength: Provide units with minimum average net-area compressive strength of 2150 psi.
 - 3. Weight Classification: Lightweight.
 - 4. Walls requiring vertical reinforcing shall use open end masonry units manufactured by the CMU supplier.

2.4 BRICK

- A General: Provide shapes indicated and as follows.
 - 1. For ends of sills and caps and for similar applications that would otherwise expose unfinished brick surfaces, provide units without cores or frogs and with exposed surfaces finished.

- B Provide special shapes for applications requiring brick of size, form, color, and texture on exposed surfaces that cannot be produced by sawing, as indicated on the Drawings.
 - 1. Provide special shapes for applications where stretcher units cannot accommodate special conditions, including those at corners, movement joints, bond beams, sashes, and lintels.
 - 2. Provide special shapes for applications where shapes produced by sawing would result in sawed surfaces being exposed to view.
- C Face Brick: Facing brick complying with ASTM C 216.
 - 1. Basis-of-Design Product: Subject to compliance with the Contract Documents design is based on the following.
 - a. "Red Royal" as manufactured by Statesville Brick Company.
 - 2. Acceptable Manufacturers: Subject to compliance with the Contract Documents provide the basis-of-design product or comparable approved product by one of the following.
 - a. Palmetto Brick Company.
 - b. Pine Hall Brick Company; "Old Colony" brick.
 - 3. Grade: SW, unless otherwise indicated.
 - 4. Type: FBS, unless otherwise indicated.
 - 5. Initial Rate of Absorption: Less than 30 g/30 sq. in. per minute when tested per ASTM C 67.
 - 6. Efflorescence: Provide brick that has been tested according to ASTM C 67 and is rated "not effloresced."
 - 7. Size (Actual Dimensions): As indicated on the Drawings.

2.5 MORTAR AND GROUT MATERIALS

- A Portland Cement: ASTM C 150/C 150M, Type I or II, except Type III may be used for cold-weather construction. Provide natural color or white cement as required to produce mortar color indicated.
 - 1. Alkali content is not more than 0.1 percent when tested in accordance with ASTM C 114.
- B Hydrated Lime: ASTM C 207, Type S.
- C Portland Cement-Lime Mix: Packaged blend of portland cement complying with ASTM C 150, Type I or Type III, and hydrated lime complying with ASTM C 207.
- D Mortar Cement: Complying with ASTM C 1329.
- E Masonry Cement: Masonry cement is prohibited.
- F Aggregate for Mortar: ASTM C 144; except for joints less than 1/4 inch thick, use aggregate graded with 100 percent passing the No. 16 sieve.
 - 1. White-Mortar Aggregates: Natural white sand or ground white stone.
 - 2. Colored-Mortar Aggregates: Natural-colored sand or ground marble, granite, or other sound stone; of color necessary to produce required mortar color.
 - 3. Masonry cement is not allowed.
- G Aggregate for Grout: ASTM C 404.
- H Mortar Pigments: Natural and synthetic iron oxides and chromium oxides, compounded for use in mortar mixes. Use only pigments with a record of satisfactory performance in masonry mortar.
- I Water: Potable.

2.6 REINFORCING STEEL

- A Uncoated Steel Reinforcing Bars: ASTM A 615/A 615M; ASTM A 616/A 616M, including Supplement 1; or ASTM A 617/A 617M, Grade 60.

2.7 MASONRY JOINT REINFORCEMENT

- A General: ASTM A 951 and as follows:
 - 1. Hot-dip galvanized, carbon-steel wire for both interior and exterior walls.
 - 2. Wire Size for Side Rods: W2.8 or 0.188-inch diameter.
 - 3. Wire Size for Cross Rods: W2.8 or 0.188-inch diameter.
 - 4. Provide in lengths of not less than 10 feet, with prefabricated corner and tee units where indicated.

- B For single-wythe masonry, provide either ladder or truss type with single pair of side rods and cross rods spaced not more than 16 inches on center.

2.8 TIES AND ANCHORS, GENERAL

- A General: Provide ties and anchors, specified in subsequent articles, made from materials that comply with this Article, unless otherwise indicated.
- B Hot-Dip Galvanized Carbon-Steel Wire: ASTM A 82; with ASTM A 153, Class B-2 coating.
- C Steel Sheet, Galvanized after Fabrication: ASTM A 1008/A 1008M cold-rolled, carbon-steel sheet hot-dip galvanized after fabrication to comply with ASTM A 153.
- D Steel Plates, Shapes, and Bars: ASTM A 36/A 36M.

2.9 ADJUSTABLE MASONRY-VENEER ANCHORS

- A General: Provide thermally broken, 2-piece assemblies that allow vertical or horizontal adjustment but resist tension and compression forces perpendicular to plane of wall, for attachment over sheathing to wood or metal studs, and as follows:
1. Structural Performance Characteristics: Capable of withstanding a 100-lbf load in both tension and compression without deforming or developing play in excess of 0.05 inch.
- B Stainless-Steel Drill Screws for Steel Studs: Proprietary fastener consisting of carbon-steel drill point and 300 Series stainless-steel shank, complying with ASTM C 954 except manufactured with hex washer head and neoprene washer, No. 10 diameter by length required to penetrate steel stud flange by not less than three exposed threads.
1. General: Provide anchors that allow vertical adjustment but resist tension and compression forces perpendicular to plane of wall, for attachment over sheathing to wood or metal studs, and as follows:
 - a. Structural Performance Characteristics: Capable of withstanding a 100-lbf load in both tension and compression without deforming or developing play in excess of 0.05 inch.
 - b. Basis of Design Product: Subject to compliance with the Contract Documents, provide "Pos-I-Tie" as manufactured by Heckmann Building Products Inc.; or comparable by one of the following:
 - 1) Dayton Superior Corporation.
 - 2) Hohmann & Barnard, Inc.
 - 3) Wire-Bond.
 - c. Anchor Section: Corrosion-resistant, self-drilling, eye-screw designed to receive wire tie. Eye-screw has spacer that seats directly against framing and is same thickness as sheathing and has gasketed, washer head that covers hole in sheathing.
 - d. Wire Ties: Seismic triangular-shaped wire ties fabricated from 0.187-inch- diameter, hot-dip galvanized steel wire in length as indicated on Drawings.

2.10 MISCELLANEOUS ANCHORS

- A Unit Type Inserts in Concrete: Cast-iron or malleable-iron inserts of type and size indicated.
- B Dovetail Slots: Furnish dovetail slots with filler strips, of slot size indicated, fabricated from 0.0336-inch, galvanized steel sheet.
- C Anchor Bolts: Steel bolts complying with ASTM A 307, Grade A; with ASTM A 563 hex nuts and, where indicated, flat washers; hot-dip galvanized to comply with ASTM A 153, Class C; of diameter and length indicated and in the following configurations:
1. Headed bolts.
 2. Nonheaded bolts, bent in manner indicated.
- D Postinstalled Anchors: Anchors as described below, with capability to sustain, without failure, load imposed within factors of safety indicated, as determined by testing per ASTM E 488, conducted by a qualified independent testing agency.
1. Type: Expansion anchors.
 2. Corrosion Protection: Carbon-steel components zinc plated to comply with ASTM B 633, Class Fe/Zn 5 (5 microns) for Class SC 1 service condition (mild).

3. For Postinstalled Anchors in Concrete: Capability to sustain, without failure, a load equal to 4 times the loads imposed.
4. For Postinstalled Anchors in Grouted Masonry Units: Capability to sustain, without failure, a load equal to 6 times the loads imposed.

2.11 EMBEDDED FLASHING

- A General: Provide metal flashing complying with the SMACNA publication Architectural Sheet Metal Manual that apply to design, dimensions, metal, and other characteristics of the item and as follows:
1. Stainless Steel: ASTM A 240/A 240M or ASTM A 666, Type 304, at least 0.016 inch thick.
 2. Fabricate continuous flashings in sections at least 96 inches long, but not exceeding 12 feet. Provide splice plates at joints of formed, smooth metal flashing.
 3. Fabricate through-wall metal flashing embedded in masonry from sheet metal indicated above and with ribs at 3-inch intervals along length of flashing to provide an integral mortar bond.
 4. Fabricate through-wall flashing with drip edge unless otherwise indicated. Fabricate by extending flashing ½ inch out from wall, with outer edge bent down 30 degrees and hemmed.
 5. Fabricate metal expansion-joint strips from sheet metal indicated above, formed to shape indicated.
 6. Fabricate metal drip edges from sheet metal indicated above.
- B Flexible Flashing: Use the following unless otherwise indicated:
1. Laminated Stainless Steel Flashing: Manufacturer's standard Stainless steel core with polymer fabric laminated to the bottom stainless steel face with non-asphalt adhesive. The top face (exposed side) must not be covered with a polymer fabric. Use only where flashing is fully concealed in masonry.
 2. Laminated Stainless Steel Flashing Products:
 - a. York Manufacturing, Inc.; Multi-Flash SS
 - b. Illinois Products, Inc.; IPCO Stainless Steel Fabric Flashing
 - c. Prosoco, Inc.; R-Guard SS ThruWall
 - d. STS Coatings, Inc.; Wall Guardian Stainless Steel TWF
 - e. TK Products, Inc.; TK TWF
- C Adhesives, Primers, and Seam Tapes for Flashings: Flashing manufacturer's standard products or products recommended by the flashing manufacturer for bonding flashing sheets to each other and to substrates.

2.12 MISCELLANEOUS MASONRY ACCESSORIES

- A Compressible Filler: Premolded filler strips complying with ASTM D 1056, Grade 2A1; compressible up to 35 percent; of width and thickness indicated; formulated from neoprene or urethane.
- B Preformed Control-Joint Gaskets: Material as indicated below, designed to fit standard sash block and to maintain lateral stability in masonry wall; size and configuration as indicated.
1. Styrene-Butadiene-Rubber Compound: ASTM D 2000, Designation M2AA-805.
- C Bond-Breaker Strips: Asphalt-saturated, organic roofing felt complying with ASTM D 226, Type I (No. 15 asphalt felt).
- D Cell Vents: Composite cellular vents consisting of small passageways bonded together; 3/8 inch wide by 2-1/2 inch deep by 3-3/8 inch long; color as selected by Architect from manufacturer's full range.
- E Plastic Weep Hole/Vent: One-piece, flexible extrusion made from UV-resistant polypropylene copolymer, designed to fill head joint with outside face held back 1/8 inch from exterior face of masonry, in color selected from manufacturer's standard.
1. Plastic weep vent is to sit directly on through-wall flashing.
- F Cavity Drainage Material: 2-inch- thick, free-draining mesh; made from polyethylene strands and shaped to avoid being clogged by mortar droppings.

- G Drainage Mat: Randomly oriented geometric patterned drainage and ventilation mat designed to eliminate moisture and moisture vapor.
- H Reinforcing Bar Positioners: Wire units designed to fit into mortar bed joints spanning masonry unit cells with loops for holding reinforcing bars in center of cells. Units are formed from 0.187-inch steel wire, hot-dip galvanized after fabrication.
 - 1. Provide units with either 2 loops or 4 loops as needed for number of bars indicated.
- I Control and Expansion Joint Sealants: Provide sealants, expansion joints and preformed joint sealants as specified in Section 07 92 00 Joint Sealants.

2.13 MORTAR AND GROUT MIXES

- A General: Do not use admixtures, including pigments, air-entraining agents, accelerators, retarders, water-repellent agents, antifreeze compounds, or other admixtures, unless otherwise indicated.
 - 1. Do not use calcium chloride in mortar or grout.
 - 2. Add cold-weather admixture, if used, at the same rate for mortar, regardless of weather conditions, to ensure that mortar color is consistent.
- B Preblended, Dry Mortar Mix: Furnish dry mortar ingredients in the form of a preblended mix. Measure quantities by weight to ensure accurate proportions, and thoroughly blend ingredients before delivering to Project site.
- C Mortar for Unit Masonry: Comply with ASTM C 270, Proportion Specification.
 - 1. Limit cementitious materials in mortar for exterior masonry to portland cement, mortar cement, and lime.
 - 2. For masonry below grade, in contact with earth, and where indicated, use Type M.
 - 3. For reinforced masonry and where indicated, use Type S.
 - 4. For exterior, above-grade, load-bearing and non-load-bearing walls and parapet walls; for interior load-bearing walls; for interior non-load-bearing partitions; and for other applications where another type is not indicated, use Type N.
- D Pigmented Mortar: Select and proportion pigments with other ingredients to produce color required. Limit pigments to the following percentages of cement content by weight:
 - 1. For mineral-oxide pigments and portland cement-lime mortar, not more than 10 percent.
 - 2. For carbon-black pigment and portland cement-lime mortar, not more than 2 percent.
- E Colored-Aggregate Mortar: Produce required mortar color by using colored aggregates combined with selected cementitious materials.
 - 1. Mix to match Architect's approved submitted Sample.
- F Grout for Unit Masonry: Comply with ASTM C 476.
 - 1. Use grout of type indicated or, if not otherwise indicated, of type (fine or coarse) that will comply with Table 5 of ACI 530.1/ASCE 6/TMS 602 for dimensions of grout spaces and pour height.
 - 2. Provide grout with a slump of 8 to 11 inches as measured according to ASTM C 143.

2.14 SOURCE QUALITY CONTROL

- A Concrete Masonry Unit Tests: For each type of concrete masonry unit indicated, units will be tested according to ASTM C 140.

PART 3 EXECUTION

3.1 EXAMINATION

- A Examine conditions, with installer present, for compliance with requirements for installation tolerances and other conditions affecting performance.
 - 1. Verify that foundations are within tolerances specified.
 - 2. Verify that reinforcing dowels are properly placed.
- B Do not proceed with installation until unsatisfactory conditions have been corrected.
 - 1. Installation of unit masonry indicates acceptance of surfaces and conditions.

3.2 PREPARATION

- A Before installation, examine rough-in and built-in construction to verify locations of piping connections.

3.3 INSTALLATION, GENERAL

- A Thickness: Build cavity and composite walls and other masonry construction to the full thickness shown. Build single-wythe walls to the actual widths of masonry units, using units of widths indicated.
- B Build chases and recesses to accommodate items specified in this Specification Section and in other Sections of the Specifications.
- C Leave openings for equipment to be installed before completing masonry. After installing equipment, complete masonry to match the construction immediately adjacent to the opening.
- D Cut masonry units with motor-driven saws to provide clean, sharp, unchipped edges. Cut units as required to provide a continuous pattern and to fit adjoining construction. Where possible, use full-size units without cutting. Allow units cut with water-cooled saws to dry before placing, unless wetting of units is specified. Install cut units with cut surfaces and, where possible, cut edges concealed.
- E Select and arrange units for exposed unit masonry to produce a uniform blend of colors and textures.
 - 1. Mix units from several pallets or cubes as they are placed.
- F Wetting of Brick: Wet brick before laying if the initial rate of absorption exceeds 30 g/30 sq. in. per minute when tested per ASTM C 67. Allow units to absorb water so they are damp but not wet at the time of laying.

3.4 CONSTRUCTION TOLERANCES

- A Comply with tolerances in ACI 530.1/ASCE 6/TMS 602 and the following:
 - 1. For conspicuous vertical lines, such as external corners, door jambs, reveals, and expansion and control joints, do not vary from plumb by more than 1/4 inch in 20 feet, nor 1/2 inch maximum.
 - 2. For vertical alignment of exposed head joints, do not vary from plumb by more than 1/4 inch in 10 feet, nor 1/2 inch maximum.
 - 3. For conspicuous horizontal lines, such as exposed lintels, sills, parapets, and reveals, do not vary from level by more than 1/4 inch in 20 feet, nor 1/2 inch maximum.
 - 4. For exposed bed joints, do not vary from thickness indicated by more than plus or minus 1/8 inch, with a maximum thickness limited to 1/2 inch. Do not vary from bed-joint thickness of adjacent courses by more than 1/8 inch.
 - 5. For exposed head joints, do not vary from thickness indicated by more than plus or minus 1/8 inch. Do not vary from adjacent bed-joint and head-joint thicknesses by more than 1/8 inch.

3.5 LAYING MASONRY WALLS

- A Lay out walls in advance for accurate spacing of surface bond patterns with uniform joint thicknesses and for accurate location of openings, movement-type joints, returns, and offsets. Avoid using less-than-half-size units, particularly at corners, jambs, and, where possible, at other locations.
- B Bond Pattern for Exposed Masonry: Lay exposed masonry in the following bond pattern; do not use units with less than nominal 4-inch horizontal face dimensions at corners or jambs.
 - 1. As indicated on the Drawings.
- C Lay concealed masonry with all units in a wythe in running bond or bonded by lapping not less than 2 inches. Bond and interlock each course of each wythe at corners. Do not use units with less than nominal 4-inch horizontal face dimensions at corners or jambs.

- D Stopping and Resuming Work: In each course, rack back one-half-unit length for one-half running bond or one-third-unit length for one-third running bond; do not tooth. Clean exposed surfaces of set masonry, wet clay masonry units lightly if required, and remove loose masonry units and mortar before laying fresh masonry.
- E Built-in Work: As construction progresses, build in items specified under this and other Sections of the Specifications. Fill in solidly with masonry around built-in items.
- F Where built-in items are to be embedded in cores of hollow masonry units, place a layer of metal lath in the joint below and rod mortar or grout into core.
- G Fill cores in hollow concrete masonry units with grout 24 inches under bearing plates, beams, lintels, posts, and similar items, unless otherwise indicated.
- H Build non-load-bearing interior partitions full height of story to underside of solid floor or roof structure above, unless otherwise indicated.
 - 1. Install compressible filler in joint between top of partition and underside of structure above.
- I All interior masonry walls shall be braced to roof or floor structure above, as indicated.

3.6 MORTAR BEDDING AND JOINTING

- A Lay hollow masonry units as follows:
 - 1. With full mortar coverage on horizontal and vertical face shells.
 - 2. Bed webs in mortar in starting course on footings and in all courses of piers, columns, and pilasters, and where adjacent to cells or cavities to be filled with grout.
 - 3. For starting course on footings where cells are not grouted, spread out full mortar bed, including areas under cells.
- B Lay solid brick-size masonry units with completely filled bed and head joints; butter ends with sufficient mortar to fill head joints and shove into place. Do not deeply furrow bed joints or slush head joints.
 - 1. At cavity walls, bevel beds away from cavity, to minimize mortar protrusions into cavity. As work progresses, trowel mortar fins protruding into cavity flat against the cavity face of the brick.
- C Tool exposed joints slightly concave when thumbprint hard, using a jointer larger than the joint thickness, unless otherwise indicated.
- D Cut joints flush for masonry walls to receive plaster or other direct-applied finishes (other than paint), unless otherwise indicated.

3.7 CAVITIES

- A Keep cavities clean of mortar droppings and other materials during construction.

3.8 MASONRY JOINT REINFORCEMENT

- A General: Provide continuous masonry joint reinforcement as indicated. Install entire length of longitudinal side rods in mortar with a minimum cover of 5/8 inch on exterior side of walls, 1/2 inch elsewhere. Lap reinforcement a minimum of 6 inches.
 - 1. Space reinforcement not more than 16 inches on center.
 - 2. Space reinforcement not more than 8 inches on center in foundation walls, unless otherwise indicated on Drawings.
 - 3. Provide reinforcement not more than 8 inches above and below wall openings and extending 24 inches beyond openings, unless otherwise indicated on Drawings.
 - a. Reinforcement above is in addition to continuous reinforcement.
- B Cut or interrupt joint reinforcement at control and expansion joints, unless otherwise indicated.
- C Provide continuity at corners and wall intersections by using prefabricated "L" and "T" sections. Cut and bend reinforcing units as directed by manufacturer for continuity at returns, offsets, column fireproofing, pipe enclosures, and other special conditions.

3.9 ANCHORING MASONRY VENEERS

- A Anchor masonry veneers to wall framing or concrete and masonry backup with seismic masonry-veneer anchors to comply with the following requirements:

1. Fasten each anchor section through sheathing to wall framing with two metal fasteners of type indicated.
2. Embed tie sections in masonry joints. Provide not less than 2 inches of air space between back of masonry veneer and face of sheathing.
3. Locate anchor sections to allow maximum vertical differential movement of ties up and down.
4. Space anchors as indicated, but not more than 16 inches on center vertically and 16 inches on center horizontally, with not less than 1 anchor for each 2 sq. ft. of wall area. Install additional anchors within 12 inches of openings and at intervals, not exceeding 8 inches, around the perimeter.

3.10 CONTROL AND EXPANSION JOINTS

- A General: Install control and expansion joints in unit masonry where indicated. Build-in related items as masonry progresses. Do not form a continuous span through movement joints unless provisions are made to prevent in-plane restraint of wall or partition movement.
1. If vertical control joints are not indicated on the Drawings, provide and install 3/8" control joints in brick and CMU at no more than 24 feet on center and coordinate locations with the Architect.
- B Form control joints in concrete masonry as follows:
1. Generally, install preformed control-joint gaskets designed to fit standard sash block.
 2. Where indicated, install interlocking units designed for control joints. Install bond-breaker strips at joint. Keep head joints free and clear of mortar or rake joint.
- C Form expansion joints in brick as follows:
1. Form open joint of width indicated, but not less than 3/8 inch for installation of sealant and backer rod specified in Section 07 92 00 Joint Sealants. Keep joint free and clear of mortar.
- D Build in horizontal, pressure-relieving joints where indicated; construct joints by inserting a compressible filler of width required for installing sealant and backer rod specified in Section 07 92 00 Joint Sealants.
1. Locate horizontal, pressure-relieving joints beneath shelf angles supporting masonry veneer and attached to structure behind masonry veneer.

3.11 FLASHING, WEEP HOLES, AND VENTS

- A General: Install embedded flashing and weep holes in masonry at shelf angles, lintels, ledges, other obstructions to downward flow of water in wall, and where indicated.
- B Prepare masonry surfaces so they are smooth and free from projections that could puncture flashing. Unless otherwise indicated, place through-wall flashing on sloping bed of mortar and cover with mortar. Before covering with mortar, seal penetrations in flashing with adhesive, sealant, or tape as recommended by flashing manufacturer.
- C Install flashing as follows:
1. At masonry-veneer walls, extend flashing from exterior face of veneer, through veneer, up face of sheathing at least 8 inches, and behind air-infiltration barrier or building paper.
 2. At lintels and shelf angles, extend flashing at least 4 inches into masonry at each end. At heads and sills, extend flashing 4 inches at ends and turn flashing up not less than 2 inches to form a pan.
- D Install weep holes in the head joints in exterior wythes of the first course of masonry immediately above embedded flashing and as follows:
1. Use plastic weep hole/vents to form weep holes.
 2. Place cavity drainage material immediately above flashing in cavities at bottom of cavity and as indicated on drawings.

3.12 REINFORCED UNIT MASONRY INSTALLATION

- A Temporary Formwork and Shores: Construct formwork and shores to support reinforced masonry elements during construction.

1. Construct formwork to conform to shape, line, and dimensions shown. Make it sufficiently tight to prevent leakage of mortar and grout. Brace, tie, and support forms to maintain position and shape during construction and curing of reinforced masonry.
 2. Do not remove forms and shores until reinforced masonry members have hardened sufficiently to carry their own weight and other temporary loads that may be placed on them during construction.
- B Placing Reinforcement: Comply with requirements of ACI 530.1/ASCE 6/TMS 602.
- C Grouting: Do not place grout until entire height of masonry to be grouted has attained sufficient strength to resist grout pressure.
1. Comply with requirements of ACI 530.1/ASCE 6/TMS for cleanouts and for grout placement, including minimum grout space and maximum pour height.

3.13 FIELD QUALITY CONTROL

- A Owner may engage a qualified independent testing agency to perform field quality-control testing indicated below.
1. Payment for these services will be made by Owner.
 2. Retesting of materials failing to meet specified requirements shall be done at Contractor's expense.
- B Mortar properties will be tested per ASTM C 780.
- C Grout will be sampled and tested for compressive strength per ASTM C 1019.
- D Brick Tests: For each type and grade of brick indicated, units will be tested according to ASTM C 67.
- E Concrete Masonry Unit Tests: For each type of concrete masonry unit indicated, units will be tested according to ASTM C 140.

3.14 REPAIRING, POINTING, AND CLEANING

- A Remove and replace masonry units that are loose, chipped, broken, stained, or otherwise damaged or that do not match adjoining units. Install new units to match adjoining units; install in fresh mortar, pointed to eliminate evidence of replacement.
- B Pointing: During the tooling of joints, enlarge voids and holes, except weep holes, and completely fill with mortar. Point up joints, including corners, openings, and adjacent construction, to provide a neat, uniform appearance. Prepare joints for sealant application.
- C In-Progress Cleaning: Clean unit masonry as work progresses by dry brushing to remove mortar fins and smears before tooling joints.
- D Final Cleaning: After mortar is thoroughly set and cured, clean exposed masonry as follows:
1. Protect adjacent surfaces from contact with cleaner.
 2. Wet wall surfaces with water before applying cleaners; remove cleaners promptly by rinsing surfaces thoroughly with clear water.
 3. Clean brick by bucket-and-brush hand-cleaning method described in "BIA Technical Notes 20."

3.15 MASONRY WASTE DISPOSAL

- A Excess Masonry Waste: Remove excess clean masonry waste and other masonry waste, and legally dispose of off Owner's property.

END OF SECTION 04 20 00

January 15, 2026

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SECTION 05 31 00 - STEEL DECKING

PART 1 GENERAL

1.1 RELATED REQUIREMENTS

- A Section 03 30 00 - Cast-in-Place Concrete: Concrete topping over metal deck.
- B Section 04 20 00 - Unit Masonry: Placement of anchors for bearing plates embedded in unit masonry assemblies.
- C Section 05 12 00 - Structural Steel Framing: Support framing for openings larger than 18 inches.
- D Section 05 12 00 - Structural Steel Framing: Placement of embedded steel anchors for bearing plates in cast-in-place concrete.
- E Section 05 21 00 - Steel Joist Framing: Support framing for openings larger than 18 inches and shear stud connectors.
- F Section 05 21 00 - Steel Joist Framing: Placement of embedded steel anchors for bearing plates and joist seats in cast-in-place concrete.
- G Section 05 50 00 - Metal Fabrications: Steel angle concrete stops at deck edges.

1.2 REFERENCE STANDARDS

- A ASTM A36/A36M - Standard Specification for Carbon Structural Steel.
- B ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
- C AWS B2.1/B2.1M - Specification for Welding Procedure and Performance Qualification.
- D AWS D1.1/D1.1M - Structural Welding Code - Steel.
- E AWS D1.3/D1.3M - Structural Welding Code - Sheet Steel.
- F IAS AC172 - Accreditation Criteria for Fabricator Inspection Programs for Structural Steel AC172.
- G SDI (DM) - Publication No.30, Design Manual for Composite Decks, Form Decks, and Roof Decks.
- H SSPC-Paint 20 - Zinc-Rich Coating (Type I - Inorganic, and Type II - Organic).

1.3 SUBMITTALS

- A See Section 01 30 00 - Administrative Requirements, for submittals procedures.
- B Product Data: Provide deck profile characteristics, dimensions, structural properties, and finishes.
- C Shop Drawings: Indicate deck plan, support locations, projections, openings, reinforcement, pertinent details, and accessories.
- D Certificates: Certify that products furnished meet or exceed specified requirements.
- E Welders' Qualification Statement: Welders' certificates in accordance with AWS B2.1/B2.1M and dated no more than 12 months before start of scheduled welding work.
- F Fabricator's Qualification Statement: Provide documentation showing steel fabricator is accredited under IAS AC172.

1.4 QUALITY ASSURANCE

- A Design deck layout, spans, fastening, and joints 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 Welder Qualifications: Welding processes and welding operators qualified in accordance with AWS D1.1/D1.1M and AWS D1.3/D1.3M and dated no more than 12 months before start of scheduled welding work.
- C Installer Qualifications: Company specializing in performing the work of this Section with minimum 5 years of experience.

1.5 DELIVERY, STORAGE, AND HANDLING

- A Cut plastic wrap to encourage ventilation.
- B Separate sheets and store deck on dry wood sleepers; slope for positive drainage.

PART 2 PRODUCTS**2.1 STEEL DECK**

- A All Deck Types: Select and design metal deck in accordance with SDI Design Manual.
 - 1. Calculate to structural working stress design and structural properties specified.
- B Roof Deck: Non-composite type, fluted steel sheet:
 - 1. Galvanized Steel Sheet: ASTM A653/A653M, Structural Steel (SS) Grade 50/340, Class 1, 2, or 4, with G90/Z275 galvanized coating.
 - 2. Structural Properties:
 - a. Span Design: Multiple.
 - 3. Minimum Base Metal Thickness: as indicated
 - 4. Nominal Height: 1-1/2 inch.
 - 5. Side Joints: as indicated.
 - 6. End Joints: Lapped, welded.
- C Composite Floor Deck: Fluted steel sheet embossed to interlock with concrete:
 - 1. Galvanized Steel Sheet: ASTM A653/A653M, Structural Steel (SS) Grade 50/340, Class 1, 2, or 4, with G90/Z275 galvanized coating.
 - 2. Span Design: Multiple.
 - 3. Minimum Base Metal Thickness: as indicated
 - 4. Nominal Height: as indicated.

2.2 ACCESSORY MATERIALS

- A Bearing Plates and Angles: ASTM A36/A36M steel, galvanized per ASTM A123/A123M.
- B Welding Materials: AWS D1.1/D1.1M.
- C Mechanical Fasteners: Steel; hex washer head, self-drilling, self-tapping.
- D Touch-Up Primer for Galvanized Surfaces: SSPC-Paint 20, complying with VOC limitations of authorities having jurisdiction.

2.3 FABRICATED DECK ACCESSORIES

- A Sheet Metal Deck Accessories: Metal closure strips, wet concrete stops, and cover plates, 22 gauge, 0.0299 inch thick sheet steel; of profile and size as indicated; finished same as deck.
- B Roof Sump Pans: Formed sheet steel, 14 gauge, 0.0747 inch minimum thickness, flat bottom, sloped sides, recessed 1-1/2 inches below roof deck surface, bearing flange 3 inches wide, sealed watertight.
- C Floor Drain Pans: Formed sheet steel, 14 gauge, 0.0747 inch minimum thickness, flat bottom, sloped sides, recessed 1-1/2 inches below floor deck surface, bearing flange 3 inches wide, sealed watertight.

PART 3 EXECUTION**3.1 EXAMINATION**

- A Verify existing conditions prior to beginning work.

3.2 INSTALLATION

- A Erect metal deck in accordance with SDI Design Manual and manufacturer's instructions. Align and level.
- B On concrete and masonry surfaces provide minimum 4 inch bearing.
- C On steel supports provide minimum 1-1/2 inch bearing.
- D Fasten deck to steel support members at ends and intermediate supports at 12 inches on center maximum, parallel with the deck flute and at each transverse flute using methods specified.
 - 1. Welding: Use fusion welds through weld washers.
- E Drive mechanical sidelap connectors completely through adjacent lapped sheets; positively engage adjacent sheets with minimum three-thread penetration.

- F Position roof drain pans with flange bearing on top surface of deck. Fusion weld at each deck flute.
- G Position floor drain pans with flange bearing on top surface of deck. Fusion weld at each deck flute.
- H Immediately after welding deck and other metal components in position, coat welds, burned areas, and damaged surface coating, with touch-up primer.

END OF SECTION 05 31 00

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SECTION 05 40 00 - COLD-FORMED METAL FRAMING

PART 1 GENERAL

1.1 SECTION INCLUDES

- A Formed steel stud exterior wall and interior wall framing.

1.2 RELATED REQUIREMENTS

- A Section 04 26 13 - Masonry Veneer: Veneer masonry supported by wall stud metal framing.
- B Section 05 31 00 - Steel Decking.
- C Section 05 44 00 - Cold-Formed Metal Trusses.
- D Section 09 22 16 - Non-Structural Metal Framing.

1.3 DEFINITIONS

- A General: See AISI S240 for definitions of terms used in this section.

1.4 ADMINISTRATIVE REQUIREMENTS

- A Coordinate with work of other sections that is to be installed in or adjacent to metal framing systems, including but not limited to structural anchors, cladding anchors, utilities, insulation, and firestopping.
- B Preinstallation Meeting: Conduct a preinstallation meeting one week prior to the start of the work of this section; require attendance by affected installers.

1.5 SUBMITTALS

- A See Section 01 30 00 - Administrative Requirements for submittal procedures.
- B Product Data: Provide data on cold-formed steel structural members; include material descriptions and base steel thickness.
- C Product Data: Provide manufacturer's data on factory-made connectors and mechanical fasteners, showing compliance with requirements.
- D Shop Drawings: Indicate component details, framed openings, bearing, anchorage, loading, welds, and type and location of fasteners, and accessories or items required of related work.
 - 1. Indicate stud layout.
 - 2. Describe method for securing studs to tracks and for bolted framing connections.
- E Steel Framing Industry Association (SFIA) Certification:
 - 1. Submit documentation that metal studs and connectors used on project meet or exceed requirements of International Building Code.
 - 2. Submit current documentation of contractor accreditation and installer certification. Keep copies of each on-site during and after installation, and present upon request.
- F Design Data:
 - 1. Shop drawings signed and sealed by a professional structural engineer.
 - 2. Design calculations sufficient to demonstrate compliance with design criteria; signed and sealed by a professional structural engineer.
 - 3. Details and calculations for factory-made connectors, signed and sealed by a professional structural engineer.
- G Evaluation Service Reports: Provide reports indicating compliance with specified requirements for cold-formed steel structural members.
- H Manufacturer Reports: Include research reports indicating compliance with applicable building codes.
- I Inspection Reports: Provide material verification Inspection Reports in accordance with requirements of AISI S240.
- J Inspection Reports: Provide Inspection Reports for welding, mechanical fastening, and cold-formed steel light-frame construction in accordance with requirements of AISI S240.
- K Manufacturer's Installation Instructions: Provide installation instructions for connectors.
- L Installation Drawings: Indicate dimensioned locations of cold-formed steel structural framing.

- M Manufacturer's Qualification statement.
- N Testing Agency Qualification Statement.
- O Welders' Qualification Statement: Welders' certificates in accordance with AWS B2.1/B2.1M and dated no more than 12 months before the start of scheduled welding work.

1.6 QUALITY ASSURANCE

- A See Section 01 40 00 - Quality Requirements for additional requirements.
- B Designer Qualifications: Design framing system under direct supervision of a professional structural engineer experienced in designing this work and licensed in the State in which the Project is located.
- C Manufacturer Qualifications:
 - 1. Company specializing in manufacturing the types of products specified in this section, and with minimum 3 years of documented experience.
 - 2. SFIA Code Compliance Certification Program: www.CFsteel.org/#sle: Use metal studs and connectors certified for compliance with International Building Code.
 - 3. Member of Steel Stud Manufacturers Association (SSMA): www.ssma.com/#sle.
- D Professional Contractor and Truss Fabricator Qualifications: SFIA-accredited contractor and fabricator: www.CFsteel.org/#sle.
- E Welder Qualifications: Welding processes and welding operators qualified in accordance with AWS D1.1/D1.1M and AWS D1.3/D1.3M and dated no more than 12 months before start of scheduled welding work.
- F Installer Qualifications: Company specializing in performing the work of this section with minimum three years documented experience and approved by manufacturer.

PART 2 PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A Comply with requirements for Contractor's design-related professional design services indicated in Section 01 40 00 - Quality Requirements.
- B Design Requirements: Design cold-formed framing systems, components and connectors to withstand specified design loads in compliance with ICC (IBC), ASCE 7, AISI S100, and AISI S240.
- C Regulatory Requirements: Comply with applicable building code criteria for loads, including seismic loads.
- D Design Criteria: As indicated on the drawings.
 - 1. Floor Live Loads:
 - a. Minimum Uniformly Distributed: 50 psf.
 - b. Minimum Concentrated: 1,000 lbs.
 - 2. Roof Live Loads:
 - a. Minimum Uniformly Distributed: _____ psf.
 - b. Minimum Concentrated: _____ psf.
 - 3. Wind Loads: _____ psf positive and _____ psf negative.
 - 4. Live load deflection meeting the following, unless otherwise indicated:
 - a. Floors: Maximum vertical deflection under live load of 1/480 of span.
 - b. Roofs: Maximum vertical deflection under live load of 1/240 of span.
 - c. Exterior Walls: Maximum horizontal deflection under wind load of 1/180 of span.
 - 5. Able to tolerate movement of components without damage, failure of joint seals, undue stress on fasteners, or other detrimental effects when subject to seasonal or cyclic day/night temperature ranges.
 - 6. Able to accommodate construction tolerances, deflection of building structural members, and clearances of intended openings.
- E Fabrication:
 - 1. Shop-fabricate cold-formed framing systems and connectors to the greatest extent possible.
 - 2. Deliver to project site in largest practical sections.

2.2 MATERIALS

- A Material and Product Requirements Criteria: AISI S201.
- B Steel Sheet: ASTM A1003/A1003M, subject to the ductility limitations indicated in AISI S240.
 - 1. Structural Grade: As required to meet design criteria.
 - 2. Corrosion Protection Coating Designation: CP 60 in accordance with AISI S240.

2.3 STRUCTURAL FRAMING COMPONENTS

- A Wall Studs and Track Sections: AISI S240; c-shaped studs and u-shaped track sections in stud-matching nominal width and compatible height.
 - 1. Structural Grade: As required to meet design criteria.
 - 2. Corrosion Protection Coating Designation: CP 60 in accordance with AISI S240.
 - 3. Thickness and Depth: Depth as indicated on the drawings; thickness and structural grade as required to meet design criteria.
 - 4. Provide components fabricated from ASTM A1011/A1011M Designation SS (structural steel).
- B Jamb Studs: AISI S240; manufactured, engineered, c-shaped with wide flanges, designed to replace conventional double-stud framing at openings.
 - 1. Structural Grade: As required to meet design criteria.
 - 2. Corrosion Protection Coating Designation: CP 60 in accordance with AISI S240.
 - 3. Thickness and Depth: Depth as indicated on drawings; thickness and structural grade as required to meet specified design criteria.
- C Headers: AISI S240; manufactured, engineered one-member or two-member assemblies, with wide flanges, designed to replace conventional box or nested header framing at openings.
 - 1. Structural Grade: As required to meet design criteria.
 - 2. Corrosion Protection Coating Designation: CP 60 in accordance with AISI S240.
 - 3. Thickness and Depth: Depth as indicated on drawings; thickness and structural grade as required to meet specified design criteria.
 - 4. Jamb Mounting Clips: Manufacturer's standard.
 - 5. Cripple Stud Clips: Manufacturer's standard.

2.4 CONNECTIONS

- A Performance Requirements: Provide connections in compliance with requirements of AISI S240.
- B Steel Sheet: ASTM A1003/A1003M, subject to the ductility limitations indicated in AISI S240.
- C Structural Performance: Maintain load and movement capacity required by applicable building code and specified design criteria.
- D Movement Connections: Provide mechanical anchorage devices that accommodate movement using slotted holes, shouldered screws or screws and anti-friction or stepped bushings, while maintaining structural performance of framing. Provide movement connections where indicated on drawings.
 - 1. Where continuous studs bypass elevated floor slab, connect stud to slab in manner allowing vertical and horizontal movement of slab without affecting studs; allow for minimum movement of 1/2 inch.
 - 2. Where top of stud wall terminates below structural floor or roof, connect studs to structure in manner allowing vertical and horizontal movement of slab without affecting studs; allow for minimum movement of 1/2 inch.
 - 3. Provide top track preassembled with connection devices spaced to fit stud spacing indicated on drawings; minimum track length of 10 feet.
- E Bridging Connections: Provide mechanical load-transferring devices that accommodate wind load torsion and weak axis buckling induced by axial compression loads. Provide bridging connectors where indicated on the drawings.

2.5 MISCELLANEOUS CONNECTIONS

- A Self-Drilling, Self-Tapping Screws, Bolts, Nuts and Washers: Hot-dip galvanized per ASTM A153/A153M.

- B Anchorage Devices: Powder actuated.
- C Welding: Comply with AWS D1.1/D1.1M.

2.6 ACCESSORIES

- A Bracing, Furring, Bridging: Formed sheet steel, thickness determined for conditions encountered; finish to match framing components.
- B Plates, Gussets, Clips: Formed Sheet Steel, thickness determined for conditions encountered; finish to match framing components.
- C Galvanizing Repair: Touch up bare steel with zinc-rich paint in compliance with ASTM A780/A780M.

PART 3 EXECUTION

3.1 EXAMINATION

- A Verify that substrate surfaces are ready to receive work.
- B Verify field measurements and adjust installation as required.

3.2 PREPARATION

- A Structural Wall Foundations: For gaps between wall bottom track and top of foundation 1/4 inch or greater, level substrate with loadbearing shims or grout between track and foundation.

3.3 INSTALLATION - GENERAL

- A Install structural members and connections in compliance with ASTM C1007.

3.4 INSTALLATION OF STUDS

- A Install wall studs plumb and level.
- B Construct corners using minimum of three studs. Install double studs at wall openings, door and window jambs.
- C Install load-bearing studs full length in one piece. Splicing of studs is not permitted.
- D Install load-bearing studs; brace, and reinforce to develop full strength and achieve design requirements.
- E Coordinate placement of insulation in multiple stud spaces made inaccessible after erection.
- F Install intermediate studs above and below openings to align with wall stud spacing.
- G Provide deflection allowance in stud track, directly below horizontal building framing at non-loadbearing framing.
- H Attach cross studs to studs for attachment of fixtures anchored to walls.
- I Install framing between studs for attachment of mechanical and electrical items, and to prevent stud rotation.
- J Touch-up field welds and damaged corrosion-protected surfaces zinc-rich paint in compliance with ASTM A780/A780M.

3.5 FIELD QUALITY CONTROL

- A See Section 01 40 00 - Quality Requirements, for additional requirements.
- B Provide material verification inspections in accordance with requirements of AISI S240.
- C Provide inspections for welding, mechanical fastening, and cold-formed steel light-frame construction in accordance with requirements of AISI S240.
- D Coordination of Other Tests and Inspections: Owner will employ independent testing agency to test and/or inspect; provide access as required to accommodate timely performance.

3.6 TOLERANCES

- A Studs - Vertical Alignment (Plumbness): 1/960 of span or 1/8 inch in 10 ft, in accordance with ASTM C1007.

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- B Stud Spacing: 1/8 inch from the designated spacing, provided that the cumulative error does not exceed the requirements of the finishing materials in accordance with ASTM C1007.

END OF SECTION 05 40 00

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SECTION 05 44 00 - COLD-FORMED METAL TRUSSES

PART 1 GENERAL

1.1 SECTION INCLUDES

- A Light gauge cold-formed steel roof trusses.
- B Anchorages, bracing, and bridging.

1.2 RELATED REQUIREMENTS

- A Section 05 40 00 - Cold-Formed Metal Framing: Light gauge structural metal studs, joists, and rafters.

1.3 REFERENCE STANDARDS

- A AISI S100 - North American Specification for the Design of Cold-Formed Steel Structural Members.
- B ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
- C ASTM A780/A780M - Standard Practice for Repair of Damaged and Uncoated Areas of Hot-Dip Galvanized Coatings.
- D AWS B2.1/B2.1M - Specification for Welding Procedure and Performance Qualification.
- E AWS D1.1/D1.1M - Structural Welding Code - Steel.
- F AWS D1.3/D1.3M - Structural Welding Code - Sheet Steel.
- G CFSEI 5000 - Field Installation Guide for Cold-Formed Steel Roof Trusses.

1.4 ADMINISTRATIVE REQUIREMENTS

- A Pre-Installation Meeting: Meet at project site prior to beginning of installation to review requirements. Require attendance by representatives of the following:
 - 1. Truss fabricator.
 - 2. Truss installer.
 - 3. Other entities affected by the work of this section, including but not limited to truss support framing installer, mechanical systems installer, and electrical systems installer.

1.5 SUBMITTALS

- A See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B Product Data: Manufacturer's data sheets on each product to be used, including:
 - 1. Span charts.
 - 2. Storage and handling requirements and recommendations.
 - 3. Installation methods.
- C Shop Drawings:
 - 1. Include detailed roof truss layout.
 - 2. Show member type, location, spacing, size and gauge, methods of attachment, and erection details. Indicate supplemental bracing, strapping, splices, bridging, and accessories.
 - 3. Include truss design drawings, signed and sealed by a qualified professional engineer registered in North Carolina verifying ability of each truss design to meet applicable code and design requirements.
 - a. Include the following:
 - 1) Design criteria.
 - 2) Engineering analysis depicting member stresses and deflections.
 - 3) Member sizes and gauges.
 - 4) Details of connections at truss joints.
 - 5) Truss support reactions.
 - 6) Bracing requirements.
- D Steel Framing Industry Association (SFIA) Certification:

1. Submit documentation that metal studs and connectors used on project meet or exceed requirements of International Building Code.
- E Designer's Qualification Statement.
- F Fabricator's Qualification Statement.
- G Installer's Qualification Statement.
- H Welders' Qualification Statement: Welders' certificates in accordance with AWS B2.1/B2.1M and dated within the previous 12 months. If welding is required by the supplier.

1.6 QUALITY ASSURANCE

- A Designer Qualifications: Design trusses under direct supervision of a Professional Structural Engineer experienced in design of this work and licensed in North Carolina.
- B Fabricator Qualifications: Steel truss fabricator with minimum 10 years of experience designing and fabricating truss systems equivalent to those required for this project and licensed by an acceptable manufacturer.
- C Installer Qualifications: Experienced installer approved by truss system fabricator.
- D Welder Qualifications: Welding processes and welding operators qualified within previous 12 months in accordance with AWS D1.1/D1.1M and AWS D1.3/D1.3M. If welding is required by the supplier.

1.7 DELIVERY, STORAGE, AND HANDLING

- A Deliver trusses and other materials in manufacturer's unopened bundles or containers, each marked with manufacturer's name, brand, type, and grade. Exercise care to avoid damage during unloading, storing, and erection.
- B Store trusses on blocking, pallets, platforms, or other supports, off the ground and in an upright position, sufficiently braced to avoid damage from excessive bending. Gently slope stored trusses to avoid accumulation of water on interior of truss chord members.
- C Protect trusses and accessories from contact with earth, corrosion, deformation, mechanical damage, or other deterioration when stored at project site.

PART 2 PRODUCTS

2.1 TRUSS DESIGN REQUIREMENTS

- A Design: Calculate structural characteristics of cold-formed steel truss members according to AISI S100.
- B Structural Performance: Design, engineer, fabricate, and erect trusses to withstand specified design loads for project conditions within required limits.
 1. Design Loads: As indicated on drawings.
 - a. Roof Live Loads:
 - 1) Minimum Uniformly Distributed: As indicated on drawings.
 - 2) Minimum Concentrated: As indicated on drawings.
 2. Deflections: Live load deflection meeting the following, unless otherwise indicated:
 - a. Roofs: Maximum vertical deflection under live load of 1/240 of span.
 3. Design trusses to accommodate movement attributable to temperature changes within a range of 120 degrees F without damage or overstressing, sheathing failure, undue strain on fasteners and anchors, or other deleterious effects.

2.2 COMPONENTS

- A Trusses: Light gauge steel assemblies providing a complete horizontal framing system for locations indicated, ready for deck installation.
 1. Truss Type, Span, and Height: As indicated on drawings.
 2. Chord and Web Members: Fabricate required shapes from commercial quality galvanized steel sheet complying with ASTM A653/A653M, with minimum yield strength of 40,000 psi; minimum G60/Z180 coating; gauges as required for load conditions; all edges rolled or closed.

- B Fasteners: Self-drilling, self-tapping screw fasteners with corrosion-resistant plated finish, as recommended by steel truss manufacturer and marked for easy identification.
 - 1. Welding: Comply with applicable provisions of AWS D1.1/D1.1M and AWS D1.3/D1.3M.
- C Bracing, Bridging, and Blocking Members: Fabricate required shapes from commercial quality galvanized steel sheet complying with ASTM A653/A653M, with minimum yield strength of 33,000 psi; minimum G60/Z180 coating; gauges as required for load conditions.

2.3 FABRICATION

- A Factory fabricate cold-formed steel trusses plumb, square, true to line, and with secure connections, complying with manufacturer's recommendations and project requirements.
 - 1. Fabricate trusses using jig templates.
 - 2. Cut truss members by sawing, shearing, or plasma cutting.
 - 3. Fasten members in full compliance with instructions of manufacturer. Wire tying of framing members is not permitted.
- B Tolerances: Fabricate trusses to maximum allowable tolerance variation from plumb, level and true line of 1/8 inch in 10 feet.
 - 1. Up to 30 feet Long: Maximum plus or minus 1/2 inch from design length.
 - 2. Over 30 feet Long: Maximum plus or minus 3/4 inch from design length.
 - 3. Up to 5 feet High: Maximum plus or minus 1/4 inch from design height.
 - 4. Over 5 feet High: Maximum plus or minus 1/2 inch from design height.

PART 3 EXECUTION

3.1 EXAMINATION

- A Examine structure, substrates, and installation conditions. Notify Architect of unsatisfactory preparation. Do not begin installation until substrates have been properly prepared and unsatisfactory conditions have been corrected.
- B Proceeding with installation indicates installer's acceptance of substrate conditions.

3.2 INSTALLATION

- A Install cold-formed steel trusses in strict accordance with manufacturer's instructions and approved shop drawings, using approved fastening methods.
- B Install temporary erection bracing and permanent bracing and bridging before application of any loads. Erect trusses with plane of truss webs vertical and parallel to each other, accurately located at spacing indicated. Anchor trusses securely at bearing points.
- C Adequately distribute applied loads to avoid exceeding the carrying capacity of any one joint, truss, or other component.
- D Exercise care to avoid damaging truss members during lifting and erection and to minimize horizontal bending of trusses.
- E Removal, cutting, or alteration of any truss chord, web, or bracing member in the field is prohibited, unless approved in advance by Architect or the engineer of record and the truss manufacturer.
- F Repair or replace damaged members and complete trusses as directed and approved in writing by Architect or the engineer of record and the truss manufacturer.
- G Galvanizing Repair: Touch up bare steel with zinc-rich paint in compliance with ASTM A780/A780M.
- H Field Welding: In accordance with AWS D1.1/D1.1M and AWS D1.3/D1.3M, as applicable, and as follows:
 - 1. Connections: Provide fillet, flat, plug, or butt welds, as indicated.
 - 2. Minimum steel thickness for welded connections, 18 gauge, 0.0478 inch.
- I Roof Trusses:
 - 1. Comply with recommendations of CFSEI 5000.
 - 2. Align truss bottom chords with load-bearing studs or continuously reinforce track as required to transfer loads to structure.
 - 3. Install continuous bridging and permanent truss bracing as indicated.

4. Install roof cross bracing and diagonal bracing as indicated.

3.3 TOLERANCES

- A Install trusses to maximum allowable tolerance variation from plumb, level, and true to line of 1/8 inch in 10 feet.
- B Space individual trusses not more than plus or minus 1/8 inch from plan location. Cumulative error in placement may not exceed minimum fastening requirements of sheathing or other material fastened to trusses.

3.4 FIELD QUALITY CONTROL

- A Owner will provide inspection service for inspection of field connections, in accordance with requirements of Section 01 40 00 - Quality Requirements.

3.5 PROTECTION

- A Protect trusses from damage by subsequent construction activities.
- B Repair or replace damaged trusses, truss members, and bracing members; obtain approval in advance by Architect or the engineer of record and the truss manufacturer for all cutting, repairs, and replacements.

END OF SECTION 05 44 00

SECTION 05 50 00 - METAL FABRICATIONS

PART 1 GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A Section Includes:

- 1. Non-decorative, utilitarian metal items and assemblies custom fabricated or manufactured from standard metal shapes and plates, and that are not specified in other Specification Sections.
 - 2. Steel framing and supports for applications where framing and supports are not specified in other Specification Sections including countertop supports.
 - 3. Alternating tread devices.
 - 4. Metal stair nosings.
 - 5. Supplementary components and accessories normally furnished or otherwise necessary for a complete installation.

1.3 REFERENCES

- A Acronyms and Abbreviations:

- 1. AWS: American Welding Society.
 - 2. GPR: Ground Penetrating Radar.
 - 3. MFMA: Metal Framing Manufacturers Association.
 - 4. SSPC: The Society for Protective Coatings.

1.4 COORDINATION

- A Coordinate installation of metal fabrications that are anchored to or that receive other work. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.

1.5 SUBMITTALS

- A Action Submittals:

- 1. Product Data: For manufactured items.
 - 2. Shop Drawings: Show fabrication and installation details for metal fabrications.
 - a. Include plans, elevations, sections, and details of metal fabrications and their connections. Show anchorage and accessory items.

- B Informational Submittals:

- 1. Welding Certificates: Certification that welders to be employed for the Project have satisfactorily passed AWS qualification tests. Certifications shall be current within last 12 months.
 - 2. Paint Compatibility Certificates: From manufacturers of topcoats applied over shop primers, certifying that shop primers are compatible with topcoats.
 - 3. Research/Evaluation Reports: For post-installed anchors, from ICC-ES.

1.6 QUALITY ASSURANCE

- A Welding Qualifications: Qualify procedures and personnel according to the following, as applicable:

- 1. AWS D1.1/D1.1M publication, Structural Welding Code - Steel.
 - 2. AWS D1.2/D1.2M publication, Structural Welding Code - Aluminum.

1.7 PROJECT CONDITIONS

- A Field Measurements: Verify locations of walls and other construction contiguous with metal fabrications by field measurements before fabrication.

PART 2 PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A Thermal Movements: Allow for thermal movements from ambient and surface temperature changes.
 - 1. Temperature Change: 120 deg F ambient; 180 deg F material surfaces.

2.2 METALS

- A Metal Surfaces, General: Provide materials with smooth, flat surfaces unless otherwise indicated. For metal fabrications exposed to view in the completed work, provide materials without seam marks, roller marks, rolled trade names, or blemishes.
- B Steel:
 - 1. Steel Plates, Shapes, and Bars: ASTM A 36/A 36M.
 - 2. Steel Tubing: ASTM A 500/A 500M, cold-formed steel tubing.
- C Cast Iron: Either gray iron, ASTM A 48, or malleable iron, ASTM A 47, unless otherwise indicated.
- D Aluminum:
 - 1. Aluminum Plate and Sheet: ASTM B 209, Alloy 6061-T6.
 - 2. Aluminum Extrusions: ASTM B 221, Alloy 6063-T6.
 - 3. Aluminum Castings: ASTM B 26, Alloy 443.0-F.

2.3 FASTENERS

- A General: Unless otherwise indicated, provide zinc-plated fasteners with coating complying with ASTM B 633 or ASTM F 1941, Class Fe/Zn 5, at exterior walls. Select fasteners for type, grade, and class required.
 - 1. Maximum penetration of fasteners in slab shall be limited to 3/4-inch to avoid damaging the post tensioning tendons in the upper (ceiling) slab and the floor slab.
- B Steel Bolts and Nuts: Regular hexagon-head bolts, ASTM A 307, Grade A; with hex nuts, ASTM A 563; and, where indicated, flat washers.
- C Anchor Bolts: ASTM F 1554, Grade 36, of dimensions indicated; with nuts, ASTM A 563; and, where indicated, flat washers.
 - 1. Hot-dip galvanize or provide mechanically deposited, zinc coating where item being fastened is indicated to be galvanized.
- D Machine Screws: ASME B18.6.3.
- E Lag Screws: ASME B18.2.1.
- F Plain Washers: Round, ASME B18.22.1.
- G Lock Washers: Helical, spring type, ASME B18.21.1.
- H Anchors, General: Anchors capable of sustaining, without failure, a load equal to 6 times the load imposed when installed in unit masonry and 4 times the load imposed when installed in concrete, as determined by testing according to ASTM E 488, conducted by a qualified independent testing agency.
 - 1. Use 0.145-inch diameter power-actuated fasteners.
- I Post-Installed Anchors: Torque-controlled expansion anchors, unless otherwise indicated. Installation of post-installed expansion anchors or torque-controlled anchors in the upper (ceiling) slab and the floor slab requires X-ray or GPR of area to avoid damaging post-tensioned tendons.
 - 1. Material for Interior Locations: Carbon-steel components zinc plated to comply with ASTM B 633 or ASTM F 1941, Class Fe/Zn 5, unless otherwise indicated.

- J Slotted-Channel Inserts: Cold-formed, hot-dip galvanized-steel box channels (struts) complying with MFMA-4, 1-5/8 by 7/8 inches length indicated with anchor straps or studs not less than 3 inches long at not more than 8 inches on center. Provide with temporary filler and tee-head bolts, complete with washers and nuts, all zinc-plated to comply with ASTM B 633, Class Fe/Zn 5, as needed for fastening to inserts.

2.4 MISCELLANEOUS MATERIALS

- A Welding Rods and Bare Electrodes: Select according to AWS specifications for metal alloy welded.
- B Universal Shop Primer: Fast-curing, lead- and chromate-free, universal modified-alkyd primer and compatible with topcoat.
1. Use primer containing pigments that make it easily distinguishable from zinc-rich primer.
- C Bituminous Paint: Cold-applied asphalt emulsion complying with ASTM D 1187.
- D Nonshrink, Nonmetallic Grout: Factory-packaged, nonstaining, noncorrosive, nongaseous grout complying with ASTM C 1107. Provide grout specifically recommended by manufacturer for interior and exterior applications.

2.5 ALTERNATING TREAD DEVICES

- A Alternating Tread Devices: Fabricate alternating tread devices of open-type construction with channel or plate stringers and pipe and tube railings unless otherwise indicated. Provide brackets and fittings for installation.
1. Manufacturers: Subject to compliance with the Contract Documents provide product by one of the following.
 - a. Lapeyre Stair Inc
 - b. Precision Ladders, LLC.
 - c. Vestil Manufacturing Corp.
 2. Tread depth is not to be less than 5 inches exclusive of nosing or less than 8-1/2 inches, including the nosing, tread width is not to be less than 7 inches, and riser height is not to be more than 9-1/2 inches.
 3. Comply with applicable railing requirements in Section 05 52 13 Pipe and Tube Railings.

2.6 ABRASIVE NOSINGS

- A Extruded Units: 2-piece aluminum units with subchannel for casting into concrete, with abrasive filler strips consisting of aluminum oxide, silicon carbide, or a combination of both, in an epoxy-resin binder. Fabricate units in lengths necessary to accurately fit openings or conditions.
1. Manufacturers: Subject to compliance with the Contract Documents, provide product by one of the following.
 - a. American Safety Tread.
 - b. Balco.
 - c. Wooster Products.
 2. Width: 2 inches.
 3. Apply clear lacquer to concealed surfaces of extruded units set into concrete.

2.7 FABRICATION, GENERAL

- A Shop Assembly: Preassemble items in the shop to greatest extent possible. Disassemble units only as necessary for shipping and handling limitations. Use connections that maintain structural value of joined pieces. Clearly mark units for reassembly and coordinated installation.
- B Cut, drill, and punch metals cleanly and accurately. Remove burrs and ease edges to a radius of approximately 1/32 inch unless otherwise indicated. Remove sharp or rough areas on exposed surfaces.
- C Form bent-metal corners to smallest radius possible without causing grain separation or otherwise impairing work.
- D Form exposed work with accurate angles and surfaces and straight edges.
- E Weld corners and seams continuously to comply with the following:

1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
 2. Obtain fusion without undercut or overlap.
 3. Remove welding flux immediately.
 4. At exposed connections, finish exposed welds and surfaces smooth and blended so no roughness shows after finishing and contour of welded surface matches that of adjacent surface.
- F Form exposed connections with hairline joints, flush and smooth, using concealed fasteners or welds where possible. Where exposed fasteners are required, use Phillips flat-head (countersunk) fasteners unless otherwise indicated. Locate joints where least conspicuous.
- G Fabricate seams and other connections that will be exposed to weather in a manner to exclude water. Provide weep holes where water may accumulate.
- H Cut, reinforce, drill, and tap metal fabrications as indicated to receive finish hardware, screws, and similar items.
- I Provide for anchorage of type indicated; coordinate with supporting structure. Space anchoring devices to secure metal fabrications rigidly in place and to support indicated loads.

2.8 MISCELLANEOUS FRAMING AND SUPPORTS

- A General: Provide steel framing and supports not specified in other Specification Sections as needed to complete the work.
- B Fabricate units from steel shapes, plates, and bars of welded construction unless otherwise indicated. Fabricate to sizes, shapes, and profiles indicated and as necessary to receive adjacent construction.
- C Fabricate supports for operable partitions from continuous steel beams of sizes recommended by partition manufacturer with attached bearing plates, anchors, and braces as recommended by partition manufacturer. Drill or punch bottom flanges of beams to receive partition track hanger rods; locate holes where indicated on operable partition Shop Drawings.
- D Galvanize miscellaneous framing and supports where indicated.

2.9 FINISHES, GENERAL

- A Finish metal fabrications after assembly.
- B Finish exposed surfaces to remove tool and die marks and stretch lines, and to blend into surrounding surface.

2.10 STEEL AND IRON FINISHES

- A Galvanizing: Hot-dip galvanize items as indicated to comply with ASTM A 153/A 153M for steel and iron hardware and with ASTM A 123/A 123M for other steel and iron products.
1. Do not quench or apply post galvanizing treatments that might interfere with paint adhesion.
- B Preparation for Shop Priming Galvanized Items: After galvanizing, thoroughly clean items of grease, dirt, oil, flux, and other foreign matter, and treat with metallic phosphate process.
- C Shop prime iron and steel items not indicated to be galvanized unless otherwise indicated.
1. Shop prime with universal shop primer indicated.
- D Preparation for Shop Priming: Prepare surfaces to comply with SSPC-SP 3, "Power Tool Cleaning."

PART 3 EXECUTION

3.1 INSTALLATION, GENERAL

- A Cutting, Fitting, and Placement: Perform cutting, drilling, and fitting required for installing metal fabrications. Set metal fabrications accurately in location, alignment, and elevation; with edges and surfaces level, plumb, true, and free of rack; and measured from established lines and levels.

- B Fit exposed connections accurately together to form hairline joints. Weld connections that are not to be left as exposed joints but cannot be shop welded because of shipping size limitations. Do not weld, cut, or abrade surfaces of exterior units that have been hot-dip galvanized after fabrication and are for bolted or screwed field connections.
 - C Field Welding: Comply with the following requirements:
 - 1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
 - 2. Obtain fusion without undercut or overlap.
 - 3. Remove welding flux immediately.
 - 4. At exposed connections, finish exposed welds and surfaces smooth and blended so no roughness shows after finishing and contour of welded surface matches that of adjacent surface.
 - D Fastening to In-Place Construction: Provide anchorage devices and fasteners where metal fabrications are required to be fastened to in-place construction. Provide threaded fasteners for use with concrete and masonry inserts, toggle bolts, through bolts, lag screws, wood screws, and other connectors.
 - E Corrosion Protection: Coat concealed surfaces of aluminum that come into contact with grout, concrete, masonry, wood, or dissimilar metals with the following:
 - 1. Cast Aluminum: Heavy coat of bituminous paint.
 - 2. Extruded Aluminum: Two coats of clear lacquer.
- 3.2 INSTALLATION OF ALTERNATING TREAD DEVICES
- A Secure top and bottom of alternating tread devices to construction to comply with manufacturer's written instructions.
- 3.3 INSTALLATION OF ABRASIVE NOSINGS
- A Install nosings in accordance with the manufacturer's written instructions and as indicated on the Drawings.
- 3.4 INSTALLATION OF MISCELLANEOUS FRAMING AND SUPPORTS
- A General: Install framing and supports to comply with requirements of items being supported, including manufacturers' written instructions and requirements indicated on Shop Drawings.
 - B Anchor supports for overhead-hung assemblies securely to, and rigidly brace from, building structure.
- 3.5 ADJUSTING AND CLEANING
- A Touchup Painting: Immediately after erection, clean field welds, bolted connections, and abraded areas. Paint uncoated and abraded areas with the same material as used for shop painting to comply with SSPC-PA 1 for touching up shop-painted surfaces.
 - 1. Apply by brush or spray to provide at least a 2.0-mil dry film thickness.
 - B Galvanized Surfaces: Clean field welds, bolted connections, and abraded areas and repair galvanizing to comply with ASTM A 780.

END OF SECTION 05 50 00

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SECTION 05 51 33 - METAL LADDERS

PART 1 GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A Section Includes:
 - 1. Manufactured fixed metal ladders for elevator pit access.
 - 2. Supplementary components and accessories normally furnished or otherwise necessary for a complete installation.

1.3 REFERENCES

- A Definitions:
 - 1. Ladder: Means the metal elevator pit ladder.
 - 2. Manufacturer: Means the ladder manufacturer unless otherwise indicated.

1.4 COORDINATION

- A Coordinate anchorage installations. Furnish setting drawings, templates, and anchorage structural loads for fastener resistance.

1.5 SUBMITTALS

- A Action Submittals:
 - 1. Product Data: For each type of product.
 - 2. Shop Drawings:
 - a. Detail fabrication and erection of each ladder indicated. Include plans, elevations, sections, and details of metal fabrications and their connections.
 - b. Provide templates for anchors and bolts specified for installation under other Sections.
 - c. Provide reaction loads for each hanger and bracket.

1.6 QUALITY ASSURANCE

- A Installer Qualifications: Experienced firm capable of selecting fasteners and installing ladders to attain operational and structural performance.
- B Product Qualification: Product design shall comply with OSHA 1910.23 standards for ladders.

PART 2 PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A Structural Performance of Aluminum Ladders: Aluminum ladders, including landings, shall withstand the effects of loads and stresses within limits and under conditions specified in ANSI A14.3.

2.2 ELEVATOR PIT ACCESS LADDERS

- A Manufacturers: Subject to compliance with the Contract Documents, provide products by one of the following.
 - 1. Alaco Ladder, Inc.
 - 2. Quality Elevator Products, Inc.
 - 3. Smart Elevator Tech, LLC.

2.3 ACCESSORIES

- A Brackets: Manufacturer's supplied brackets for mounting method indicated.

- B Accessories: As supplied, recommended, or required by the manufacturer and as necessary for a complete installation.

PART 3 EXECUTION

3.1 EXAMINATION

- A Do not begin installation until supporting structure is complete and ladder installation will not interfere with supporting structure work.
 - 1. Installation of ladders indicates acceptance of surfaces and conditions.

3.2 INSTALLATION

- A Securely install ladders to building structure in accordance with manufacturer's instructions, cited standards, and in proper relationship with adjacent construction.

END OF SECTION 05 51 33

SECTION 05 52 13 - PIPE AND TUBE RAILINGS

PART 1 GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A Section Includes:
 - 1. Steel railings.
 - 2. Supplementary components and accessories normally furnished or otherwise necessary for a complete installation.

1.3 REFERENCES

- A Acronyms and Abbreviations
 - 1. NAAMM: National Association of Architectural Metal Manufacturers.
 - 2. NACE: National Association of Corrosion Engineers.
 - 3. NOMMA: National Ornamental and Miscellaneous Metals Association.
 - 4. SSPC: The Society for Protective Coatings.

1.4 SUBMITTALS

- A Action Submittals:
 - 1. Product Data: For pipe and tube railing components.
 - 2. Shop Drawings: Include plans, elevations, sections, details, and attachments to other work.
 - 3. Delegated-Design Submittal: For railings, including analysis data signed and sealed by the qualified professional engineer licensed in the State of North Carolina responsible for their preparation.
- B Informational Submittals:
 - 1. Qualification Data: For professional engineer.
 - 2. Welding certificates.
 - 3. Paint Compatibility Certificates: From manufacturers of topcoats applied over shop primers certifying that shop primers are compatible with topcoats.

1.5 QUALITY ASSURANCE

- A Professional Engineer Qualifications: A professional engineer experienced with providing delegated design engineering services of the kind indicated, including documentation that engineer is a licensed engineer in the state of North Carolina.
- B Welding Qualifications: Qualify procedures and personnel in accordance with the following:
 - 1. AWS D1.1/D1.1M, "Structural Welding Code - Steel."

1.6 FIELD CONDITIONS

- A Field Measurements: Verify locations of walls and other construction contiguous with railings by field measurements before fabrication.

PART 2 PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A Delegated Design: Engage a qualified professional engineer licensed in the State of North Carolina to design railings, including attachment to building construction.
 - 1. Engineering services are defined as those performed for installations of the system, assembly, or product that are similar in material, design, and extent to those indicated for this Project.

- B Structural Performance: Railings, including attachment to building construction, withstand the effects of gravity loads and the following loads and stresses within limits and under conditions indicated:

1. Handrails: Uniform and concentrated loads need not be assumed to act concurrently.
 - a. Uniform Load: 50 lbf/ ft. applied in any direction.
 - b. Concentrated Load: 200 lbf applied in any direction.
2. Infill of Guards: Infill load and other loads need not be assumed to act concurrently.
 - a. Concentrated Load: 50 lbf applied horizontally on an area of 1 sq. ft.

2.2 METALS, GENERAL

- A Metal Surfaces, General: Provide materials with smooth surfaces, without seam marks, roller marks, rolled trade names, stains, discolorations, or blemishes.
- B Brackets, Flanges, and Anchors: Cast or formed metal of same type of material and finish as supported rails unless otherwise indicated.

2.3 STEEL RAILINGS

- A Source Limitations: Obtain each type of railing from single source from the same manufacturer.
- B Pipe: ASTM A 53/A 53M, Type F or Type S, Grade A, Standard Weight (Schedule 40), unless another grade and weight are required by structural loads.
- C Plates, Shapes, and Bars: ASTM A 36/A 36M.
- D Cast Iron Fittings: Either gray iron, ASTM A 48/A 48M, or malleable iron, ASTM A 47/A 47M, unless otherwise indicated.

2.4 FASTENERS

- A Fastener Materials:
1. Ungalvanized-Steel Railing Components: Plated steel fasteners complying with ASTM F 1941/F 1941M, Class Fe/Zn 5 for zinc coating.
- B Fasteners for Anchoring Railings to Other Construction: Select fasteners of type, grade, and class required to produce connections suitable for anchoring railings to other types of construction and capable of withstanding design loads.

2.5 MISCELLANEOUS MATERIALS

- A Handrail Brackets: Cast iron.
- B Welding Rods and Bare Electrodes: Select in accordance with AWS specifications for metal alloy welded.
1. For railings, provide type and alloy as recommended by producer of metal to be welded and as required for color match, strength, and compatibility in fabricated items.
- C Universal Shop Primer: Fast-curing, lead- and chromate-free, universal modified-alkyd primer complying with MPI#79 and compatible with topcoat.
- D Nonshrink, Nonmetallic Grout: Factory-packaged, nonstaining, noncorrosive, nongaseous grout, complying with ASTM C 1107/C 1107M. Provide grout specifically recommended by manufacturer for exterior applications.
- E Anchoring Cement: Factory-packaged, nonshrink, nonstaining, hydraulic-controlled expansion cement formulation for mixing with water at Project site to create pourable anchoring, patching, and grouting compound.

2.6 FABRICATION

- A General: Fabricate railings to comply with requirements indicated for design, dimensions, member sizes and spacing, details, finish, and anchorage, but not less than that required to support structural loads.
- B Shop assemble railings to greatest extent possible to minimize field splicing and assembly. Disassemble units only as necessary for shipping and handling limitations.
1. Clearly mark units for reassembly and coordinated installation.
 2. Use connections that maintain structural value of joined pieces.

- C Cut, drill, and punch metals cleanly and accurately.
 - 1. Remove burrs and ease edges to a radius of approximately 1/32 inch unless otherwise indicated.
 - 2. Remove sharp or rough areas on exposed surfaces.
- D Form work true to line and level with accurate angles and surfaces.
- E Connections: Fabricate railings with welded connections unless otherwise indicated.
- F Welded Connections: Cope components at connections to provide close fit, or use fittings designed for this purpose. Weld all around at connections, including at fittings.
 - 1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
 - 2. Obtain fusion without undercut or overlap.
 - 3. Remove flux immediately.
 - 4. At exposed connections, finish exposed welds to comply with the NOMMA publication Voluntary Joint Finish Standards for Finish #2 welds; completely sanded joint, some undercutting and pinholes okay.
- G Form changes in direction as detailed.
- H Close exposed ends of hollow railing members with prefabricated cap and end fittings of same metal and finish as railings.
- I Provide wall returns at ends of wall-mounted handrails unless otherwise indicated. Close ends of returns unless clearance between end of rail and wall is 1/4 inch or less.
- J Brackets, Flanges, Fittings, and Anchors: Provide wall brackets, flanges, miscellaneous fittings, and anchors to interconnect railing members to other work unless otherwise indicated.
- K Provide inserts and other anchorage devices for connecting railings to concrete or masonry work.
 - 1. Fabricate anchorage devices capable of withstanding loads imposed by railings.
 - 2. Coordinate anchorage devices with supporting structure.

2.7 STEEL AND IRON FINISHES

- A For nongalvanized-steel railings, provide nongalvanized ferrous-metal fittings, brackets, fasteners, and sleeves; however, hot-dip galvanize anchors to be embedded in exterior concrete or masonry.
- B Preparation for Shop Priming: Prepare uncoated ferrous-metal surfaces to comply with SSPC-SP 3.
- C Primer Application: Apply shop primer to prepared surfaces of railings unless otherwise indicated. Comply with requirements in SSPC-PA 1 for shop painting. Primer need not be applied to surfaces to be embedded in concrete or masonry.

PART 3 EXECUTION

3.1 INSTALLATION, GENERAL

- A Perform cutting, drilling, and fitting required for installing railings.
 - 1. Fit exposed connections together to form tight, hairline joints.
 - 2. Install railings level, plumb, square, true to line; without distortion, warp, or rack.
 - 3. Set railings accurately in location, alignment, and elevation; measured from established lines and levels.
 - 4. Set posts plumb within a tolerance of 1/16 inch in 3 feet.
 - 5. Align rails so variations from level for horizontal members and variations from parallel with rake of steps and ramps for sloping members do not exceed 1/4 inch in 12 feet.
- B Control of Corrosion: Prevent galvanic action and other forms of corrosion by insulating metals and other materials from direct contact with incompatible materials.
- C Adjust railings before anchoring to ensure matching alignment at abutting joints.
- D Fastening to In-Place Construction: Use anchorage devices and fasteners where necessary for securing railings and for properly transferring loads to in-place construction.

3.2 ANCHORING POSTS

- A Anchor posts to metal surfaces with flanges, angle type, or floor type, as required by conditions, connected to posts and to metal supporting members as follows:
 - 1. For steel railings, weld flanges to post and bolt to metal supporting surfaces.

3.3 RAILING CONNECTIONS

- A Welded Connections: Use fully welded joints for permanently connecting railing components. Comply with requirements for welded connections in "Fabrication" Article, whether welding is performed in the shop or in the field.

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SECTION 05 52 15 - PIPE AND TUBE RAILINGS, LANDSCAPE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes:

- 1. Stainless-steel pipe railings.

1.3 COORDINATION

- A. Coordinate selection of shop primers with topcoats to be applied over them. Comply with paint and coating manufacturers' written recommendations to ensure that shop primers and topcoats are compatible with one another.
- B. Coordinate installation of anchorages for railings. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.
- C. Schedule installation so wall attachments are made only to completed walls. Do not support railings temporarily by any means that do not satisfy structural performance requirements.

1.4 ACTION SUBMITTALS

- A. Product Data: For the following:

- 1. Manufacturer's product lines of mechanically connected railings.
 - 2. Railing brackets.
 - 3. Grout, anchoring cement, and paint products.

- B. Shop Drawings: Include plans, elevations, sections, details, and attachments to other work.

- C. Samples: For each type of exposed finish required.

- 1. Sections of each distinctly different linear railing member, including handrails, top rails, posts, and balusters.
 - 2. Fittings and brackets.
 - 3. Assembled Sample of railing system, made from full-size components, including top rail, post, handrail, and infill. Sample need not be full height.

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a. Show method of connecting and finishing members at intersections.

D. Delegated-Design Submittal: For railings, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

1.5 INFORMATIONAL SUBMITTALS

A. Qualification Data: For testing agency.

B. Welding certificates.

C. Mill Certificates: Signed by manufacturers of stainless-steel products certifying that products furnished comply with requirements.

D. Paint Compatibility Certificates: From manufacturers of topcoats applied over shop primers certifying that shop primers are compatible with topcoats.

E. Product Test Reports: For pipe and tube railings, for tests performed by a qualified testing agency, according to ASTM E 894 and ASTM E 935.

F. Evaluation Reports: For post-installed anchors, from ICC-ES.

1.6 QUALITY ASSURANCE

A. Welding Qualifications: Qualify procedures and personnel according to the following:
1. AWS D1.6/D1.6M, "Structural Welding Code - Stainless Steel."

1.7 DELIVERY, STORAGE, AND HANDLING

A. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

1.8 FIELD CONDITIONS

A. Field Measurements: Verify actual locations of walls and other construction contiguous with metal fabrications by field measurements before fabrication.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Source Limitations: Obtain each type of railing from single source from single manufacturer.

2.2 PERFORMANCE REQUIREMENTS

A. Delegated Design: Engage a qualified professional engineer, as defined in Section 014000 "Quality Requirements," to design railings, including attachment to building construction.

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- B. Structural Performance: Railings, including attachment to building construction, shall withstand the effects of gravity loads and the following loads and stresses within limits and under conditions indicated:

1. Handrails and Top Rails of Guards:

- a. Uniform load of 50 lbf/ ft. applied in any direction.
- b. Concentrated load of 200 lbf applied in any direction.
- c. Uniform and concentrated loads need not be assumed to act concurrently.

2. Infill of Guards:

- a. Concentrated load of 50 lbf applied horizontally on an area of 1 sq. ft..
- b. Infill load and other loads need not be assumed to act concurrently.

3. Deflection Limits:

Maximum Deflection Limit: 0.60 inches unless current code requires more stringent limit.

- 1) Limit based on NC State Building Code and International Building Code for structural system requirements to not exceed most restrictive deflection limits.

- C. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes.

1. Temperature Change: 120 deg F, ambient; 180 deg F.

2.3 METALS, GENERAL

- A. Metal Surfaces, General: Provide materials with smooth surfaces, without seam marks, roller marks, rolled trade names, stains, discolorations, or blemishes.
- B. Brackets, Flanges, and Anchors: Cast or formed metal of same type of material and finish as supported rails unless otherwise indicated.
1. Provide type of bracket with flange tapped for concealed anchorage to threaded hanger bolt and that provides 1-1/2-inch clearance from inside face of handrail to finished wall surface.

2.4 STAINLESS STEEL

- A. Tubing: ASTM A 554, Grade MT 304L.
- B. Pipe: ASTM A 312/A 312M, Grade TP 304.
- C. Castings: ASTM A 743/A 743M, Grade CF 8 or CF 20.
- D. Plate and Sheet: ASTM A 240/A 240M or ASTM A 666, Type 304.

2.5 FASTENERS

A. General: Provide the following:

1. Ungalvanized-Steel Railings: Plated steel fasteners complying with ASTM B 633 or ASTM F 1941, Class Fe/Zn 5 for zinc coating.
2. Hot-Dip Galvanized Railings: Type 304 stainless-steel or hot-dip zinc-coated steel fasteners complying with ASTM A 153/A 153M or ASTM F 2329 for zinc coating.
3. Stainless-Steel Railings: Type 304 stainless-steel fasteners.
4. Provide exposed fasteners with finish matching appearance, including color and texture, of railings.

B. Fasteners for Anchoring Railings to Other Construction: Select fasteners of type, grade, and class required to produce connections suitable for anchoring railings to other types of construction indicated and capable of withstanding design loads.

C. Fasteners for Interconnecting Railing Components:

1. Provide concealed fasteners for interconnecting railing components and for attaching them to other work, unless otherwise indicated.
2. Provide concealed fasteners for interconnecting railing components and for attaching them to other work, unless exposed fasteners are unavoidable or are the standard fastening method for railings indicated.
3. Provide tamper-resistant flat-head machine screws for exposed fasteners unless otherwise indicated.

D. Post-Installed Anchors: chemical anchors capable of sustaining, without failure, a load equal to 6 times the load imposed when installed in unit masonry and 4 times the load imposed when installed in concrete, as determined by testing according to ASTM E 488/E 488M, conducted by a qualified independent testing agency.

1. Material for Exterior Locations and Where Stainless Steel Is Indicated: Alloy Group 1 (A1) stainless-steel bolts, ASTM F 593 (ASTM F 738M), and nuts, ASTM F 594 (ASTM F 836M).

2.6 MISCELLANEOUS MATERIALS

A. Welding Rods and Bare Electrodes: Select according to AWS specifications for metal alloy welded.

1. For stainless-steel railings, provide type and alloy as recommended by producer of metal to be welded and as required for color match, strength, and compatibility in fabricated items.

B. Etching Cleaner for Galvanized Metal: Complying with MPI#25.

C. Galvanizing Repair Paint: High-zinc-dust-content paint complying with SSPC-Paint 20 and compatible with paints specified to be used over it.

D. Shop Primers: Provide primers that comply with Section 099113 "Exterior Painting," Section 099123 "Interior Painting," and Section 099600 "High-Performance Coatings."

E. Epoxy Zinc-Rich Primer: Complying with MPI#20 and compatible with topcoat.

Commented [J1]: Your handrails are all welded, ask the PIC if this section is needed, maybe it is helpful for other mics fasteners on the project?

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- F. Shop Primer for Galvanized Steel: Primer formulated for exterior use over zinc-coated metal and compatible with finish paint systems indicated.
- G. Intermediate Coats and Topcoats: Provide products that comply with Section 099113 "Exterior Painting," Section 099123 "Interior Painting," and Section 099600 "High-Performance Coatings."
- H. Epoxy Intermediate Coat: Complying with MPI #77 and compatible with primer and topcoat.
- I. Polyurethane Topcoat: Complying with MPI #72 and compatible with undercoat.
- J. Bituminous Paint: Cold-applied asphalt emulsion complying with ASTM D 1187/D 1187M.
- K. Nonshrink, Nonmetallic Grout: Factory-packaged, nonstaining, noncorrosive, nongaseous grout complying with ASTM C 1107/C 1107M. Provide grout specifically recommended by manufacturer for interior and exterior applications.
- L. Anchoring Cement: Factory-packaged, nonshrink, nonstaining, hydraulic-controlled expansion cement formulation for mixing with water at Project site to create pourable anchoring, patching, and grouting compound.
 - 1. Water-Resistant Product: At exterior locations provide formulation that is resistant to erosion from water exposure without needing protection by a sealer or waterproof coating and that is recommended by manufacturer for exterior use.

2.7 FABRICATION

- A. General: Fabricate railings to comply with requirements indicated for design, dimensions, member sizes and spacing, details, finish, and anchorage, but not less than that required to support structural loads.
- B. Shop assemble railings to greatest extent possible to minimize field splicing and assembly. Disassemble units only as necessary for shipping and handling limitations. Clearly mark units for reassembly and coordinated installation. Use connections that maintain structural value of joined pieces.
- C. Cut, drill, and punch metals cleanly and accurately. Remove burrs and ease edges to a radius of approximately 1/32 inch unless otherwise indicated. Remove sharp or rough areas on exposed surfaces.
- D. Form work true to line and level with accurate angles and surfaces.
- E. Fabricate connections that are exposed to weather in a manner that excludes water. Provide weep holes where water may accumulate.
- F. Cut, reinforce, drill, and tap as indicated to receive finish hardware, screws, and similar items.
- G. Connections: Fabricate railings with welded connections unless otherwise indicated.
- H. Welded Connections: Cope components at connections to provide close fit, or use fittings designed for this purpose. Weld all around at connections, including at fittings.

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1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
 2. Obtain fusion without undercut or overlap.
 3. Remove flux immediately.
 4. At exposed connections, finish exposed surfaces smooth and blended so no roughness shows after finishing and welded surface matches contours of adjoining surfaces.
- I. Welded Connections for Aluminum Pipe: Fabricate railings to interconnect members with concealed internal welds that eliminate surface grinding, using manufacturer's standard system of sleeve and socket fittings.
- J. Nonwelded Connections: Connect members with concealed mechanical fasteners and fittings. Fabricate members and fittings to produce flush, smooth, rigid, hairline joints.
1. Fabricate splice joints for field connection using an epoxy structural adhesive if this is manufacturer's standard splicing method.
- K. Form Changes in Direction as Follows:
1. By radius bends of radius indicated.
- L. For changes in direction made by bending, use jigs to produce uniform curvature for each repetitive configuration required. Maintain cross section of member throughout entire bend without buckling, twisting, cracking, or otherwise deforming exposed surfaces of components.
- M. Close exposed ends of railing members with prefabricated end fittings.
- N. Provide wall returns at ends of wall-mounted handrails unless otherwise indicated. Close ends of returns unless clearance between end of rail and wall is 1/4 inch or less.
- O. Brackets, Flanges, Fittings, and Anchors: Provide wall brackets, flanges, miscellaneous fittings, and anchors to interconnect railing members to other work unless otherwise indicated.
1. At brackets and fittings fastened to plaster or gypsum board partitions, provide crush-resistant fillers or other means to transfer loads through wall finishes to structural supports and prevent bracket or fitting rotation and crushing of substrate.
- P. Provide inserts and other anchorage devices for connecting railings to concrete or masonry work. Fabricate anchorage devices capable of withstanding loads imposed by railings. Coordinate anchorage devices with supporting structure.
- Q. For railing posts set in concrete, provide stainless-steel sleeves not less than 8 inches long with inside dimensions not less than 1/2 inch greater than outside dimensions of post, with metal plate forming bottom closure.
- R. For removable railing posts, fabricate slip-fit sockets from stainless-steel tube or pipe whose ID is sized for a close fit with posts; limit movement of post without lateral load, measured at top, to not more than one-fortieth of post height. Provide socket covers designed and fabricated to resist being dislodged.
1. Provide chain with eye, snap hook, and staple across gaps formed by removable railing sections at locations indicated. Fabricate from same metal as railings.

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2.8 STAINLESS-STEEL FINISHES

- A. Remove tool and die marks and stretch lines, or blend into finish.
- B. Grind and polish surfaces to produce uniform, directionally textured, polished finish indicated, free of cross scratches.
- C. Satin Finish: No. 6.
- D. When polishing is completed, passivate and rinse surfaces. Remove embedded foreign matter and leave surfaces chemically clean.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine plaster and gypsum board assemblies, where reinforced to receive anchors, to verify that locations of concealed reinforcements are clearly marked for Installer. Locate reinforcements and mark locations if not already done.

3.2 INSTALLATION, GENERAL

- A. Fit exposed connections together to form tight, hairline joints.
- B. Perform cutting, drilling, and fitting required for installing railings. Set railings accurately in location, alignment, and elevation; measured from established lines and levels and free of rack.
 - 1. Do not weld, cut, or abrade surfaces of railing components that are coated or finished after fabrication and that are intended for field connection by mechanical or other means without further cutting or fitting.
 - 2. Set posts plumb within a tolerance of 1/16 inch in 3 feet (2 mm in 1 m).
 - 3. Align rails so variations from level for horizontal members and variations from parallel with rake of steps and ramps for sloping members do not exceed 1/4 inch in 12 feet (6 mm in 3.5 m).
- C. Control of Corrosion: Prevent galvanic action and other forms of corrosion by insulating metals and other materials from direct contact with incompatible materials.
 - 1. Coat, with a heavy coat of bituminous paint, concealed surfaces of aluminum that are in contact with grout, concrete, masonry, wood, or dissimilar metals.
- D. Adjust railings before anchoring to ensure matching alignment at abutting joints.
- E. Fastening to In-Place Construction: Use anchorage devices and fasteners where necessary for securing railings and for properly transferring loads to in-place construction.

3.3 RAILING CONNECTIONS

- A. Nonwelded Connections: Use mechanical or adhesive joints for permanently connecting railing components. Seal recessed holes of exposed locking screws using plastic cement filler colored to match finish of railings.
- B. Welded Connections: Use fully welded joints for permanently connecting railing components. Comply with requirements for welded connections in "Fabrication" Article whether welding is performed in the shop or in the field.
- C. Expansion Joints: Install expansion joints at locations indicated but not farther apart than required to accommodate thermal movement. Provide slip-joint internal sleeve extending 2 inches (50 mm) beyond joint on either side, fasten internal sleeve securely to one side, and locate joint within 6 inches (150 mm) of post.

3.4 ANCHORING POSTS

- A. Use metal sleeves preset and anchored into concrete for installing posts. After posts are inserted into sleeves, fill annular space between post and sleeve with nonshrink, nonmetallic grout or anchoring cement, mixed and placed to comply with anchoring material manufacturer's written instructions.
- B. Form or core-drill holes not less than 5 inches (125 mm) deep and 3/4 inch (20 mm) larger than OD of post for installing posts in concrete. Clean holes of loose material, insert posts, and fill annular space between post and concrete with nonshrink, nonmetallic grout or anchoring cement, mixed and placed to comply with anchoring material manufacturer's written instructions.
- C. Cover anchorage joint with flange of same metal as post, welded to post after placing anchoring material.
- D. Anchor posts to metal surfaces with oval flanges, angle type, or floor type as required by conditions, connected to posts and to metal supporting members as follows:
 - 1. For aluminum pipe railings, attach posts using fittings designed and engineered for this purpose.
 - 2. For stainless-steel pipe railings, weld flanges to post and bolt to supporting surfaces.
 - 3. For steel pipe railings, weld flanges to post and bolt to metal supporting surfaces.
- E. Install removable railing sections, where indicated, in slip-fit metal sockets cast in concrete.

3.5 ATTACHING RAILINGS

- A. Anchor railing ends at walls with round flanges anchored to wall construction and welded to railing ends.
- B. Attach railings to wall with wall brackets, except where end flanges are used. Locate brackets as indicated or, if not indicated, at spacing required to support structural loads.
- C. Secure wall brackets and railing end flanges to building construction as follows:

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1. For concrete and solid masonry anchorage, use drilled-in expansion shields and hanger or lag bolts.
2. For hollow masonry anchorage, use toggle bolts.
3. For wood stud partitions, use hanger or lag bolts set into studs or wood backing between studs. Coordinate with carpentry work to locate backing members.

3.6 ADJUSTING AND CLEANING

- A. Clean stainless steel by washing thoroughly with clean water and soap and rinsing with clean water.
- B. Touchup Painting: Immediately after erection, clean field welds, bolted connections, and abraded areas of shop paint, and paint exposed areas with the same material as used for shop painting to comply with SSPC-PA 1 requirements for touching up shop-painted surfaces.
 1. Apply by brush or spray to provide a minimum 2.0-mil (0.05-mm) dry film thickness.
- C. Touchup Painting: Cleaning and touchup painting of field welds, bolted connections, and abraded areas of shop paint are specified in Section 099600 "High-Performance Coatings."

3.7 PROTECTION

- A. Protect finishes of railings from damage during construction period with temporary protective coverings approved by railing manufacturer. Remove protective coverings at time of Final Acceptance.

END OF SECTION 05 52 15

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SECTION 05 52 15 - PIPE AND TUBE RAILINGS, LANDSCAPE

PART 1 GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A Section Includes:
 - 1. Stainless-steel pipe railings.

1.3 COORDINATION

- A Coordinate selection of shop primers with topcoats to be applied over them. Comply with paint and coating manufacturers' written recommendations to ensure that shop primers and topcoats are compatible with one another.
- B Coordinate installation of anchorages for railings. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.
- C Schedule installation so wall attachments are made only to completed walls. Do not support railings temporarily by any means that do not satisfy structural performance requirements.

1.4 ACTION SUBMITTALS

- A Product Data: For the following:
 - 1. Manufacturer's product lines of mechanically connected railings.
 - 2. Railing brackets.
 - 3. Grout, anchoring cement, and paint products.
- B Shop Drawings: Include plans, elevations, sections, details, and attachments to other work.
- C Samples: For each type of exposed finish required.
 - 1. Sections of each distinctly different linear railing member, including handrails, top rails, posts, and balusters.
 - 2. Fittings and brackets.
 - 3. Assembled Sample of railing system, made from full-size components, including top rail, post, handrail, and infill. Sample need not be full height.
 - a. Show method of connecting and finishing members at intersections.
- D Delegated-Design Submittal: For railings, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

1.5 INFORMATIONAL SUBMITTALS

- A Qualification Data: For testing agency.
- B Welding certificates.
- C Mill Certificates: Signed by manufacturers of stainless-steel products certifying that products furnished comply with requirements.
- D Paint Compatibility Certificates: From manufacturers of topcoats applied over shop primers certifying that shop primers are compatible with topcoats.
- E Product Test Reports: For pipe and tube railings, for tests performed by a qualified testing agency, according to ASTM E 894 and ASTM E 935.
- F Evaluation Reports: For post-installed anchors, from ICC-ES.

1.6 QUALITY ASSURANCE

- A Welding Qualifications: Qualify procedures and personnel according to the following:
 - 1. AWS D1.6/D1.6M, "Structural Welding Code - Stainless Steel."

1.7 DELIVERY, STORAGE, AND HANDLING

- A Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

1.8 FIELD CONDITIONS

- A Field Measurements: Verify actual locations of walls and other construction contiguous with metal fabrications by field measurements before fabrication.

PART 2 PRODUCTS**2.1 MANUFACTURERS**

- A Source Limitations: Obtain each type of railing from single source from single manufacturer.

2.2 PERFORMANCE REQUIREMENTS

- A Delegated Design: Engage a qualified professional engineer, as defined in Section 014000 "Quality Requirements," to design railings, including attachment to building construction.
- B Structural Performance: Railings, including attachment to building construction, shall withstand the effects of gravity loads and the following loads and stresses within limits and under conditions indicated:
 - 1. Handrails and Top Rails of Guards:
 - a. Uniform load of 50 lbf/ ft. applied in any direction.
 - b. Concentrated load of 200 lbf applied in any direction.
 - c. Uniform and concentrated loads need not be assumed to act concurrently.
 - 2. Infill of Guards:
 - a. Concentrated load of 50 lbf applied horizontally on an area of 1 sq. ft..
 - b. Infill load and other loads need not be assumed to act concurrently.
 - 3. Deflection Limits:
 - a. Maximum Deflection Limit: 0.60 inches unless current code requires more stringent limit.
 - 1) Limit based on NC State Building Code and International Building Code for structural system requirements to not exceed most restrictive deflection limits.
- C Thermal Movements: Allow for thermal movements from ambient and surface temperature changes.
 - 1. Temperature Change: 120 deg F, ambient; 180 deg F.

2.3 METALS, GENERAL

- A Metal Surfaces, General: Provide materials with smooth surfaces, without seam marks, roller marks, rolled trade names, stains, discolorations, or blemishes.
- B Brackets, Flanges, and Anchors: Cast or formed metal of same type of material and finish as supported rails unless otherwise indicated.
 - 1. Provide type of bracket with flange tapped for concealed anchorage to threaded hanger bolt and that provides 1-1/2-inch clearance from inside face of handrail to finished wall surface.

2.4 STAINLESS STEEL

- A Tubing: ASTM A 554, Grade MT 304L.
- B Pipe: ASTM A 312/A 312M, Grade TP 304.
- C Castings: ASTM A 743/A 743M, Grade CF 8 or CF 20.
- D Plate and Sheet: ASTM A 240/A 240M or ASTM A 666, Type 304.

2.5 FASTENERS

- A General: Provide the following:
 - 1. Ungalvanized-Steel Railings: Plated steel fasteners complying with ASTM B 633 or ASTM F 1941, Class Fe/Zn 5 for zinc coating.

2. Hot-Dip Galvanized Railings: Type 304 stainless-steel or hot-dip zinc-coated steel fasteners complying with ASTM A 153/A 153M or ASTM F 2329 for zinc coating.
 3. Stainless-Steel Railings: Type 304 stainless-steel fasteners.
 4. Provide exposed fasteners with finish matching appearance, including color and texture, of railings.
- B Fasteners for Anchoring Railings to Other Construction: Select fasteners of type, grade, and class required to produce connections suitable for anchoring railings to other types of construction indicated and capable of withstanding design loads.
- C Fasteners for Interconnecting Railing Components:
1. Provide concealed fasteners for interconnecting railing components and for attaching them to other work, unless otherwise indicated.
 2. Provide concealed fasteners for interconnecting railing components and for attaching them to other work, unless exposed fasteners are unavoidable or are the standard fastening method for railings indicated.
 3. Provide tamper-resistant flat-head machine screws for exposed fasteners unless otherwise indicated.
- D Post-Installed Anchors: chemical anchors capable of sustaining, without failure, a load equal to 6 times the load imposed when installed in unit masonry and 4 times the load imposed when installed in concrete, as determined by testing according to ASTM E 488/E 488M, conducted by a qualified independent testing agency.
1. Material for Exterior Locations and Where Stainless Steel Is Indicated: Alloy Group 1 (A1) stainless-steel bolts, ASTM F 593 (ASTM F 738M), and nuts, ASTM F 594 (ASTM F 836M).

2.6 MISCELLANEOUS MATERIALS

- A Welding Rods and Bare Electrodes: Select according to AWS specifications for metal alloy welded.
1. For stainless-steel railings, provide type and alloy as recommended by producer of metal to be welded and as required for color match, strength, and compatibility in fabricated items.
- B Etching Cleaner for Galvanized Metal: Complying with MPI#25.
- C Galvanizing Repair Paint: High-zinc-dust-content paint complying with SSPC-Paint 20 and compatible with paints specified to be used over it.
- D Shop Primers: Provide primers that comply with Section 099113 "Exterior Painting," Section 099123 "Interior Painting," and Section 099600 "High-Performance Coatings."
- E Epoxy Zinc-Rich Primer: Complying with MPI#20 and compatible with topcoat.
- F Shop Primer for Galvanized Steel: Primer formulated for exterior use over zinc-coated metal and compatible with finish paint systems indicated.
- G Intermediate Coats and Topcoats: Provide products that comply with Section 099113 "Exterior Painting," Section 099123 "Interior Painting," and Section 099600 "High-Performance Coatings."
- H Epoxy Intermediate Coat: Complying with MPI #77 and compatible with primer and topcoat.
- I Polyurethane Topcoat: Complying with MPI #72 and compatible with undercoat.
- J Bituminous Paint: Cold-applied asphalt emulsion complying with ASTM D 1187/D 1187M.
- K Nonshrink, Nonmetallic Grout: Factory-packaged, nonstaining, noncorrosive, nongaseous grout complying with ASTM C 1107/C 1107M. Provide grout specifically recommended by manufacturer for interior and exterior applications.
- L Anchoring Cement: Factory-packaged, nonshrink, nonstaining, hydraulic-controlled expansion cement formulation for mixing with water at Project site to create pourable anchoring, patching, and grouting compound.
1. Water-Resistant Product: At exterior locations provide formulation that is resistant to erosion from water exposure without needing protection by a sealer or waterproof coating and that is recommended by manufacturer for exterior use.

2.7 FABRICATION

- A General: Fabricate railings to comply with requirements indicated for design, dimensions, member sizes and spacing, details, finish, and anchorage, but not less than that required to support structural loads.
- B Shop assemble railings to greatest extent possible to minimize field splicing and assembly. Disassemble units only as necessary for shipping and handling limitations. Clearly mark units for reassembly and coordinated installation. Use connections that maintain structural value of joined pieces.
- C Cut, drill, and punch metals cleanly and accurately. Remove burrs and ease edges to a radius of approximately 1/32 inch unless otherwise indicated. Remove sharp or rough areas on exposed surfaces.
- D Form work true to line and level with accurate angles and surfaces.
- E Fabricate connections that are exposed to weather in a manner that excludes water. Provide weep holes where water may accumulate.
- F Cut, reinforce, drill, and tap as indicated to receive finish hardware, screws, and similar items.
- G Connections: Fabricate railings with welded connections unless otherwise indicated.
- H Welded Connections: Cope components at connections to provide close fit, or use fittings designed for this purpose. Weld all around at connections, including at fittings.
 - 1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
 - 2. Obtain fusion without undercut or overlap.
 - 3. Remove flux immediately.
 - 4. At exposed connections, finish exposed surfaces smooth and blended so no roughness shows after finishing and welded surface matches contours of adjoining surfaces.
- I Welded Connections for Aluminum Pipe: Fabricate railings to interconnect members with concealed internal welds that eliminate surface grinding, using manufacturer's standard system of sleeve and socket fittings.
- J Nonwelded Connections: Connect members with concealed mechanical fasteners and fittings. Fabricate members and fittings to produce flush, smooth, rigid, hairline joints.
 - 1. Fabricate splice joints for field connection using an epoxy structural adhesive if this is manufacturer's standard splicing method.
- K Form Changes in Direction as Follows:
 - 1. By radius bends of radius indicated.
- L For changes in direction made by bending, use jigs to produce uniform curvature for each repetitive configuration required. Maintain cross section of member throughout entire bend without buckling, twisting, cracking, or otherwise deforming exposed surfaces of components.
- M Close exposed ends of railing members with prefabricated end fittings.
- N Provide wall returns at ends of wall-mounted handrails unless otherwise indicated. Close ends of returns unless clearance between end of rail and wall is 1/4 inch or less.
- O Brackets, Flanges, Fittings, and Anchors: Provide wall brackets, flanges, miscellaneous fittings, and anchors to interconnect railing members to other work unless otherwise indicated.
 - 1. At brackets and fittings fastened to plaster or gypsum board partitions, provide crush-resistant fillers or other means to transfer loads through wall finishes to structural supports and prevent bracket or fitting rotation and crushing of substrate.
- P Provide inserts and other anchorage devices for connecting railings to concrete or masonry work. Fabricate anchorage devices capable of withstanding loads imposed by railings. Coordinate anchorage devices with supporting structure.
- Q For railing posts set in concrete, provide stainless-steel sleeves not less than 8 inches long with inside dimensions not less than 1/2 inch greater than outside dimensions of post, with metal plate forming bottom closure.
- R For removable railing posts, fabricate slip-fit sockets from stainless-steel tube or pipe whose ID is sized for a close fit with posts; limit movement of post without lateral load, measured at top, to not more than one-fortieth of post height. Provide socket covers designed and fabricated to resist being dislodged.

1. Provide chain with eye, snap hook, and staple across gaps formed by removable railing sections at locations indicated. Fabricate from same metal as railings.

2.8 STAINLESS-STEEL FINISHES

- A Remove tool and die marks and stretch lines, or blend into finish.
- B Grind and polish surfaces to produce uniform, directionally textured, polished finish indicated, free of cross scratches.
- C Satin Finish: No. 6.
- D When polishing is completed, passivate and rinse surfaces. Remove embedded foreign matter and leave surfaces chemically clean.

PART 3 EXECUTION

3.1 EXAMINATION

- A Examine plaster and gypsum board assemblies, where reinforced to receive anchors, to verify that locations of concealed reinforcements are clearly marked for Installer. Locate reinforcements and mark locations if not already done.

3.2 INSTALLATION, GENERAL

- A Fit exposed connections together to form tight, hairline joints.
- B Perform cutting, drilling, and fitting required for installing railings. Set railings accurately in location, alignment, and elevation; measured from established lines and levels and free of rack.
 1. Do not weld, cut, or abrade surfaces of railing components that are coated or finished after fabrication and that are intended for field connection by mechanical or other means without further cutting or fitting.
 2. Set posts plumb within a tolerance of 1/16 inch in 3 feet.
 3. Align rails so variations from level for horizontal members and variations from parallel with rake of steps and ramps for sloping members do not exceed 1/4 inch in 12 feet.
- C Control of Corrosion: Prevent galvanic action and other forms of corrosion by insulating metals and other materials from direct contact with incompatible materials.
 1. Coat, with a heavy coat of bituminous paint, concealed surfaces of aluminum that are in contact with grout, concrete, masonry, wood, or dissimilar metals.
- D Adjust railings before anchoring to ensure matching alignment at abutting joints.
- E Fastening to In-Place Construction: Use anchorage devices and fasteners where necessary for securing railings and for properly transferring loads to in-place construction.

3.3 RAILING CONNECTIONS

- A Nonwelded Connections: Use mechanical or adhesive joints for permanently connecting railing components. Seal recessed holes of exposed locking screws using plastic cement filler colored to match finish of railings.
- B Welded Connections: Use fully welded joints for permanently connecting railing components. Comply with requirements for welded connections in "Fabrication" Article whether welding is performed in the shop or in the field.
- C Expansion Joints: Install expansion joints at locations indicated but not farther apart than required to accommodate thermal movement. Provide slip-joint internal sleeve extending 2 inches beyond joint on either side, fasten internal sleeve securely to one side, and locate joint within 6 inches of post.

3.4 ANCHORING POSTS

- A Use metal sleeves preset and anchored into concrete for installing posts. After posts are inserted into sleeves, fill annular space between post and sleeve with nonshrink, nonmetallic grout or anchoring cement, mixed and placed to comply with anchoring material manufacturer's written instructions.

- B Form or core-drill holes not less than 5 inches deep and 3/4 inch larger than OD of post for installing posts in concrete. Clean holes of loose material, insert posts, and fill annular space between post and concrete with nonshrink, nonmetallic grout or anchoring cement, mixed and placed to comply with anchoring material manufacturer's written instructions.
- C Cover anchorage joint with flange of same metal as post, welded to post after placing anchoring material.
- D Anchor posts to metal surfaces with oval flanges, angle type, or floor type as required by conditions, connected to posts and to metal supporting members as follows:
 - 1. For aluminum pipe railings, attach posts using fittings designed and engineered for this purpose.
 - 2. For stainless-steel pipe railings, weld flanges to post and bolt to supporting surfaces.
 - 3. For steel pipe railings, weld flanges to post and bolt to metal supporting surfaces.
- E Install removable railing sections, where indicated, in slip-fit metal sockets cast in concrete.

3.5 ATTACHING RAILINGS

- A Anchor railing ends at walls with round flanges anchored to wall construction and welded to railing ends.
- B Attach railings to wall with wall brackets, except where end flanges are used. Locate brackets as indicated or, if not indicated, at spacing required to support structural loads.
- C Secure wall brackets and railing end flanges to building construction as follows:
 - 1. For concrete and solid masonry anchorage, use drilled-in expansion shields and hanger or lag bolts.
 - 2. For hollow masonry anchorage, use toggle bolts.
 - 3. For wood stud partitions, use hanger or lag bolts set into studs or wood backing between studs. Coordinate with carpentry work to locate backing members.

3.6 ADJUSTING AND CLEANING

- A Clean stainless steel by washing thoroughly with clean water and soap and rinsing with clean water.
- B Touchup Painting: Immediately after erection, clean field welds, bolted connections, and abraded areas of shop paint, and paint exposed areas with the same material as used for shop painting to comply with SSPC-PA 1 requirements for touching up shop-painted surfaces.
 - 1. Apply by brush or spray to provide a minimum 2.0-mil (0.05-mm) dry film thickness.
- C Touchup Painting: Cleaning and touchup painting of field welds, bolted connections, and abraded areas of shop paint are specified in Section 099600 "High-Performance Coatings."

3.7 PROTECTION

- A Protect finishes of railings from damage during construction period with temporary protective coverings approved by railing manufacturer. Remove protective coverings at time of Substantial Completion.

END OF SECTION 05 52 15

SECTION 06 10 53 - MISCELLANEOUS ROUGH CARPENTRY

PART 1 GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A Section Includes:
 - 1. Wood blocking, furring, and nailers.
 - 2. Plywood backing panels.
 - 3. Supplementary components and accessories normally furnished or otherwise necessary for a complete installation.

1.3 REFERENCES

- A Acronyms and Abbreviations:
 - 1. AHJ: Authority (Authorities) Having Jurisdiction.
 - 2. ALSC: American Lumber Standards Committee, Inc.
 - 3. DOC: Department of Commerce.
 - 4. FRT: Fire-Retardant Treated.
 - 5. GPR: Ground Penetrating Radar.
 - 6. NeLMA: Northeastern Lumber Manufacturers Association.
 - 7. NLGA: National Lumber Grades Authority.
 - 8. S4S: Surfaced Four Sides.
 - 9. SPIB: Southern Pine Inspection Bureau.
 - 10. WCLIB: West Coast Lumber Inspection Bureau.
 - 11. WWPA: Western Wood Products Association.
- B Definitions:
 - 1. Boards or Strips: Means lumber of less than 2 inches nominal size in least dimension.
 - 2. Dimension Lumber: Means lumber of 2 inches nominal or greater size but less than 5 inches nominal size in least dimension.

1.4 SUBMITTALS

- A Action Submittals:
 - 1. Product Data: For each type of process and factory-fabricated product; include Health Product Declaration and Environmental Product Declaration. Indicate component materials and dimensions and include construction and application details.
 - a. Include data for wood-preservative treatment from chemical treatment manufacturer and certification by treating plant that treated materials comply with requirements. Indicate type of preservative used and net amount of preservative retained.
 - b. Include data for fire-retardant treatment from chemical treatment manufacturer and certification by treating plant that treated materials comply with requirements. Include physical properties of treated materials based on testing by a qualified independent testing agency.
 - c. For fire-retardant treatments, include physical properties of treated lumber both before and after exposure to elevated temperatures, based on testing by a qualified independent testing agency according to ASTM D 5664.
 - d. For products receiving a waterborne treatment, include statement that moisture content of treated materials was reduced to levels specified before shipment to Project site.
- B Informational Submittals:
 - 1. Material Certificates: For preservative-treated wood products. Indicate type of preservative used and net amount of preservative retained.

1.5 DELIVERY, STORAGE, AND HANDLING

- A Stack wood products flat with spacers beneath and between each bundle to provide air circulation. Protect wood products from weather by covering with waterproof sheeting, securely anchored. Provide for air circulation around stacks and under coverings.

PART 2 PRODUCTS

2.1 WOOD PRODUCTS, GENERAL

- A Lumber: Comply with DOC PS 20 and applicable rules of grading agencies indicated. If no grading agency is indicated, provide lumber that complies with the applicable rules of any rules-writing agency certified by the ALSC Board of Review. Provide lumber graded by an agency certified by the ALSC Board of Review to inspect and grade lumber under the rules indicated.
 - 1. Factory mark each piece of lumber with grade stamp of grading agency.
 - 2. Where nominal sizes are indicated, provide actual sizes required by DOC PS 20 for moisture content specified. Where actual sizes are indicated, they are minimum dressed sizes for dry wood products.
 - 3. Dress lumber, S4S, unless otherwise indicated.
- B Maximum Moisture Content of Lumber: 19 percent unless otherwise indicated.

2.2 WOOD-PRESERVATIVE-TREATED LUMBER

- A Preservative Treatment by Pressure Process: AWP U1, Use categories as follows:
 - 1. UC3A (All Other Commodity Specifications): Products in exterior construction not in contact with ground, exposed to all weather cycles but protected from liquid water. Include the following items:
 - a. Wood cants, nailers, curbs, equipment support bases, blocking, stripping, and similar members in connection with roofing, flashing, vapor barriers, and waterproofing.
 - 2. Preservative Chemicals: Acceptable to the AHJ and containing no arsenic or chromium.
 - 3. After treatment, redry dimension lumber to a moisture content of no more than 19 percent.
- B Kiln-dry lumber after treatment to a moisture content of no more than 19 percent. Do not use material that is warped or that does not comply with requirements for untreated material.
- C Mark lumber with treatment quality mark of an inspection agency approved by the ALSC Board of Review.
- D Application: Treat items indicated on Drawings.

2.3 FRT LUMBER

- A General: Where FRT materials are indicated, materials are to comply with requirements in this article, that are acceptable to the AHJ, and with fire-test-response characteristics specified as determined by testing identical products per test method indicated by a qualified testing agency.
- B FRT Lumber by Pressure Process: Products with a flame-spread index of 25 or less when tested according to ASTM E 84, and with no evidence of significant progressive combustion when the test is extended an additional 20 minutes, and with the flame front not extending more than 10.5 feet beyond the centerline of the burners at any time during the test.
 - 1. Treatment shall not promote corrosion of metal fasteners.
 - 2. Provide one of the following:
 - a. Exterior Type: Treated materials are to comply with requirements specified above for FRT lumber by pressure process after being subjected to accelerated weathering in accordance with ASTM D 2898. Suitable for use in interior applications.
 - b. Interior Type A: Treated materials are to have a moisture content of 28 percent or less when tested in accordance with ASTM D 3201/D 3201M at 92 percent relative humidity.
- C Kiln-dry lumber after treatment to a moisture content of no more than 19 percent. Kiln-dry plywood after treatment to moisture content of no more than 15 percent.
- D Identify FRT wood with appropriate classification marking of qualified testing agency and other information required by the AHJ.
- E Application: Treat all interior miscellaneous rough carpentry.

2.4 MISCELLANEOUS LUMBER

- A General: Provide miscellaneous lumber indicated and lumber for support or attachment of other construction, including the following:
 - 1. Blocking.
 - 2. Nailers.
 - 3. Furring.
- B Concealed Boards: Moisture content of no more than 19 percent and any of the following species and grades:
 - 1. Mixed southern pine or southern pine, No. 2 grade; SPIB.
 - 2. Spruce-pine-fir (south) or spruce-pine-fir, Construction or No. 2 Common grade; NeLMA, NLGA, WCLIB, or WWPA.
 - 3. Eastern softwoods, No. 2 Common grade; NeLMA.
- C For blocking not used for attachment of other construction, Utility, Stud, or No. 3 grade lumber of any species may be used provided that it is cut and selected to eliminate defects that will interfere with its attachment and purpose.
- D For blocking and nailers used for attachment of other construction, select and cut lumber to eliminate knots and other defects that will interfere with attachment of other work.

2.5 PLYWOOD BACKING PANELS

- A Equipment Backing Panels: FRT plywood, DOC PS 1, Exterior, C-C Plugged, in thickness indicated or, if not indicated, not less than 1/2-inch nominal thickness.

2.6 FASTENERS

- A General: Provide fasteners of size and type indicated that comply with requirements specified in this article for material and manufacture. Provide nails or screws, in sufficient length, to penetrate not less than 1-1/2 inches into wood substrate.
 - 1. Maximum penetration of fasteners in slab shall be limited to 3/4-inch to avoid damaging the post tensioning tendons in the upper (ceiling) slab and the floor slab.
- B Nails, Brads, and Staples: ASTM F 1667.
- C Screws for Fastening to Metal Framing: ASTM C 954, length as recommended by screw manufacturer for material being fastened.
- D Power-Driven Fasteners: Fastener systems with an evaluation report acceptable to the AHJ, based on ICC-ES AC70.
 - 1. Use 0.145-inch diameter power-actuated fasteners.
- E Post-Installed Anchors: Fastener systems with an evaluation report acceptable to the AHJ, as appropriate for the substrate. Installation of post-installed expansion anchors or torque-controlled anchors in the upper (ceiling) slab and the floor slab requires X-ray or GPR of area to avoid damaging post-tensioned tendons.

PART 3 EXECUTION

3.1 INSTALLATION, GENERAL

- A Set work to required levels and lines, with members plumb, true to line, cut, and fitted. Fit rough carpentry accurately to other construction. Locate nailers, blocking, and similar supports to comply with requirements for attaching other construction.
- B Provide blocking as indicated and as required to support facing materials, fixtures, specialty items, and trim.
 - 1. Provide metal clips for fastening gypsum board or lath at corners and intersections where blocking does not provide a surface for fastening edges of panels. Space clips not more than 16 inches on center.
- C Install plywood backing panels by fastening to studs; coordinate locations with utilities requiring backing panels. Install FRT plywood backing panels with classification marking of testing agency exposed to view.

- D Sort and select lumber so that natural characteristics do not interfere with installation or with fastening other materials to lumber. Do not use materials with defects that interfere with function of member or pieces that are too small to use with minimum number of joints or optimum joint arrangement.
- E Securely attach rough carpentry work to substrate by anchoring and fastening as indicated, complying with the following:
 - 1. Table 2304.10.1, "Fastening Schedule," in the NCBC.
 - 2. ICC-ES evaluation report for fastener.
- F Use steel common nails unless otherwise indicated. Select fasteners of size that will not fully penetrate members where opposite side will be exposed to view or will receive finish materials. Make tight connections between members. Install fasteners without splitting wood. Drive nails snug but do not countersink nail heads unless otherwise indicated.

3.2 INSTALLATION OF WOOD BLOCKING AND NAILERS

- A Install where indicated and where required for attaching other work. Form to shapes indicated and cut as required for true line and level of attached work. Coordinate locations with other work involved.
- B Attach wood blocking to substrates to support applied loading. Recess bolts and nuts flush with surfaces unless otherwise indicated.

3.3 WOOD FURRING INSTALLATION

- A Install level and plumb with closure strips at edges and openings. Shim with wood as required for tolerance of finish work.

END OF SECTION 06 10 53

SECTION 06 16 00 - SHEATHING

PART 1 GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A Section Includes:
 - 1. Wall sheathing.
 - 2. Roof sheathing.
 - 3. Supplementary components and accessories normally furnished or otherwise necessary for a complete installation.

1.3 REFERENCES

- A Acronyms and Abbreviations:
 - 1. AHJ: Authority (Authorities) Having Jurisdiction.
 - 2. APA: The Engineered Wood Association.
 - 3. GA: Gypsum Association.
- B Definitions:
 - 1. Manufacturer: Means the sheathing manufacturer, as applicable, unless otherwise indicated.

1.4 SUBMITTALS

- A Action Submittals:
 - 1. Product Data Submittals: For each product; include Health Product Declaration and Environmental Product Declaration. Indicate component materials and dimensions and include construction and application details.

1.5 DELIVERY, STORAGE, AND HANDLING

- A Stack panels flat with spacers beneath and between each bundle to provide air circulation. Protect sheathing from weather by covering with waterproof sheeting, securely anchored. Provide for air circulation around stacks and under coverings.

PART 2 PRODUCTS

2.1 GYPSUM WALL SHEATHING

- A Wall Sheathing: At the Contractor's option, provide one of the following wall sheathing types.
 - 1. Glass-Mat Gypsum Sheathing: ASTM C 1177/C 1177M.
 - a. Products: Subject to compliance with the Contract Documents, provide one of the following.
 - 1) "GlasRoc Sheathing Type X" manufactured by CertainTeed.
 - 2) "DensGlass Fireguard Sheathing" manufactured by Georgia-Pacific Gypsum.
 - 3) "Gold Bond eXP Fire-Shield Sheathing" manufactured by National Gypsum Company.
 - 4) "Securock Brand Ultralight Glass-Mat Sheathing Firecode X" manufactured by USG Corporation.
 - b. Type and Thickness: Type X, 5/8 inch thick.
 - c. Size: At least 48 by 96 inches.

2.2 ROOF AND PARAPET SHEATHING

- A Plywood Sheathing: DOC PS 1, Exterior sheathing.
 - 1. Span Rating: Not less than 32/16.
 - 2. Nominal Thickness: Not less than 15/32 inch.

- B Factory mark panels to indicate compliance with applicable standard.

2.3 FASTENERS

- A General: Provide fasteners of size and type indicated that comply with requirements specified in this article for material and manufacture.
 - 1. Provide fasteners with hot-dip zinc coating complying with ASTM A153/A 153M or of Type 304 stainless steel.
- B Power-Driven Fasteners: Fastener systems with an evaluation report acceptable to the AHJ, based on ICC-ES AC70.
- C Screws for Fastening Gypsum Sheathing to Cold-Formed Metal Framing: Steel drill screws, in length recommended by sheathing manufacturer for thickness of sheathing to be attached.
 - 1. For steel framing from 0.033 to 0.112 inch thick, use screws that comply with ASTM C 954.

PART 3 EXECUTION

3.1 INSTALLATION, GENERAL

- A Do not use materials with defects that impair quality of sheathing or pieces that are too small to use with minimum number of joints or optimum joint arrangement. Arrange joints so that pieces do not span between fewer than three support members.
- B Cut panels at penetrations, edges, and other obstructions of work; fit tightly against abutting construction unless otherwise indicated.
- C Securely attach to substrate by fastening as indicated, complying with the following:
 - 1. Table 2304.10.1, "Fastening Schedule," in the NCBC.
 - 2. ICC-ES evaluation report for fastener.
- D Coordinate wall and parapet sheathing installation with flashing and joint-sealant installation so these materials are installed in sequence and manner that prevent exterior moisture from passing through completed assembly.
- E Do not bridge building expansion joints; cut and space edges of panels to match spacing of structural support elements.
- F Coordinate sheathing installation with installation of materials installed over sheathing so sheathing is not exposed to precipitation or left exposed at end of the workday when rain is forecast.

3.2 INSTALLATION OF WOOD STRUCTURAL PANEL

- A General: Comply with applicable recommendations in APA Form No. E30, "Engineered Wood Construction Guide," for types of structural-use panels and applications indicated.
- B Fastening Methods: Fasten panels as indicated below:
 - 1. Wall and Roof Sheathing: Screw to cold-formed metal framing. Space panels 1/8 inch apart at edges and ends.

3.3 INSTALLATION OF GYPSUM SHEATHING

- A Comply with GA-253 and with manufacturer's written instructions.
 - 1. Fasten gypsum sheathing to cold-formed metal framing with screws.
 - 2. Install panels with a 3/8-inch gap where non-load-bearing construction abuts structural elements.
 - 3. Install panels with a 1/4-inch gap where they abut masonry or similar materials that might retain moisture, to prevent wicking.
- B Apply fasteners so heads bear tightly against face of sheathing, but do not cut into facing.
- C Horizontal Installation: Install sheathing with V-grooved edge down and tongue edge up. Interlock tongue with groove to bring long edges in contact with edges of adjacent panels without forcing. Abut ends over centers of studs, and stagger end joints of adjacent panels not less than one stud spacing. Attach at perimeter and within field of panel to each stud.

1. Space fasteners approximately 8 inches on center and set back at least 3/8 inch from edges and ends of panels.
- D Vertical Installation: Install vertical edges centered over studs. Abut ends and edges with those of adjacent panels. Attach at perimeter and within field of panel to each stud.
 1. Space fasteners approximately 8 inches on center and set back at least 3/8 inch from edges and ends of panels.

END OF SECTION 06 16 00 06 16 00

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SECTION 06 40 23 - INTERIOR ARCHITECTURAL WOODWORK

PART 1 GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A Section Includes:
 - 1. Lobby desk.
 - 2. Upholstered banquettes.
 - 3. Vanity aprons.
 - 4. Range base.
 - 5. Supplementary components and accessories normally furnished or otherwise necessary for a complete installation.

1.3 REFERENCES

- A Acronyms and Abbreviations:
 - 1. AWI: Architectural Woodwork Institute.
 - 2. SCAQMD: South Coast Air Quality Management District.
 - 3. VOC: Volatile Organic Compound.

1.4 SUBMITTALS

- A Action Submittals:
 - 1. Product Data: For the following.
 - a. Anchors.
 - b. Adhesives Indicate VOC content.
 - c. Shop finishing materials.
 - 2. Shop Drawings: Include dimensioned plans, elevations, sections, and attachment details. Detail fabrication and installation.
- B Informational Submittals:
 - 1. Product Certificates: For adhesives.

1.5 QUALITY ASSURANCE

- A Manufacturer's Qualifications: Employs skilled workers who custom fabricate products similar to those required for this Project and whose products have a record of successful in-service performance.
 - 1. Manufacturer's Certification: Licensed participant in AWI's Quality Certification Program.
- B Installer Qualifications: Manufacturer of products.

1.6 DELIVERY, STORAGE, AND HANDLING

- A Do not deliver interior architectural woodwork until painting and similar finish operations that might damage woodwork have been completed in installation areas.
- B Store woodwork in installation areas or in areas where environmental conditions comply with requirements specified in "Field Conditions" Article.

1.7 FIELD CONDITIONS

- A Environmental Limitations: Do not deliver or install interior architectural woodwork until building is enclosed, wet-work is complete, and HVAC system is operating and maintaining temperature and relative humidity at levels designed for building occupants for the remainder of the construction period.

- B Field Measurements: Where interior architectural woodwork is indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication, and indicate measurements on Shop Drawings.

PART 2 PRODUCTS

2.1 ARCHITECTURAL WOODWORK, GENERAL

- A Quality Standard: Unless otherwise indicated, comply with the Architectural Woodwork Standards for grades of interior architectural woodwork indicated for construction, finishes, installation, and other requirements.
1. The Contract Documents may contain requirements that are more stringent than the Architectural Woodwork Standards. Comply with the Contract Documents and Architectural Woodwork Standards.
 2. Architectural Woodwork Standards Grade: Custom.

2.2 UPHOLSTERED BANQUETTES

- A Banquette Seating:
1. Fabric: As selected by the Architect.
 2. Upholstery Padding: Flexible, cellular, molded or slab polyurethane foam.
 - a. Pounding-Fatigue Performance: Grade AP (heavy-duty use) for seats and Grade BP (normal duty use) for backs; according to ASTM D 3453.
 - b. Seating Padding Thicknesses: As indicated on the Drawings.
 3. Furring, Blocking, Shims, and Nailers: As specified in Section 06 10 53 Miscellaneous Rough Carpentry.
 4. Anchors: Select material, type, size, and finish required for each substrate for secure anchorage.

2.3 RESTROOM VANITY APRONS

- A Restroom Vanity Aprons:
1. Architectural Woodwork Standards Grade: Custom.
 2. Core: Exterior grade plywood complying with DOC PS 1, Grade C-C Plugged, touch sanded.
 3. Plastic-Laminate Cladding:
 - a. Basis-of-Design Product: Subject to compliance with the Contract Documents design is based on product indicated in in the Finish Material Schedule on the Drawings as manufactured by the following.
 - 1) Formica Corp.
 - b. Acceptable Manufacturers: Subject to compliance with the Contract Documents provide the basis-of-design product or comparable approved product by one of the following.
 - 1) Wilsonart LLC.
 - 2) Panolam (Nevamar)
 4. Thickness and Dimensions: As indicated on the Drawings.

2.4 MISCELLANEOUS MATERIALS

- A Fasteners: Provide nails or screws, in sufficient length to penetrate not less than 1-1/2 inches into wood substrate.
- B Anchors: Select material, type, size, and finish required for each substrate for secure anchorage.
- C Adhesives: Product recommended by fabricator for each material and substrate for secure anchorage.
1. Allowable VOC Content: Adhesives, adhesive bonding primers, and adhesive primers must comply with SCAQMD Rule 1168 VOC limits.
 - a. Such products also shall comply with the Rule 1168 prohibition on the use of certain toxic compounds (chloroform, ethylene dichloride, methylene chloride, perchloroethylene, and trichloroethylene).

- D Accessories: As supplied, recommended, or required by the manufacturers or fabricators and as necessary for a complete installation.

2.5 FABRICATION

- A Fabricate interior architectural woodwork to dimensions, profiles, and details indicated.
- B Complete fabrication, including assembly and finishing, to maximum extent possible before shipment to Project site.
1. Disassemble components only as necessary for shipment and installation.
 2. Where necessary for fitting at site, provide allowance for scribing, trimming, and fitting.

PART 3 EXECUTION

3.1 PREPARATION

- A Before installation, condition interior architectural woodwork to humidity conditions in installation areas for not less than 72 hours prior to beginning of installation.
- B Before installing interior architectural woodwork, examine shop-fabricated work for completion and complete work as required.

3.2 INSTALLATION

- A Grade: Install interior architectural woodwork to comply with same grade as item to be installed.
- B Assemble interior architectural woodwork and complete fabrication at Project site to the extent that it was not completed during shop fabrication.
- C Install interior architectural woodwork level, plumb, true in line, and without distortion.
1. Install level and plumb to a tolerance of 1/8 inch in 96 inches.
- D Scribe and cut interior architectural woodwork to fit adjoining work, refinish cut surfaces, and repair damaged finish at cuts.
- E Anchor interior architectural woodwork to anchors or blocking built in or directly attached to substrates, unless otherwise indicated or required to be adhered.
1. Secure with countersunk, concealed fasteners and blind nailing.
 2. Use fine finishing nails or finishing screws for exposed fastening, countersunk and filled flush with interior architectural woodwork.

3.3 REPAIR

- A Repair damaged and defective interior architectural woodwork, where possible, to eliminate functional and visual defects.
- B Where not possible to repair, replace defective woodwork.

3.4 CLEANING

- A Clean interior architectural woodwork on exposed and semiexposed surfaces.

END OF SECTION 06 40 23

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SECTION 06 41 16 - PLASTIC-LAMINATE-CLAD ARCHITECTURAL CABINETS

PART 1 GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A Section Includes:
 - 1. Plastic-laminate-clad architectural cabinets.
 - 2. Supplementary components and accessories normally furnished or otherwise necessary for a complete installation.

1.3 REFERENCES

- A Acronyms and Abbreviations:
 - 1. AWI: Architectural Woodwork Institute.
 - 2. BHMA: Builders Hardware Manufacturers Association.
- B Definitions:
 - 1. Manufacturer: Means the plastic-laminate material manufacturer unless otherwise indicated.

1.4 COORDINATION

- A Coordinate sizes and locations of framing, blocking, furring, reinforcements, and other related units of work specified in other Specification Sections to support loads imposed by installed and fully loaded cabinets.

1.5 SUBMITTALS

- A Action Submittals:
 - 1. Product Data: For each type of product. Include current Health Product Declaration and Environmental Product Declaration.
 - 2. Shop Drawings:
 - a. Include plans, elevations, sections, and attachment methods to floor and wall details; Detail fabrication and installation, including countertop field joints.
 - b. Show large-scale details.
 - c. Show locations and sizes of furring, blocking, and hanging strips, including concealed blocking and reinforcement specified in other Specification Sections.
 - d. Show locations and sizes of cutouts and holes for items installed in plastic-laminate-clad architectural cabinets.
- B Informational Submittals:
 - 1. Qualification Data: For manufacturer and installer.
 - 2. Product Certificates: For each type of product.
- C Closeout Submittals:
 - 1. Keys: Provide Owner's representative with sets of 2 keys for each cabinet lock.

1.6 QUALITY ASSURANCE

- A Manufacturer's Qualifications: Employs skilled workers who custom fabricate products similar to those required for this Project and whose products have a record of successful in-service performance.
- B Installer Qualifications: Manufacturer of products.

1.7 DELIVERY, STORAGE, AND HANDLING

- A Do not deliver cabinets until painting and similar finish operations that might damage architectural cabinets have been completed in installation areas. Store cabinets in installation areas or in areas where environmental conditions comply with requirements specified in "Field Conditions" Article.

- B Deliver countertops only after cabinets and supports on which they will be installed have been completed in installation areas.
- C Keep surfaces of countertops covered with protective covering during handling and installation.

1.8 FIELD CONDITIONS

- A Environmental Limitations: Do not deliver or install cabinets until building is enclosed, wet-work is complete, and HVAC system is operating and maintaining temperature between 60 and 90 deg F and relative humidity between 25 and 55 percent during the remainder of the construction period.
- B Field Measurements: Where cabinets are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication, and indicate measurements on Shop Drawings. Coordinate fabrication schedule with construction progress to avoid delaying the work.
 - 1. Locate concealed framing, blocking, and reinforcements that support cabinets by field measurements before being enclosed/concealed by construction, and indicate measurements on Shop Drawings.

PART 2 PRODUCTS

2.1 PLASTIC-LAMINATE-CLAD ARCHITECTURAL CABINETS

- A Quality Standard: Unless otherwise indicated, comply with the "Architectural Woodwork Standards" for grades of cabinets indicated for construction, finishes, installation, and other requirements.
 - 1. The Contract Documents may contain requirements that are more stringent than the referenced quality standard. Comply with requirements of Contract Documents in addition to those of the referenced quality standard.
- B Architectural Woodwork Standards Grade: Custom.
- C Type of Construction: As indicated on the Drawings.
- D Door and Drawer-Front Style: As indicated on the Drawings.
- E High-Pressure Decorative Laminate: ISO 4586-3.
 - 1. Basis-of-Design Products: Subject to compliance with the Contract Documents, the design is based on products indicated in the Finish Material Schedule on the Drawings as manufactured by the following.
 - a. PL-1: Formica Corporation.
 - b. PL-2: Wilsonart Inc.
 - 2. Acceptable Manufacturers: Subject to compliance with the Contract Documents provide the basis-of-design products or comparable approved product by one of the following.
 - a. Wilsonart.
 - b. Formica Corporation.
 - c. Panolam Industries International, Inc. (Nevamar)
- F Materials for Semiexposed Surfaces:
 - 1. Surfaces Other Than Drawer Bodies: High-pressure decorative laminate, ISO 4586-3.
 - a. Edges of Plastic-Laminate Shelves; PVC tape, at least 0.018-inch thick, matching laminate in color, pattern, and finish.
 - b. For semiexposed backs of panels with exposed plastic-laminate surfaces, provide surface of high-pressure decorative laminate, Grade VGS.
 - 2. Drawer Sides and Backs: Solid-hardwood lumber.
 - 3. Drawer Bottoms: Hardwood plywood.
- G Concealed Backs of Panels with Exposed Plastic-Laminate Surfaces: High-pressure decorative laminate, ISO 4586-3.
- H Drawer Construction: Fabricate with exposed fronts fastened to subfront with mounting screws from interior of body.
 - 1. Join subfronts, backs, and sides with glued rabbeted joints supplemented by mechanical fasteners.

2.2 WOOD MATERIALS

- A Wood Products: Provide materials that comply with requirements of referenced quality standard for each type of architectural cabinet and quality grade specified unless otherwise indicated.
- B Composite Wood Products: Provide materials that comply with requirements of referenced quality standard for each type of architectural cabinet and quality grade specified unless otherwise indicated.
 - 1. Softwood Plywood: DOC PS 1.
 - 2. Medium-Density Fiberboard (MDF): ANSI A208.2, Grade 130.

2.3 CABINET HARDWARE AND ACCESSORIES

- A General: Provide cabinet hardware and accessory materials associated with architectural cabinets.
- B Frameless Concealed Hinges (European Type): ANSI/BHMA A156.9, B01602, 135 degrees of opening, self-closing.
- C Back-Mounted Pulls: ANSI/BHMA A156.9, B0201, as selected by the Architect.
- D Shelf Rests: ANSI/BHMA A156.9, B04013; metal.
- E Drawer Slides: ANSI/BHMA A156.9.
 - 1. Grade 1 and Grade 2: Side mounted and extending under bottom edge of drawer.
 - a. Type: Full extension, easy close.
 - b. Material: Epoxy-coated steel with polymer rollers.
 - 2. Grade 1HD-100 and Grade 1HD-200: Side mounted; full-overtravel-extension type; zinc-plated-steel ball-bearing slides.
 - 3. For drawers not more than 3 inches high and not more than 24 inches wide, provide Grade 2.
 - 4. For drawers more than 3 inches high, but not more than 6 inches high and not more than 24 inches wide, provide Grade 1.
 - 5. For drawers more than 6 inches high or more than 24 inches wide, provide Grade 1HD-100.
 - 6. For computer keyboard shelves, provide Grade 1.
 - 7. For trash bins not more than 20 inches high and 16 inches wide, provide Grade 1HD-100.
- F Door Locks: ANSI/BHMA A156.11, E07121; verify locations with Architect.
- G Drawer Locks: ANSI/BHMA A156.11, E07041; verify locations with Architect.
- H Door and Drawer Silencers: ANSI/BHMA A156.16, L03011.
- I Exposed Hardware Finishes: For exposed hardware, provide finish that complies with ANSI/BHMA A156.18 for ANSI/BHMA finish number indicated, and as indicated on the Drawings.
- J For concealed hardware, provide manufacturer's standard finish that complies with product class requirements in ANSI/BHMA A156.9.

2.4 MISCELLANEOUS MATERIALS

- A Furring, Blocking, Shims, and Hanging Strips: As specified in Section 06 10 53 Miscellaneous Rough Carpentry.
- B Anchors: Select material, type, size, and finish required for each substrate for secure anchorage. Provide metal expansion sleeves or expansion bolts for post-installed anchors. Use nonferrous-metal or hot-dip galvanized anchors and inserts at inside face of exterior walls and at floors.

2.5 FABRICATION

- A Fabricate architectural cabinets to dimensions, profiles, and details indicated.
- B Fabricate countertops to dimensions, profiles, and details indicated. Provide front and end overhang of 1 inch over base cabinets.
- C Complete fabrication, including assembly and hardware application, to maximum extent possible before shipment to Project site. Disassemble components only as necessary for shipment and installation. Where necessary for fitting at site, provide ample allowance for scribing, trimming, and fitting.

- D Shop-cut openings to maximum extent possible to receive hardware, appliances, electrical work, and similar items. Locate openings accurately and use templates or roughing-in diagrams to produce accurately sized and shaped openings. Sand edges of cutouts to remove splinters and burrs.

PART 3 EXECUTION

3.1 PREPARATION

- A Before installation, condition cabinets to humidity conditions in installation areas for not less than 72 hours.

3.2 INSTALLATION

- A Architectural Woodwork Standards Grade: Install cabinets to comply with quality standard grade of item to be installed.
- B Cabinet Installation:
 - 1. Assemble cabinets and complete fabrication at Project site to extent that it was not completed in the shop.
 - 2. Anchor cabinets to anchors or blocking built in or directly attached to substrates. Secure with wafer-head cabinet installation screws.
 - 3. Install cabinets level, plumb, and true in line to a tolerance of 1/8 inch in 96 inches using concealed shims.
 - a. Scribe and cut cabinets to fit adjoining work, refinish cut surfaces, and repair damaged finish at cuts.
 - b. Install cabinets without distortion so doors and drawers fit openings and are accurately aligned. Adjust hardware to center doors and drawers in openings and to provide unencumbered operation. Complete installation of hardware and accessory items as indicated.
 - c. Fasten wall cabinets through back, near top and bottom, and at ends not more than 16 inches on center with No. 10 wafer-head screws sized for not less than 1-1/2 inch penetration into wood framing, blocking, or hanging strips.

3.3 ADJUSTING AND CLEANING

- A Repair damaged and defective cabinets, where possible, to eliminate functional and visual defects. Where not possible to repair, replace architectural cabinets. Adjust joinery for uniform appearance.
- B Clean, lubricate, and adjust cabinet hardware.
- C Clean cabinets on exposed and semiexposed surfaces.

END OF SECTION 06 41 16

SECTION 06 42 19 - PLASTIC-LAMINATE-FACED WOOD PANELING (ALTERNATE)

PART 1 GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A Section Includes:
 - 1. Plastic-laminate-faced wood paneling.
 - 2. Supplementary components and accessories normally furnished or otherwise necessary for a complete installation or application.
- B Related Requirements:
 - 1. Section 01 23 00 Alternates.

1.3 REFERENCES

- A Acronyms and Abbreviations:
 - 1. AHJ: Authority (Authorities) Having Jurisdiction.
 - 2. FRT: Fire-Retardant-Treated.
 - 3. MDF: Medium Density Fiberboard.
- B Definitions:
 - 1. Manufacturer: Means the plastic-laminate cladding manufacturer unless otherwise indicated.

1.4 COORDINATION

- A Coordinate sizes and locations of blocking, furring, reinforcements, and other related units of work specified in other Specification Sections to ensure that paneling can be installed as indicated.

1.5 SUBMITTALS

- A Action Submittals:
 - 1. Product Data: For plastic-laminate-faced wood paneling.
 - a. Include data for fire-retardant treatment from chemical-treatment manufacturer and certification by treating plant that treated materials comply with requirements.
 - 2. Shop Drawings: For plastic-laminate-faced wood paneling.
 - a. Include plans, elevations, sections, and attachment details.
 - b. Show locations and sizes of blocking, including concealed blocking specified in other Specification Sections.
- B Informational Submittals:
 - 1. Qualification Data: For fabricator.
 - 2. Evaluation Reports: For fire-retardant-treated materials, from ICC-ES.

1.6 QUALITY ASSURANCE

- A Fabricator Qualifications: Shop that employs skilled workers who custom-fabricate products similar to those required for this Project and whose products have a record of successful in-service performance.

1.7 DELIVERY, STORAGE, AND HANDLING

- A Do not deliver paneling until painting and similar operations that might damage paneling have been completed in installation areas. Store paneling in installation areas or in areas where environmental conditions comply with requirements specified in "Field Conditions" Article.

1.8 FIELD CONDITIONS

- A Environmental Limitations without Humidity Control: Do not deliver or install paneling until building is enclosed, wet-work is complete, and HVAC system is operating and will maintain temperature and relative humidity at levels planned for building occupants during the remainder of the construction period.
- B Field Measurements: Where paneling is indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication and indicate measurements on Shop Drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work.
 - 1. Locate concealed blocking and reinforcements that support paneling by field measurements before being enclosed/concealed by construction and indicate measurements on Shop Drawings.

PART 2 PRODUCTS

2.1 PANELING, GENERAL

- A Quality Standard: Unless otherwise indicated, comply with the "Architectural Woodwork Standards" for grades of plastic-laminate-faced wood paneling (decorative laminate surfacing) indicated for construction, finishes, installation, and other requirements.
 - 1. The Contract Documents may contain requirements that are more stringent than the referenced woodwork quality standard. Comply with requirements of Contract Documents in addition to those of the referenced quality standard.

2.2 PLASTIC-LAMINATE-FACED WOOD PANELING

- A Grade: Custom.
- B Plastic Laminate: High-pressure decorative laminate complying with ISO 4586-3.
 - 1. Basis-of-Design Products (PL-3): Subject to compliance with the Contract Documents the design is based on products indicated in the Finish Material Schedule on the Drawings as manufactured by the following.
 - a. Wilsonart LLC.
 - 2. Acceptable Manufacturers: Subject to compliance with the Contract Documents provide the basis-of-design products or comparable approved products by one of the following.
 - a. Formica Corporation.
 - b. Panolam Industries International Inc. (Nevamar).
- C Panel Core: Fire-retardant MDF.
 - 1. Thickness: 3/4 inch.
- D Exposed Panel Edges: Plastic-laminate matching faces.
- E Adhesives for Bonding Plastic Laminate: As selected by fabricator to comply with Project conditions.
 - 1. Adhesive for Bonding Edges: Hot-melt adhesive or adhesive used for faces.
- F FRT Paneling: Panels are to consist of fire-retardant plastic laminate and fire-retardant MDF. Panels are to have a flame-spread index of 25 or less and a smoke-developed index of 450 or less per ASTM E 84, and be listed and labeled by a testing and inspecting agency acceptable to the AHJ.
- G Assemble panels by gluing .

2.3 MATERIALS

- A Materials, General: Provide materials that comply with requirements of referenced quality standard for each quality grade specified unless otherwise indicated.
- B Composite Wood Products: Provide materials that comply with requirements of referenced quality standard for each quality grade specified unless otherwise indicated.
 - 1. MDF: ANSI 208.2, Grade 130.

2.4 FRT MATERIALS

- A FRT Materials, General: Where FRT materials are indicated, use materials that are acceptable to the AHJ and with fire-test-response characteristics specified as determined by testing identical products per test method indicated by a qualified testing agency.
 - 1. Use treated materials that comply with requirements of referenced quality standard. Do not use materials that are warped, discolored, or otherwise defective.
 - 2. Use fire-retardant-treatment formulations that do not bleed through or otherwise adversely affect finishes. Do not use colorants to distinguish treated materials from untreated materials.
 - 3. Identify FRT materials with appropriate classification marking of qualified testing agency in the form of removable paper label or imprint on surfaces that will be concealed from view after installation.
- B Fire-Retardant Fiberboard: MDF panels complying with ANSI A208.2, made from softwood fibers, synthetic resins, and fire-retardant chemicals mixed together at time of panel manufacture to achieve flame-spread index of 25 or less and smoke-developed index of 200 or less per ASTM E 84.

2.5 INSTALLATION MATERIALS

- A Z-Clips: Concealed panel hanger clips. Subject to compliance with the Contract Documents provide products by one of the following.
 - 1. Eagle Aluminum
 - 2. Monarch Metal.
 - 3. Star Hanger Systems.

2.6 FABRICATION

- A Complete fabrication, including assembly, to maximum extent possible, before shipment to Project site. Disassemble components only as necessary for shipment and installation. Where necessary for fitting at site, provide ample allowance for scribing, trimming, and fitting.
- B Shop cut openings, to maximum extent possible if applicable, to receive hardware, appliances, plumbing fixtures, electrical work, and similar items. Locate openings accurately and use templates or roughing-in diagrams to produce accurately sized and shaped openings. Sand edges of cutouts to remove splinters and burrs.

PART 3 EXECUTION

3.1 PREPARATION

- A Before installation, condition paneling to humidity conditions in installation areas.
- B Before installing paneling, examine shop-fabricated work for completion.

3.2 INSTALLATION

- A Grade: Install paneling to comply with quality standard grade of paneling to be installed.
- B Install paneling level, plumb, true in line, and without distortion. Shim as required with concealed shims. Install level and plumb to a tolerance of 1/8 inch in 96 inches. Install with no more than 1/16 inch in 96 inch vertical cup or bow and 1/8 inch in 96 inch horizontal variation from a true plane.
- C Anchor paneling to supporting substrate with concealed panel-hanger clips. Do not use face fastening unless.

3.3 ADJUSTING AND CLEANING

- A Repair damaged and defective paneling, where possible, to eliminate defects. Where not possible to repair, replace paneling. Adjust for uniform appearance.

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- B Clean paneling on exposed surfaces. Touch up shop-applied finishes to restore damaged or soiled areas.

END OF SECTION 06 42 19

SECTION 06 61 00 - ARCHITECTURAL FIBERGLASS FABRICATIONS

PART 1 GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A Section Includes:
 - 1. Exterior architectural fiberglass reinforced polymer fabrications
 - 2. Supplementary components and accessories normally furnished or otherwise necessary for a complete installation.

1.3 REFERENCES

- A Acronyms and Abbreviations:
 - 1. ACMA: American Composites Manufacturers Association.
 - 2. FRP: Fiberglass Reinforced Polymer.
- B Definitions:
 - 1. Manufacturer: Means FRP fabrication manufacturer unless otherwise indicated.

1.4 SUBMITTALS

- A Action Submittals:
 - 1. Product Data: For each type of product; include construction details, material descriptions, dimensions of individual components and profiles, and finishes for architectural FRP fabrications.
 - 2. Shop Drawings: Show plans, sections, details, joint treatment, materials, thickness, required clearances, reinforcing, support, fastening devices, integration of components, relation to adjacent construction and list of part numbers that coordinate with labeled FRP fabrications.
 - 3. Samples: At least 6 inches square for each color, texture, and finish.
 - 4. Delegated-Design Submittal: For FRP fabrications and connections indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.
- B Informational Submittals:
 - 1. Qualification Data: For installer and professional engineer.
- C Closeout Submittals:
 - 1. Maintenance Data: For FRP fabrications to include in maintenance manuals.

1.5 QUALITY ASSURANCE

- A Manufacturer Qualifications: A qualified manufacturer of architectural fiberglass fabrications similar to those indicated for this Project, with sufficient production capacity to manufacture required units.
 - 1. Manufacturer to comply with Quality Control and Assurance Procedures and fabricate architectural fiberglass based upon provisions published in the ACMA publication Guidelines and Recommended Practices for Fiberglass Reinforced Plastic Architectural Products.
- B Installer Qualifications: An entity that employs installers who are acceptable to the manufacturer and with at least 5 consecutive years' experience in the installation of FRP fabrications similar in material, design, complexity, and extent to this project that have resulted in installations with a documented record of successful in-service performance.
- C Professional Engineer Qualifications: A professional engineer experienced with providing delegated design engineering services of the kind indicated, including documentation that engineer is a licensed engineer in the state of North Carolina.

1.6 DELIVERY, STORAGE AND HANDLING

- A Handle, store and transport fiberglass fabrications according to manufacturer's recommendations and in a manner that prevents damage.
- B Protect fabrications from damage by retaining shipping protection in place until installation.

PART 2 PRODUCTS**2.1 PERFORMANCE REQUIREMENTS**

- A Delegated Design: Engage a qualified professional engineer licensed in the state of North Carolina to design FRP fabrications and their connections to the structure.
 - 1. Engineering services are defined as those performed for installations of the system, assembly, or product that are similar in material, design, and extent to those indicated for this Project.
- B Fire-Test-Response Characteristics: As determined by testing identical polyester resin to substrates in accordance with test method indicated below.
 - 1. Surface-Burning Characteristics: Comply with ASTM E 84; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
 - a. Flame-Spread Index: 25 or less.
 - b. Smoke-Developed Index: 450 or less.

2.2 FRP MANUFACTURERS

- A FRP Manufacturers:
 - 1. Basis-of-Design Manufacturer: Subject to compliance with the Contract Documents design is based on FRP fabrications indicated on the Drawings as manufactured by the following.
 - a. Wilson Composites, LLC.
 - 2. Acceptable Manufacturers: Subject to compliance with the Contract Documents, provide FRP fabrications by the basis-of-design manufacturer, or by one of the following.
 - a. EDON Composites.
 - b. Melton Classics Incorporated.

2.3 MATERIALS CHARACTERISTICS

- A Gel Coat: U-V inhibited NPG-ISO polyester gel coat, 18 to 22 mils thick.
 - 1. Integrally color gel coat to match specified finish and texture per approved sample.
- B Glass Content: Not less than 25 percent.

2.4 MECHANICAL PROPERTIES

- A Tensile Strength: 12,000 psi per ASTM D 638.
- B Flexural Strength: 20,000 psi per ASTM D 790.
- C Flexural Modulus: 0.9×10^6 per ASTM D 790.
- D Compressive Strength: 17,000 psi per ASTM D 695.
- E Bearing Strength: 9,000 psi per ASTM D 638.

2.5 FINISH

- A Texture: Sandblasted gel coat at factory to produce a stone aggregate finish.
- B Color: As selected by Architect.

2.6 TOLERANCES

- A Part Thickness: plus or minus 1/8 inch.
- B Gel Coat Thickness: plus or minus 2.5 mils.
- C Length: plus or minus 1/8 inch.
- D Variation from Square: 1/8 inch.

2.7 ANCHORS AND FASTENERS

- A Non-corrosive anchors and fasteners and other accessories for proper installation of architectural FRP fabrications.

PART 3 EXECUTION

3.1 EXAMINATION

- A Site Conditions: Verify the conditions for compliance with the manufacturer's requirements including installation tolerances and other conditions affecting the installation and performance of the FRP parts. Any unsatisfactory conditions to be corrected prior to installation.
 - 1. Verify that bearing surfaces are true and level.
 - 2. Verify that support framing has been constructed to allow accurate placement, alignment and connection of architectural fiberglass fabrications to structure.
- B Do not proceed with installation until unsatisfactory conditions have been corrected.
 - 1. Beginning FRP fabrications installation means acceptance of existing conditions and fiberglass materials.

3.2 INSTALLATION

- A Install architectural FRP fabrications in accordance with manufacturer's instructions and approved shop drawings.

3.3 ALLOWABLE TOLERANCES FOR INSTALLED UNITS

- A Maximum Offset from True Alignment: 1/4 inch in 20 feet.
- B Maximum Variation from True Position: 1/2 inch in 20 feet.

3.4 CLEANING

- A Clean installed architectural FRP fabrications using cleaning methods and material approved by manufacturer.

END OF SECTION 06 61 00

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SECTION 06 83 16 - FIBERGLASS-REINFORCED PANELING (FRP)

PART 1 GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A Section Includes:
 - 1. Plastic (FRP) sheet paneling.
 - 2. Supplementary components and accessories normally furnished or otherwise necessary for a complete installation.

1.3 REFERENCES

- A Acronyms and Abbreviations:
 - 1. FRP: Fiberglass-Reinforced Plastic.
 - 2. SCAQMD: South Coast Air Quality Management District.
 - 3. VOC: Volatile Organic Compounds.
- B Definitions:
 - 1. Manufacturer: Means the FRP manufacturer unless otherwise indicated.

1.4 SUBMITTALS

- A Action Submittals:
 - 1. Product Data: For each type of product; include Health Product Declaration and Environmental Product Declaration. Indicate VOC content for adhesive.
- B Closeout Submittals:
 - 1. Maintenance Data: For FRP to include in maintenance manuals.

1.5 PROJECT CONDITIONS

- A Environmental Limitations: Do not deliver or install FRP until spaces are enclosed and weathertight and temporary HVAC system is operating and maintaining ambient temperature and humidity conditions at occupancy levels during the remainder of the construction period.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A Source Limitations: Obtain FRP and trim accessories from the same manufacturer.

2.2 FIBERGLASS-REINFORCED PANELING (FRP)

- A FRP: Gelcoat-finished, glass-fiber-reinforced plastic panels complying with ASTM D 5319.
 - 1. Basis-of-Design Product (FRP-1): Subject to compliance with the Contract Documents, design is based on product indicated in the Finish Material Schedules on the Drawings as manufactured by the following.
 - a. Panolam Industries International, Inc.
 - 2. Acceptable Manufacturers: Subject to compliance with the Contract Documents provide the basis-of-design product or comparable approved product by one of the following.
 - a. Crane Composites.
 - b. Marlite, Inc.

2.3 ACCESSORIES

- A Trim Accessories: Manufacturer's standard vinyl extrusions designed to retain and cover edges of panels. Provide caps as needed to conceal edges.
 - 1. Color: Match panels.

- B Adhesive: Adhesive as supplied, recommended, or required by the manufacturer.
 - 1. Allowable VOC Content: Adhesives, adhesive bonding primers, and adhesive primers must comply with SCAQMD Rule 1168 VOC limits.
 - a. Such products also shall comply with the Rule 1168 prohibition on the use of certain toxic compounds (chloroform, ethylene dichloride, methylene chloride, perchloroethylene, and trichloroethylene).
- C Sealant: Sealant recommended in writing by the manufacturer and complying with requirements in Section 07 92 00 Joint Sealants.
- D Accessories: Provide other accessories supplied, recommended, or required by the manufacturer as necessary for a complete installation.

PART 3 EXECUTION

3.1 EXAMINATION

- A Examine substrates and conditions, with installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the work.
- B Do not proceed with installation until unsatisfactory conditions have been corrected.
 - 1. Installation of FRP indicates acceptance of surfaces and conditions.

3.2 PREPARATION

- A Remove materials that might interfere with adhesive bond.
- B Prepare substrate by sanding high spots and filling low spots as needed to provide flat, even surface for panel installation.
- C Clean substrates of substances that could impair adhesive bond, including oil, grease, dirt, and dust.
- D Condition panels by unpacking and placing in installation space before installation according to manufacturer's written recommendations.
- E Lay out paneling before installing. Locate panel joints so that trimmed panels at corners are not less than 12 inches wide.
 - 1. Mark plumb lines on substrate at panel joint locations for accurate installation.

3.3 INSTALLATION

- A Install FRP according to manufacturer's written instructions.
- B Install panels in a full spread of adhesive.
- C Install trim accessories with adhesive.
 - 1. High-Moisture and Wet Areas: Fill grooves in trim accessories with sealant before installing panels, and bed inside corner trim in a bead of sealant.
- D Maintain uniform space between panels and wall fixtures. Fill space with sealant.
- E Remove excess sealant and smears as paneling is installed. Clean with solvent recommended by sealant manufacturer and then wipe with clean dry cloths until no residue remains.

END OF SECTION 06 83 16

SECTION 07 11 13 - BITUMINOUS DAMPPROOFING

PART 1 GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A Section Includes:
 - 1. Cold-applied, emulsified-asphalt dampproofing.
 - 2. Supplementary components and accessories normally furnished or otherwise necessary for a complete installation.

1.3 REFERENCES

- A Acronyms and Abbreviations:
 - 1. AHJ: Authority (Authorities) Having Jurisdiction.
 - 2. VOC: Volatile Organic Compound.
- B Definitions:
 - 1. Manufacturer: Means the bituminous dampproofing manufacturer unless otherwise indicated.

1.4 ACTION SUBMITTALS

- A Product Data: For each type of product; include Health Product Declaration and Environmental Product Declaration.

1.5 FIELD CONDITIONS

- A Weather Limitations: Do not proceed with application until existing and forecasted weather conditions permit dampproofing to be performed according to manufacturers' written instructions.
- B Ventilation: Provide adequate ventilation during application of dampproofing in enclosed spaces. Maintain ventilation until dampproofing has cured.

PART 2 PRODUCTS

2.1 SOURCE LIMITATIONS

- A Source Limitations: Obtain primary dampproofing materials and primers from single source from the same manufacturer. Provide auxiliary materials recommended in writing by manufacturer of primary materials.

2.2 PERFORMANCE REQUIREMENTS

- A VOC Content: Products are to comply with VOC content limits of the AHJ unless otherwise indicated.

2.3 COLD-APPLIED, EMULSIFIED-ASPHALT DAMPPROOFING

- A Manufacturers: Subject to compliance with the Contract Documents, provide products by one of the following.
 - 1. The Euclid Chemical Company.
 - 2. Henry Company.
 - 3. W.R. Meadows, Inc.
- B Trowel Coats: ASTM D 1227, Type II, Class 1.
- C Fibered Brush and Spray Coats: ASTM D 1227, Type II, Class 1.
- D Brush and Spray Coats: ASTM D 1227, Type III, Class 1.

2.4 AUXILIARY MATERIALS

- A Furnish auxiliary materials recommended in writing by the manufacturer for intended use and compatible with bituminous dampproofing.
- B Emulsified-Asphalt Primer: ASTM D 1227, Type III, Class 1, except diluted with water as recommended in writing by manufacturer.
- C Asphalt-Coated Glass Fabric: ASTM D1668/D1668M, Type I.
- D Patching Compound: Asbestos-free fibered mastic of type recommended in writing by the manufacturer.
- E Accessories: As supplied, recommended, or required by the manufacturer, including drainage panels and protection course, if indicated on the Drawings, and as necessary for a complete installation.

PART 3 EXECUTION

3.1 EXAMINATION

- A Examine substrates, areas, and conditions, with applicator present, for compliance with requirements for surface smoothness, maximum surface moisture content, and other conditions affecting performance of the work.
- B Do not proceed with application until substrate construction and penetrating work have been completed and unsatisfactory conditions have been corrected.
 - 1. Application of dampproofing indicates acceptance of surfaces and conditions.

3.2 PREPARATION

- A Clean, prepare, and treat substrates according to manufacturer's written instructions. Provide clean, dust-free, and dry substrates for dampproofing application.
- B Mask or otherwise protect adjoining exposed surfaces from being stained, spotted, or coated with dampproofing. Prevent dampproofing materials from entering and clogging weep holes and drains.
- C Clean substrates of projections and substances detrimental to dampproofing work; fill voids, seal joints, and remove bond breakers if any.
- D Apply patching compound to patch and fill tie holes, honeycombs, reveals, and other imperfections; cover with asphalt-coated glass fabric if recommended or required in writing by the manufacturer.

3.3 INSTALLATION, GENERAL

- A Comply with manufacturer's written instructions for dampproofing application, cure time between coats, and drying time unless otherwise indicated.
 - 1. Apply dampproofing to provide continuous plane of protection.
 - 2. Apply additional coats if recommended in writing by manufacturer or to achieve a smooth surface and uninterrupted coverage.
- B Where dampproofing footings and foundation walls, apply from finished-grade line to top of footing; extend over top of footing and down at least 6 inches over outside face of footing.
 - 1. Extend dampproofing 12 inches onto intersecting walls and footings, but do not extend onto surfaces exposed to view when Project is completed.
 - 2. Install flashings and corner protection stripping at internal and external corners, changes in plane, construction joints, cracks, and where indicated as "reinforced," by embedding an 8-inch-wide strip of asphalt-coated glass fabric in a heavy coat of dampproofing. Dampproofing coat for embedding fabric is in addition to other coats required.

3.4 INSTALLATION OF PROTECTION COURSE AND DRAINAGE PANELS

- A Comply with manufacturer's written instructions if required by Project conditions or if indicated on the Drawings.

3.5 INSTALLATION OF COLD-APPLIED, EMULSIFIED-ASPHALT DAMPPROOFING

- A General: Install where indicated on the Drawings.
- B Concrete Foundations: Apply one trowel coat at not less than 4 gal./100 sq. ft.
- C Concrete Backup for Masonry Veneer Assemblies: Apply one brush or spray coat at not less than 1 gal./100 sq. ft.

3.6 CORRECTION

- A Correct dampproofing that does not comply with requirements; repair substrates, and reapply dampproofing.

END OF SECTION 07 11 13

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SECTION 07 21 00 - THERMAL INSULATION

PART 1 GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A Section Includes:
 - 1. Glass-fiber insulation.
 - 2. Supplementary components and accessories normally furnished or otherwise necessary for a complete installation.

1.3 REFERENCES

- A Acronyms and Abbreviations:
 - 1. AHJ: Authority (Authorities) Having Jurisdiction.
- B Definitions:
 - 1. Manufacturer: Means the thermal insulation manufacturer unless otherwise indicated.

1.4 SUBMITTALS

- A Action Submittals:
 - 1. Product Data: For specified products; include Environmental Product Declaration and Health Product Declaration.
- B Informational Submittals:
 - 1. Installer's Certification: Listing type, manufacturer, and R-value of insulation installed in each element of the building thermal envelope unless insulation materials are labeled by the manufacturer to indicated R-value.
 - 2. Product Test Reports: For each product, for tests performed by a qualified testing agency.

1.5 DELIVERY, STORAGE, AND HANDLING

- A Protect insulation materials from damage and from deterioration due to moisture, soiling, and other sources. Store inside and in a dry location. Comply with manufacturer's written instructions for handling, storing, and protecting during installation.

PART 2 PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A Surface-Burning Characteristics: Maximum flame-spread and smoke-developed indexes less than 25 and 450 when tested in accordance with ASTM E 84.
- B Labeling: Provide identification of mark indicating R-value of each piece of insulation 12 inches and wider in width.
- C Thermal-Resistance Value (R-Value): R-value as indicated on Drawings in accordance with ASTM C 518.

2.2 GLASS-FIBER INSULATION

- A Manufacturers: Subject to compliance with the Contract Documents, provide products by one of the following:
 - 1. CertainTeed.
 - 2. Johns Manville.
 - 3. Knauf.
 - 4. Owens Corning.
- B Glass-Fiber Blanket Insulation, Unfaced: ASTM C 655, Type I; passing ASTM E 136 for combustion characteristics.

2.3 ACCESSORIES

- A Adhesively Attached, Spindle-Type Insulation Anchors: Plate welded to projecting spindle; capable of holding insulation of specified thickness securely in position with self-locking washer in place.
- B Accessories: As supplied, recommended, or required by the manufacturer and as necessary for a complete installation.

PART 3 EXECUTION

3.1 PREPARATION

- A Clean substrates of substances that are harmful to insulation, including removing projections capable of puncturing insulation or vapor retarders, or that interfere with insulation attachment.

3.2 INSTALLATION, GENERAL

- A Comply with insulation manufacturer's written instructions applicable to products and applications.
- B Install insulation that is undamaged, dry, and unsoiled and that has not been left exposed to ice, rain, or snow at any time.
- C Install insulation with manufacturer's R-value label exposed after insulation is installed unless installer is providing certification specified in "Informational Submittals" Article in Part 1.
- D Extend insulation to envelop entire area to be insulated. Fit tightly around obstructions and fill voids with insulation. Remove projections that interfere with placement.
- E Provide sizes to fit applications and selected from manufacturer's standard thicknesses, widths, and lengths. Apply single layer of insulation units unless multiple layers are otherwise shown or required to make up total thickness or to achieve R-value.

3.3 INSTALLATION OF INSULATION IN FRAMED CONSTRUCTION

- A Blanket/Batt Insulation: Install in cavities formed by framing members according to the following requirements:
 - 1. Use insulation widths and lengths that fill the cavities formed by framing members. If more than one length is required to fill the cavities, provide lengths that will produce a snug fit between ends.
 - 2. Place insulation in cavities formed by framing members to produce a friction fit between edges of insulation and adjoining framing members.
 - 3. Maintain 3-inch clearance of insulation around recessed lighting fixtures not rated for or protected from contact with insulation.
- B Miscellaneous Voids: Install insulation in miscellaneous voids and cavity spaces where required to prevent gaps in insulation.

3.4 PROTECTION

- A Protect installed insulation from damage.
- B Provide temporary coverings or enclosures where insulation is subject to abuse and cannot be concealed and protected by permanent construction immediately after installation.

END OF SECTION 07 21 00

SECTION 07 21 19 - FOAMED-IN-PLACE INSULATION

PART 1 GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A Section Includes:
 - 1. Closed-cell spray polyurethane foam insulation.
 - 2. Supplementary components and accessories normally furnished or otherwise necessary for a complete installation.

1.3 REFERENCES

- A Acronyms and Abbreviations:
 - 1. SCAQMD: South Coast Air Quality Management District.
 - 2. VOC: Volatile Organic Compounds.
- B Definitions:
 - 1. Manufacturer: Means the spray foam insulation manufacturer unless otherwise indicated.

1.4 SUBMITTALS

- A Action Submittals:
 - 1. Product Data: For each type of product. Include the following.
 - a. Manufacturer's written instructions for evaluating, preparing, and treating substrate; technical data; temperature and other limitations of installation conditions, and; tested physical and performance properties of products.
 - b. Current Environmental Product Declaration.
 - c. Primer VOC content disclosure data.
- B Informational Submittals:
 - 1. Qualification Data: For installer.
 - 2. Product Test Reports: For each product, for tests performed by a qualified testing agency.
 - 3. Research Reports: For spray-applied polyurethane foam-plastic insulation, from ICC-ES.
 - 4. Field quality-control reports.

1.5 QUALITY ASSURANCE

- A Installer Qualifications: An authorized representative who is trained and approved by manufacturer.

PART 2 PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A Air Permeance Performance: Spray foam air permeance not to exceed 0.02 cfm/sq. ft. of surface area at 1.57 lbf/sq. ft. when tested in accordance with ASTM E 2178.
- B Allowable VOC Content: Sealants, adhesives, adhesive bonding primers, and adhesive primers must comply with SCAQMD Rule 1168 VOC limits.
 - 1. Such products also shall comply with the Rule 1168 prohibition on the use of certain toxic compounds (chloroform, ethylene dichloride, methylene chloride, perchloroethylene, and trichloroethylene).
- C Fire Propagation Characteristics: Passes NFPA 285 testing as part of an approved assembly.

2.2 CLOSED-CELL SPRAY POLYURETHANE FOAM

- A Closed-Cell Spray Polyurethane Foam: ASTM C 1029, Type II, density of at least 1.5 lb./cu. ft. and aged R-value at 1-inch thickness of at least 6.2 degrees Fahrenheit x h x sq. ft./Btu at 75 degrees Fahrenheit.
 - 1. Product: Subject to compliance with the Contract Documents, provide the following.
 - a. "Heatlok HFO Pro" manufactured by Huntsman Building Solutions.
 - b. "JM Corbond III" manufactured by Johns Mansville.
 - c. "SealTite PRO HFO" manufactured by Carlisle.
 - 2. Surface-Burning Characteristics: Comply with ASTM E 84; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
 - a. Flame-Spread Index: 25 or less.
 - b. Smoke-Developed Index: 450 or less.
 - 3. Fire Propagation Characteristics: Passes NFPA 285 testing as part of an approved assembly.

2.3 MISCELLANEOUS MATERIALS

- A Primer: Material supplied or recommended in writing by manufacturer where required for adhesion of insulation to substrates.
- B Foam Stop Angle: Cold rolled galvanized steel, aluminum, or stainless steel angle.
- C Accessories: As supplied, recommended, or required by the manufacturer and as necessary for a complete installation.

PART 3 EXECUTION

3.1 PREPARATION

- A Verify that substrates are clean, dry, and free of substances that are harmful to insulation.
- B Priming: Prime substrates where recommended in writing by the manufacturer. Apply primer to comply with manufacturer's written instructions. Confine primers to areas to be insulated; do not allow spillage or migration onto adjoining surfaces.

3.2 INSTALLATION

- A Comply with manufacturer's written instructions applicable to products and applications.
- B Spray insulation to envelop entire area to be insulated and fill voids.
- C Apply in multiple passes to not exceed maximum thicknesses recommended by manufacturer. Do not spray into rising foam.
- D Miscellaneous Voids: Apply according to manufacturer's written instructions.

3.3 PROTECTION

- A Protect installed insulation from damage due to harmful weather exposures, physical abuse, and other causes.

END OF SECTION 07 21 19

SECTION 07 31 13 - ASPHALT SHINGLES

PART 1 GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A Section Includes:
 - 1. Glass-fiber-reinforced asphalt shingles.
 - 2. Underlayment materials.
 - 3. Ridge vents.
 - 4. Metal flashing and trim.
 - 5. Supplementary components and accessories normally furnished or otherwise necessary for a complete installation or application.

1.3 REFERENCES

- A Acronyms and Abbreviations:
 - 1. NRCA: National Roofing Contractors Association.
- B Definitions:
 - 1. Roofing Terminology, General: See ASTM D 1079 for definitions of terms related to roofing work in this Specification Section.

1.4 SUBMITTALS

- A Action Submittals:
 - 1. Product Data: For specified products.
 - 2. Shop Drawings: For metal flashing and trim.
- B Informational Submittals:
 - 1. Qualification Data: For installer.
 - 2. Product Test Reports: For each type of asphalt shingle and underlayment product indicated, for tests performed by a qualified testing agency or by the manufacturer and witnessed by a qualified testing agency.
 - 3. Research Reports: For synthetic underlayment, from ICC-ES, indicating that product is suitable for intended use under applicable building codes.
 - 4. Sample Warranty: For manufacturer's materials warranty.
- C Closeout Submittals:
 - 1. Maintenance Data: For asphalt shingles to include in maintenance manuals.
 - 2. Materials warranties.
 - 3. Roofing installer's warranty.

1.5 QUALITY ASSURANCE

- A Installer Qualifications: An authorized installer who is trained and approved by manufacturer.

1.6 DELIVERY, STORAGE, AND HANDLING

- A Store roofing materials in a dry, well-ventilated location protected from weather, sunlight, and moisture in accordance with manufacturer's written instructions.
- B Store underlayment rolls on end, on pallets or other raised surfaces. Do not double-stack rolls.
- C Protect unused roofing materials from weather, sunlight, and moisture when left overnight or when roofing work is not in progress.
- D Handle, store, and place roofing materials in a manner to prevent damage to roof deck or structural supporting members.

1.7 FIELD CONDITIONS

- A Environmental Limitations: Do not proceed with installation until existing and forecasted weather conditions permit product installation and related work to be performed in accordance with manufacturer's written instructions and warranty requirements.

1. Install self-adhering, polymer-modified bitumen sheet underlayment within the range of ambient and substrate temperatures recommended in writing by manufacturer.

1.8 WARRANTY

- A Materials Warranty: Manufacturer agrees to repair or replace asphalt shingles that fail within specified warranty period.

1. Failures include the following:
 - a. Manufacturing defects.
2. Materials Warranty Period: 30 years from date of Final Acceptance, prorated, with first 20 years nonprorated.
3. Algae-Resistance Warranty Period: Asphalt shingles will not discolor for 25 years from date of Final Acceptance.

- B Roofing Installer's Warranty: On warranty form at end of this Specification Section, signed by installer, in which installer agrees to repair or replace components of asphalt shingle roofing that fail in materials or workmanship within specified warranty period.

1. Warranty Period: 10 years from date of Final Acceptance.

PART 2 PRODUCTS

2.1 SOURCE LIMITATIONS

- A Obtain each type of product from single source from the same manufacturer.

2.2 GLASS-FIBER-REINFORCED ASPHALT SHINGLES

- A TIMBERLINE HDZ pewter gray

- B Laminated-Strip Asphalt Shingles: ASTM D 3462/D 3462M, laminated, multi-ply overlay construction; glass-fiber reinforced, mineral-granule surfaced, and self-sealing.

1. Basis-of-Design Product: Subject to compliance with the Contract Documents design is based on the following.
 - a. "Timberline HDZ" shingles as manufactured by GAF.
2. Acceptable Manufacturers: Subject to compliance with the Contract Documents provide the basis-of-design product or comparable approved product by one of the following.
 - a. Atlas Roofing Corporation.
 - b. CertainTeed, LLC.
3. Butt Edge: Straight.
4. Strip Size: 39-3/8 inches long.
5. Algae Resistance: Granules resist algae discoloration.
6. Color: "Pewter Gray".

- C Hip and Ridge Shingles: Manufacturer's standard units to match asphalt shingles.

2.3 UNDERLAYMENT MATERIALS

- A Self-Adhering, Polymer-Modified Bitumen Sheet: ASTM D 1970/D 1970M, at least 40-mil thick sheet; glass-fiber-mat-reinforced, polymer-modified asphalt; with slip-resistant top surface and release backing; cold applied.

2.4 RIDGE VENTS

- A Rigid Ridge Vent: Manufacturer's standard, rigid-section, high-density, UV-stabilized plastic ridge vent for use under ridge shingles.

2.5 ACCESSORIES

- A Asphalt Roofing Cement: ASTM D 4586/D 4586M Type II, asbestos free.

- B Elastomeric Flashing Sealant: ASTM C 920, Type S, Grade NS, one-part, non-sag, elastomeric polymer sealant; of class and use classifications required to seal joints and remain watertight; recommended in writing by manufacturer for installation of flashing systems.
- C Roofing Nails: ASTM F 1667, aluminum, stainless steel, copper, or hot-dip galvanized-steel wire shingle nails, at least 0.120-inch diameter, sharp-pointed, with a 3/8- to 7/16-inch flat head and of sufficient length to penetrate 3/4 inch into solid wood decking or extend at least 1/8 inch through sheathing less than 3/4 inch thick.
 - 1. Where nails are in contact with metal flashing, use nails made from same metal as flashing.

2.6 METAL FLASHING AND TRIM

- A Comply with requirements in Section 07 62 00 Sheet Metal Flashing and Trim.

PART 3 EXECUTION

3.1 EXAMINATION

- A Examine substrates, areas, and conditions, with installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the work.
 - 1. Examine roof sheathing to verify that sheathing joints are supported by framing and blocking or metal clips and that installation is within flatness tolerances.
 - 2. Verify that substrate is sound, dry, smooth, clean, sloped for drainage, and completely anchored and that provisions have been made for flashings and penetrations through asphalt shingles.
 - 3. Verify that penetrations through roofing are installed and securely fastened.
- B Do not proceed with installation until unsatisfactory conditions have been corrected.
 - 1. Installation of asphalt shingles indicates acceptance of surfaces and conditions.

3.2 INSTALLATION OF UNDERLAYMENT MATERIALS

- A Comply with asphalt shingle and underlayment manufacturers' written installation instructions and with recommendations in the NRCA publication *The NRCA Roofing Manual: Steep-Slope Roof Systems* applicable to products and applications indicated unless more stringent requirements are specified in this Section or indicated on Drawings.

3.3 INSTALLATION OF METAL FLASHING AND TRIM

- A Install metal flashings and trim to comply with requirements in Section 07 62 00 Sheet Metal Flashing and Trim and the following.
 - 1. Install metal flashings in accordance with recommendations in the NRCA publication *NRCA Guidelines for Asphalt Shingle Roof Systems*.

3.4 INSTALLATION OF ASPHALT SHINGLES

- A Install asphalt shingles in accordance with manufacturer's written instructions and recommendations in the NRCA publication *NRCA Guidelines for Asphalt Shingle Roof Systems*.

3.5 ROOFING INSTALLER'S WARRANTY

- A WHEREAS **Insert name** of **Insert address**, herein called the "Roofing Installer," has performed roofing and associated work ("the work") on the following project:
 - 1. Owner: **Insert name of Owner**.
 - 2. Owner Address: **Insert address**.
 - 3. Building Name/Type: **Insert information**.
 - 4. Building Address: **Insert address**.
 - 5. Area of the Work: **Insert information**.
 - 6. Acceptance Date: **Insert date**.
 - 7. Warranty Period: **Insert time**.
 - 8. Expiration Date: **Insert date**.

- B AND WHEREAS Roofing Installer has contracted (either directly with Owner or indirectly as a subcontractor) to warrant the work against leaks and faulty or defective materials and workmanship for designated Warranty Period,
- C NOW THEREFORE Roofing Installer hereby warrants, subject to terms and conditions herein set forth, that, during Warranty Period, Roofing Installer will, at Roofing Installer's own cost and expense, make or cause to be made such repairs to or replacements of the work as are necessary to correct faulty and defective work and as are necessary to maintain the work in a watertight condition.
- D This Warranty is made subject to the following terms and conditions:
1. Specifically excluded from this Warranty are damages to the work and other parts of the building, and to building contents, caused by:
 - a. Lightning;
 - b. Fire;
 - c. Failure of roofing system substrate, including cracking, settlement, excessive deflection, deterioration, and decomposition;
 - d. Faulty construction of copings, chimneys, skylights, vents, equipment supports, and other edge conditions and penetrations of the work;
 - e. Vapor condensation on bottom of roofing; and
 - f. Activity on roofing by others, including construction contractors, maintenance personnel, other persons, and animals, whether authorized or unauthorized by Owner.
 2. When the work has been damaged by any of foregoing causes, Warranty is to be null and void until such damage has been repaired by Roofing Installer and until cost and expense thereof have been paid by Owner or by another responsible party so designated.
 3. Roofing Installer is responsible for damage to the work covered by this Warranty but is not liable for consequential damages to building or building contents resulting from leaks or faults or defects of the work.
 4. During Warranty Period, if Owner allows alteration of the work by anyone other than Roofing Installer, including cutting, patching, and maintenance in connection with penetrations, attachment of other work, and positioning of anything on roof, this Warranty becomes null and void on date of the alterations, but only to the extent the alterations affect the work covered by this Warranty. If Owner engages Roofing Installer to perform the alterations, Warranty does not become null and void unless Roofing Installer, before starting the alterations, notified Owner in writing, showing reasonable cause for claim, that the alterations would likely damage or deteriorate the work, thereby reasonably justifying a limitation or termination of this Warranty.
 5. During Warranty Period, if original use of roof is changed and it becomes used for, but was not originally specified for, a use or service more severe than originally specified, this Warranty becomes null and void on date of the change, but only to the extent the change affects the work covered by this Warranty.
 6. Owner promptly notifies Roofing Installer of observed, known, or suspected leaks, defects, or deterioration and affords reasonable opportunity for Roofing Installer to inspect the work and to examine evidence of such leaks, defects, or deterioration.
 7. This Warranty is recognized to be the only warranty of Roofing Installer on the work and does not operate to restrict or cut off Owner from other remedies and resources lawfully available to Owner in cases of roofing failure. Specifically, this Warranty does not operate to relieve Roofing Installer of responsibility for performance of the work according to requirements of the Contract Documents, regardless of whether Contract was a contract directly with Owner or a subcontract with Owner's General Contractor.
- E IN WITNESS THEREOF, this instrument has been duly executed this **Insert Day** day of **Insert Month**, **Insert year**.
1. Authorized Signature: **Insert signature**.
 2. Name: **Insert name**.

January 15, 2026

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Housing Village Phase 3
Complete Package - Construction Documents

5142301800
SCO 24-29053-02D

3. Title: **Insert title.**

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SECTION 07 46 46 - FIBER-CEMENT SIDING

PART 1 GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A Section Includes:
 - 1. Fiber-cement trim.
 - 2. Supplementary components and accessories normally furnished or otherwise necessary for a complete application.

1.3 REFERENCES

- A Acronyms and Abbreviations:
 - 1. AHJ: Authority (Authorities) Having Jurisdiction.
- B Definitions:
 - 1. Manufacturer: Means the fiber-cement trim manufacturer unless otherwise indicated.

1.4 COORDINATION

- A Coordinate trim installation with flashings and other adjoining construction to ensure proper sequencing.

1.5 SUBMITTALS

- A Action Submittals:
 - 1. Product Data: For each type of product. Include the following.
 - a. Construction details, material descriptions, dimensions of individual components and profiles, and finishes.
 - b. Current Environmental Product Declaration.
- B Informational Submittals:
 - 1. Product Certificates: For trim.
 - 2. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, for fiber-cement trim.
 - 3. Sample Warranty: For special warranty.
- C Closeout Submittals:
 - 1. Maintenance Data: For each type of product, including related accessories, to include in maintenance manuals.

1.6 DELIVERY, STORAGE, AND HANDLING

- A Deliver and store packaged materials in original containers with labels intact until time of use.
- B Store materials on elevated platforms, under cover, and in a dry location.

1.7 WARRANTY

- A Special Warranty: Manufacturer agrees to repair or replace products that fail in materials or workmanship within specified warranty period.
 - 1. Failures include the following:
 - a. Structural failures including cracking and deforming.
 - b. Deterioration of materials beyond normal weathering.
 - 2. Warranty Period: 30 years from date of Final Acceptance.
- B Special Finish Warranty, Shop-Applied Finishes: Standard form in which pre-finisher agrees to repair finishes that shows evidence of deterioration of applied finishes within specified warranty period.
 - 1. Warranty Period: At least 15 years from date of Final Acceptance.

PART 2 PRODUCTS

2.1 SOURCE LIMITATIONS

- A Obtain products, including related accessories, from single source from the same manufacturer.

2.2 PRE-FINISHERS

- A Approved Pre-Finishers: Subject to compliance with the Contract Documents, the following companies are approved as pre-finishers for shop-applied paint for the fiber-cement products.
1. Colortones. (www.carolinacolortones.com)
 2. Legacy Pre-Finishing, Inc. (www.legacyprefinishing.com)
 3. Comparable pre-finisher acceptable to the Architect.

2.3 FIBER-CEMENT TRIM

- A General: Provide fiber-cement trim that is tested and labeled in accordance with ASTM C 1186 by a qualified testing agency acceptable to the AHJ.
- B Trim: ASTM C 1186, Type A, Grade II, fiber-cement board, noncombustible when tested in accordance with ASTM E 136; with a flame-spread index of 25 or less when tested in accordance with ASTM E 84.
1. Product:
 - a. Basis-of-Design Product: Subject to compliance with the Contract Documents, design is based on the following.
 - 1) "HZ10 Hardie Trim" as manufactured by James Hardie Building Products Inc.
 - b. Acceptable Manufacturers: Subject to compliance with the Contract Documents provide the basis-of-design product or comparable approved product by one of the following.
 - 1) Allura.
 - 2) Nichiha.
 2. Thickness: 3/4 inch.
 3. Width: As indicated on the Drawings, or if not indicated as selected by the Architect.
 4. Texture: "Smooth."
 5. Finish: Primed for shop painting.
 - a. Color: As selected by the Architect.

2.4 ACCESSORIES

- A Fasteners: For fastening fiber cement, use hot-dip galvanized or stainless steel fasteners.
1. For fastening to metal, use ribbed bugle-head screws of sufficient length to penetrate at least 1/4 inch, or 3 screw-threads, into substrate.
- B Accessories: As supplied, recommended, or required by the manufacturer and as necessary for a complete installation.

PART 3 EXECUTION

3.1 EXAMINATION

- A Examine substrates for compliance with requirements for installation tolerances and other conditions affecting performance of fiber-cement siding and related accessories.
- B Do not proceed with installation until unsatisfactory conditions have been corrected.
1. Installation of fiber-cement siding indicates acceptance of surfaces and conditions.

3.2 PREPARATION

- A Clean substrates of projections and substances detrimental to application.

3.3 INSTALLATION

- A General: Comply with manufacturer's written installation instructions applicable to products and applications indicated unless more stringent requirements apply.

- 1. Do not install damaged components.
- B Trim Locations: As indicated on the Drawings.

3.4 ADJUSTING AND CLEANING

- A Remove damaged, improperly installed, or otherwise defective materials and replace with new materials complying with specified requirements.
- B Clean finished surfaces according to manufacturer's written instructions and maintain in a clean condition during construction.

END OF SECTION 07 46 46

January 15, 2026

University of North Carolina at Wilmington
Housing Village Phase 3
Complete Package - Construction Documents

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SECTION 07 54 23 - THERMOPLASTIC POLYOLEFIN (TPO) ROOFING

PART 1 GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A Section Includes:
 - 1. Adhered thermoplastic polyolefin (TPO) roofing system.
 - 2. Accessory roofing materials.
 - 3. Substrate board.
 - 4. Roof insulation.
 - 5. Insulation accessories and cover board.
 - 6. Walkways.
 - 7. Supplementary components and accessories normally furnished or otherwise necessary for a complete installation.

1.3 REFERENCES

- A Acronyms and Abbreviations:
 - 1. AHJ: Authority (Authorities) Having Jurisdiction.
 - 2. NRCA: National Roofing Contractors Association.
 - 3. SPRI: Single Ply Roofing Industry.
 - 4. TPO: Thermoplastic Polyolefin.
 - 5. VOC: Volatile Organic Compound.
- B Definitions:
 - 1. Manufacturer: Means the roof membrane manufacturer unless otherwise indicated.
 - 2. Roofing Terminology: Definitions in ASTM D 1079 and glossary in the NRCA publication The NRCA Roofing and Waterproofing Manual apply to work of this Specification Section.

1.4 PREINSTALLATION MEETINGS

- A Preinstallation Roofing Conference: Conduct conference at Project site.
 - 1. Meet with Owner, Architect, Owner's insurer if applicable, roofing installer, roofing system manufacturer's field representative, deck installer, and installers whose work interfaces with or affects roofing, including installers of roof accessories and roof-mounted equipment.
 - 2. Review methods and procedures related to roofing installation, including manufacturer's written instructions.
 - 3. Review and finalize construction schedule, and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
 - 4. Examine deck substrate conditions and finishes for compliance with requirements, including flatness and fastening.
 - 5. Review structural loading limitations of roof deck during and after roofing.
 - 6. Review base flashings, special roofing details, roof drainage, roof penetrations, equipment curbs, and condition of other construction that affects roofing system.
 - 7. Review governing regulations and requirements for insurance and certificates if applicable.
 - 8. Review temporary protection requirements for roofing system during and after installation.
 - 9. Review roof observation and repair procedures after roofing installation.

1.5 SUBMITTALS

- A Action Submittals:
 - 1. Product Data: For each type of product; include Health Product Declaration and Environmental Product Declaration.

2. Shop Drawings: For roofing system. Include plans, elevations, sections, details, and attachments to other work, including:
 - a. Base flashings and membrane terminations.
 - b. Tapered insulation, including slopes.
 - c. Roof plan showing orientation of steel roof deck and orientation of roofing, fastening spacings, and patterns for mechanically fastened roofing.
 - d. Insulation fastening patterns for corner, perimeter, and field-of-roof locations.
 3. Samples for Verification: For the following products:
 - a. Sheet roofing, of color required.
 - b. Roof insulation.
 - c. Walkway pads or rolls.
- B Informational Submittals:
1. Qualification Data: For installer and manufacturer.
 2. Manufacturer Certificates: Signed by the manufacturer certifying that roofing system complies with requirements specified in "Performance Requirements" Article.
 - a. Submit evidence of compliance with performance requirements.
 3. Product Test Reports: For components of roofing system, tests performed by manufacturer and witnessed by a qualified testing agency.
 4. Research/Evaluation Reports: For components of roofing system, from ICC-ES.
 5. Field quality-control reports.
 6. Sample Warranties: For manufacturer's special warranties.
- C Closeout Submittals:
1. Maintenance Data: For roofing system to include in maintenance manuals.

1.6 QUALITY ASSURANCE

- A Manufacturer Qualifications: A qualified manufacturer that is listed in SPRI's Directory of Roof Assemblies for roofing system identical to that used for this Project.
- B Installer Qualifications: A qualified firm that is approved, authorized, or licensed by the manufacturer to install manufacturer's product and that is eligible to receive manufacturer's special warranty.

1.7 DELIVERY, STORAGE, AND HANDLING

- A Deliver roofing materials to Project site in original containers with seals unbroken and labeled with manufacturer's name, product brand name and type, date of manufacture, approval or listing agency markings, and directions for storing and mixing with other components.
- B Store liquid materials in their original undamaged containers in a clean, dry, protected location and within the temperature range required by roofing system manufacturer. Protect stored liquid material from direct sunlight.
 1. Discard and legally dispose of liquid material that cannot be applied within its stated shelf life.
- C Protect roof insulation materials from damage and from deterioration by sunlight, moisture, soiling, and other sources. Store in a dry location. Comply with insulation manufacturer's written instructions for handling, storing, and protecting during installation.
- D Handle and store roofing materials, and place equipment in a manner to avoid permanent deflection of deck.

1.8 FIELD CONDITIONS

- A Weather Limitations: Do not proceed with installation until existing and forecasted weather conditions permit roofing system to be installed according to manufacturer's written instructions and warranty requirements.

1.9 WARRANTY

- A Special Warranty: Manufacturer agrees to repair or replace components of roofing system that fail in materials or workmanship within specified warranty period.

1. Special warranty includes roofing, base flashings, roof insulation, fasteners, roofing accessories, and other components of roofing system.
 2. Warranty Period: 20 years from date of Substantial Completion.
- B Special Project Warranty: Submit roofing installer's warranty, on warranty form at end of this Specification Section, signed by installer, covering the work of this Specification Section, including all components of roofing system such as roofing, base flashing, roof insulation, fasteners, cover boards, substrate boards, and walkway products, for the following warranty period:
1. Warranty Period: 2 years from date of Substantial Completion.

PART 2 PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A General Performance: Installed roofing and base flashings shall withstand specified uplift pressures, thermally induced movement, and exposure to weather without failure due to defective manufacture, fabrication, installation, or other defects in construction. Roofing and base flashings shall remain watertight.
1. Accelerated Weathering: Roof to withstand 2000 hours of exposure when tested according to ASTM G 152, ASTM G 154, or ASTM G 155.
 2. Impact Resistance: Roof membrane to resist impact damage when tested according to ASTM D 3746, ASTM D 4272, or the "Resistance to Foot Traffic Test" in FM Approvals 4470.
- B Material Compatibility: Roofing materials shall be compatible with one another and adjacent materials under conditions of service and application required, as demonstrated by the manufacturer based on testing and field experience.
- C Wind Uplift Resistance: Design roofing system to resist the following wind uplift pressures when tested according to FM Approvals 4474, UL 580, or UL 1897:
1. Zone 1 (Roof Area Field): As indicated on the Drawings.
 2. Zone 2 (Roof Area Perimeter): As indicated on the Drawings.
 - a. Location: From roof edge to inside roof edge, as indicated on the Drawings.
 3. Zone 3 (Roof Area Corners): As indicated on the Drawings.
 - a. Location: As indicated on the Drawings in each direction from each building corner.
- D SPRI's Directory of Roof Assemblies Listing: Roof membrane, base flashings, and component materials comply with requirements in FM Approvals 4450 or FM Approvals 4470 as part of a roofing system, and are listed in SPRI's Directory of Roof Assemblies for roof assembly identical for that specified for this Project.
1. Wind Uplift Load Capacity: As indicated on the Drawings.

2.2 THERMOPLASTIC POLYOLEFIN (TPO) ROOFING SYSTEM

- A TPO Sheet: ASTM D 6878/D 6878M, internally fabric- or scrim-reinforced, TPO sheet.
1. Manufacturers:
 - a. Basis-of-Design Manufacturer: Subject to compliance with the Contract Documents, design is based on roof assembly components by the following:
 - 1) Carlisle SynTec Incorporated.
 - b. Acceptable Manufacturers: Subject to compliance with the Contract Documents provide roof assembly components manufactured by the basis-of-design manufacturer or comparable roof assembly components by one of the following.
 - 1) Elevate (Holcim).
 - 2) Johns Manville.
 2. Source Limitations: Obtain components for membrane roofing system from roof membrane manufacturer or manufacturers approved by the roof membrane manufacturer.
 3. Thickness: 60 mils, nominal.
 4. Exposed Face Color: White.

2.3 ACCESSORY ROOFING MATERIALS

- A General: Accessory materials recommended by the manufacturer for intended use and compatible with other roofing components.
 - 1. Liquid Components: Comply with VOC limits of the AHJ.
- B Sheet Flashing: Manufacturer's standard unreinforced TPO sheet flashing, at least 55 mils thick, of same color as TPO sheet.
- C Prefabricated Pipe Flashings: As recommended by the manufacturer.
- D Bonding Adhesive: Manufacturer's standard.
- E Metal Termination Bars: Manufacturer's standard, predrilled stainless-steel bars, approximately 1 by 1/8 inch thick; with anchors.
- F Fasteners: Factory-coated steel fasteners and metal or plastic plates complying with corrosion-resistance provisions in FM Approvals 4470, designed for fastening roofing components to substrate, and acceptable to roofing system manufacturer.
- G Miscellaneous Accessories: Provide pourable sealers, preformed cone and vent sheet flashings, preformed inside and outside corner sheet flashings, T-joint covers, lap sealants, termination reglets, and other accessories.
- H Other Accessories: As supplied, recommended, or required by the manufacturer and as necessary for a complete installation.

2.4 SUBSTRATE BOARD

- A Glass-Mat Gypsum Roof Substrate Board: ASTM C 1177/C 1177M, water-resistant gypsum board.
 - 1. Thickness: As indicated on the Drawings.
 - 2. Surface Finish: Factory primed.
- B Fasteners: Factory-coated steel fasteners and metal or plastic plates complying with corrosion-resistance provisions in FM Approvals 4470, designed for fastening substrate board to roof deck.

2.5 ROOF INSULATION

- A General: Preformed roof insulation boards manufactured or approved by TPO roof membrane manufacturer, approved for use in SPRI's Directory of Roof Assemblies listed roof assemblies.
- B Polyisocyanurate Board Insulation: ASTM C 1289, Type II, Class 2, Grade 2, felt or glass-fiber mat facer on both major surfaces.
 - 1. Compressive Strength: At least 20 psi.
 - 2. Size: 48 inches by 48 inches.
 - 3. Base and Upper Layer Thickness: As indicated on the Drawings and to achieve required R-value of roof assembly.
- C Tapered Insulation: Provide factory-tapered insulation boards of material matching the roof insulation, fabricated to slope of 1/4 inch per 12 inches, unless otherwise indicated.
 - 1. Provide preformed saddles, crickets, tapered edge strips, and other insulation shapes where indicated for sloping to drain. Fabricate to at least 1/2-inch per foot.

2.6 INSULATION ACCESSORIES AND COVER BOARD

- A General: Roof insulation accessories recommended by insulation manufacturer for intended use and compatibility with other roofing system components.
- B Fasteners: Factory-coated steel fasteners with metal or plastic plates complying with corrosion-resistance provisions in FM Approvals 4470, designed for fastening roof insulation and cover boards to substrate, and acceptable to the manufacturer.
- C Insulation Adhesive: Insulation manufacturer's recommended adhesive formulated to attach roof insulation to substrate or to another insulation layer.
- D Glass-Mat Gypsum Cover Board: ASTM C 1177/C 1177M, water-resistant gypsum board.
 - 1. Thicknesses: Provide the following unless otherwise indicated or recommended or required by the manufacturer.
 - a. Roof: 1/2 inch thick.

2.7 WALKWAYS

- A Flexible Walkways: Factory-formed, nonporous, heavy-duty, slip-resisting, surface-textured walkway pads or rolls, approximately 3/16 inch thick and acceptable to the manufacturer.
 - 1. Size: Approximately 36 by 60 inches.
 - 2. Color: Contrasting with roof membrane.

PART 3 EXECUTION

3.1 EXAMINATION

- A Examine substrates, areas, and conditions, with installer present, for compliance with requirements and other conditions affecting performance of the work.
 - 1. Verify that roof openings and penetrations are in place, curbs are set and braced, and roof-drain bodies are securely clamped in place.
 - 2. Verify that wood blocking, curbs, and nailers are securely anchored to roof deck at penetrations and terminations and that nailers match thicknesses of insulation.
 - 3. Verify that surface plane flatness and fastening of roof deck complies with requirements in Section 05 31 00 Steel Decking.
- B Do not proceed with installation until unsatisfactory conditions have been corrected.
 - 1. Installation of TPO roofing indicates acceptance of surfaces and conditions.

3.2 PREPARATION

- A Clean substrate of dust, debris, moisture, and other substances detrimental to roofing installation according to roofing system manufacturer's written instructions. Remove sharp projections.
- B Prevent materials from entering and clogging roof drains and conductors and from spilling or migrating onto surfaces of other construction. Remove roof-drain plugs when no work is taking place or when rain is forecast.

3.3 INSTALLATION OF ROOFING, GENERAL

- A Install roofing system according to the manufacturer's written instructions.
- B Complete terminations and base flashings and provide temporary seals to prevent water from entering completed sections of roofing system at the end of the workday or when rain is forecast. Remove and discard temporary seals before beginning work on adjoining roofing.

3.4 INSTALLATION OF INSULATION

- A Coordinate installing roofing system components so insulation is not exposed to precipitation or left exposed at the end of the workday.
- B Comply with roofing system and insulation manufacturer's written instructions for installing roof insulation.
- C Installation Over Metal Decking:
 - 1. Install base layer of insulation with joints staggered not less than 24 inches in adjacent rows.
 - a. Trim insulation neatly to fit around penetrations and projections, and to fit tight to intersecting sloping roof decks.
 - b. Make joints between adjacent insulation boards not more than 1/4 inch in width.
 - c. At internal roof drains, slope insulation to create a square drain sump with each side equal to the diameter of the drain bowl plus 24 inches
 - 1) Trim insulation so that water flow is unrestricted.
 - d. Fill gaps exceeding 1/4 inch with insulation.
 - e. Cut and fit insulation within 1/4 inch of nailers, projections, and penetrations.
 - f. If required, mechanically attach base layer of insulation and substrate board using mechanical fasteners specifically designed and sized for fastening specified board-type roof insulation to metal decks.
 - 1) Fasten insulation according to requirements in SPRI's Directory of Roof Assemblies for specified Wind Uplift Load Capacity.

- 2) Fasten insulation to resist specified uplift pressure at corners, perimeter, and field of roof.
2. Install upper layers of insulation and tapered insulation with joints of each layer offset not less than 12 inches from previous layer of insulation.
 - a. Staggered end joints within each layer not less than 24 inches in adjacent rows.
 - b. Trim insulation neatly to fit around penetrations and projections, and to fit tight to intersecting sloping roof decks.
 - c. Make joints between adjacent insulation boards not more than 1/4 inch in width.
 - d. At internal roof drains, slope insulation to create a square drain sump with each side equal to the diameter of the drain bowl plus 24 inches.
 - 1) Trim insulation so that water flow is unrestricted.
 - e. Fill gaps exceeding 1/4 inch with insulation.
 - f. Cut and fit insulation within 1/4 inch of nailers, projections, and penetrations.
 - g. Adhere each layer of insulation to substrate using adhesive according to SPRI's Directory of Roof Assemblies listed roof assembly requirements for specified Wind Uplift Load Capacity and FM Global Property Loss Prevention Data Sheet 1-29.
- D Installation Over Concrete Decks:
 1. Install base layer of insulation with joints staggered not less than 24 inches in adjacent rows.
 - a. Trim insulation neatly to fit around penetrations and projections, and to fit tight to intersecting sloping roof decks.
 - b. Make joints between adjacent insulation boards not more than 1/4 inch in width.
 - c. At internal roof drains, slope insulation to create a square drain sump with each side equal to the diameter of the drain bowl plus 24 inches.
 - 1) Trim insulation so that water flow is unrestricted.
 - d. Fill gaps exceeding 1/4 inch with insulation.
 - e. Cut and fit insulation within 1/4 inch of nailers, projections, and penetrations.
 - f. Adhere base layer of insulation to concrete roof deck using adhesive according to SPRI's Directory of Roof Assemblies listed roof assembly requirements for specified Wind Uplift Load Capacity] and FM Global Property Loss Prevention Data Sheet 1-29.
 2. Install upper layers of insulation and tapered insulation if indicated with joints of each layer offset not less than 12 inches from previous layer of insulation.
 - a. Staggered end joints within each layer not less than 24 inches in adjacent rows.
 - b. Trim insulation neatly to fit around penetrations and projections, and to fit tight to intersecting sloping roof decks.
 - c. Make joints between adjacent insulation boards not more than 1/4 inch in width.
 - d. At internal roof drains, slope insulation to create a square drain sump with each side equal to the diameter of the drain bowl plus 24 inches.
 - 1) Trim insulation so that water flow is unrestricted.
 - e. Fill gaps exceeding 1/4 inch with insulation.
 - f. Cut and fit insulation within 1/4 inch of nailers, projections, and penetrations.
 - g. Adhere base layer of insulation to concrete roof deck using adhesive according to SPRI's Directory of Roof Assemblies listed roof assembly requirements for specified Wind Uplift Load Capacity] and FM Global Property Loss Prevention Data Sheet 1-29.

3.5 INSTALLATION OF COVER BOARDS

- A Install cover boards over insulation with long joints in continuous straight lines with end joints staggered between rows. Offset joints of insulation below at least 6 inches in each direction.
 1. Trim cover board neatly to fit around penetrations and projections, and to fit tight to intersecting sloping roof decks.
 2. At internal roof drains, conform to slope of drain sump.
 - a. Trim cover board so that water flow is unrestricted.
 3. Cut and fit cover board tight to nailers, projections, and penetrations.

4. Adhere cover board to substrate using adhesive according to SPRI's Directory of Roof Assemblies listed roof assembly requirements for specified Wind Uplift Load Capacity and FM Global Property Loss Prevention Data Sheet 1-29.

3.6 INSTALLATION OF ADHERED ROOF MEMBRANE

- A Adhere membrane roofing over area to receive roofing and install according to manufacturer's written instructions.
- B Unroll roof membrane and allow to relax before installing.
- C Start installation of membrane roofing in presence of manufacturer's technical personnel.
- D Accurately align membrane roofing and maintain uniform side and end laps of minimum dimensions required by manufacturer. Stagger end laps.
- E Bonding Adhesive: Apply to substrate and underside of membrane roofing at rate required by manufacturer and allow to partially dry before installing membrane roofing. Do not apply to splice area of membrane roofing.
- F In addition to adhering, mechanically fasten membrane roofing securely at terminations, penetrations, and perimeter of roofing.
- G Apply membrane roofing with side laps shingled with slope of roof deck where possible.
- H Seams: Clean seam areas, overlap membrane roofing, and hot-air weld side and end laps of membrane roofing and sheet flashings according to manufacturer's written instructions to ensure a watertight seam installation.
 1. Test lap edges with probe to verify seam weld continuity. Apply lap sealant to seal cut edges of sheet membrane.
 2. Verify field strength of seams at least twice daily and repair seam sample areas.
 3. Repair tears, voids, and lapped seams in roofing that does not comply with requirements.
- I Spread sealant bed over deck drain flange at roof drains and securely seal membrane roofing in place with clamping ring.

3.7 INSTALLATION OF BASE FLASHING

- A Install sheet flashings and preformed flashing accessories, and adhere to substrates according to roofing system manufacturer's written instructions.
- B Apply bonding adhesive to substrate and underside of sheet flashing at required rate, and allow to partially dry. Do not apply to seam area of flashing.
- C Flash penetrations and field-formed inside and outside corners with cured or uncured sheet flashing.
- D Clean seam areas, overlap, and firmly roll sheet flashings into the adhesive. Hot-air weld side and end laps to ensure a watertight seam installation.
- E Terminate and seal top of sheet flashings and mechanically anchor to substrate through termination bars.

3.8 INSTALLATION OF WALKWAYS

- A Flexible Walkways: Install walkway products in locations indicated. Heat weld to substrate or adhere walkway products to substrate with compatible adhesive according to roofing system manufacturer's written instructions.

3.9 FIELD QUALITY CONTROL

- A Final Roof Inspection: Arrange for roofing system manufacturer's technical personnel to inspect roofing installation on completion, in presence of the Architect and Owner, and to prepare inspection report.
 1. Notify Architect and Owner 48 hours in advance of the date and time of inspection.
- B Repair or remove and replace components of roofing system where inspections indicate that they do not comply with specified requirements.
- C Additional testing and inspecting, at Contractor's expense, will be performed to determine if replaced or additional work complies with specified requirements.

3.10 PROTECTING AND CLEANING

- A Protect roofing system from damage and wear during remainder of construction period. When remaining construction does not affect or endanger roofing, inspect roofing for deterioration and damage, describing its nature and extent in a written report, with copies to Architect and Owner.
- B Correct deficiencies in or remove roofing system that does not comply with requirements, repair substrates, and repair or reinstall roofing system to a condition free of damage and deterioration at time of Final Acceptance and according to warranty requirements.
- C Clean overspray and spillage from adjacent construction using cleaning agents and procedures recommended by manufacturer of affected construction.

END OF SECTION 07 54 23

SECTION 07 62 00 - SHEET METAL FLASHING AND TRIM

PART 1 GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A Section includes the following sheet metal flashing and trim:
 - 1. Formed wall flashing and trim.
 - 2. Miscellaneous sheet metal fabrications.
 - 3. Supplementary components and accessories normally furnished or otherwise necessary for a complete installation.

1.3 REFERENCES

- A Acronyms and Abbreviations:
 - 1. AAMA: American Architectural Manufacturers Association (now FGIA).
 - 2. NAAMM: National Association of Architectural Metal Manufacturers.
 - 3. NRCA: National Roofing Contractors Association.
 - 4. SMACNA: Sheet Metal and Air Conditioning Contractors' National Association.
 - 5. SPRI: Single Ply Roofing Industry.

1.4 COORDINATION

- A Coordinate sheet metal flashing and trim layout and seams with sizes and locations of penetrations to be flashed, and joints and seams in adjacent materials.
- B Coordinate sheet metal flashing and trim installation with adjoining roofing and wall materials, joints, and seams to provide leakproof, secure, and noncorrosive installation.

1.5 SUBMITTALS

- A Action Submittals:
 - 1. Product Data: For each type of product indicated. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes.
 - 2. Shop Drawings: Show layouts of sheet metal flashing and trim.
 - a. Include plans, elevations, sections, and attachment details.
 - b. Detail fabrication and installation layouts, expansion-joint locations, and keyed details. Distinguish between shop- and field-assembled work.
 - c. Include identification of material, thickness, weight, and finish for each item and location in Project.
 - d. Include details for forming, including profiles, shapes, seams, and dimensions.
 - e. Include details for joining, supporting, and securing, including layout and spacing of fasteners, cleats, clips, and other attachments. Include pattern of seams.
 - f. Include details of termination points and assemblies.
 - g. Include details of roof-penetration flashing.
 - h. Include details of edge conditions, including counterflashings as applicable.
 - i. Include details of special conditions.
 - j. Include details of connections to adjoining work.
 - k. Detail formed flashing and trim at scale of not less than 1-1/2 inches per 12 inches.

1.6 DELIVERY, STORAGE, AND HANDLING

- A Do not store sheet metal flashing and trim materials in contact with other materials that might cause staining, denting, or other surface damage.
 - 1. Store sheet metal flashing and trim materials away from uncured concrete and masonry.
 - 2. Protect stored sheet metal flashing and trim from contact with water.

- B Protect strippable protective covering on sheet metal flashing and trim from exposure to sunlight and high humidity, except to extent necessary for period of sheet metal flashing and trim installation.

PART 2 PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A General: Sheet metal flashing and trim assemblies including cleats, anchors, and fasteners, shall withstand wind loads, structural movement, thermally induced movement, and exposure to weather without failure due to defective manufacture, fabrication, installation, or other defects in construction. Completed sheet metal flashing and trim shall not rattle, leak, or loosen, and shall remain watertight.
- B Sheet Metal Standard for Flashing and Trim: Comply with the NRCA publication *The NRCA Roofing Manual: Architectural Metal Flashing, Condensation and Air Leakage Control, and Reroofing* and the SMACNA publication *Architectural Sheet Metal Manual* requirements for dimensions and profiles shown unless more stringent requirements are indicated.
- C Thermal Movements: Allow for thermal movements from ambient and surface temperature changes to prevent buckling, opening of joints, overstressing of components, failure of joint sealants, failure of connections, and other detrimental effects. Base calculations on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.
 - 1. Temperature Change: 120 deg F, ambient; 180 deg F, material surfaces.
- D Water Infiltration: Provide sheet metal flashing and trim that do not allow water infiltration to building interior.

2.2 SHEET METALS

- A Stainless-Steel Sheet: ASTM A240 or ASTM A666, Type 304, 0.016 inch thick dead soft, fully annealed.
- B Aluminum Sheet: ASTM B 209, alloy as standard with manufacturer for finish required, with temper as required to suit forming operations and performance required; with smooth, flat surface.
 - 1. As-Milled Finish: For concealed flashing.

2.3 UNDERLAYMENT MATERIALS

- A Self-Adhering, High-Temperature Sheet Underlayment: At least 30 mils thick, consisting of a slip-resistant polyethylene- or polypropylene-film top surface laminated to a layer of butyl- or SBS-modified asphalt adhesive, with release-paper backing; specifically designed to withstand high metal temperatures beneath metal roofing. Provide primer in accordance with underlayment manufacturer's written instructions.
 - 1. Products: Subject to compliance with the Contract Documents, provide one of the following.
 - a. "Grace Ultra" manufactured by Grace Construction Products, a unit of W.R. Grace & Co.
 - b. "MetShield" manufactured by Metal-Fab Manufacturing, LLC.
 - c. "WeatherLock Metal High Temperature Underlayment" manufactured by Owens Corning.

2.4 MISCELLANEOUS MATERIALS

- A General: Provide materials and types of fasteners, solder, welding rods, protective coatings, separators, sealants, and other miscellaneous items as required for complete sheet metal flashing and trim installation and as recommended by manufacturer of primary sheet metal or manufactured item unless otherwise indicated.
- B Fasteners: Wood screws, annular threaded nails, self-tapping screws, self-locking rivets and bolts, and other suitable fasteners designed to withstand design loads and recommended by manufacturer of primary sheet metal or manufactured item.
 - 1. General: Blind fasteners or self-drilling screws, gasketed, with hex-washer head.

- a. Exposed Fasteners: Heads matching color of sheet metal by means of plastic caps or factory-applied coating. Provide metal-backed EPDM or PVC sealing washers under heads of exposed fasteners bearing on weather side of metal.
 - b. Blind Fasteners: High-strength aluminum or stainless-steel rivets suitable for metal being fastened.
- 2. Fasteners for Aluminum Sheet: Aluminum or Series 300 stainless steel.
- C Sealant Tape: Pressure-sensitive, 100 percent solids, polyisobutylene compound sealing tape with release-paper backing. Provide permanently elastic, nonsag, nontoxic, nonstaining tape.
- D Elastomeric Sealant: ASTM C 920, elastomeric silicone polymer sealant; of type, grade, class, and use classifications required to seal joints in sheet metal flashing and trim and remain watertight.
- E Epoxy Seam Sealer: 2-part, noncorrosive, aluminum seam-cementing compound, recommended by aluminum manufacturer for exterior nonmoving joints, including riveted joints.
- F Bituminous Coating: ASTM D 1187/D 1187M cold-applied asphalt emulsion.

2.5 FABRICATION, GENERAL

- A General: Custom fabricate sheet metal flashing and trim to comply with details indicated and recommendations in cited sheet metal standard that apply to design, dimensions, geometry, metal thickness, and other characteristics of item required.
 - 1. Fabricate sheet metal flashing and trim in shop to greatest extent possible.
 - 2. Fabricate sheet metal flashing and trim in thickness or weight needed to comply with performance requirements, but not less than that specified for each application and metal.
 - 3. Verify shapes and dimensions of surfaces to be covered and obtain field measurements for accurate fit before shop fabrication.
 - 4. Form sheet metal flashing and trim to fit substrates without excessive oil canning, buckling, and tool marks; true to line, levels, and slopes; and with exposed edges folded back to form hems.
 - 5. Conceal fasteners and expansion provisions where possible. Do not use exposed fasteners on faces exposed to view.
- B Fabrication Tolerances: Fabricate sheet metal flashing and trim that is capable of installation to a tolerance of 1/4 inch in 20 feet on slope and location lines indicated on Drawings and within 1/8-inch offset of adjoining faces and of alignment of matching profiles.
- C Sealant Joints: Where movable, nonexpansion-type joints are required, form metal in accordance with cited sheet metal standard to provide for proper installation of elastomeric sealant.
- D Expansion Provisions: Form metal for thermal expansion of exposed flashing and trim.
 - 1. Where lapped or bayonet-type expansion provisions in the work cannot be used, form expansion joints of intermeshing hooked flanges, not less than 1 inch deep, filled with elastomeric sealant concealed within joints.
- E Fabricate cleats and attachment devices of sizes as recommended by cited sheet metal standard for application, but not less than thickness of metal being secured.
- F Seams for Aluminum: Fabricate nonmoving seams with flat-lock seams. Form seams and seal with elastomeric sealant unless otherwise recommended by sealant manufacturer for intended use. Rivet joints where necessary for strength.
- G Do not use graphite pencils to mark metal surfaces.

PART 3 EXECUTION

3.1 EXAMINATION

- A Examine substrates, areas, and conditions, with Installer present, to verify actual locations, dimensions and other conditions affecting performance of work.
 - 1. Verify compliance with requirements for installation tolerances of substrates.
 - 2. Verify that substrate is sound, dry, smooth, clean, sloped for drainage, and securely anchored.
- B Do not proceed with installation until unsatisfactory conditions have been corrected.

1. Installation of sheet metal flashing and trim indicates acceptance of surfaces and conditions.

3.2 INSTALLATION OF UNDERLAYMENT

A Self-Adhering, High-Temperature Sheet Underlayment:

1. Install self-adhering, high-temperature sheet underlayment; wrinkle free.
2. Prime substrate if recommended by underlayment manufacturer.
3. Comply with temperature restrictions of underlayment manufacturer for installation; use primer for installing underlayment at low temperatures.
4. Apply in shingle fashion to shed water, with end laps of not less than 6 inches staggered 24 inches between courses.
5. Overlap side edges not less than 3-1/2 inches. Roll laps and edges with roller.
6. Roll laps and edges with roller.
7. Cover underlayment within 14 days.

3.3 INSTALLATION, GENERAL

A Install sheet metal flashing and trim to comply with details indicated and recommendations of cited sheet metal standard that apply to installation characteristics required unless otherwise indicated on Drawings.

1. Install fasteners, solder, protective coatings, separators, sealants, and other miscellaneous items as required to complete sheet metal flashing and trim system.
2. Install sheet metal flashing and trim true to line, levels, and slopes. Provide uniform, neat seams with minimum exposure of solder and sealant.
3. Anchor sheet metal flashing and trim and other components of the Work securely in place, with provisions for thermal and structural movement.
4. Install sheet metal flashing and trim to fit substrates and to result in watertight performance.
5. Install continuous cleats with fasteners spaced not more than 12 inches o.c.
6. Space individual cleats not more than 12 inches apart. Attach each cleat with at least two fasteners. Bend tabs over fasteners.
7. Install exposed sheet metal flashing and trim with limited oil-canning, and free of buckling and tool marks.
8. Do not field cut sheet metal flashing and trim by torch.
9. Do not use graphite pencils to mark metal surfaces.

B Metal Protection: Where dissimilar metals contact each other, or where metal contacts pressure-treated wood or corrosive substrates, protect against galvanic action or corrosion by painting contact surfaces with bituminous coating or by other permanent separation as recommended by fabricator or manufacturers of dissimilar metals.

1. Coat side of uncoated aluminum sheet and stainless steel metal flashing and trim with bituminous coating where flashing and trim will contact wood, ferrous metal, or cementitious construction.
2. Underlayment: Where installing metal flashing directly on cementitious or wood substrates, install underlayment and cover with a slip sheet.
3. Bed flanges in thick coat of asphalt roofing cement where required for waterproof performance.

C Install sheet metal flashing and trim to fit substrates and to result in watertight performance. Verify shapes and dimensions of surfaces to be covered before fabricating sheet metal.

D Expansion Provisions: Provide for thermal expansion of exposed flashing and trim. Space movement joints at a maximum of 10 feet with no joints allowed within 24 inches of corner or intersection. Where lapped or bayonet-type expansion provisions cannot be used or would not be sufficiently watertight, form expansion joints of intermeshing hooked flanges, not less than 1 inch deep, filled with elastomeric sealant concealed within joints.

E Fasteners: Use fasteners of sizes that will penetrate substrate not less than recommended by fastener manufacturer to achieve maximum pull-out resistance.

1. Aluminum: Use aluminum or stainless-steel fasteners.

- F Conceal fasteners and expansion provisions where possible in exposed work and locate to minimize possibility of leakage. Cover and seal fasteners and anchors as required for a tight installation.
- G Seal joints with elastomeric sealant as required for watertight construction.
 - 1. Where sealant-filled joints are used, embed hooked flanges of joint members not less than 1 inch into sealant. Form joints to completely conceal sealant. When ambient temperature at time of installation is moderate, between 40 and 70 deg F, set joint members for 50 percent movement either way. Adjust setting proportionately for installation at higher ambient temperatures. Do not install sealant-type joints at temperatures below 40 deg F.
 - 2. Prepare joints and apply sealants to comply with requirements in Section 07 92 00 Joint Sealants.
- H Uncoated Aluminum Flashing: Rivet joints in uncoated aluminum where necessary for strength.

3.4 INSTALLATION OF ROOF FLASHINGS

- A Install sheet metal flashing and trim to comply with performance requirements, sheet metal manufacturer's written installation instructions, and cited sheet metal standard.
 - 1. Provide concealed fasteners where possible, and set units true to line, levels, and slopes.
 - 2. Install work with laps, joints, and seams that are permanently watertight and weather resistant.

3.5 INSTALLATION OF WALL FLASHINGS

- A Install sheet metal wall flashing to intercept and exclude penetrating moisture in accordance with cited sheet metal standard unless otherwise indicated. Coordinate installation of wall flashing with installation of wall-opening components such as windows, doors, and louvers.
- B Opening Flashings in Frame Construction: Install continuous head, sill, jamb, and similar flashings to extend 4 inches beyond wall openings.

3.6 ERECTION TOLERANCES

- A Installation Tolerances: Shim and align sheet metal flashing and trim within installed tolerance of 1/4 inch in 20 feet on slope and location lines indicated on Drawings and within 1/8-inch offset of adjoining faces and of alignment of matching profiles.

3.7 CLEANING

- A Clean exposed metal surfaces of substances that interfere with uniform oxidation and weathering.
- B Clean off excess sealants.

3.8 PROTECTION

- A On completion of sheet metal flashing and trim installation, remove unused materials and clean finished surfaces as recommended in writing by sheet metal flashing and trim manufacturer.
- B Maintain sheet metal flashing and trim in clean condition during construction.
- C Replace sheet metal flashing and trim that have been damaged or that have deteriorated beyond successful repair by finish touchup or similar minor repair procedures, as determined by Architect.

END OF SECTION 07 62 00

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SECTION 07 71 00 - ROOF SPECIALTIES

PART 1 GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A Section Includes:
 - 1. Copings.
 - 2. Roof-edge drainage systems.
 - 3. Supplementary components and accessories normally furnished or otherwise necessary for a complete installation.

1.3 REFERENCES

- A Acronyms and Abbreviations:
 - 1. NAAMM: National Association of Architectural Metal Manufacturers.
 - 2. SPRI: Single Ply Roofing Institute.
- B Definitions:
 - 1. Manufacturer: Means the applicable roofing specialty manufacturer unless otherwise indicated.

1.4 SUBMITTALS

- A Action Submittals:
 - 1. Product Data Submittals: For each product; include Health Product Declaration and Environmental Product Declaration.
 - a. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes.
 - 2. Shop Drawings: For roof specialties.
 - a. Include plans, elevations, expansion-joint locations, keyed details, and attachments to other work. Distinguish between plant- and field-assembled work.
 - b. Include details for expansion and contraction; locations of expansion joints, including direction of expansion and contraction.
 - c. Indicate profile and pattern of seams and layout of fasteners, cleats, clips, and other attachments.
 - d. Detail termination points and assemblies, including fixed points.
 - e. Include details of special conditions.
- B Informational Submittals:
 - 1. Qualification Data: For manufacturer.
 - 2. Product Certificates: For each type of roof specialty.
 - 3. Product Test Reports: For products, for tests performed by a qualified testing agency.
- C Closeout Submittals:
 - 1. Maintenance Data: For roofing specialties to include in maintenance manuals.

1.5 QUALITY ASSURANCE

- A Manufacturer Qualifications: A qualified manufacturer offering products meeting requirements that are FM Approvals listed for specified class and SPRI ES-1 tested to specified design pressure.

1.6 DELIVERY, STORAGE, AND HANDLING

- A Do not store roof specialties in contact with other materials that might cause staining, denting, or other surface damage. Store roof specialties away from uncured concrete and masonry.

- B Protect strippable protective covering on roof specialties from exposure to sunlight and high humidity, except to extent necessary for the period of roof-specialty installation.

1.7 FIELD CONDITIONS

- A Field Measurements: Verify profiles and tolerances of roof-specialty substrates by field measurements before fabrication, and indicate measurements on Shop Drawings.
- B Coordination: Coordinate roof specialties with flashing, trim, and construction of parapets, roof deck, roof and wall panels, and other adjoining work to provide a leakproof, secure, and noncorrosive installation.

PART 2 PRODUCTS

2.1 SOURCE LIMITATIONS

- A Source Limitations: Obtain each type of roof specialty from a single source from the same manufacturer.

2.2 PERFORMANCE REQUIREMENTS

- A General Performance: Roof specialties to withstand exposure to weather and resist thermally induced movement without failure, rattling, leaking, or fastener disengagement due to defective manufacture, fabrication, installation, or other defects in construction.
- B SPRI Wind Design Standard: Manufacture and install copings tested in accordance with SPRI ES-1 and capable of resisting the following design pressures:
 - 1. Design Pressure: As indicated on Drawings.
- C Thermal Movements: Allow for thermal movements from ambient and surface temperature changes to prevent buckling, opening of joints, hole elongation, overstressing of components, failure of joint sealants, failure of connections, and other detrimental effects. Provide clips that resist rotation and avoid shear stress as a result of thermal movements. Base calculations on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.
 - 1. Temperature Change (Range): 120 deg F, ambient; 180 deg F, material surfaces.

2.3 COPINGS

- A Manufacturers: Subject to compliance with the Contract Documents, provide product selected by the Architect from one of the following.
 - 1. ATAS International, Inc.
 - 2. Carlisle SynTec Systems.
 - 3. Metal-Era LLC.
- B Metal Copings: Manufactured coping system consisting of metal coping cap in section lengths not exceeding 12 feet, concealed anchorage; with corner units, end cap units, and concealed splice plates with finish matching coping caps.
 - 1. Formed Aluminum Sheet Coping Caps: Aluminum sheet, 0.050 inch thick.
 - a. Surface: Smooth, flat finish.
- C Aluminum Sheet: ASTM B 209, alloy as standard with manufacturer for finish required, with temper to suit forming operations and performance required.

2.4 ROOF-EDGE DRAINAGE SYSTEMS

- A Manufacturers: Subject to compliance with the Contract Documents, provide product selected by the Architect from one of the following.
 - 1. ATAS International, Inc.
 - 2. Carlisle SynTec Systems.
 - 3. Metal-Era LLC.
- B Downspouts and Gutters:
 - 1. Formed Aluminum Sheet: At least 0.032 inch thick unless otherwise indicated; verify with Architect.
 - 2. Dimensions and Profiles: As indicated on the Drawings.

- C Aluminum Sheet: ASTM B 209, alloy as standard with manufacturer for finish required, with temper to suit forming operations and performance required.

2.5 UNDERLAYMENT MATERIALS

- A Self-Adhering, High-Temperature Sheet: At least 30 to 40 mils thick, consisting of slip-resisting polyethylene-film top surface laminated to layer of butyl or SBS-modified asphalt adhesive, with release-paper backing; cold applied. Provide primer when recommended by underlayment manufacturer.
1. Thermal Stability: ASTM D 1970/D 1970M; stable after testing at 240 deg F.
 2. Low-Temperature Flexibility: ASTM D 1970/D 1970M; passes after testing at minus 20 deg F.

2.6 MISCELLANEOUS MATERIALS

- A Fasteners: Manufacturer's recommended fasteners, suitable for application and designed to meet performance requirements. Furnish the following unless otherwise indicated:
1. Exposed Penetrating Fasteners: Gasketed screws with hex washer heads matching color of sheet metal.
 2. Fasteners for Aluminum: Aluminum or Series 300 stainless steel.
- B Expansion Assemblies: As standard with the manufacturer.
- C Elastomeric Sealant: ASTM C 920, elastomeric polymer sealant of type, grade, class, and use classifications required by the manufacturer for each application.
- D Butyl Sealant: ASTM C 1311, single-component, solvent-release butyl rubber sealant; polyisobutylene plasticized; heavy bodied for hooked-type joints with limited movement.
- E Bituminous Coating: Cold-applied asphalt emulsion complying with ASTM D 1187/D 1187M.
- F Asphalt Roofing Cement: ASTM D 4586, asbestos free, of consistency required for application.
- G Accessories: As supplied, recommended, or required by the manufacturer and as necessary for a complete installation.

2.7 FINISHES

- A Comply with the NAAMM publication Metal Finishes Manual for Architectural and Metal Products for recommendations for applying and designating finishes.
- B Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.
- C Coil-Coated Aluminum Sheet Finishes:
- D High-Performance Organic Finish: Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions. Provide one of the following as standard with manufacturer and meeting finish warranty.
1. AAMA 2605. Fluoropolymer finish containing not less than 70 percent polyvinylidene fluoride (PVDF) resin by weight. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.
 2. Color: As selected by the Architect from manufacturer's full range of available colors.
- E Concealed Surface Finish: Apply pretreatment and manufacturer's standard acrylic or polyester backer finish consisting of prime coat and wash coat with a total dry film thickness of at least 0.5 mil.

PART 3 EXECUTION

3.1 EXAMINATION

- A Examine substrates, areas, and conditions, with installer present, to verify actual locations, dimensions, and other conditions affecting performance of the work.
- B Examine walls, roof edges, and parapets for suitable conditions for roof specialties.
- C Verify that substrate is sound, dry, smooth, clean, sloped for drainage where applicable, and securely anchored.
- D Do not proceed with installation until unsatisfactory conditions have been corrected.

1. Installation of roof specialties indicates acceptance of surfaces and conditions.

3.2 INSTALLATION OF UNDERLAYMENT

- A Self-Adhering Sheet Underlayment: Apply primer if required by manufacturer. Comply with temperature restrictions of underlayment manufacturer for installation. Apply wrinkle free, in shingle fashion to shed water, and with end laps of not less than 6 inches staggered 24 inches between courses. Overlap side edges not less than 3-1/2 inches. Roll laps with roller. Cover underlayment within 14 days.
1. Apply continuously under copings.
 2. Coordinate application of self-adhering sheet underlayment under roof specialties with requirements for continuity with adjacent air barrier materials.

3.3 INSTALLATION, GENERAL

- A Install roof specialties in accordance with manufacturer's written instructions. Anchor roof specialties securely in place, with provisions for thermal and structural movement. Use fasteners, solder, protective coatings, separators, underlayments, sealants, and other miscellaneous items as required to complete roof-specialty systems.
1. Install roof specialties level, plumb, true to line and elevation; with limited oil-canning and without warping, jogs in alignment, buckling, or tool marks.
 2. Provide uniform, neat seams with minimum exposure of solder and sealant.
 3. Install roof specialties to fit substrates and to result in weathertight performance. Verify shapes and dimensions of surfaces to be covered before manufacture.
 4. Torch cutting of roof specialties is not permitted.
- B Metal Protection: Protect metals against galvanic action by separating dissimilar metals from contact with each other or with corrosive substrates by painting contact surfaces with bituminous coating or by other permanent separation as recommended by manufacturer.
1. Coat concealed side of roof specialties with bituminous coating where in contact with wood, ferrous metal, or cementitious construction.
 2. Bed flanges in thick coat of asphalt roofing cement where required by manufacturers of roof specialties for waterproof performance.
- C Expansion Provisions: Allow for thermal expansion of exposed roof specialties.
1. Space movement joints at no more than 12 feet with no joints within 18 inches of corners or intersections unless otherwise indicated on Drawings.
 2. When ambient temperature at time of installation is between 40 and 70 deg F, set joint members for 50 percent movement each way. Adjust setting proportionately for installation at higher ambient temperatures.
- D Fastener Sizes: Use fasteners of sizes that penetrate substrate not less than recommended by fastener manufacturer to achieve maximum pull-out resistance.
- E Seal concealed joints with butyl sealant as required by the manufacturer.
- F Seal joints as required for weathertight construction. Place sealant to be completely concealed in joint. Do not install sealants at temperatures below 40 deg F.

3.4 INSTALLATION OF COPINGS

- A Install cleats, anchor plates, and other anchoring and attachment accessories and devices with concealed fasteners.
- B Anchor copings with manufacturer's required devices, fasteners, and fastener spacing to meet performance requirements.
1. Interlock face and back leg drip edges of snap-on coping cap into cleated anchor plates anchored to substrate at manufacturer's required spacing that meets performance requirements.

3.5 INSTALLATION OF ROOF-EDGE DRAINAGE SYSTEMS

- A Install components to produce a complete roof-edge drainage system in accordance with manufacturer's written instructions. Coordinate installation of roof perimeter flashing with installation of roof-edge drainage system.

3.6 CLEANING AND PROTECTION

- A Remove temporary protective coverings and strippable films as roof specialties are installed. On completion of installation, clean finished surfaces, including removing unused fasteners, metal filings, pop rivet stems, and pieces of flashing. Maintain roof specialties in a clean condition during construction.
- B Replace roof specialties that have been damaged or that cannot be successfully repaired by finish touchup or similar minor repair procedures.

END OF SECTION 07 71 00

January 15, 2026

University of North Carolina at Wilmington
Housing Village Phase 3
Complete Package - Construction Documents

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SCO 24-29053-02D

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SECTION 07 84 13 - PENETRATION FIRESTOPPING

PART 1 GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A Section Includes:
 - 1. Penetration firestopping systems
 - 2. Supplementary components and accessories normally furnished or otherwise necessary for a complete installation.

1.3 REFERENCES

- A Abbreviations and Acronyms:
 - 1. AHJ: Authority (Authorities) Having Jurisdiction.
 - 2. SCAQMD: South Coast Air Quality Management District.
 - 3. VOC: Volatile Organic Compounds.
- B Definitions:
 - 1. Manufacturer: Means the penetration firestopping system materials manufacturer unless otherwise indicated.
 - 2. F-Ratings: F-ratings indicate that the firestopping systems withstood the fire test for the rating period without any of the following taking place: flames passing through openings, flaming of any element on the unexposed side of the firestopping system, and any openings developing that permit projection of water from the hose stream beyond the unexposed side.
 - 3. L-Ratings: L-ratings indicate the amount of air leakage through the joint firestopping system during testing and indicate how well systems resist the passage of smoke.
 - 4. T-Ratings: T-ratings signify that heat transmitted through the firestopping systems during the rating period did not raise the temperature of any thermocouple on the unexposed firestopping system surface or on any penetrating item by more than 325 degrees Fahrenheit above its initial temperature.
 - 5. W-Ratings: Indicate the ability of cured firestopping systems to resist the passage of water for nonmoving penetrations; pipes subject to water hammer or other vibration may not achieve the watertightness indicated by the rating.

1.4 SUBMITTALS

- A Action Submittals:
 - 1. Product Data: For each type of penetrating firestopping product indicated; include Health Product Declaration and Environmental Product Declaration.
 - a. Indicate VOC content for sealants, sealant primers, and caulks.
 - 2. Product Schedule: For each penetration firestopping system. Include location, illustration of firestopping system, and design designation of qualified testing and inspecting agency.
 - a. Engineering Judgments: Where Project conditions require modification to a qualified testing and inspecting agency's illustration for a particular penetration firestopping system, submit illustration, with modifications marked, approved by manufacturer's fire-protection engineer as an engineering judgment or equivalent fire-resistance-rated assembly. Obtain approval of the AHJ prior to submittal.
- B Informational Submittals:
 - 1. Qualification Data: For installer.
 - 2. Product Test Reports: For each penetration firestopping system, for tests performed by a qualified testing agency.
- C Closeout Submittals:

1. Installer Certificates: From installer indicating that penetration firestopping systems have been installed in compliance with requirements and manufacturer's written instructions.

1.5 QUALITY ASSURANCE

- A Installer Qualifications: An experienced installer who specializes in the installation of firestop products and has completed penetrating firestopping similar in material, design, and extent to that indicated for this Project and whose work has resulted in construction with a record of successful in-service performance.

1.6 DELIVERY, STORAGE, AND HANDLING

- A Deliver penetrating firestopping products to Project site in original, unopened containers or packages with intact and legible manufacturers' labels identifying product and manufacturer; date of manufacture; lot number; shelf life, if applicable; qualified testing and inspecting agency's classification marking applicable to Project; curing time; and mixing instructions for multicomponent materials.
- B Store and handle materials for penetrating firestopping to prevent their deterioration or damage due to moisture, temperature changes, contaminants, or other causes.

1.7 PROJECT CONDITIONS

- A Environmental Limitations: Do not install penetrating firestopping when ambient or substrate temperatures are outside limits permitted by penetrating firestopping manufacturers or when substrates are wet due to rain, frost, condensation, or other causes.
- B Ventilate through-penetration firestop systems per manufacturer's written instructions by natural means or, where this is inadequate, forced-air circulation.

1.8 COORDINATION

- A Coordinate construction of openings and penetrating items to ensure that penetrating firestopping are installed according to specified requirements.
- B Coordinate sizing of sleeves, openings, core-drilled holes, or cut openings to accommodate penetrating firestopping.

PART 2 PRODUCTS

2.1 SOURCE LIMITATIONS

- A Source Limitations: Obtain penetration firestopping systems for each type of opening indicated from single manufacturer.

2.2 PERFORMANCE REQUIREMENTS

- A Fire-Test-Response Characteristics:
 1. Perform penetration firestopping system tests by a qualified testing agency acceptable to the AHJ.
 2. Test per testing standards referenced in the "Penetration Firestopping Systems" Article. Provide rated systems complying with the following requirements:
 - a. Penetration firestopping systems shall bear classification marking of a qualified testing agency.
 - 1) UL in its online directory "Product iQ".
 - 2) Intertek Group in the publication Directory of Building Products.
- B Provide components for each penetration firestopping system that, upon curing, do not re-emulsify, dissolve, leach, break down, or otherwise deteriorate over time from exposure to atmospheric moisture, sweating pipes, ponding water, or other forms of moisture characteristic during and after construction.
- C Provide components for each penetration firestopping system that do not contain ethylene glycol.
- D Provide components for each penetration firestopping system that are sufficiently flexible to accommodate movement, such as pipe vibration, water hammer, thermal expansion, and other normal building movement without damage.

- E Provide components for each penetration firestopping system that are appropriately tested for the thickness and type of insulation utilized.
- F Provide components that are compatible with one another, with the substrates forming openings, and with the items, if any, penetrating firestopping, under conditions of service and application, as demonstrated by the manufacturer based on testing and field experience.

2.3 PENETRATION FIRESTOPPING SYSTEMS

- A Penetration Firestopping Systems: Systems that resist spread of fire, passage of smoke and other gases, and maintain original fire-resistance rating of construction penetrated. Penetration firestopping systems must be compatible with one another, with the substrates forming openings, and with penetrating items if any.
 - 1. Manufacturers: Subject to compliance with the Contract Documents, provide products by one of the following:
 - a. Hilti Construction Chemicals, Inc.
 - b. Specified Technologies Inc.
 - c. Tremco.
- B Accessories: Provide components for each penetration firestopping system that are needed to install fill materials and to maintain ratings required. Use only those components specified by penetration firestopping system manufacturer and approved by qualified testing and inspecting agency for conditions indicated, including:
 - 1. Permanent forming/damming/backing materials.
 - 2. Substrate primers.
 - 3. Collars.
 - 4. Steel sleeves.

2.4 FILL MATERIALS

- A General: Provide penetrating firestopping containing the types of fill materials by the UL design. Fill materials are those referred to in directories of the referenced testing and inspecting agencies as fill, void, or cavity materials.
 - 1. Allowable VOC Content: Sealants, sealant primers, and caulks must comply with SCAQMD Rule 1168 VOC limits.
 - a. Such products also shall comply with the Rule 1168 prohibition on the use of certain toxic compounds (chloroform, ethylene dichloride, methylene chloride, perchloroethylene, and trichloroethylene).
- B Cast-in-Place Firestop Devices: Factory-assembled devices for use in cast-in-place concrete floors and consisting of an outer metallic sleeve lined with an intumescent strip, a radial extended flange attached to one end of the sleeve for fastening to concrete formwork, and a neoprene gasket.
- C Latex Sealants: Single-component latex formulations that after cure do not re-emulsify during exposure to moisture.
- D Firestop Devices: Factory-assembled collars formed from galvanized steel and lined with intumescent material sized to fit specific diameter of penetrant.
- E Intumescent Composite Sheets: Rigid panels consisting of aluminum-foil-faced elastomeric sheet bonded to galvanized steel sheet.
- F Intumescent Putties: Nonhardening dielectric, water-resistant putties containing no solvents, inorganic fibers, or silicone compounds.
- G Intumescent Wrap Strips: Single-component intumescent elastomeric sheets with aluminum foil on one side.
- H Mortars: Prepackaged, dry mixes consisting of a blend of inorganic binders, hydraulic cement, fillers, and lightweight aggregate formulated for mixing with water at Project site to form a nonshrinking, homogeneous mortar.
- I Pillows/Bags: Reusable, heat-expanding pillows/bags consisting of glass-fiber cloth cases filled with a combination of mineral-fiber, water-insoluble expansion agents and fire-retardant additives.

- J Silicone Foams: Multicomponent, silicone-based liquid elastomers that, when mixed, expand and cure in place to produce a flexible, nonshrinking foam.
- K Silicone Sealants: Moisture-curing, single-component, silicone-based, neutral-curing elastomeric sealants of grade indicated below:
 - 1. Grade for Horizontal Surfaces: Pourable (self-leveling) formulation for openings in floors and other horizontal surfaces.
 - 2. Grade for Vertical Surfaces: Nonsag formulation for openings in vertical and other surfaces.

2.5 MIXING

- A Mixing: For those products requiring mixing before application, comply with penetrating firestopping manufacturer's written instructions for accurate proportioning of materials, water (if required), type of mixing equipment, selection of mixer speeds, mixing containers, mixing time, and other items or procedures needed to produce products of uniform quality with optimum performance characteristics for application indicated.

PART 3 EXECUTION

3.1 EXAMINATION

- A Examine substrates and conditions, with installer present, for compliance with requirements for opening configurations, penetrating items, substrates, and other conditions affecting performance.
- B Do not proceed with installation until unsatisfactory conditions have been corrected.
 - 1. Installing penetration firestopping indicates acceptance of surfaces and conditions.

3.2 PREPARATION

- A Surface Cleaning: Clean out openings immediately before installing penetrating firestopping to comply with written recommendations of firestopping system manufacturer and the following requirements:
 - 1. Remove from surfaces of opening substrates and from penetrating items foreign materials that could interfere with adhesion of penetrating firestopping.
 - 2. Clean opening substrates and penetrating items to produce clean, sound surfaces capable of developing optimum bond with penetrating firestopping. Remove loose particles remaining from cleaning operation.
 - 3. Remove laitance and form-release agents from concrete.
- B Priming: Prime substrates where recommended in writing by penetrating firestopping manufacturer using that manufacturer's recommended products and methods. Confine primers to areas of bond; do not allow spillage and migration onto exposed surfaces.
- C Masking Tape: Use masking tape to prevent penetrating firestopping from contacting adjoining surfaces that will remain exposed on completion of work and that would otherwise be permanently stained or damaged by such contact or by cleaning methods used to remove smears from firestop system materials. Remove tape as soon as possible without disturbing firestop system's seal with substrates.

3.3 THROUGH-PENETRATION FIRESTOP SYSTEM INSTALLATION

- A General: Install penetration firestopping systems in accordance with manufacturer's written installation instructions and published drawings for products and applications.
- B Install forming materials and other accessories of types required to support fill materials during their application and in the position needed to produce cross-sectional shapes and depths required to achieve fire ratings indicated.
 - 1. After installing fill materials and allowing them to fully cure, remove combustible forming materials and other accessories not forming permanent components of firestopping.
- C Install fill materials by proven techniques to produce the following results:
 - 1. Fill voids and cavities formed by openings, forming materials, accessories, and penetrating items to achieve required fire-resistance ratings.

2. Apply materials so they contact and adhere to substrates formed by openings and penetrating items.
3. For fill materials that will remain exposed after completing the work, finish to produce smooth, uniform surfaces that are flush with adjoining finishes.

3.4 IDENTIFICATION

- A Penetration Identification: Identify each penetration firestopping system with legible metal or plastic labels. Attach labels permanently to surfaces adjacent to and within 6 inches of penetration firestopping system edge so labels are visible to anyone seeking to remove penetrating items or firestopping systems. Use mechanical fasteners or self-adhering-type labels with adhesives capable of permanently bonding labels to surfaces on which labels are placed. Include the following information on labels:
1. The words "Warning - Penetration Firestopping - Do Not Disturb. Notify Building Management of Any Damage."
 2. Contractor's name, address, and phone number.
 3. Designation of applicable testing and inspecting agency.
 4. Date of installation.
 5. Manufacturer's name.
 6. Installer's name.

3.5 FIELD QUALITY CONTROL

- A Owner will engage a qualified inspection agency to conduct and report on inspections in accordance with ASTM E 2174.
- B Where deficiencies are found or penetration firestopping system is damaged or removed because of testing, repair or replace penetration firestopping system to comply with requirements.
- C Proceed with enclosing penetration firestopping systems with other construction only after inspection reports are issued and installations comply with requirements.

3.6 CLEANING AND PROTECTION

- A Clean off excess fill materials adjacent to openings as work progresses by methods and with cleaning materials that are approved in writing by penetrating firestopping manufacturers and that do not damage materials in which openings occur.
- B Provide final protection and maintain conditions during and after installation that ensure penetrating firestopping are without damage or deterioration at time of Final Acceptance. If, despite such protection, damage or deterioration occurs, cut out and remove damaged or deteriorated penetrating firestopping immediately and install new materials to produce penetrating firestopping complying with specified requirements.

END OF SECTION 07 84 13

Attachment: Penetration Firestopping Schedule

January 15, 2026

University of North Carolina at Wilmington
Housing Village Phase 3
Complete Package - Construction Documents

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SCO 24-29053-02D

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PENETRATION FIRESTOPPING SCHEDULE													
THIS SCHEDULE INDICATES WHICH SERIES OF UL CLASSIFIED PENETRATING FIRESTOPPING ASSEMBLIES ARE ACCEPTABLE FOR THIS PROJECT BASED ON BARRIER TYPE, BARRIER CONSTRUCTION AND PENETRANT TYPE.													
EACH SYSTEM WITHIN A GIVEN SERIES IS CLASSIFIED FOR SPECIFIC PENETRATION CONDITIONS. CONTRACTOR SHALL SELECT TPFS ASSEMBLIES THAT ARE CLASSIFIED FOR USE WITH EACH PENETRATION'S CONDITION BASED ON CRITERIA SUCH AS THE FOLLOWING: PENETRATION SIZE, PENETRATION SHAPE, PENETRANT SIZE(S), PENETRANT MATERIAL(S), PENETRANT QUANTITY, LOCATIONS(S) OF PENETRANT(S) WITHIN PENETRATION.													
BARRIER		FIRE STOPPING REQUIREMENTS	PENETRANT TYPE										
TYPE	BASIS OF CONSTRUCTION		NO PENETRANTS	METALLIC, UNINSULATED PIPE, CONDUIT, OR TUBING (EXAMPLES: COPPER, IRON, STEEL)	NONMETALLIC, UNINSULATED PIPE, CONDUIT, OR TUBING (EXAMPLES: PVC, CPVC, GLASS)	ELECTRICAL CABLES	CABLE TRAYS W/ELECTRICAL CABLES	INSULATED PIPES (EXAMPLES: COPPER, GLASS, IRON, PLASTIC, STEEL) IN SYSTEMS OPERATING BETWEEN 32 DEGF (0 DEGC) AND 122 DEGF (50 DEGC) (NOTE 1)	INSULATED PIPES (EXAMPLES: COPPER, GLASS, IRON, PLASTIC, STEEL) IN SYSTEMS OPERATING BETWEEN 32 DEGF (0 DEGC) OR ABOVE 122 DEGF (50 DEGC) (NOTE 2)	MISC ELECTRICAL PENETRATIONS (EXAMPLES: BUS DUCTS)	METAL DUCT	UL LISTED ELECTRICAL BOXES	OTHER RECESSED DEVICES (NOTE 3)
WALL	WOOD STUDS & GYPSUM WALLBOAR	SINGLE PENETRANT SYSTEM	W-L-000 SERIES OR NOTE 4	W-L-1000 SERIES	W-L-2000 SERIES	W-L-3000 SERIES	W-L-4000 SERIES	W-L-5000 SERIES	W-L-5000 SERIES	W-L-6000 SERIES	W-L-7000 SERIES	CLIV OR NOTE 6	NOTE 8
UL DESIGN NO. - U300 SERIES		MULTIPLE PENETRANTS		W-L-8000 SERIES NOTE 5				W-L-8000 SERIES NOTE 5	W-L-8000 SERIES NOTE 5	N/A	N/A	N/A	
		F RATING	EQUAL TO BARRIER RATING										
		T RATING	EQUAL TO F RATING (NOTE 9)										
ADDITIONAL REQUIREMENTS		NONE	NONE	NONE	NONE	NONE	NONE	NOTE 6	NONE	NOTE 7	NONE	NONE	
WALL	METAL STUDS & GYPSUM WALLBOAR	SINGLE PENETRANT SYSTEM	W-L-0000 SERIES OR NOTE 4	W-L-1000 SERIES	W-L-2000 SERIES	W-L-3000 SERIES	W-L-4000 SERIES	W-L-5000 SERIES	W-L-5000 SERIES	W-L-6000 SERIES	W-L-7000 SERIES	CLIV OR NOTE 6	NOTE 8
UL DESIGN NO. - U400 SERIES		MULTIPLE PENETRANTS		W-L-8000 SERIES NOTE 5				W-L-8000 SERIES NOTE 5	W-L-8000 SERIES NOTE 5	N/A	N/A	N/A	
		F RATING	EQUAL TO BARRIER RATING										
		T RATING	EQUAL TO F RATING (NOTE 9)										
ADDITIONAL REQUIREMENTS		NONE	NONE	NONE	NONE	NONE	NONE	NOTE 6	NONE	NOTE 7	NONE	NONE	
WALL	POURED CONCRETE, CONCRETE BLOCK OR MASONRY	SINGLE PENETRANT SYSTEM	W-J-0000 SERIES OR NOTE 4	C-AJ-1000 OR W-J-1000 SERIES - NOTE 10	C-AJ-2000 OR W-J-2000 SERIES - NOTE 10	C-AJ-3000 OR W-J-3000 SERIES - NOTE 10	C-AJ-4000 OR W-J-4000 SERIES - NOTE 10	C-AJ-5000 OR W-J-5000 SERIES - NOTE 10	C-AJ-5000 OR W-J-5000 SERIES - NOTE 10	C-AJ-6000 SERIES - NOTE 10	C-AJ-7000 OR W-J-7000 SERIES - NOTE 10	??	NOTE 8
UL DESIGN NO. FOR CONCRETE BLOCK WALL - U900 SERIES (ANY THICKNESS)		MULTIPLE PENETRANTS		C-AJ-8000 OR W-J-8000 SERIES -- NOTE 5				C-AJ-8000 OR W-J-8000 SERIES - NOTE 5	C-AJ-8000 OR W-J-8000 SERIES - NOTE 5		N/A	N/A	
		F RATING	EQUAL TO BARRIER RATING										
		T RATING	EQUAL TO F RATING (NOTE 9)										
ADDITIONAL REQUIREMENTS		NONE	NONE	NONE	NONE	NONE	NONE	NOTE 6	NONE	NOTE 7	NONE	NONE	
WALL	POURED CONCRETE BLOCK OR MASONRY	SINGLE PENETRANT SYSTEM	NOTE 4	C-BK-1000 OR W-K-1000 SERIES	N/A	N/A	W-K-4000 SERIES	N/A	N/A	N/A	N/A	N/A	NOTE 8
UL DESIGN NO. FOR CONCRETE BLOCK WALL - U900 SERIES MINIMUM THICKNESS GREATER THAN EIGHT INCHES		MULTIPLE PENETRANTS		N/A									
		F RATING		EQUAL TO BARRIER RATING									
		T RATING	EQUAL TO F RATING (NOTE 9)										
ADDITIONAL REQUIREMENTS		NONE											
FLOOR	FRAMED	SINGLE PENETRANT SYSTEM	NOTE 4	F-C-1000 SERIES	F-C-2000 SERIES	F-C-3000 SERIES	N/A	F-C-5000 SERIES	F-C-5000 SERIES	N/A	F-C-7000 SERIES	??	NOTE 8
		MULTIPLE PENETRANTS		F-C-8000 SERIES NOTE 5				F-C-8000 SERIES NOTE 5	F-C-8000 SERIES NOTE 5		N/A	N/A	
		F RATING		EQUAL TO BARRIER RATING									
		T RATING	EQUAL TO F RATING (NOTE 9)										
ADDITIONAL REQUIREMENTS		NONE	NONE	NONE	NONE	NONE	NONE	NOTE 6	NONE	NOTE 7	NONE	NONE	

FLOOR	POURED CONCRETE	SINGLE		C-AJ-0000 SERIES, F-A-0000 SERIES OR NOTE 4	C-AJ-1000 OR F-A-1000 SERIES	C-AJ-2000 OR F-A-2000 SERIES	C-AJ-3000 OR F-A-3000 SERIES	C-AJ-4000 OR F-A-4000 SERIES	C-AJ-5000 OR F-A-5000 SERIES	C-AJ-5000 OR F-A-5000 SERIES	C-AJ-6000 SERIES	C-AJ-7000 OR F-A-7000 SERIES	??	NOTE 8	
MAXIMUM THICKNESS OF FIVE INCHES OR LESS		UL CLASSIFIED	PENETRANT	C-AJ-0000 SERIES OR NOTE 4	C-AJ-8000 OR F-A-8000 SERIES -- NOTE 5				C-AJ-8000 OR F-A-8000 SERIES - NOTE 5	C-AJ-8000 OR F-A-8000 SERIES - NOTE 5		N/A	N/A		
		SYSTEM	MULTIPLE PENETRANTS												
		F RATING		EQUAL TO BARRIER RATING											
		T RATING		EQUAL TO F RATING (NOTE 9)											
ADDITIONAL REQUIREMENTS				NONE	NONE	NONE	NONE	NONE	NONE	NOTE 6	NONE	NOTE 7	NONE	NONE	
FLOOR	POURED CONCRETE	SINGLE		C-BJ-0000 SERIES OR NOTE 4	C-BJ-1000 OR F-B-1000 SERIES	C-BJ-2000 OR F-B-2000 SERIES	C-BJ-3000 OR F-B-3000 SERIES	C-BJ-4000 OR F-B-4000 SERIES	C-BJ-5000 OR F-B-5000 SERIES	C-AJ-5000 OR F-A-5000 SERIES	C-AJ-6000 SERIES	C-BJ-7000 OR F-B-7000 SERIES	??	NOTE 8	
MINIMUM THICKNESS GREATER THAN FIVE INCHES		UL CLASSIFIED	PENETRANT	C-BJ-0000 SERIES OR NOTE 4	C-BJ-8000 OR F-B-8000 SERIES -- NOTE 5				C-AJ-8000 OR F-A-8000 SERIES - NOTE 5	C-BJ-8000 OR F-B-8000 SERIES - NOTE 5		N/A	N/A		
		SYSTEM	MULTIPLE PENETRANTS												
		F RATING		EQUAL TO BARRIER RATING											
		T RATING		EQUAL TO F RATING (NOTE 9)											
ADDITIONAL REQUIREMENTS				NONE	NONE	NONE	NONE	NONE	NONE	NOTE 6	NONE	NOTE 7	NONE	NONE	

THIS SCHEDULE USES THE IDENTIFICATION SYSTEMS OF UNDERWRITERS LABORATORIES, INC. AS DEFINED IN THEIR "FIRE RESISTANCE DIRECTORY" AND AS USED BY MANUFACTURERS ON THEIR UL CLASSIFIED SYSTEM.

INDICATED RATINGS MAY BE EXCEEDED. "N/A" = NOT APPLICABLE

NOTES

- EXAMPLES OF SYSTEMS THAT OPERATE BETWEEN 32 DEGF (0DEGC) AND 122 DEGF (50 DEGC):

CHILLED WATER SUPPLY & RETURN	DOMESTIC HOT WATER LESS THAN 122 DEGF (50 DEGC)
HEAT PUMP WATER SUPPLY & RETURN	DOMESTIC HOT WATER RECIRCULATION LESS THAN 122 DEGF (50 DEGC)
DOMESTIC COLD WATER	
- EXAMPLES OF SYSTEMS OPERATING BELOW 32 DEGF (0DEGC) OR ABOVE 122 DEGF (50 DEGC):

STEAM SUPPLY & RETURN	HEATING HOT WATER SUPPLY & RETURN
STEAM VENT	HOT-CHILLED WATER SUPPLY & RETURN
CONDENSATE PUMP DISCHARGE	GLYCOL HEATING HOT WATER SUPPLY & RETURN
BOILER BLOW DOWN	DOMESTIC HOT WATER SUPPLY 140 DEGF (60 DEGC)
CRYOGENIC VENT	DOMESTIC HOT WATER RECIRCULATION 140 DEGF (60 DEGC)
- EXAMPLES OF OTHER RECESSED DEVICES:

MEDICAL GAS ZONE VALVES	UNIT HEATERS
MEDICAL GAS OUTLETS	FIRE FIGHTERS' PHONE
FIRE VALVE CABINETS	FIRE EXTINGUISHER CABINET
FIRE HOSE CABINETS	
- SEAL OPENING USING BARRIER'S ORIGINAL CONSTRUCTION.
- WHERE APPROPRIATE MULTI-PENETRATION CLASSIFICATION IS NOT AVAILABLE; INSTALL PENETRANTS SINGLY, AND PROVIDE SINGLE-PENETRANT SYSTEMS.
- FOR SYSTEMS THAT OPERATE BELOW 32 DEGF (0DEGC) OR ABOVE 122 DEGF (50 DEGC), COMPLY WITH THE FOLLOWING ADDITIONAL REQUIREMENTS:
 - PROVIDE TPFS SYSTEM USING INTUMESCENT ELASTOMERIC WRAP STRIP AS ITS FILL, VOID, OR CAVITY MATERIAL.
 - DO NOT USE SERIES 8000 PENETRATIONS. PROVIDE ONLY SINGLE PENETRATIONS.
- FOR PENETRATIONS PROTECTED WITH DAMPERS, PROVIDE TPFS SYSTEM APPROVED BY DAMPER MANUFACTURER.
- WHERE UL CLASSIFIED SYSTEMS ARE NOT AVAILABLE FOR OTHER RECESSED DEVICES, MAINTAIN CONTINUITY OF RATED BARRIER CONSTRUCTION AROUND RECESS.
- WHERE PENETRANT EXITS PENETRATION ENTIRELY WITHIN THE CAVITY OF A WALL A T-RATING IS NOT REQUIRED.
- WHERE WALL THICKNESSES ARE LESS THAN 4 1/2 INCHES THICK, SUBMIT UL SYSTEM TO ACCOMMODATE.

SECTION 07 84 43 - JOINT FIRESTOPPING

PART 1 GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A Section Includes:
 - 1. Joints in or between fire-resistance-rated construction.
 - 2. Joints in smoke barriers.
 - 3. Supplementary components and accessories normally furnished or otherwise necessary for a complete installation, whether or not such items are included in the Specifications or indicated on the Drawings.

1.3 REFERENCES

- A Abbreviations and Acronyms:
 - 1. AHJ: Authority (Authorities) Having Jurisdiction.
 - 2. SCAQMD: South Coast Air Quality Management District.
 - 3. VOC: Volatile Organic Compounds.
- B Definitions:
 - 1. Manufacturer: Means the joint firestopping system manufacturer unless otherwise indicated.
 - 2. F-Ratings: F-ratings indicate that the firestopping systems withstood the fire test for the rating period without any of the following taking place: flames passing through openings, flaming of any element on the unexposed side of the firestopping system, and any openings developing that permit projection of water from the hose stream beyond the unexposed side.
 - 3. L-Ratings: L-ratings indicate the amount of air leakage through the joint firestopping system during testing and indicate how well systems resist the passage of smoke.

1.4 SUBMITTALS

- A Action Submittals:
 - 1. Product Data: For each type of product; include Health Product Declaration.
 - 2. Product Schedule: For each joint firestopping system. Include location, illustration of firestopping system, and design designation of qualified testing agency.
 - 3. Engineering Judgments: Where Project conditions require modification to a qualified testing agency's illustration for a particular joint firestopping system condition, submit illustration, with modifications marked, approved by manufacturer's fire-protection engineer as an engineering judgment or equivalent fire-resistance-rated assembly.
- B Informational Submittals:
 - 1. Qualification Data: For installer.
 - 2. Listed System Designs: For each joint firestopping system, for tests performed by a qualified testing agency.
- C Closeout Submittals:
 - 1. Installer Certificates: From installer indicating that joint firestopping systems have been installed in compliance with requirements and manufacturer's written instructions.

1.5 QUALITY ASSURANCE

- A Installer Qualifications: A firm that has been approved by FM Approvals in accordance with FM Approvals 4991 or been evaluated by UL and found to comply with UL's "UL Solutions Qualified Firestop Contractor Program."

1.6 PROJECT CONDITIONS

- A Environmental Limitations: Do not install joint firestopping systems when ambient or substrate temperatures are outside limits permitted by manufacturers or when substrates are wet due to rain, frost, condensation, or other causes.
- B Install and cure joint firestopping systems in compliance with manufacturer's written instructions using natural means of ventilation or, where this is inadequate, forced-air circulation.

1.7 COORDINATION

- A Coordinate construction of joints to ensure that joint firestopping systems can be installed according to specified firestopping system design.
- B Coordinate sizing of joints to accommodate joint firestopping systems.

PART 2 PRODUCTS

2.1 SOURCE LIMITATIONS

- A Source Limitations: Obtain joint firestop systems for each type of joint opening indicated from the same manufacturer.

2.2 PERFORMANCE REQUIREMENTS

- A Fire-Test-Response Characteristics:
 - 1. A qualified testing agency, acceptable to authorities having jurisdiction, will perform joint firestopping system tests.
 - 2. Test in accordance with testing standards referenced in "Joint Firestopping Systems" Article. Provide rated systems complying with the following requirements:
 - a. Joint firestop systems installed with products bearing the classification marking of a qualified product certification agency in accordance with listed system designs published by a qualified testing agency.
 - 1) UL in its online directory "Product iQ."
 - 2) Intertek Group in its publication Directory of Building Products.
- B Rain/Water Resistance: For perimeter fire-barrier system applications, where inclement weather or greater-than-transient water exposure is expected, use products that dry rapidly and cure in the presence of atmospheric moisture sufficient to pass ASTM D 6904 early rain-resistance test (24-hour exposure).
- C Allowable VOC Content: Sealants, sealant primers, and caulks must comply with SCAQMD Rule 1168 VOC limits.
 - 1. Such products also shall comply with the Rule 1168 prohibition on the use of certain toxic compounds (chloroform, ethylene dichloride, methylene chloride, perchloroethylene, and trichloroethylene).

2.3 MANUFACTURERS

- A Manufacturers: Subject to compliance with the Contract Documents, provide products by one of the following.
 - 1. 3M Fire Protection Products.
 - 2. Hilti, Inc.
 - 3. Specified Technologies, Inc.

2.4 JOINT FIRESTOPPING SYSTEMS

- A Joint Firestopping Systems: Systems that resist spread of fire, passage of smoke and other gases, and maintain original fire-resistance rating of assemblies in or between which joint firestopping systems are installed. Joint firestopping systems shall accommodate building movements without impairing their ability to resist the passage of fire and hot gases.

1. Where UL-classified systems are indicated, they refer to system numbers in UL's Fire Resistance Directory under product Category XHBN for floor-to-floor, wall-to-wall, head-of-wall, bottom-of-wall, and wall-to wall joints intended for use as corner guards; or Category XHDG for perimeter fire-containment systems.
- B Joints In or Between Fire-Resistance-Rated Construction: Provide joint firestopping systems with ratings determined per ASTM E 1966 or UL 2079.
 1. Fire-Resistance Rating: Equal to or exceeding the fire-resistance rating of the wall, floor, or roof in or between which it is installed.
- C Joints in Smoke Barriers: Provide fire-resistive joint systems with ratings determined per UL 2079 based on testing at a positive pressure differential of 0.30-inch wg.
 1. L-Rating: Not exceeding 5.0 cfm/ft. of joint at both ambient and elevated temperatures.
- D Exposed Joint Firestopping Systems: Flame-spread and smoke-developed indexes of less than 25 and 450, respectively, as determined per ASTM E 84.

2.5 ACCESSORIES

- A Accessories: Provide components of fire-resistive joint systems, including primers and forming materials, that are needed to install elastomeric fill materials and to maintain ratings required. Use only components specified by the manufacturer and approved by the qualified testing agency for conditions indicated.

PART 3 EXECUTION

3.1 EXAMINATION

- A Examine substrates and conditions, with Installer present, for compliance with requirements for joint configurations, substrates, and other conditions affecting performance of the work.
- B Do not proceed with installation until unsatisfactory conditions have been corrected.
 1. Installation of joint firestopping indicates acceptance of substrates and conditions.

3.2 PREPARATION

- A Surface Cleaning: Before installing fire-resistive joint systems, clean joints immediately to comply with the manufacturer's written instructions and the following requirements:
 1. Remove from surfaces of joint substrates foreign materials that could interfere with adhesion of elastomeric fill materials or compromise fire-resistive rating.
 2. Clean joint substrates to produce clean, sound surfaces capable of developing optimum bond with elastomeric fill materials. Remove loose particles remaining from cleaning operation.
 3. Remove laitance and form-release agents from concrete.
- B Prime substrates where recommended in writing by the manufacturer using that manufacturer's recommended products and methods. Confine primers to areas of bond; do not allow spillage and migration onto exposed surfaces.

3.3 INSTALLATION

- A General: Install fire-resistive joint systems to comply with manufacturer's written installation instructions and published drawings for products and applications indicated.
- B Install forming materials and other accessories of types required to support elastomeric fill materials during their application and in position needed to produce cross-sectional shapes and depths required to achieve fire ratings indicated.
 1. After installing elastomeric fill materials and allowing them to fully cure, remove combustible forming materials and other accessories not indicated as permanent components of fire-resistive joint system.
- C Install elastomeric fill materials for fire-resistive joint systems by proven techniques to produce the following results:
 1. Elastomeric fill voids and cavities formed by joints and forming materials as required to achieve fire-resistance ratings indicated.

2. Apply elastomeric fill materials so they contact and adhere to substrates formed by joints.
3. For elastomeric fill materials that will remain exposed after completing the work, finish to produce smooth, uniform surfaces that are flush with adjoining finishes.

3.4 IDENTIFICATION

- A Wall Identification: Permanently label walls containing firestopping systems with the words "FIRE AND/OR SMOKE BARRIER - PROTECT ALL OPENINGS," using lettering not less than 3 inches high and with at least 0.375-inch strokes.
 1. Locate in accessible concealed floor, floor-ceiling 15 feet from end of wall and at intervals not exceeding 30 feet
- B Joint Identification: Identify joint firestopping systems with legible metal or plastic labels. Attach labels permanently to surfaces adjacent to and within 6 inches of joint edge so labels are visible to anyone seeking to remove or joint firestopping system. Use mechanical fasteners or self-adhering-type labels with adhesives capable of permanently bonding labels to surfaces on which labels are placed. Include the following information on labels:
 1. The words Warning - Joint Firestopping - Do Not Disturb. Notify Building Management of Any Damage.
 2. Contractor's name, address, and phone number.
 3. Designation of applicable testing agency.
 4. Date of installation.
 5. Manufacturer's name.
 6. Installer's name.

3.5 FIELD QUALITY CONTROL

- A Inspecting Agency: Owner will engage a qualified testing agency to perform tests and inspections according to ASTM E 2393.
- B Where deficiencies are found or joint firestopping systems are damaged or removed due to testing, repair or replace joint firestopping systems so they comply with requirements.
- C Do not proceed with enclosing joint firestopping systems with other construction until inspection reports are issued and installations comply with requirements.

3.6 CLEANING AND PROTECTION

- A Clean off excess elastomeric fill materials adjacent to joints as the work progresses by methods and with cleaning materials that are approved in writing by the manufacturers and that do not damage materials in which joints occur.
- B Provide final protection and maintain conditions during and after installation that ensure joint firestopping systems are without damage or deterioration at time of Substantial Completion. If damage or deterioration occurs despite such protection, cut out and remove damaged or deteriorated fire-resistive joint systems immediately and install new materials to produce fire-resistive joint systems complying with specified requirements.

END OF SECTION 07 84 43

SECTION 07 92 00 - JOINT SEALANTS

PART 1 GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A Section Includes:
 - 1. Silicone joint sealants.
 - 2. Urethane joint sealants.
 - 3. Mildew-resistant joint sealants.
 - 4. Latex joint sealants.
 - 5. Supplementary components and accessories normally furnished or otherwise necessary for a complete installation.

1.3 REFERENCES

- A Acronyms and Abbreviations:
 - 1. SCAQMD: South Coast Air Quality Management District.
 - 2. VOC: Volatile Organic Compounds.
- B Definitions:
 - 1. Manufacturer: Means the joint sealant manufacturer unless otherwise indicated.

1.4 SUBMITTALS

- A Action Submittals:
 - 1. Product Data: For specified products; include Health Product Declaration and Environmental Product Declaration.
 - a. Indicate VOC content for sealants and sealant primers.
 - 2. Samples: For each kind and color of joint sealant required.
 - 3. Joint-Sealant Schedule: Include the following information:
 - a. Joint-sealant application, joint location, and designation.
 - b. Joint-sealant manufacturer and product name.
 - c. Joint-sealant formulation.
 - d. Joint-sealant color.
- B Informational Submittals:
 - 1. Qualification Data: For qualified testing agency.
 - 2. Product Test Reports: For each kind of joint sealant, for tests performed by a qualified testing agency.
 - 3. Preconstruction Field-Adhesion-Test Reports: Indicate which sealants and joint preparation methods resulted in optimum adhesion to joint substrates based on testing specified in "Preconstruction Testing" Article.

1.5 QUALITY ASSURANCE

- A Installer Qualifications: An authorized representative who is trained and approved by manufacturer.
- B Product Testing: Test joint sealants using a qualified testing agency.
 - 1. Testing Agency Qualifications: Qualified according to ASTM C 1021 to conduct the testing indicated.

1.6 PRECONSTRUCTION TESTING

- A Preconstruction Field-Adhesion Testing: Before installing sealants, field test their adhesion to Project joint substrates as follows:
 - 1. Locate test joints where indicated on Project or, if not indicated, as directed by Architect.

2. Conduct field tests for each kind of sealant and joint substrate.
3. Notify Architect 7 days in advance of dates and times when test joints will be erected.
4. Arrange for tests to take place with the manufacturer's technical representative present.
 - a. Test Method: Test joint sealants according to Method A, Field-Applied Sealant Joint Hand Pull Tab, in Appendix X1.1 in ASTM C 1193 or Method A, Tail Procedure, in ASTM C 1521.
 - 1) For joints with dissimilar substrates, verify adhesion to each substrate separately; extend cut along one side, verifying adhesion to opposite side. Repeat procedure for opposite side.
5. Report whether sealant failed to adhere to joint substrates or tore cohesively. Include data on pull distance used to test each kind of product and joint substrate. For sealants that fail adhesively, retest until satisfactory adhesion is obtained.
6. Evaluation of Preconstruction Field-Adhesion-Test Results: Sealants not evidencing adhesive failure from testing, in absence of other indications of noncompliance with requirements, will be considered satisfactory. Do not use sealants that fail to adhere to joint substrates during testing.

1.7 FIELD CONDITIONS

- A Do not proceed with installation of joint sealants under the following conditions:
1. When ambient and substrate temperature conditions are outside limits permitted by the manufacturer.
 2. When joint substrates are wet.
 3. Where joint widths are less than those allowed by the manufacturer for applications indicated.
 4. Where contaminants capable of interfering with adhesion have not yet been removed from joint substrates.

1.8 WARRANTY

- A Special Installer's Warranty: Installer agrees to repair or replace joint sealants that do not comply with performance and other requirements specified in this Specification Section within specified warranty period.
1. Warranty Period: 2 years from date of Final Acceptance.
- B Special Manufacturer's Warranty: Manufacturer agrees to furnish joint sealants to repair or replace those joint sealants that do not comply with performance and other requirements specified in this Specification Section within specified warranty period.
1. Warranty Period: 5 years from date of Final Acceptance.
- C Special Manufacturer's Warranty: Manufacturer's standard form in which elastomeric sealant manufacturer agrees to furnish elastomeric joint sealants to repair or replace those that do not comply with performance and other requirements specified in this Specification Section within specified warranty period.
1. Warranty Period: 20 years from date of Final Acceptance.
- D Special warranties specified in this article exclude deterioration or failure of joint sealants from the following:
1. Movement of the structure caused by stresses on the sealant exceeding sealant manufacturer's written specifications for sealant elongation and compression.
 2. Disintegration of joint substrates from causes exceeding design specifications.
 3. Mechanical damage caused by individuals, tools, or other outside agents.
 4. Changes in sealant appearance caused by accumulation of dirt or other atmospheric contaminants.

PART 2 PRODUCTS

2.1 JOINT SEALANTS, GENERAL

- A Source Limitations: Obtain joint sealants from a single manufacturer for each sealant type.

- B Compatibility: Provide joint sealants, backings, and other related materials that are compatible with one another and with joint substrates under conditions of service and application, as demonstrated by the manufacturer, based on testing and field experience.
- C Allowable VOC Content: Sealants, sealant primers, and caulks must comply with SCAQMD Rule 1168 VOC limits.
 - 1. Such products also shall comply with the Rule 1168 prohibition on the use of certain toxic compounds (chloroform, ethylene dichloride, methylene chloride, perchloroethylene, and trichloroethylene).
- D Suitability for Contact with Food: Where sealants are indicated for joints that will come in repeated contact with food, provide products that comply with 21 CFR 177.2600.
- E Stain-Test-Response Characteristics: Where sealants are specified to be nonstaining to porous substrates, provide products that have undergone testing according to ASTM C 1248 and have not stained porous joint substrates indicated for Project.
- F Colors of Exposed Joint Sealants: As selected by Architect from manufacturer's full range.

2.2 SILICONE JOINT SEALANTS

- A Neutral-Curing Silicone Joint Sealant, Nonstaining: ASTM C 920.
 - 1. Products: Subject to compliance with the Contract Documents, provide one of the following:
 - a. Dow Chemical Company; DOWSIL 756 SMS.
 - b. Sika Corporation; Sikasil WS-295 or WS-290.
 - c. Pecora Corporation; 864 NST.
 - 2. Type: Single component (S).
 - 3. Grade Nonsag (NS).
 - 4. Class: 50.
 - 5. Use: Nontraffic (NT).
- B Mildew-Resistant, Neutral-Curing Silicone Sealant:
 - 1. Products: Subject to compliance with the Contract Documents, provide one of the following:
 - a. Pecora Corporation; 898
 - b. Tremco, Tremsil 600.
 - c. Dow Chemical Company; DOWSIL 786.
 - 2. Type: Single-component (S)
 - 3. Grade: Nonsag (NS)
 - 4. Class: 25.
 - 5. Use: Nontraffic (NT)

2.3 URETHANE JOINT SEALANTS

- A Urethane Joint Sealant: ASTM C 920.
 - 1. Basis-of-Design Product: Subject to compliance with the Contract Documents, design is based on the following. provide the following:
 - a. Tremco Incorporated; Dymeric 240FC.
 - 2. Acceptable Manufacturers: Subject to compliance with the Contract Documents provide the basis-of-design product or comparable acceptable product by one of the following.
 - a. Pecora Corporation.
 - b. Sika.
 - 3. Type: Multicomponent (M).
 - 4. Grade: Nonsag (NS).
 - 5. Class: 50.
 - 6. Uses: T, NT.
 - 7. Color: "Baptist Brick"; verify with Architect.

2.4 LATEX JOINT SEALANTS

- A Latex Joint Sealant: Acrylic latex or siliconized acrylic latex, ASTM C 834, Type OP, Grade NF.
 - 1. Product: Subject to compliance with the Contract Documents, provide one of the following:
 - a. Pecora Corporation; AC-20+.

- b. Tremco Incorporated; Tremflex 834.
- c. BASF Corporation; Sonolac.

2.5 JOINT SEALS

- A Preformed, Foam Joint Seals: Joint seal manufactured from urethane or EVA (ethylene vinyl acetate) foam with minimum density of 10 lb/cu. ft. and impregnated with a nondrying, water repellent agent. Factory produce in precompressed sizes in roll or stick form to fit joint widths based on design criteria indicated, with factory or field applied adhesive for bonding to substrates.
 - 1. Manufacturers: Subject to compliance with the Contract Documents, provide products by one of the following:
 - a. Dow Corning Corporation.
 - b. EMSEAL Joint Systems, Ltd.
 - c. MM Systems Corporation.
 - d. Nystrom, Inc.
 - e. Watson Bowman Acme Corp.
 - 2. Design Criteria:
 - a. Nominal Joint Width: Indicated on Drawings.
 - b. Movement Capability: Minus 25 percent/ Plus 25 percent.
- B Extruded Silicone Joint Seals: Seal consisting of precured low modulus silicone extrusion, with a neutral curing silicone sealant for bonding extrusions to substrates.
 - 1. Manufacturers: Subject to compliance with the Contract Documents, provide products by one of the following:
 - a. Dow Corning Corporation.
 - b. GE Construction Sealants.
 - c. Pecora Corporation.
 - d. Sika Corporation; Joint Sealants.
 - 2. Joint Seal Width: Size indicated on Drawings plus 1 inch.

2.6 JOINT SEALANT BACKING

- A Sealant Backing Material, General: Nonstaining; compatible with joint substrates, sealants, primers, and other joint fillers; and approved for applications indicated by sealant manufacturer based on field experience and laboratory testing.
- B Cylindrical Sealant Backings: ASTM C 1330, Type C (closed-cell material with a surface skin), and of size and density to control sealant depth and otherwise contribute to producing optimum sealant performance.
- C Bond-Breaker Tape: Polyethylene tape or other plastic tape recommended by sealant manufacturer.

2.7 MISCELLANEOUS MATERIALS

- A Primer: Material recommended by the manufacturer where required for adhesion of sealant to joint substrates indicated, as determined from preconstruction field tests.
- B Cleaners for Nonporous Surfaces: Chemical cleaners acceptable to manufacturers of sealants and sealant backing materials, free of oily residues or other substances capable of staining or harming joint substrates and adjacent nonporous surfaces in any way, and formulated to promote optimum adhesion of sealants to joint substrates.
- C Masking Tape: Nonstaining, nonabsorbent material compatible with joint sealants and surfaces adjacent to joints.
- D Accessories: As supplied, recommended, or required by the manufacturer and as necessary for a complete installation.

PART 3 EXECUTION**3.1 EXAMINATION**

- A Examine joints indicated to receive joint sealants, with installer present, for compliance with requirements for joint configuration, installation tolerances, and other conditions affecting performance of the work.
- B Do not proceed with installation until unsatisfactory conditions have been corrected.
 - 1. Installation of joint sealants indicates acceptance of surfaces and conditions.

3.2 PREPARATION

- A Surface Cleaning of Joints: Clean out joints immediately before installing joint sealants to comply with joint-sealant manufacturer's written instructions.
 - 1. Remove all foreign material from joint substrates that could interfere with adhesion of joint sealant, including dust, paints (except for permanent, protective coatings tested and approved for sealant adhesion and compatibility by sealant manufacturer), old joint sealants, oil, grease, waterproofing, water repellents, water, surface dirt, and frost.
 - a. Remove laitance and form-release agents from concrete.
 - 2. Clean nonporous joint substrate surfaces with chemical cleaners or other means that do not stain, harm substrates, or leave residues capable of interfering with adhesion of joint sealants.
 - 3. Clean porous joint substrate surfaces by brushing, grinding, blast cleaning, mechanical abrading, or a combination of these methods to produce a clean, sound substrate capable of developing optimum bond with joint sealants. Remove loose particles remaining after cleaning operations above by vacuuming or blowing out joints with oil-free compressed air.
- B Joint Priming: Prime joint substrates where recommended by the manufacturer or as indicated by preconstruction joint-sealant-substrate tests or prior experience. Apply primer to comply with the manufacturer's written instructions. Confine primers to areas of joint-sealant bond; do not allow spillage or migration onto adjoining surfaces.
- C Masking Tape: Use masking tape where required to prevent contact of sealant or primer with adjoining surfaces that otherwise would be permanently stained or damaged by such contact or by cleaning methods required to remove sealant smears. Remove tape immediately after tooling without disturbing joint seal.

3.3 INSTALLATION

- A Sealant Installation Standard: Comply with recommendations in ASTM C 1193 for use of joint sealants as applicable to materials, applications, and conditions indicated.
- B Install sealant backings of kind indicated to support sealants during application and at position required to produce cross-sectional shapes and depths of installed sealants relative to joint widths that allow optimum sealant movement capability.
 - 1. Do not leave gaps between ends of sealant backings.
 - 2. Do not stretch, twist, puncture, or tear sealant backings.
 - 3. Remove absorbent sealant backings that have become wet before sealant application and replace them with dry materials.
- C Install bond-breaker tape behind sealants where sealant backings are not used between sealants and backs of joints.
- D Install sealants using proven techniques that comply with the following and at the same time backings are installed:
 - 1. Place sealants so they directly contact and fully wet joint substrates.
 - 2. Completely fill recesses in each joint configuration.
 - 3. Produce uniform, cross-sectional shapes and depths relative to joint widths that allow optimum sealant movement capability.

- E Tooling of Nonsag Sealants: Immediately after sealant application and before skinning or curing begins, tool sealants according to requirements specified in subparagraphs below to form smooth, uniform beads of configuration indicated; to eliminate air pockets; and to ensure contact and adhesion of sealant with sides of joint.
1. Remove excess sealant from surfaces adjacent to joints.
 2. Use tooling agents that are approved in writing by sealant manufacturer and that do not discolor sealants or adjacent surfaces.
 3. Provide concave joint profile per Figure 8A in ASTM C 1193, unless otherwise indicated.

3.4 CLEANING

- A Clean off excess sealant or sealant smears adjacent to joints as the Work progresses by methods and with cleaning materials approved in writing by manufacturers of joint sealants and of products in which joints occur.

3.5 FIELD QUALITY CONTROL

- A Field-Adhesion Testing: Field test joint-sealant adhesion to joint substrates as follows:
1. Extent of Testing: Test completed elastomeric sealant joints as follows:
 - a. Perform 10 tests for the first 1000 feet of joint length for each type of elastomeric sealant and joint substrate.
 - b. Perform 1 test for each 1000 feet of joint length thereafter or 1 test per each floor per elevation.
 2. Test Method: Test joint sealants according to Method A, Field-Applied Sealant Joint Hand Pull Tab in Appendix X1 in ASTM C 1193, as appropriate for type of joint-sealant application indicated.
 - a. For joints with dissimilar substrates, verify adhesion to each substrate separately; do this by extending cut along one side, verifying adhesion to opposite side. Repeat procedure for opposite side.
 3. Inspect joints for complete fill, for absence of voids, and for joint configuration complying with specified requirements. Record results in a field-adhesion-test log.
 4. Inspect tested joints and report on the following:
 - a. Whether sealants in joints connected to pulled-out portion failed to adhere to joint substrates or tore cohesively. Include data on pull distance used to test each type of product and joint substrate. Compare these results to determine if adhesion passes sealant manufacturer's field-adhesion hand-pull test criteria.
 - b. Whether sealants filled joint cavities and are free of voids.
 - c. Whether sealant dimensions and configurations comply with specified requirements.
 5. Record test results in a field-adhesion-test log. Include dates when sealants were installed, names of persons who installed sealants, test dates, test locations, whether joints were primed, adhesion results and percent elongations, sealant fill, sealant configuration, and sealant dimensions.
 6. Repair sealants pulled from test area by applying new sealants following same procedures used originally to seal joints. Ensure that original sealant surfaces are clean and that new sealant contacts original sealant.
- B Evaluation of Field Test Results: Sealants not evidencing adhesive failure from testing or noncompliance with other indicated requirements will be considered satisfactory. Remove sealants that fail to adhere to joint substrates during testing or to comply with other requirements. Retest failed applications until test results prove sealants comply with indicated requirements.

3.6 PROTECTION

- A Protect joint sealants during and after curing period from contact with contaminating substances and from damage resulting from construction operations or other causes so sealants are without deterioration or damage at time of Final Acceptance. If, despite such protection, damage or deterioration occurs, cut out, remove, and repair damaged or deteriorated joint sealants immediately so installations with repaired areas are indistinguishable from original work.

END OF SECTION 07 92 00

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SECTION 07 95 13.13 - INTERIOR EXPANSION JOINT COVER ASSEMBLIES

PART 1 GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A Section Includes:
 - 1. Floor expansion joint covers.
 - 2.
 - 3. Supplementary components and accessories normally furnished or otherwise necessary for a complete installation.

1.3 REFERENCES

- A Definitions:
 - 1. Manufacturer: Means the expansion joint cover assembly manufacturer unless otherwise indicated.

1.4 SUBMITTALS

- A Action Submittals:
 - 1. Product Data: Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for expansion joint cover assemblies.
 - 2. Shop Drawings: For each expansion joint cover assembly.
 - a. Include plans, elevations, sections, details, splices, block-out requirement, attachments to other work, and line diagrams showing entire route of each expansion joint.
 - b. Where expansion joint cover assemblies change planes, provide isometric or clearly detailed drawing depicting how components interconnect.
- B Informational Submittals:
 - 1. Product Test Reports: For each fire-resistance-rated expansion joint cover assembly, for tests performed by a qualified testing agency, or by the manufacturer and witnessed by a qualified testing agency.

PART 2 PRODUCTS

2.1 ASSEMBLY DESCRIPTION

- A Furnish units in longest practicable lengths to minimize field splicing.
- B Include factory-fabricated closure materials and transition pieces, T-joints, corners, curbs, cross-connections, and other accessories as required to provide continuous expansion joint cover assemblies.

2.2 PERFORMANCE REQUIREMENTS

- A Fire-Resistance Ratings: Provide expansion joint cover assemblies with fire barriers identical to those of systems tested for fire resistance according to UL 2079 or ASTM E 1966 by a qualified testing agency.

2.3 FLOOR EXPANSION JOINT COVERS

- A Center-Plate Floor Joint Cover: Assembly consisting of center plate that slides over metal frames fixed to sides of joint gaps.
 - 1. Joint Cover:
 - a. Basis-of-Design Product: Subject to compliance with the Contract Documents, design is based on the following.
 - 1) "Model HFXR-2-1" as manufactured by MM Systems.

- b. Acceptable Manufacturers: Subject to compliance with the Contract Documents provide the basis-of-design product or comparable product by one of the following.
 - 1) Balco.
 - 2) Construction Specialties, Inc.
- 2. Application: Floor to floor, floor to corner.
- 3. Installation: Recessed (blockout mount).
- 4. Frames: Recessed to accept floor finish; verify with Architect.
- 5. Load Capacity: Pedestrian.
- 6. Fire-Resistance Rating: Not less than that indicated on the Drawings, as applicable.
- 7. Cover-Plate Design: Plain.
- 8. Exposed Metal: Manufacturer's standard; verify with Architect.

2.4 WALL EXPANSION JOINTS

A Aluminum Covers and Center Slide Plate:

- 1. Joint Cover
 - a. Basis-of-Design Product: Subject to compliance with the Contract Documents, design is based on the following.
 - 1) "Model EX-K2_STUD" as manufactured by MM Systems.
 - b. Acceptable Manufacturers: Subject to compliance with the Contract Documents provide the basis-of-design product or comparable product by one of the following.
 - 1) Balco.
 - 2) Construction Specialties, Inc.
- 2. Application: Wall to wall, wall to ceiling.
- 3. Frames: Aluminum covers with supporting factory-installed isolation gasket.
- 4. Fire-Resistance Rating: Not less than that indicated on the Drawings, as applicable.
- 5. Exposed Metal: Clear anodized, unless otherwise indicated. Verify with Architect.

2.5 MATERIALS

- A Aluminum: ASTM B 221, Alloy 6063-T5 for extrusions; ASTM B 209, Alloy 6061-T6 for sheet and plate.
 - 1. Apply manufacturer's standard protective coating on aluminum surfaces to be placed in contact with cementitious materials.
- B Fire Barriers: Any material or material combination, when fire tested after cycling, designated to resist the passage of flame and hot gases through a movement joint and to comply with performance criteria for required fire-resistance rating.
- C Nonmetallic, Shrinkage-Resistant Grout: ASTM C 1107/C 1107M, factory-packaged, nonmetallic aggregate grout, noncorrosive, nonstaining, mixed with water to consistency suitable for application and a 30-minute working time.

2.6 ACCESSORIES

- A Manufacturer's standard attachment devices. Include anchors, clips, fasteners, set screws, spacers, and other accessories compatible with material in contact, as indicated or required for complete installations.

PART 3 EXECUTION

3.1 EXAMINATION

- A Examine surfaces where expansion joint cover assemblies will be installed for installation tolerances and other conditions affecting performance of the work.
- B Do not proceed with installation until unsatisfactory conditions have been corrected.
 - 1. Installation of expansion joint cover assemblies indicates acceptance of surfaces and conditions.

3.2 PREPARATION

- A Prepare substrates according to the manufacturer's written instructions.
- B Coordinate and furnish anchorages, setting drawings, and instructions for installing expansion joint cover assemblies. Provide fasteners of metal, type, and size to suit type of construction indicated and to provide for secure attachment of expansion joint cover assemblies.

3.3 INSTALLATION

- A Comply with manufacturer's written instructions for storing, handling, and installing expansion joint cover assemblies and materials unless more stringent requirements are indicated.
- B Metal Frames: Perform cutting, drilling, and fitting required to install expansion joint cover assemblies.
 - 1. Repair or grout block out as required for continuous frame support using nonmetallic, shrinkage-resistant grout.
 - 2. Install frames in continuous contact with adjacent surfaces.
 - a. Shimming is not permitted.
 - 3. Install in true alignment and proper relationship to joints and adjoining finished surfaces measured from established lines and levels.
 - 4. Adjust for differences between actual structural gap and nominal design gap due to ambient temperature at time of installation.
 - 5. Cut and fit ends to accommodate thermal expansion and contraction of metal without buckling of frames.
 - 6. Locate anchors at interval recommended by manufacturer, but not less than 3 inches from each end and not more than 24 inches on center.
- C Install with hairline mitered corners where expansion joint cover assemblies change direction or abut other materials.
- D Terminate exposed ends of expansion joint cover assemblies with field- or factory-fabricated termination devices.
- E Fire-Resistance-Rated Assemblies: Coordinate installation of expansion joint cover assembly materials and associated work so complete assemblies comply with performance requirements.
 - 1. Fire Barriers: Install fire barriers to provide continuous, uninterrupted fire resistance throughout length of joint, including transitions and field splices.

3.4 PROTECTION

- A Do not remove protective covering until finish work in adjacent areas is complete. When protective covering is removed, clean exposed metal surfaces to comply with manufacturer's written instructions.
- B Protect the installation from damage by work of other Specification Sections. Where necessary due to heavy construction traffic, remove and properly store cover plates or seals and install temporary protection over expansion joint cover assemblies. Reinstall cover plates or seals prior to Final Acceptance.

END OF SECTION 07 95 13.13

January 15, 2026

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SECTION 07 95 13.16 - EXTERIOR EXPANSION JOINT COVER ASSEMBLIES

PART 1 GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A Section Includes:
 - 1. Exterior expansion joint covers.
 - 2. Supplementary components and accessories normally furnished or otherwise necessary for a complete installation or application.

1.3 REFERENCES

- A Definitions:
 - 1. Manufacturer: Means the expansion joint cover assembly manufacturer unless otherwise indicated.

1.4 SUBMITTALS

- A Action Submittals:
 - 1. Product Data: For each type of product.
 - a. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for expansion joint cover assemblies.
 - 2. Shop Drawings: For each expansion joint cover assembly.
 - a. Include plans, elevations, sections, details, splices, block-out requirement, attachments to other work, and line diagrams showing entire route of each expansion joint.
 - b. Where expansion joint cover assemblies change planes, provide isometric or clearly detailed drawing depicting how components interconnect.
 - 3. Samples: For each type of expansion joint cover assembly, full width by 6 inches long in size.
- B Informational Submittals:
 - 1. Product Test Reports: For each fire-resistance-rated expansion joint cover assembly, for tests performed by manufacturer and witnessed by a qualified testing agency or by a qualified testing agency.

PART 2 PRODUCTS

2.1 ASSEMBLY DESCRIPTION

- A Furnish units in longest practicable lengths to minimize field splicing.
- B Include factory-fabricated closure materials and transition pieces, T-joints, corners, curbs, cross-connections, and other accessories as required to provide continuous expansion joint cover assemblies.

2.2 PERFORMANCE REQUIREMENTS

- A Fire-Resistance Ratings: Provide expansion joint cover assemblies with fire barriers identical to those of systems tested for fire resistance according to UL 2079 or ASTM E 1966 by a qualified testing agency.
 - 1. Hose Stream Test: Wall-to-wall and wall-to-soffit assemblies shall be subjected to hose stream testing.

2.3 EXTERIOR EXPANSION JOINT COVERS

- A Manufacturers:

1. Basis-of-Design Manufacturer: Subject to compliance with the Contract Documents, design is based on products by the following.
 - a. Construction Specialties.
 2. Acceptable Manufacturers: Subject to compliance with the Contract Documents, provide the basis-of-design products or comparable products by one of the following.
 - a. Balco
 - b. Inpro.
 - B Exterior Elastomeric-Seal Joint Cover: Assembly consisting of elastomeric seal anchored to surface-mounted frames fixed to sides of joint gap.
 1. Joint Cover:
 - a. Basis-of-Design Product: Subject to compliance with the Contract Documents, design is based on the following.
 - 1) "Model VSS-200" as manufactured by MM Systems.
 - b. Acceptable Manufacturers: Subject to compliance with the Contract Documents provide the basis-of-design product or comparable product by one of the following.
 - 1) Balco.
 - 2) Construction Specialties, Inc.
 2. Application: As indicated on the Drawings.
 3. Fire-Resistance Rating: Not less than that indicated on Drawings, as applicable.
 4. Seal: Preformed elastomeric membrane or extrusion.
 - a. Color: As selected by Architect from manufacturer's full range.
- 2.4 ACCESSORIES
- A Moisture Barriers: Manufacturer's standard continuous, waterproof membrane within joint and attached to substrate on sides of joint.
 - B Manufacturer's standard attachment devices. Include anchors, clips, fasteners, set screws, spacers, and other accessories compatible with material in contact, as indicated or required for complete installations.

PART 3 EXECUTION

3.1 EXAMINATION

- A Examine surfaces where expansion joint cover assemblies will be installed for installation tolerances and other conditions affecting performance of the work.
- B Do not proceed with installation until unsatisfactory conditions have been corrected.
 1. Installation of expansion joint assemblies indicates acceptance of surfaces and conditions.

3.2 PREPARATION

- A Prepare substrates according to the manufacturer's written instructions.
- B Coordinate and furnish anchorages, setting drawings, and instructions for installing expansion joint cover assemblies. Provide fasteners of metal, type, and size to suit type of construction indicated and to provide for secure attachment of expansion joint cover assemblies.

3.3 INSTALLATION

- A Comply with manufacturer's written instructions for storing, handling, and installing expansion joint cover assemblies and materials unless more stringent requirements are indicated.
- B Metal Frames: Perform cutting, drilling, and fitting required to install expansion joint cover assemblies.
 1. Install in true alignment and proper relationship to joints and adjoining finished surfaces measured from established lines and levels.
 2. Adjust for differences between actual structural gap and nominal design gap due to ambient temperature at time of installation.
 3. Cut and fit ends to accommodate thermal expansion and contraction of metal without buckling of frames.

4. Install frames in continuous contact with adjacent surfaces.
 - a. Shimming is not permitted.
5. Locate anchors at interval recommended by manufacturer, but not less than 3 inches from each end and not more than 24 inches on center.
- C Elastomeric Seals: Install elastomeric seals and membranes in frames to comply with manufacturer's written instructions. Install with minimum number of end joints.
 1. Provide in continuous lengths for straight sections.
 2. Seal transitions. Vulcanize or heat-weld field-spliced joints as recommended by manufacturer.
 3. Mechanically lock seals into frames or adhere to frames with adhesive or pressure-sensitive tape as recommended by manufacturer.
- D Install with hairline mitered corners where expansion joint cover assemblies change direction or abut other materials.
- E Terminate exposed ends of expansion joint cover assemblies with field- or factory-fabricated termination devices.

3.4 PROTECTION

- A Protect the installation from damage by work of other Specification Sections.

END OF SECTION 07 95 13.16

January 15, 2026

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SECTION 08 11 13 - HOLLOW METAL DOORS AND FRAMES

PART 1 GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A Section Includes:
 - 1. Interior standard steel frames.
 - 2. Exterior standard steel doors and frames.
 - 3. Supplementary components and accessories normally furnished or otherwise necessary for a complete installation.

1.3 REFERENCES

- A Acronyms and Abbreviations:
 - 1. AHJ: Authority (Authorities) Having Jurisdiction.
 - 2. BHMA: Builders Hardware Manufacturers Association.
 - 3. DHI: Door and Hardware Institute.
 - 4. SDI: Steel Door Institute.
- B Definitions:
 - 1. Manufacturer: Means the hollow metal door and frame manufacturer unless otherwise indicated.
 - 2. Minimum Thickness: Minimum thickness of base metal without coatings in accordance with ANSI/SDI A250.8.

1.4 COORDINATION

- A Coordinate anchorage installation for hollow-metal frames. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors. Deliver such items to Project site in time for installation.
- B Coordinate requirements for installation of door hardware, electrified door hardware, and access control and security systems.

1.5 SUBMITTALS

- A Action Submittals:
 - 1. Product Data: For each type of product; include Environmental Product Declaration.
 - a. Include construction details, material descriptions, core descriptions, and finishes.
 - 2. Shop Drawings: Include the following:
 - a. Elevations of each door type.
 - b. Details of doors, including vertical- and horizontal-edge details and metal thicknesses.
 - c. Frame details for each frame type, including dimensioned profiles and metal thicknesses.
 - d. Locations of reinforcement and preparations for hardware.
 - e. Details of each different wall opening condition.
 - f. Details of electrical raceway and preparation for electrified hardware, access control systems, and security systems.
 - g. Details of anchorages, joints, field splices, and connections.
 - h. Details of accessories.
 - 3. Product Schedule: For hollow-metal doors and frames, prepared by or under the supervision of supplier, using same reference numbers for details and openings as those on Drawings. Coordinate with final door hardware schedule.
- B Informational Submittals:
 - 1. Qualification Data: For door inspector.

- a. Fire-Rated Door Inspector: Submit documentation of compliance with NFPA 80, Section 5.2.3.1.
 - b. Egress Door Inspector: Submit documentation of compliance with NFPA 101, Section 7.2.1.15.4.
 - c. If acceptable to AHJ, in lieu of documentations indicated above, submit copy of DHI Fire and Egress Door Assembly Inspector (FDAI) certificate.
2. Product Test Reports: For each type of fire-rated hollow-metal door and frame assembly and thermally rated door assemblies for tests performed by a qualified testing agency indicating compliance with performance requirements.
- C Closeout Submittals:
1. Record Documents: For fire-rated doors, list of door numbers and applicable room name and number to which door accesses.

1.6 QUALITY ASSURANCE

- A Fire-Rated Door Inspector Qualifications: Inspector for field quality control inspections of fire-rated door assemblies is to meet the qualifications set forth in NFPA 80, section 5.2.3.1 and the following:
1. Door and Hardware Institute FDAI certification, or other DHI certification if acceptable to the AHJ.
- B Egress Door Inspector Qualifications: Inspector for field quality-control inspections of egress door assemblies is to meet the qualifications set forth in NFPA 101, Section 7.2.1.15.4 and the following:
1. Door and Hardware Institute Fire and Egress Door Assembly Inspector (FDAI) certification.
 2. Other DHI certification if acceptable to the AHJ.

1.7 DELIVERY, STORAGE, AND HANDLING

- A Deliver hollow-metal doors and frames palletized, packaged, or crated to provide protection during transit and Project-site storage. Do not use nonvented plastic.
- B Deliver welded frames with 2 removable spreader bars across bottom of frames, tack welded to jambs and mullions.
- C Store hollow-metal doors and frames vertically under cover at Project site with head up. Place on at least 4-inch- high blocking. Provide at least 1/4-inch space between each stacked door to permit air circulation.

PART 2 PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A Fire-Rated Door Assemblies: Assemblies complying with NFPA 80 that are listed and labeled by a qualified testing agency acceptable to the AHJ for fire-protection ratings indicated on Drawings, based on testing at positive pressure in accordance with NFPA 252 or UL 10C.
- B Thermally Rated Door Assemblies: Provide door assemblies with U-factor of not more than 0.50 deg Btu/F x h x sq. ft. when tested in accordance with ASTM C 1363 or ASTM E 1423.

2.2 MANUFACTURERS

- A Hollow Metal Doors and Frames:
1. Basis-of-Design Manufacturer: Subject to compliance with the Contract Documents the design is based on products the following.
 - a. Steelcraft; an Allegion company.
 2. Acceptable Manufacturers: Subject to compliance with the Contract Documents provide products by the basis-of-design manufacturer or comparable products by one of the following.
 - a. CECO Door; an ASSA ABLOY Group company.
 - b. CURRIES; an ASSA ABLOY Group company.
 - c. Republic Doors and Frames; an Allegion company.

2.3 INTERIOR STANDARD STEEL DOORS AND FRAMES

- A General: Construct hollow-metal doors and frames to comply with standards indicated for materials, fabrication, hardware locations, hardware reinforcement, tolerances, and clearances, and as specified.
- B Heavy-Duty Doors and Frames: ANSI/SDI A250.8, Level 2; ANSI/SDI A250.4, Level B.
 - 1. Doors:
 - a. Type: As indicated in the Door Schedule.
 - b. Thickness: 1-3/4 inches
 - c. Face: Uncoated steel sheet, at least 0.042 inch
 - d. Edge Construction: Model 1, Full Flush.
 - e. Edge Bevel: Provide manufacturer's standard beveled or square edges.
 - f. Core: Manufacturer's standard.
 - g. Fire-Rated Core: Manufacturer's standard core for fire-rated doors.
- C Heavy-Duty Frames: ANSI/SDI A250.8, Level 2.
 - 1. Frames:
 - a. Materials: Uncoated steel sheet, at least 0.053 inch.
 - b. Sidelite Frames: Fabricated from same thickness material as adjacent door frame.
 - c. Construction: Full profile welded.
 - 2. Exposed Finish: Factory prime.

2.4 EXTERIOR STANDARD HOLLOW METAL DOORS AND FRAMES

- A Extra-Heavy-Duty Doors and Frames: ANSI/SDI A250.8, Level 3; ANSI/SDI A250.4, Level A.
 - 1. Doors:
 - a. Type: As indicated in the Door and Frame Schedule.
 - b. Thickness: 1-3/4 inches.
 - c. Face: Metallic-coated steel sheet, at least 0.053 inch thick, with at least A60 coating.
 - d. Edge Construction: Model 1, Full Flush.
 - e. Edge Bevel: Provide manufacturer's standard beveled or square edges.
 - f. Top Edge Closures: Close top edges of doors with flush closures of same material as face sheets. Seal joints against water penetration.
 - g. Bottom Edges: Close bottom edges of doors where required for attachment of weather stripping with end closures or channels of same material as face sheets. Provide weep-hole openings in bottoms of exterior doors to permit moisture to escape.
 - h. Core: Manufacturer's standard.
 - i. Fire-Rated Core: Manufacturer's standard vertical steel stiffener with insulation or laminated mineral board core for fire-rated doors.
 - 2. Frames:
 - a. Materials: Metallic-coated steel sheet, at least 0.053 inch, with at least A60 coating.
 - b. Construction: Full profile welded.
 - 3. Exposed Finish: Factory prime.

2.5 FRAME ANCHORS

- A Jamb Anchors:
 - 1. Type: Anchors of minimum size and type required by applicable door and frame standard, and suitable for performance level indicated.
 - 2. Quantity: At least 3 anchors per jamb, with 1 additional anchor for frames with no floor anchor. Provide 1 additional anchor for each 24 inches of frame height above 7 feet.
 - 3. Postinstalled Expansion Anchor: At least 3/8-inch- diameter bolts with expansion shields or inserts, with manufacturer's standard pipe spacer.
- B Floor Anchors: Provide floor anchors for each jamb and mullion that extends to floor.
- C Floor Anchors for Concrete Slabs with Underlayment: Adjustable-type anchors with extension clips, allowing not less than 2-inch height adjustment. Terminate bottom of frames at top of underlayment.
- D Material: ASTM A 879/A 879M, Commercial Steel (CS), 04Z designation; mill phosphatized.

1. For anchors built into exterior walls, steel sheet complying with ASTM A 1008/A 1008M or ASTM A 1011/A 1011M; hot-dip galvanized in accordance with ASTM A 153/A 153M, Class B.

2.6 MATERIALS

- A Cold-Rolled Steel Sheet: ASTM A 1008/A 1008M, Commercial Steel (CS), Type B; suitable for exposed applications.
- B Hot-Rolled Steel Sheet: ASTM A 1011/A 1011M, Commercial Steel (CS), Type B; free of scale, pitting, or surface defects; pickled and oiled.
- C Metallic-Coated Steel Sheet: ASTM A 653/A 653M, Commercial Steel (CS), Type B.
- D Inserts, Bolts, and Fasteners: Hot-dip galvanized in accordance with ASTM A 153/A 153M.
- E Power-Actuated Fasteners in Concrete: Fastener system of type suitable for application indicated, fabricated from corrosion-resistant materials, with clips or other accessory devices for attaching hollow-metal frames of type indicated.
- F Mineral-Fiber Insulation: ASTM C 665, Type I (blankets without membrane facing); consisting of fibers manufactured from slag or rock wool; with flame-spread and smoke-developed indexes of no more than 25 and 50, respectively; passing ASTM E 136 for combustion characteristics.

2.7 FABRICATION

- A Hollow-Metal Frames: Fabricate in one piece except where handling and shipping limitations require multiple sections. Where frames are fabricated in sections, provide alignment plates or angles at each joint, fabricated of metal of same or greater thickness as frames.
 1. Sidelite Frames: Provide closed tubular members with no visible face seams or joints, fabricated from same material as door frame. Fasten members at crossings and to jambs by welding.
 2. Provide countersunk, flat- or oval-head exposed screws and bolts for exposed fasteners unless otherwise indicated.
 3. Door Silencers: Except on weather-stripped frames, drill stops to receive door silencers as follows. Keep holes clear during construction.
 - a. Single-Door Frames: Drill stop in strike jamb to receive 3 door silencers.
 - b. Double-Door Frames: Drill stop in head jamb to receive 2 door silencers.
- B Hardware Preparation: Factory prepare hollow-metal doors and frames to receive templated mortised hardware, and electrical wiring; include cutouts, reinforcement, mortising, drilling, and tapping in accordance with ANSI/SDI A250.6, the Door Hardware Schedule, and templates.
 1. Reinforce doors and frames to receive nontemplated, mortised, and surface-mounted door hardware.
 2. Comply with BHMA A156.115 for preparing hollow-metal doors and frames for hardware.

2.8 STEEL FINISHES

- A Prime Finish: Clean, pretreat, and apply manufacturer's standard primer.
 1. Shop Primer: Manufacturer's standard, fast-curing, lead- and chromate-free primer complying with ANSI/SDI A250.10; recommended by primer manufacturer for substrate; compatible with substrate and field-applied coatings despite prolonged exposure.

PART 3 EXECUTION

3.1 PREPARATION

- A Remove welded-in shipping spreaders installed at factory. Restore exposed finish by grinding, filling, and dressing, as required to make repaired area smooth, flush, and invisible on exposed faces. Touch up factory-applied finishes where spreaders are removed.
- B Drill and tap doors and frames to receive nontemplated, mortised, and surface-mounted door hardware.

3.2 INSTALLATION

- A Install hollow-metal doors and frames plumb, rigid, properly aligned, and securely fastened in place. Comply with approved Shop Drawings and with manufacturer's written instructions.
- B Hollow-Metal Frames: Comply with ANSI/SDI A250.11.
 - 1. Set frames accurately in position; plumbed, aligned, and braced securely until permanent anchors are set. After wall construction is complete, remove temporary braces without damage to completed work.
 - a. Where frames are fabricated in sections, field splice at approved locations by welding face joint continuously; grind, fill, dress, and make splice smooth, flush, and invisible on exposed faces. Touch-up finishes.
 - 2. Floor Anchors: Secure with postinstalled expansion anchors.
 - a. Floor anchors may be set with power-actuated fasteners instead of postinstalled expansion anchors if so indicated and approved on Shop Drawings.
 - 3. Solidly pack mineral-fiber insulation inside frames.
 - 4. Installation Tolerances: Adjust hollow-metal frames to the following tolerances:
 - a. Squareness: Plus or minus 1/16 inch, measured at door rabbet on a line 90 degrees from jamb perpendicular to frame head.
 - b. Alignment: Plus or minus 1/16 inch, measured at jambs on a horizontal line parallel to plane of wall.
 - c. Twist: Plus or minus 1/16 inch, measured at opposite face corners of jambs on parallel lines, and perpendicular to plane of wall.
 - d. Plumbness: Plus or minus 1/16 inch, measured at jambs at floor.
- C Hollow-Metal Doors: Fit and adjust hollow-metal doors accurately in frames, within clearances specified below.
 - 1. Non-Fire-Rated Steel Doors: Comply with ANSI/SDI A250.8.
 - 2. Fire-Rated Openings: Install frames in accordance with NFPA 80.

3.3 FIELD QUALITY CONTROL

- A Inspection Agency: Engage a qualified inspector to perform inspections and to furnish reports to Architect.
- B Inspections:
 - 1. Fire-Rated Door Inspections: Inspect each fire-rated door in accordance with NFPA 80, Section 5.2.
 - 2. Egress Door Inspections: Inspect each door equipped with panic hardware, each door located in an exit enclosure, each electrically controlled egress door, and each door equipped with special locking arrangements in accordance with NFPA 101, Section 7.2.1.15.
- C Repair or remove and replace installations where inspections indicate that they do not comply with specified requirements.
- D Reinspect repaired or replaced installations to determine if replaced or repaired door assembly installations comply with specified requirements.

3.4 REPAIR

- A Prime-Coat Touchup: Immediately after erection, sand smooth rusted or damaged areas of prime coat and apply touchup of compatible air-drying, rust-inhibitive primer.

END OF SECTION 08 11 13 08 11 13

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SECTION 08 14 16 - FLUSH WOOD DOORS

PART 1 GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A Section Includes:
 - 1. Solid-core flush wood doors.
 - 2. Factory fitting flush wood doors to frames and factory machining for hardware.
 - 3. Supplementary components and accessories normally furnished or otherwise necessary for a complete installation.

1.3 REFERENCES

- A Acronyms and Abbreviations:
 - 1. AHJ: Authority (Authorities) Having Jurisdiction.
 - 2. BHMA: Builders Hardware Manufacturers Association.
 - 3. DHI: Door and Hardware Institute.
 - 4. WDMA: Window & Door Manufacturers Association.
- B Definitions:
 - 1. Manufacturer: Means the door manufacturer unless otherwise indicated.

1.4 SUBMITTALS

- A Action Submittals:
 - 1. Product Data: For each type of product. Include the following:
 - a. Door core materials and construction.
 - b. Door edge construction
 - c. Door face type and characteristics.
 - d. Door trim for openings.
 - e. Factory-machining criteria.
 - f. Current Health Product Declaration.
 - g. Current Environmental Product Declaration.
 - 2. Shop Drawings: Indicate location, size, and hand of each door; elevation of each type of door; construction details not covered in Product Data; and the following:
 - a. Door schedule indicating door location, type, size, fire protection rating, and swing.
 - b. Door elevations, dimension and locations of hardware.
 - c. Details of electrical raceway and preparation for electrified hardware, access control systems, and security systems.
 - d. Dimensions and locations of blocking for hardware attachment.
 - e. Dimensions and locations of mortises and holes for hardware.
 - f. Clearances and undercuts.
 - 3. Samples: Only required, in manufacturer's standard size, if other than the basis-of-design product will be provided for the Project.
- B Informational Submittals:
 - 1. Qualification Data: For door inspector.
 - a. Fire-Rated Door Inspector: Submit documentation of compliance with NFPA 80, Section 5.2.3.1.
 - b. Egress Door Inspector: Submit documentation of compliance with NFPA 101, Section 7.2.1.15.4.
 - 2. Field quality-control reports.
 - 3. Sample Warranty: For special warranty.
- C Closeout Submittals:

1. Maintenance Data: For doors to include in maintenance manuals.
2. Record Documents: For fire-rated doors, list of door numbers and applicable room name and number to which door accesses.

1.5 QUALITY ASSURANCE

- A Fire-Rated Door Inspector Qualifications: Inspector for field quality-control inspections of fire-rated door assemblies complies with qualifications set forth in NFPA 80, Section 5.2.3.1 and the following:
 1. DHI's Fire and Egress Door Assembly Inspector (FDAI) certification, or other DHI certification if acceptable to the AHJ.
- B Egress Door Inspector Qualifications: Inspector for field quality-control inspections of egress door assemblies complies with qualifications set forth in NFPA 101, Section 7.2.1.15.4 and the following:
 1. DHI's Fire and Egress Door Assembly Inspector (FDAI) certification, or other DHI certification if acceptable to the AHJ.

1.6 DELIVERY, STORAGE, AND HANDLING

- A Comply with requirements of referenced standard and manufacturer's written instructions.
- B Package doors as standard with the manufacturer: (1) individually in plastic bags or cardboard cartons; or (2) individually in cardboard cartons, and wrap bundles of doors in plastic sheeting.
- C Mark each door on top and bottom rail with opening number used on Shop Drawings.

1.7 PROJECT CONDITIONS

- A Environmental Limitations: Do not deliver or install doors until spaces are enclosed and weathertight, wet work in spaces is complete and dry, and HVAC system is operating and maintaining ambient temperature and humidity conditions at occupancy levels during the remainder of the construction period.

1.8 WARRANTY

- A Special Warranty: Manufacturer agrees to repair or replace doors that fail in materials or workmanship within specified warranty period.
 1. Failures include:
 - a. Warping (bow, cup, or twist) more than 1/4 inch in a 42-by-84-inch section.
 - b. Telegraphing of core construction in face veneers exceeding 0.01 inch in a 3-inch span.
 2. Warranty Period for Solid-Core Interior Doors: Life of installation.

PART 2 PRODUCTS

2.1 SOURCE LIMITATIONS

- A Obtain flush wood doors from single manufacturer.

2.2 PERFORMANCE REQUIREMENTS

- A Fire-Rated Wood Door and Frame Assemblies: Assemblies complying with NFPA 80 that are listed and labeled by a qualified testing agency acceptable to the AHJ, for fire-protection ratings indicated on Drawings, based on testing at positive pressure in accordance with UL 10C or NFPA 252.

2.3 MANUFACTURERS

- A Manufacturers:
 1. Basis-of-Design Product: Subject to compliance with the Contract Documents design is based on the following.
 - a. "Aspiro Series" doors as manufactured by Forte Opening Solutions (formerly Masonite).
- B Acceptable Manufacturers: Subject to compliance with the Contract Documents provide the basis-of-design product or comparable acceptable product by one of the following manufacturers.

1. VT Industries, Inc.
2. Oshkosh Door Company.

2.4 FLUSH WOOD DOORS, GENERAL

- A Quality Standard: In addition to requirements specified, comply with ANSI/WDMA I.S. 1A.

2.5 SOLID-CORE 5-PLY FLUSH WOOD VENEER-FACED DOORS FOR TRANSPARENT FINISH

A Interior Doors:

1. Performance Grade: ANSI/WDMA I.S. 1A: Extra Heavy Duty.
2. ANSI/WDMA I.S. 1A Grade: Custom.
3. Faces: Single-ply wood veneer not less than 1/50 inch thick. Provide the following.
 - a. Species: As selected by the Architect.
 - b. Cut: As selected by the Architect.
 - c. Match Between Veneer Leaves: As selected by the Architect.
 - d. Assembly of Veneer Leaves on Door Faces: Balance match.
 - e. Pair and Set Match: Provide for doors hung in same opening.
4. Exposed Vertical Edges: Same species as faces or a compatible species.
5. Core for Non-Fire-Rated Doors: Manufacturer's standard unless extra-heavy-duty particleboard cores are required for surface-mounted hardware.
 - a. ANSI A208.1, Grade LD-2 particleboard.
 - 1) Blocking: Provide wood blocking in particleboard-core doors as follows:
 - (a) 5-inch top-rail blocking, in doors indicated to have closers.
 - (b) 5-inch bottom-rail blocking, in doors indicated to have kick, mop, or armor plates.
 - 2) Provide doors with WDMA I.S. 10 structural-composite-lumber cores instead of particleboard cores for doors scheduled to receive exit devices.
 - b. WDMA I.S. 10 structural composite lumber.
 - 1) Screw Withdrawal, Door Face: 550 lbf.
 - 2) Screw Withdrawal, Vertical Door Edge: 550 lbf.
6. Core for Fire-Rated Doors: Manufacturer's standard as required to achieve fire-protection rating indicated on Drawings.
7. Construction: 5 plies, hot-pressed bonded (vertical and horizontal edging is bonded to core), with entire unit abrasive planed before veneering.

2.6 FABRICATION

- A Factory fit doors to suit frame-opening sizes indicated.
1. Comply with clearance requirements of referenced quality standard for fitting unless otherwise indicated.
- B Factory machine doors for hardware that is not surface applied.
1. Locate hardware to comply with DHI-WDHS-3.
 2. Comply with final hardware schedules, door frame Shop Drawings, hardware templates, and ANSI/BHMA-156.115-W.
 3. Coordinate with hardware mortises in metal frames, to verify dimensions and alignment before factory machining.

2.7 FACTORY FINISHING

- A Comply with referenced quality standard for factory finishing.
1. Complete fabrication, including fitting doors for openings and machining for hardware that is not surface applied, before finishing.
 2. Finish faces, all 4 edges, edges of cutouts, and mortises.
 3. Stains and fillers may be omitted on bottom edges, edges of cutouts, and mortises.
- B Factory finish doors.
- C Transparent Finish:
1. ANSI/WDMA I.S. 1A Grade: Custom.

- a. TR-8 UV Cured Acrylated Polyester/Urethane.
- 2. Staining: As selected by the Architect.
- 3. Sheen: As selected by the Architect.

PART 3 EXECUTION

3.1 EXAMINATION

- A Examine doors and installed door frames, with installer present, before hanging doors.
 - 1. Verify that installed frames comply with indicated requirements for type, size, location, and swing characteristics and have been installed with level heads and plumb jambs.
 - 2. Reject doors with defects.
- B Do not proceed with installation until unsatisfactory conditions have been corrected.
 - 1. Installation of doors indicates acceptance of surfaces and conditions.

3.2 INSTALLATION

- A Hardware: As specified in Section 08 71 00 Door Hardware.
- B Install doors to comply with manufacturer's written instructions and referenced quality standard, and as indicated.
 - 1. Install fire-rated doors in accordance with NFPA 80.
- C Factory-Fitted Doors: Align in frames for uniform clearance at each edge.

3.3 FIELD QUALITY CONTROL

- A Inspection Agency: Engage a qualified inspector to perform inspections and to furnish reports to Architect.
- B Inspections:
 - 1. Fire-Rated Door Inspections: Inspect each fire-rated door in accordance with NFPA 80, Section 5.2.
 - 2. Egress Door Inspections: Inspect each door equipped with panic hardware, each door equipped with fire exit hardware, each door located in an exit enclosure, each electrically controlled egress door, and each door equipped with special locking arrangements in accordance with NFPA 101, Section 7.2.1.15.
- C Repair or remove and replace installations where inspections indicate that they do not comply with specified requirements.
- D Reinspect repaired or replaced installations to determine if replaced or repaired door assembly installations comply with specified requirements.
- E Prepare and submit separate inspection report for each fire-rated door assembly indicating compliance with each item listed in NFPA 80 and NFPA 101.

3.4 ADJUSTING

- A Operation: Rehang or replace doors that do not swing or operate freely.
- B Finished Doors: Replace doors that are damaged or that do not comply with requirements. Doors may be repaired or refinished if work complies with requirements and shows no evidence of repair or refinishing as determined by the Architect.

END OF SECTION 08 14 16

SECTION 08 31 13 - ACCESS DOORS AND FRAMES

PART 1 GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A Section Includes:
 - 1. Access door assemblies.
 - 2. Supplementary components and accessories normally furnished or otherwise necessary for a complete installation.

1.3 REFERENCES

- A Acronyms and Abbreviations:
 - 1. MSG: Manufacturer's Standard Gauge.
- B Definitions:
 - 1. Manufacturer: Means the access door assembly manufacturer unless otherwise indicated.

1.4 ACTION SUBMITTALS

- A Product Data: For each type of product; include Health Product Declaration and Environmental Product Declaration.
 - 1. Include construction details material descriptions, dimensions of individual components and profiles, and finishes.

PART 2 PRODUCTS

2.1 ACCESS DOORS AND FRAMES

- A Flush Access Doors with Exposed Flanges:
 - 1. Manufacturers: Subject to compliance with the Contract Documents, provide products by one of the following.
 - a. Acudor Products, Inc.
 - b. Babcock-Davis.
 - c. Karp Associates, Inc.
 - d. Nystrom, Inc.
 - e. Milcor; Duravent Group.
 - 2. Description: Face of door flush with frame, with exposed flange and concealed hinge.
 - 3. Door Size(s): As indicated on the Drawings.
 - 4. Uncoated Steel Sheet for Door: Nominal 0.060 inch, factory primed for shop painting.
 - a. Color(s) and Sheen(s): Verify locations and gloss levels and colors with Architect.
 - 5. Frame Material: Same material and thickness as door.
 - 6. Latch and Lock: Cam latch, screwdriver operated.

2.2 MATERIALS

- A Steel Plates, Shapes, and Bars: ASTM A 36/A 36M.
- B Steel Sheet: Uncoated or electrolytic zinc coated, ASTM A 879/A 879M, with cold-rolled steel sheet substrate complying with ASTM A 1008/A 1008M, Commercial Steel (CS), exposed.
- C Inserts, Bolts, and Anchor Fasteners: Hot-dip galvanized steel according to ASTM A 153/A 153M or ASTM F 2329.
- D Accessories: As supplied, recommended, or required by the manufacturer and as necessary for a complete installation.

2.3 FABRICATION

- A General: Provide access door assemblies manufactured as integral units ready for installation.

PART 3 EXECUTION

3.1 EXAMINATION

- A Examine substrates for compliance with requirements for installation tolerances and other conditions affecting performance of the work.
- B Do not proceed with installation until unsatisfactory conditions have been corrected.
 - 1. Installation of access door assemblies indicates acceptance of surfaces and conditions.

3.2 INSTALLATION

- A Comply with manufacturer's written instructions for installing access doors and frames.

3.3 ADJUSTING

- A Adjust doors and hardware, after installation, for proper operation.

END OF SECTION 08 31 13

SECTION 08 33 43 - OVERHEAD COILING SMOKE CURTAINS

PART 1 GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A Section Includes:
 - 1. Overhead coiling smoke-protective curtains for elevator doors.
 - 2. Supplementary components and accessories normally furnished or otherwise necessary for a complete installation, whether or not such items are included in the Specifications or indicated on the Drawings.

1.3 REFERENCES

- A Acronyms and Abbreviations:
 - 1. AHJ: Authority (Authorities) Having Jurisdiction.
 - 2. MSG: Manufacturer's Standard Gauge.
- B Definitions:
 - 1. Manufacturer: Means the overhead coiling smoke-protective curtain manufacturer unless otherwise indicated.
 - 2. Smoke Curtain(s): Means the overhead coiling smoke-protective curtain assembly(ies).

1.4 COORDINATION

- A Coordinate smoke curtains with the following:
 - 1. Power, signal, fire-alarm, and smoke-detection systems.
 - 2. Elevator hoistway door frames.
 - 3. Ceilings for operational clearances and maintenance access requirements.
 - 4. Walls for support requirements, rating continuity above ceilings, and recessed wall switches.
 - 5. Requirements for metal supports.

1.5 SUBMITTALS

- A Action Submittals:
 - 1. Product Data: For smoke curtains. Include manufacturer's technical data, installation instructions, and recommendations and requirements for proper storage and handling.
 - 2. Shop Drawings: Plans, elevations, sections, full-size details, and attachments to other work.
- B Informational Submittals:
 - 1. Qualifications Data: For installer.
 - 2. Warranty information.
 - 3. Field quality-control reports.
- C Closeout Submittals:
 - 1. Maintenance Data: For smoke curtains to include in maintenance manuals.

1.6 QUALITY ASSURANCE

- A Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by manufacturer for both installation and maintenance of units required for this Project.

1.7 DELIVERY, STORAGE, AND HANDLING

- A Deliver materials in original packages bearing manufacturer's labels in accordance with the manufacturer's instructions and recommendations.
- B Protect materials from damage. Store inside and in a dry location. Comply with manufacturer's written instructions for handling, storing, and protecting during installation

1.8 FIELD CONDITIONS

- A Field Measurements: Verify dimensions of other construction by field measurements before fabrication and indicate measurements on Shop Drawings.

1.9 WARRANTY

- A Materials Warranty: Manufacturer agrees to repair or replace smoke curtains that fail within specified warranty period.
 - 1. Warranty Period: 1 year from date of Final Acceptance.

PART 2 PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A Smoke-Protective Curtain Assemblies: Listed and labeled with the letter "S" by a qualified testing agency for smoke- and draft-control based on testing in accordance with UL 1784 without an artificial bottom seal; with air-leakage rate of no more than 3.0 cfm/sq. ft. of opening at 0.10 inch wg for both ambient and elevated temperature tests in accordance with ICC-ES AC77.
 - 1. Surface-Burning Characteristics: Comply with ASTM E 84; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
 - a. Flame-Spread Index: 25 or less.
 - b. Smoke-Developed Index: 60 or less.
- B Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

2.2 SMOKE CURTAINS

- A Overhead Coiling Smoke-Protective Curtains: Fully-integrated alarm-activated smoke-and-draft containment system consisting of smoke-and-draft-protective curtains, operators, and controls.
 - 1. Basis-of-Design Product: Subject to compliance with the Contract Documents design is based on the following.
 - a. "Model 200" by Smoke Guard, a CSW Industrials Company.
 - 2. Acceptable Manufacturers: Subject to compliance with the Contract Documents provide the basis-of-design product or comparable approved product by one of the following.
 - a. CornellCookson LLC.
 - b. Door Systems.
- B Curtain Materials: Provide manufacturer's standard transparent curtain complying with vision panel requirements of ASME A17.1.
 - 1. Screen Reinforcement: Provide film with reinforcement to limit deflection or tearing.
- C Curtain Egress: Provide curtain that is operable from the egress side without use of keys, tools, special knowledge, or effort in excess of the opening force requirements of the AHJ.
 - 1. Egress Switch: Include switch to rewind screen into housing to comply with egress requirements of ASME A17.1.
 - a. Switch Size and Color: Provide switch no less than 4 by 4 inches and in contrasting color with curtain.
 - b. Switch Operation: Provide switch operable with a closed fist or a loose grip, not requiring finger movements.
 - c. Switch Location: Between 15 and 48 inches above finished floor level.
 - 2. Manual Egress: Provide curtain allowing fail-safe manual egress with less than 15 pounds release pressure in the direction of travel.
 - a. Opening Size: Provide curtain with manual egress opening of at least 32 inches.
- D Curtain Attachment: Provide curtain that forms a pressure-resisting seal by magnetic adhesion with flexible multi-pole magnetic strips attached to longitudinal edges of film with low modulus silicone adhesive.
 - 1. Curtain Installation: Provide curtain attachment systems that do not require modification of the elevator jamb including direct or mechanical attachment.

2. Auxiliary Rails: Provide at least 0.0625 inch thick (MSG 16) ASTM A 240/240M, Type 430, ferritic stainless steel vertical rails above elevator door head to create seal with curtain by magnetic adhesion no less than 2 inches wide, 1 inch deep.
- E Curtain Housing: Provide sheet metal housings containing support rollers and associated electronics.
 1. Coordinate operator wiring requirements and electrical characteristics with building electrical system.
 2. Housing Finish: Manufacturer's standard stainless steel; verify with Architect.
- F Curtain Operation: Controlled descent automatically by fail-safe, gravity-closing deployment and motorized rewind.
 1. Curtain deploys on activation of one of the following:
 - a. Local Smoke Detector.
 - b. Building Fire Alarm: Verify with Architect.
 - c. Testing Key Switch
 2. Release Mechanism: Labelled as defined by UL 864.

2.3 ACCESSORIES

- A Accessories: As supplied, recommended, or required by the manufacturer as necessary for a complete installation.

PART 3 EXECUTION

3.1 EXAMINATION

- A Examine substrates upon which work will be installed.
 1. Verify related work performed under other Specification Sections is complete and in accordance with Shop Drawings.
 2. Verify wall surfaces and elevator door frames are acceptable for installation of smoke containment system components.
- B Do not proceed with installation only after unsatisfactory conditions have been corrected.
 1. Installation of smoke curtains indicates acceptance of surfaces and conditions.

3.2 PREPARATION

- A Clean surfaces prior to installation.
- B Prepare surfaces as recommended by the manufacturer for achieving optimal results.
- C Verify that locations of concealed reinforcements have been clearly marked for the installer.
- D Locate reinforcement points and clearly mark their locations if not already done.

3.3 INSTALLATION

- A Install in accordance with manufacturer's current installation instructions and industry recognized best practices.
- B Install in accordance with all code bodies having jurisdiction.

3.4 CLEANING AND PROTECTION

- A Clean and remove all stains, grime, or other soils using soap and water. Only use detergents approved by the manufacturer for use on the finishes specified. Do not use acid solutions, steel wool, and other harsh abrasives.
- B Repair or replace damaged products prior to Final Acceptance.
- C Protect installed products until completion of work of this Specification Section.

3.5 FIELD QUALITY CONTROL

- A Field Test: Follow manufacturer's cycle test procedures.
 1. Notify Owner's Representative, local Fire Marshal, alarm sub-contractor and elevator sub-contractor or service company at least one week in advance of scheduled testing.
 2. Complete maintenance service record.

3.6 DEMONSTRATION

- A Demonstrate required testing and maintenance procedures to Owner's designated personnel.

3.7 MAINTENANCE AND TESTING.

- A Perform at least semi-annual maintenance and testing on each smoke containment system as required by the manufacturer's warranty, code agency evaluation reports, and as required by the AHJ.
 - 1. Retain permanent record of tests.
- B Fire Event: Owner shall engage a qualified inspector to assess units after exposure to a fire event.

END OF SECTION 08 33 43

SECTION 08 41 13 - ALUMINUM-FRAMED ENTRANCES AND STOREFRONTS

PART 1 GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A Section Includes:
 - 1. Aluminum-framed storefront systems.
 - 2. Aluminum-framed entrance door systems.
 - 3. Supplementary components and accessories normally furnished or otherwise necessary for a complete installation.

1.3 REFERENCES

- A Acronyms and Abbreviations:
 - 1. AAMA: Architectural Aluminum Manufacturers Association.
 - 2. NFRC: National Fenestration Rating Council.
- B Definitions:
 - 1. Manufacturer: Means the aluminum-framed entrance and storefront system manufacturer unless otherwise indicated.

1.4 SUBMITTALS

- A Action Submittals:
 - 1. Product Data: For each type of product. Include the following:
 - a. Construction details, material descriptions, dimensions of individual components and profiles, and finishes.
 - b. Current Environmental Product Declaration.
 - 2. Shop Drawings: For aluminum-framed entrances and storefronts. Include plans, elevations, sections, full-size details, and attachments to other work.
 - a. Include details of provisions for assembly expansion and contraction and for draining moisture occurring within the assembly to the exterior.
 - b. Include full-size isometric details of each type of vertical-to-horizontal intersection of aluminum-framed entrances and storefronts, showing the following:
 - 1) Joinery, including concealed welds.
 - 2) Anchorage.
 - 3) Expansion provisions.
 - 4) Glazing.
 - 5) Flashing and drainage.
 - c. Show connection to and continuity with adjacent thermal, weather, air, and vapor barriers.
 - d. Include point-to-point wiring diagrams showing the following:
 - 1) Power requirements for each electrically operated door hardware.
 - 2) Location and types of switches, signal device, conduit sizes, and number and size of wires.
 - 3. Samples: For each type of exposed finish required, in manufacturer's standard sizes.
- B Informational Submittals:
 - 1. Qualification Data: For installer.
 - 2. Energy Performance Certificates: For aluminum-framed entrances and storefronts, accessories, and components, from manufacturer.
- C Closeout Submittals:
 - 1. Maintenance Data: For aluminum-framed entrances and storefronts to include in maintenance manuals.

1.5 QUALITY ASSURANCE

- A Installer Qualifications: An entity that employs installers and supervisors who are acceptable to the manufacturer and that employs a qualified glazing contractor for this Project.
- B Product Options: Information on Drawings and in Specifications establishes requirements for aesthetic effects and performance characteristics of assemblies. Aesthetic effects are indicated by dimensions, arrangements, alignment, and profiles of components and assemblies as they relate to sightlines, to one another, and to adjoining construction.
 - 1. Do not change intended aesthetic effects, as judged solely by Architect, except with Architect's approval. If changes are proposed, submit comprehensive explanatory data to Architect for review.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A Source Limitations: Obtain all components of aluminum-framed entrance and storefront system, including framing and accessories, from single manufacturer.

2.2 PERFORMANCE REQUIREMENTS

- A General Performance: Comply with performance requirements specified, as determined by testing of aluminum-framed entrances and storefronts representing those indicated for this Project without failure due to defective manufacture, fabrication, installation, or other defects in construction.
 - 1. Aluminum-framed entrances and storefronts shall withstand movements of supporting structure, including twist, column shortening, long-term creep, and deflection from uniformly distributed and concentrated live loads.
 - 2. Failure also includes the following:
 - a. Thermal stresses transferring to building structure.
 - b. Glass breakage.
 - c. Noise or vibration created by wind and thermal and structural movements.
 - d. Loosening or weakening of fasteners, attachments, and other components.
- B Structural Loads: As indicated on the Drawings.
- C Deflection of Framing Members Supporting Glass: At design wind load, as follows:
 - 1. Deflection Normal to Wall Plane: Limited to 1/175 of clear span for spans of up to 13 feet 6 inches and to 1/240 of clear span plus 1/4 inch for spans greater than 13 feet 6 inches.
 - 2. Deflection Parallel to Glazing Plane: Limited to amount not exceeding that which reduces glazing bite to less than 75 percent of design dimension and that which reduces edge clearance between framing members and glazing or other fixed components to less than 1/8 inch.
- D Structural: Test according to ASTM E 330 as follows:
 - 1. When tested at positive and negative wind-load design pressures, storefront assemblies, including entrance doors, do not evidence deflection exceeding specified limits.
 - 2. When tested at 150 percent of positive and negative wind-load design pressures, storefront assemblies, including entrance doors and anchorage, do not evidence material failures, structural distress, or permanent deformation of main framing members exceeding 0.2 percent of span.
 - 3. Test Durations: As required by design wind velocity, but not less than 10 seconds.
- E Thermal Movements: Design system preventing buckling, opening of joints, overstressing of components, failure of joint sealants, failure of connections, permanent deformation, and other detrimental effects.
 - 1. Allow for thermal movements resulting from maximum ambient temperature change (range) of 120 degrees Fahrenheit and surface temperature change of 180 degrees.

2.3 EXTERIOR STOREFRONT SYSTEM

- A Exterior Aluminum-Framed Storefront:

1. Basis-of-Design Assembly: Subject to compliance with the Contract Documents design is based on the following.
 - a. "XTHERM 406X Storefront" as manufactured by EFCO, an Apogee Architectural Metals brand.
2. Acceptable Manufacturers: Subject to compliance with the Contract Documents provide the basis-of-design assembly or comparable approved assembly by one of the following.
 - a. Oldcastle BuildingEnvelope.
 - b. Kawneer.
- B Framing Members: Manufacturer's extruded- or formed-aluminum framing members of thickness required and reinforced as required to support imposed loads.
 1. Framing Construction: Thermally broken.
 2. Framing Dimensions: 2 inches by 6-1/2 inches.
 3. Glazing System: Retained mechanically with gaskets on 4 sides.
 4. Glazing Plane: Outside flush glazed.
 5. Aluminum: Alloy and temper recommended by manufacturer for type of use and finish indicated.
 6. Steel Reinforcement: As required by manufacturer.
- C Backer Plates: Manufacturer's standard, continuous backer plates for framing members, if not integral, where framing abuts adjacent construction.
- D Brackets and Reinforcements: Manufacturer's standard high-strength aluminum with nonstaining, nonferrous shims for aligning system components.

2.4 INTERIOR STOREFRONT SYSTEM

- A Interior Aluminum-Framed Storefront:
 1. Basis-of-Design Assembly: Subject to compliance with the Contract Documents design is based on the following.
 - a. "Trifab Versaglaze 450" as manufactured by Kawneer.
 2. Acceptable Manufacturers: Subject to compliance with the Contract Documents provide the basis-of-design assembly or comparable approved assembly by one of the following.
 - a. EFCO, an Apogee Architectural Metals brand.
 - b. Oldcastle BuildingEnvelope.
- B Framing Members: Manufacturer's extruded- or formed-aluminum framing members of thickness required and reinforced as required to support imposed loads.
 1. Framing Construction: Non-therma.
 2. Framing Dimensions: 1-3/4 inches by 4-1/2 inches.
 3. Glazing System: Retained mechanically with gaskets on 4 sides.
 4. Glazing Plane: Center glazed.
 5. Aluminum: Alloy and temper recommended by manufacturer for type of use and finish indicated.
 6. Steel Reinforcement: As required by manufacturer.
- C Backer Plates: Manufacturer's standard, continuous backer plates for framing members, if not integral, where framing abuts adjacent construction.
- D Brackets and Reinforcements: Manufacturer's standard high-strength aluminum with nonstaining, nonferrous shims for aligning system components.

2.5 ENTRANCE DOOR SYSTEMS

- A Entrance Doors: Provide entrance doors manufactured by the storefront manufacturers.
 1. Door Models:
 - a. Exterior Doors: As selected by the Architect.
 - b. Interior Doors: As selected by the Architect.
 2. Glazing stops and gaskets.
 3. Entrance Door Hardware: As indicated in Section 08 71 00 Door Hardware.
 4. Finish: Match adjacent storefront and curtain wall framing finish.

2.6 GLAZING

- A Glazing: Comply with Section 08 80 00 Glazing.
- B Glazing Gaskets: Manufacturer's standard sealed-corner pressure-glazing system of black, resilient elastomeric glazing gaskets, setting blocks, and shims or spacers.
- C Glazing Sealants: As recommended by the manufacturer and in accordance with Section 07 92 00 Joint Sealants.

2.7 MATERIALS

- A Sheet and Plate: ASTM B 209.
- B Extruded Bars, Rods, Profiles, and Tubes: ASTM B 221.
- C Structural Profiles: ASTM B 308.
- D Steel Reinforcement:
 - 1. Structural Shapes, Plates, and Bars: ASTM A 36.
 - 2. Cold-Rolled Sheet and Strip: ASTM A 1008.
 - 3. Hot-Rolled Sheet and Strip: ASTM A 1011.
- E Steel Reinforcement Primer: Manufacturer's standard zinc-rich, corrosion-resistant primer complying with SSPC-PS Guide No. 12.00; applied immediately after surface preparation and pretreatment. Select surface preparation methods according to recommendations in SSPC-SP COM, and prepare surfaces according to applicable SSPC standard.

2.8 ACCESSORIES

- A Fasteners and Accessories: Manufacturer's standard corrosion-resistant, nonstaining, nonbleeding fasteners and accessories compatible with adjacent materials.
 - 1. Use self-locking devices where fasteners are subject to loosening or turning out from thermal and structural movements, wind loads, or vibration.
 - 2. Reinforce members as required to receive fastener threads.
- B Anchors: 3-way adjustable anchors with adjustment of at least 1 inch that accommodate fabrication and installation tolerances in material and finish compatible with adjoining materials and recommended by manufacturer.
 - 1. Concrete and Masonry Inserts: Hot-dip galvanized cast-iron, malleable-iron, or steel inserts complying with ASTM A 123 or ASTM A 153 requirements.
- C Concealed Flashing: Dead-soft, 0.018-inch-thick stainless steel, complying with ASTM A 240, of type recommended by manufacturer.
- D Bituminous Paint: Cold-applied asphalt-mastic paint containing no asbestos, formulated for 30-mil thickness per coat.
- E Other Accessories: As supplied, recommended, or required by the manufacturer as necessary for a complete installation.

2.9 FABRICATION

- A Form or extrude aluminum shapes before finishing.
- B Weld in concealed locations to greatest extent possible to minimize distortion or discoloration of finish. Remove weld spatter and welding oxides from exposed surfaces by descaling or grinding.
- C Fabricate components that, when assembled, have the following characteristics:
 - 1. Profiles that are sharp, straight, and free of defects or deformations.
 - 2. Accurately fitted joints with ends coped or mitered.
 - 3. Physical and thermal isolation of glazing from framing members.
 - 4. Accommodations for thermal and mechanical movements of glazing and framing to maintain required glazing edge clearances.
 - 5. Provisions for field replacement of glazing from exterior.
 - 6. Fasteners, anchors, and connection devices that are concealed from view to greatest extent possible.
- D Mechanically Glazed Framing Members: Fabricate for flush glazing without projecting stops.
- E Entrance Door Frames: Reinforce as required to support loads imposed by door operation and for installing entrance door hardware.

1. Provide compression weather stripping at fixed stops on doors.
- F Entrance Doors: Reinforce doors as required for installing entrance door hardware.
 1. At pairs of exterior doors, provide sliding-type weather stripping retained in adjustable strip and mortised into door edge.
 2. At exterior doors, provide weather sweeps applied to door bottoms.
- G Entrance Door Hardware Installation: Factory install entrance door hardware to the greatest extent possible. Cut, drill, and tap for factory-installed entrance door hardware before applying finishes. Coordinate entrance door hardware with Section 08 71 00 Door Hardware.
- H After fabrication, clearly mark components to identify their locations in Project according to Shop Drawings.

2.10 ALUMINUM FINISHES

- A PVDF Organic Finish: Fluoropolymer finish complying with AAMA 2605 and containing not less than 70 percent PVDF resin by weight in both color coat and clear topcoat.
 1. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.
 2. Color: As selected by the Architect from the manufacturer's full range of available colors.

PART 3 EXECUTION

3.1 EXAMINATION

- A Examine areas, with installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the work.
- B Do not proceed with installation until unsatisfactory conditions have been corrected.
 1. Installation of aluminum-framed entrances and storefronts indicates acceptance of surfaces and conditions.

3.2 INSTALLATION, GENERAL

- A Comply with manufacturer's written instructions.
- B Do not install damaged components.
- C Fit joints to produce hairline joints free of burrs and distortion.
- D Rigidly secure nonmovement joints.
- E Install anchors with separators and isolators to prevent metal corrosion and electrolytic deterioration and to prevent impeding movement of moving joints.
- F Seal perimeter and other joints watertight unless otherwise indicated.
- G Metal Protection:
 1. Where aluminum is in contact with dissimilar metals, protect against galvanic action by painting contact surfaces with materials recommended by manufacturer for this purpose or by installing nonconductive spacers.
 2. Where aluminum is in contact with concrete or masonry, protect against corrosion by painting contact surfaces with bituminous paint.
- H If recommended in writing by the manufacturer, set continuous sill members and flashing in full sealant bed, as specified in Section 07 92 00 Joint Sealants, to produce weathertight installation.
- I Install joint filler behind sealant as recommended by sealant manufacturer.
- J Install components plumb and true in alignment with established lines and grades.

3.3 INSTALLATION OF GLAZING

- A Install glazing as specified in Section 08 80 00 Glazing.

3.4 INSTALLATION OF ALUMINUM-FRAMED ENTRANCE DOORS

- A Install entrance doors to produce smooth operation and tight fit at contact points.
- B Exterior Doors: Install to produce weathertight enclosure and tight fit at weather stripping.

- C Field-Installed Entrance Door Hardware: Install surface-mounted entrance door hardware according to entrance door hardware manufacturers' written instructions using concealed fasteners to greatest extent possible.

3.5 ERECTION TOLERANCES

- A Install aluminum-framed entrances and storefronts to comply with the following maximum tolerances:
1. Plumb: 1/8 inch in 10 feet; 1/4 inch in 40 feet.
 2. Level: 1/8 inch in 20 feet; 1/4 inch in 40 feet.
 3. Alignment:
 - a. Where surfaces abut in line or are separated by reveal or protruding element up to 1/2 inch wide, limit offset from true alignment to 1/16 inch.
 - b. Where surfaces are separated by reveal or protruding element from 1/2 to 1 inch wide, limit offset from true alignment to 1/8 inch.
 - c. Where surfaces are separated by reveal or protruding element of 1 inch wide or more, limit offset from true alignment to 1/4 inch.
 4. Location: Limit variation from plane to 1/8 inch in 12 feet; 1/2 inch over total length.

3.6 CLEANING

- A Clean surfaces in compliance with manufacturer's instructions and recommendations. Remove excess mastic, mastic smears, sealants, foreign materials and other unsightly marks.
- B Clean metal surfaces exercising care to avoid damage.
- C Clean glazing in accordance with glazing manufacturer's written instructions.
- D Clean system again not more than one week before inspection for Substantial Completion.

3.7 FIELD QUALITY CONTROL

- A Testing Agency: Engage a qualified testing agency to perform tests.
- B Tests: Perform the following tests on representative areas of aluminum-framed entrance and storefront systems.
1. Water-Spray Test: Before installation of interior finishes has begun, areas designated by Architect to be tested in accordance with AAMA 501.2 and to not evidence water penetration.
 - a. Perform at least 3 tests in areas as directed by Architect.
 2. Air Leakage: ASTM E 783 at 1.5 times the rate specified for laboratory testing in "Performance Requirements" Article but not more than 0.09 cfm/sq. ft. at a static-air-pressure differential of 1.57 lbf/sq. ft.
 - a. Perform at least 3 tests in areas as directed by Architect.
 3. Water Penetration: ASTM E 1105 at a uniform static-air-pressure differential of at least 0.67 times the static-air-pressure differential specified for laboratory testing in "Performance Requirements" Article, but not less than 6.24 lbf/sq. ft., and to not evidence water penetration.
- C Aluminum-framed entrance and storefront systems will be considered defective if they do not pass tests and inspections.
- D Prepare test and inspection reports.

END OF SECTION 08 41 13

SECTION 08 41 13.13 - FIRE-RATED ALUMINUM-FRAMED ENTRANCES AND STOREFRONTS

PART 1 GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A Section Includes:
 - 1. Fire-resistance-rated glazing and framing systems for installation as wall sections in interior openings.
 - 2. Fire-protection-rated glazing and framing systems for installation as full vision fire rated doors in interior openings.
 - 3. Supplementary components and accessories normally furnished or otherwise necessary for a complete installation.

1.3 REFERENCES

- A Acronyms and Abbreviations:
 - 1. AHJ: Authority (Authorities) Having Jurisdiction.
 - 2. NGA: National Glass Association.
- B Definitions:
 - 1. Fire-Protection-Rated Glazing: Glazing that prevents spread of fire and smoke and complies with requirements for rated openings; incapable of blocking radiant heat
 - 2. Fire-Resistance-Rated Glazing: Glazing that prevents spread of fire and smoke and radiant heat and complies with requirements for rated walls and rated openings; capable of blocking radiant heat
 - 3. Glass Thicknesses: Indicated by thickness designations in millimeters in accordance with ASTM C 1036.
 - 4. Manufacturer: Means the firm that produces primary glass, fabricated glass, or framing as defined in referenced glazing publications.

1.4 PREINSTALLATION MEETINGS

- A Preinstallation Conference: Conduct conference at Project site.

1.5 SUBMITTALS

- A Action Submittals:
 - 1. Product Data: For fire-rated systems. Include the following.
 - a. Construction details, material descriptions, dimensions of individual components and profiles, and finishes.
 - b. Operating characteristics and furnished accessories.
 - 2. Shop Drawings:
 - a. Plans, elevations, sections, full-size details, and attachments to other work.
 - b. Details of provisions for assembly expansion and contraction.
 - c. Full-size isometric details of each type of vertical-to-horizontal intersection of fire-rated aluminum-framed entrance and storefront systems, showing the following:
 - 1) Joinery, including concealed welds.
 - 2) Anchorage.
 - 3) Expansion provisions.
 - 4) Glazing.
 - 3. Samples: Provide the following.
 - a. Actual sample of finished products for each type of exposed finish in manufacturer's standard sizes.
 - b. Glass: For each type of glass product; 12 inches square.

4. Glazing Schedule: List glass types and thicknesses for each size opening and location. Use same designations indicated on Drawings.
 - B Informational Submittals:
 1. Qualification Data: For installer and glass testing agency.
 2. Product Test Reports: For fire-rated aluminum-framed entrance and storefront systems, and glazing, for tests performed by a qualified testing agency, or the manufacturer and witnessed by a qualified testing agency as acceptable to the AHJ.
 3. Product Certificates: For each type of glass and glazing product.
 4. Sample Warranties: For fire-rated aluminum-framed entrance and storefront systems.
- 1.6 CLOSEOUT SUBMITTALS
- A Operation and Maintenance Data: For fire-rated glazing and aluminum-framed entrance and storefront systems.
- 1.7 QUALITY ASSURANCE
- A Installer Qualifications:
1. Fabricator of products or entity that employs installers and supervisors who are trained and approved by manufacturer.
- B Egress Door Inspector Qualifications:
1. Inspector for field quality-control inspections of egress door assemblies to comply with qualifications set forth in NFPA 101, Ch. 7 "Means of Egress," Section "Means of Egress Components," Article "Inspection of Door Openings."
- C Product Options: Information on Drawings and in Specifications establishes requirements for aesthetic effects and performance characteristics of assemblies. Aesthetic effects are indicated by dimensions, arrangements, alignment, and profiles of components and assemblies as they relate to sightlines, to one another, and to adjoining construction.
1. Do not change intended aesthetic effects, as judged solely by Architect, except with Architect's approval. If changes are proposed, submit comprehensive explanatory data to Architect for review.

PART 2 PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A General Performance: Comply with performance requirements specified, as determined by testing of fire-rated aluminum-framed entrance and storefront systems representing those indicated for this Project without failure due to defective manufacture, fabrication, installation, or other defects in construction.
1. Fire-rated aluminum-framed entrance and storefront systems to withstand movements of supporting structure, including, but not limited to, twist, column shortening, long-term creep, and deflection from uniformly distributed and concentrated live loads.
 2. Failure also includes the following:
 - a. Thermal stresses transferring to building structure.
 - b. Glass breakage.
 - c. Noise or vibration created by wind and thermal and structural movements.
 - d. Loosening or weakening of fasteners, attachments, and other components.
 - e. Failure of operating units.
- B Structural Loads: As indicated on the Drawings.

2.2 FIRE-RATED ALUMINUM-FRAMED ENTRANCE AND STOREFRONT SYSTEMS

- A Storefront Framing Members: Manufacturer's extruded- or formed-aluminum framing members of thickness required and reinforced as required to support imposed loads.
1. Basis-of-Design System: Subject to compliance with the Contract Document the design is based on the following.
 - a. "Fireframes Aluminum Series" as manufactured by Technical Glass Products.

2. Acceptable Manufacturers: Subject to compliance with the Contract documents provide the basis-of-design system or comparable approved system by one of the following.
 - a. McGrory Glass.
 - b. SAFTI FIRST.
 - B Backer Plates: Manufacturer's standard, continuous backer plates for framing members, if not integral, where framing abuts adjacent construction.
 - C Brackets and Reinforcements: Manufacturer's standard high-strength aluminum with nonstaining, nonferrous shims for aligning system components.
 - D Entrance Doors: Glazed entrance doors for manual-swing operation.
 1. Finish: Match adjacent storefront framing finish.
 2. Entrance Door Hardware: As provided by the manufacturer.
- 2.3 GLAZING
- A Fire-Rated Glazing: Provide storefront system manufacturer's fire-rated glazing to meet required fire-rating.
 - B Glazing Gaskets: Manufacturer's standard.
- 2.4 MATERIALS
- A Sheet and Plate: ASTM B 209.
 - B Extruded Bars, Rods, Profiles, and Tubes: ASTM B 221.
 - C Structural Profiles: ASTM B 308/B 308M.
 - D Steel Reinforcement:
 1. Structural Shapes, Plates, and Bars: ASTM A36/A36M.
 2. Cold-Rolled Sheet and Strip: ASTM A1008/A1008M.
 3. Hot-Rolled Sheet and Strip: ASTM A1011/A1011M.
- 2.5 ACCESSORIES
- A Fasteners and Accessories: Manufacturer's standard corrosion-resistant, nonstaining, nonbleeding fasteners and accessories compatible with adjacent materials.
 - B

PART 3 EXECUTION

3.1 EXAMINATION

- A Examine areas, with installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the work.
- B Do not proceed with installation until unsatisfactory conditions have been corrected.
 1. Installation of fire-rated systems indicates acceptance of surfaces and conditions.

3.2 INSTALLATION OF FIRE-RATED ALUMINUM-FRAMED ENTRANCE AND STOREFRONT SYSTEMS

- A Comply with manufacturer's written instructions.
- B Do not install damaged components.
- C Fit joints to produce hairline joints free of burrs and distortion.
- D Rigidly secure nonmovement joints.
- E Install anchors with separators and isolators to prevent metal corrosion and electrolytic deterioration and to prevent impeding movement of moving joints.
- F Metal Protection:
 1. Where aluminum is in contact with dissimilar metals, protect against galvanic action by painting contact surfaces with materials recommended by manufacturer for this purpose or by installing nonconductive spacers.
 2. Where aluminum is in contact with concrete or masonry, protect against corrosion by painting contact surfaces with bituminous paint.
- G Install components plumb and true in alignment with established lines and grades.

H Install entrance doors to produce smooth operation and tight fit at contact points.

3.3 ERECTION TOLERANCES

- A Install fire-rated aluminum-framed entrance and storefront systems to comply with the following maximum tolerances:
1. Plumb: 1/8 inch in 10 feet; 1/4 inch in 40 feet.
 2. Level: 1/8 inch in 20 feet; 1/4 inch in 40 feet.
 3. Alignment:
 - a. Where surfaces abut in line or are separated by reveal or protruding element up to 1/2 inch wide, limit offset from true alignment to 1/16 inch.
 - b. Where surfaces are separated by reveal or protruding element from 1/2 to 1 inch wide, limit offset from true alignment to 1/8 inch.
 - c. Where surfaces are separated by reveal or protruding element of 1 inch wide or more, limit offset from true alignment to 1/4 inch.
 4. Location: Limit variation from plane to 1/8 inch in 12 feet; 1/2 inch over total length.

3.4 FIELD QUALITY CONTROL

- A Inspection Agency: Engage a qualified inspector to perform inspections.
- B Inspections:
1. Egress Door Inspections: Inspect each aluminum-framed entrance door equipped with panic hardware, located in an exit enclosure, electrically controlled, and equipped with special locking arrangements, in accordance with NFPA 101, Ch. 7 "Means of Egress," Section "Means of Egress Components," Article "Inspection of Door Openings."
- C Fire-rated aluminum-framed entrance and storefront systems will be considered defective if they do not pass tests and inspections.
- D Prepare test and inspection reports.

END OF SECTION 08 41 13.13

SECTION 08 44 13 - GLAZED ALUMINUM CURTAIN WALLS

PART 1 GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A Section Includes:
 - 1. Conventionally glazed aluminum curtain wall systems.
 - 2. Supplementary components and accessories normally furnished or otherwise necessary for a complete installation

1.3 REFERENCES

- A Acronyms and Abbreviations:
 - 1. NFRC: National Fenestration Rating Council.
 - 2. SSPC: The Society for Protection Coatings (now AMPP).
- B Definitions:
 - 1. Manufacturer: Means the glazed aluminum curtain wall manufacturer unless otherwise indicated.

1.4 PREINSTALLATION MEETINGS

- A Preinstallation Conference: Conduct conference at Project site.

1.5 SUBMITTALS

- A Action Submittals:
 - 1. Product Data: For each type of product.
 - a. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes. Include Environmental Product Declaration for each product.
 - 2. Shop Drawings: For glazed aluminum curtain walls. Include plans, elevations, sections, full-size details, and attachments to other work.
 - a. Include details of provisions for assembly expansion and contraction and for draining moisture occurring within the assembly to the exterior.
 - b. Include full-size isometric details of each type of vertical-to-horizontal intersection of glazed aluminum curtain walls, showing the following:
 - 1) Joinery, including concealed welds.
 - 2) Anchorage.
 - 3) Expansion provisions.
 - 4) Glazing.
 - 5) Flashing and drainage.
 - c. Show connection to and continuity with adjacent thermal, weather, air, and vapor barriers.
 - 3. Delegated Design Submittal: For glazed aluminum curtain wall indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by qualified professional engineer licensed in the State of North Carolina responsible for their preparation.
- B Informational Submittals:
 - 1. Qualification Data: For installer, professional engineer, and field testing agency.
 - 2. Energy Performance Certificates: For glazed aluminum curtain walls, accessories, and components from manufacturer.
 - a. Basis for Certification: NFRC-certified energy performance values for each glazed aluminum curtain wall.

3. Product Test Reports: For glazed aluminum curtain walls, for tests performed by a qualified testing agency, or by the manufacturer and witnessed by a qualified testing agency.
4. Field quality-control reports.
- C Closeout Submittals:
 1. Maintenance Data: For glazed aluminum curtain walls to include in maintenance manuals.

1.6 QUALITY ASSURANCE

- A Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by manufacturer and that employs a qualified glazing contractor for this Project who is certified under the North American Contractor Certification Program (NACC) for Architectural Glass & Metal (AGM) contractors.
- B Professional Engineer Qualifications: A professional engineer experienced with providing delegated design engineering services of the kind indicated, including documentation that engineer is a licensed engineer in the state of North Carolina.
- C Testing Agency Qualifications: Qualified in accordance with ASTM E 699 for testing indicated and acceptable to Owner and Architect.
- D Product Options: Information on Drawings and in Specifications establishes requirements for aesthetic effects and performance characteristics of assemblies. Aesthetic effects are indicated by dimensions, arrangements, alignment, and profiles of components and assemblies as they relate to sightlines, to one another, and to adjoining construction.
 1. Do not change intended aesthetic effects, as judged solely by Architect, except with Architect's approval. If changes are proposed, submit comprehensive explanatory data to Architect for review.

PART 2 PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A Delegated Design: Engage a qualified professional engineer licensed in the state of North Carolina to design curtain walls.
 1. Engineering services are defined as those performed for installations of the system, assembly, or product that are similar in material, design, and extent to those indicated for this Project.
- B General Performance: Comply with performance requirements specified, as determined by testing of glazed aluminum curtain walls representing those indicated for this Project without failure due to defective manufacture, fabrication, installation, or other defects in construction.
 1. Glazed aluminum curtain walls shall withstand movements of supporting structure, including, but not limited to, story drift, twist, column shortening, long-term creep, and deflection from uniformly distributed and concentrated live loads.
 2. Failure also includes the following:
 - a. Thermal stresses transferring to building structure.
 - b. Glass breakage.
 - c. Noise or vibration created by wind and thermal and structural movements.
 - d. Loosening or weakening of fasteners, attachments, and other components.
 - e. Failure of operating units.
- C Structural Loads:
 1. Wind Loads: As indicated on Drawings.
 2. Other Design Loads: As indicated on Drawings.
- D Water Penetration under Static Pressure: Test in accordance with ASTM E 331 as follows:
 1. No evidence of water penetration through fixed glazing and framing areas when tested in accordance with a minimum static-air-pressure differential of 20 percent of positive wind-load design pressure, but not less than 6.24 lbf/sq. ft.
- E Thermal Movements: Allow for thermal movements resulting from ambient and surface temperature changes:
 1. Temperature Change: 120 deg F, ambient; 180 deg F, material surfaces.

2.2 SOURCE LIMITATIONS

- A Source Limitations: Obtain all components of curtain-wall system and storefront system, including framing, entrances, and accessories, from single manufacturer.

2.3 GLAZED ALUMINUM CURTAIN WALL SYSTEM

- A Glazed Aluminum Curtain Wall System:
1. Basis-of-Design Assembly: Subject to compliance with the Contract Documents design is based on the following.
 - a. "5600 2-1/4" Curtain Wall System" as manufactured by EFCO, an Apogee Architectural Metals brand.
 2. Acceptable Manufacturers: Subject to compliance with the Contract Documents provide the basis-of-design assembly or comparable acceptable assembly by one of the following.
 - a. Oldcastle BuildingEnvelope.
 - b. Kawneer.
- B Framing Members: Manufacturer's extruded- or formed-aluminum framing members of thickness required and reinforced as required to support imposed loads.
1. Framing Construction: Thermally broken.
 2. Framing Dimensions: As indicated on the Drawings.
 - a. 2-1/4 inches by 7-1/4 inches.
 - b. 2-1/4 inches by 10-1/4 inches.
 3. Glazing System: Retained mechanically with gaskets on 4 sides.
 4. Aluminum: Alloy and temper recommended by manufacturer for type of use and finish indicated.
 5. Steel Reinforcement: As required by manufacturer.
- C Insulated Spandrel Panels: Metal-faced flat substructure panels with no deviations in plane exceeding 0.8 percent of panel dimension in width or length.
1. Product:
 - a. Basis of Design Product: Subject to compliance with the Contract Documents, design is based on the following. provide the following.
 - 1) "MapeShape Panels" as manufactured by Mapes Industries, Inc.
 - b. Acceptable Manufacturers: Subject to compliance with the Contract Documents provide the basis-of-design product or comparable acceptable product by one of the following.
 - 1) H&H Metals.
 - 2) Nudo.
 2. Overall Panel Thickness: As indicated.
 3. Exterior Skin: Aluminum.
 - a. Thickness: Manufacturer's standard for finish and texture indicated.
 - b. Finish: Match framing system.
 - c. Texture: Smooth.
 - d. Backing Sheet: 0.125-inch-thick, corrugated, high-density polyethylene.
 4. Interior Skin:
 - a. Thickness: Manufacturer's standard for finish and texture indicated.
 - b. Finish: Mill finish.
 - c. Texture: Smooth.
 - d. Backing Sheet: 0.125-inch-thick, corrugated, high-density polyethylene.
 5. Thermal Insulation Core: Manufacturer's standard rigid, closed-cell, polyisocyanurate board.
 6. Surface-Burning Characteristics: Comply with ASTM E84; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
 - a. Flame-Spread Index: 25 or less.
 - b. Smoke-Developed Index: 50 or less.
- D Brackets and Reinforcements: Manufacturer's standard high-strength aluminum with nonstaining, nonferrous shims for aligning system components.

2.4 GLAZING

- A Glazing: Comply with Section 08 80 00 Glazing.
- B Glazing Gaskets: ASTM C 509 or ASTM C 864. Manufacturer's standard.
- C Glazing Sealants: Comply with Section 08 80 00 Glazing.

2.5 MATERIALS

- A Sheet and Plate: ASTM B 209.
- B Extruded Bars, Rods, Profiles, and Tubes: ASTM B 221.
- C Structural Profiles: ASTM B 308/B 308M.
- D Steel Reinforcement:
 - 1. Structural Shapes, Plates, and Bars: ASTM A 36/A 36M.
 - 2. Cold-Rolled Sheet and Strip: ASTM A 1008/A 1008M.
 - 3. Hot-Rolled Sheet and Strip: ASTM A 1011/A 1011M.
- E Steel Reinforcement Primer: Manufacturer's standard zinc-rich, corrosion-resistant primer complying with SSPC-PS Guide No. 12.00; applied immediately after surface preparation and pretreatment. Select surface preparation methods in accordance with recommendations in SSPC-SP COM, and prepare surfaces in accordance with applicable SSPC standard.

2.6 ACCESSORIES

- A Fasteners and Accessories: Manufacturer's standard corrosion-resistant, nonstaining, nonbleeding fasteners and accessories compatible with adjacent materials.
 - 1. Use self-locking devices where fasteners are subject to loosening or turning out from thermal and structural movements, wind loads, or vibration.
 - 2. Reinforce members as required to receive fastener threads.
- B Anchors: 3-way adjustable anchors with adjustment of at least 1 inch that accommodate fabrication and installation tolerances in material and finish compatible with adjoining materials and recommended by manufacturer.
 - 1. Concrete and Masonry Inserts: Hot-dip galvanized cast-iron, malleable-iron, or steel inserts complying with ASTM A 123/A 123M or ASTM A 153/A 153M requirements.
- C Concealed Flashing: Dead-soft, 0.018-inch-thick stainless steel, ASTM A 240/A 240M of type recommended by manufacturer.
- D Bituminous Paint: Cold-applied asphalt-mastic paint containing no asbestos, formulated for 30-mil thickness per coat.

2.7 FABRICATION

- A Form or extrude aluminum shapes before finishing.
- B Fabricate components that, when assembled, have the following characteristics:
 - 1. Profiles that are sharp, straight, and free of defects or deformations.
 - 2. Accurately fitted joints with ends coped or mitered.
 - 3. Physical and thermal isolation of glazing from framing members.
 - 4. Accommodations for thermal and mechanical movements of glazing and framing to maintain required glazing edge clearances.
 - 5. Provisions for field replacement of glazing from exterior.
 - 6. Fasteners, anchors, and connection devices that are concealed from view to greatest extent possible.
- C Curtain-Wall Framing: Fabricate components for assembly using manufacturer's standard assembly method.
- D After fabrication, clearly mark components to identify their locations in Project in accordance with Shop Drawings.

2.8 ALUMINUM FINISHES

- A PVDF Organic Finish: Fluoropolymer finish complying with AAMA 2605 and containing not less than 70 percent PVDF resin by weight in both color coat and clear topcoat.

1. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.
2. Color: As selected by the Architect from the manufacturer's full range of available colors.

PART 3 EXECUTION

3.1 EXAMINATION

- A Examine areas, with installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the work.
- B Do not proceed with installation until unsatisfactory conditions have been corrected.
 1. Installation of glazed aluminum curtain walls indicates acceptance of surfaces and conditions.

3.2 INSTALLATION, GENERAL

- A Comply with manufacturer's written instructions.
- B Do not install damaged components.
- C Fit joints to produce hairline joints free of burrs and distortion.
- D Rigidly secure nonmovement joints.
- E Install anchors with separators and isolators to prevent metal corrosion and electrolytic deterioration and to prevent impeding movement of moving joints.
- F Where welding is required, weld components in concealed locations to minimize distortion or discoloration of finish. Protect glazing surfaces from welding.
- G Seal joints watertight unless otherwise indicated.
- H Metal Protection:
 1. Where aluminum is in contact with dissimilar metals, protect against galvanic action by painting contact surfaces with primer, applying sealant or tape, or installing nonconductive spacers as recommended by manufacturer for this purpose.
 2. Where aluminum is in contact with concrete or masonry, protect against corrosion by painting contact surfaces with bituminous paint.
- I Install components to drain water passing joints, condensation occurring within framing members, and moisture migrating within glazed aluminum curtain wall to exterior.
- J Install components plumb and true in alignment with established lines and grades.

3.3 INSTALLATION OF GLAZING

- A Install glazing as specified in Section 08 80 00 Glazing.

3.4 ERECTION TOLERANCES

- A Install glazed aluminum curtain walls to comply with the following maximum tolerances:
 1. Plumb: 1/8 inch in 10 feet; 1/4 inch in 40 feet.
 2. Level: 1/8 inch in 20 feet; 1/4 inch in 40 feet.
 3. Alignment:
 - a. Where surfaces abut in line or are separated by reveal or protruding element up to 1/2 inch wide, limit offset from true alignment to 1/16 inch.
 - b. Where surfaces are separated by reveal or protruding element from 1/2 to 1 inch wide, limit offset from true alignment to 1/8 inch.
 - c. Where surfaces are separated by reveal or protruding element of 1 inch wide or more, limit offset from true alignment to 1/4 inch.
 4. Location: Limit variation from plane to 1/8 inch in 12 feet; 1/2 inch over total length.

3.5 FIELD QUALITY CONTROL

- A Testing Agency: Engage a qualified testing agency to perform tests and inspections.
- B Test Area: Perform tests on one bay at least 30 feet by one story.
- C Field Quality-Control Testing: Perform the following test on representative areas of glazed aluminum curtain walls.

1. Water-Spray Test: Before installation of interior finishes has begun, areas designated by Architect shall be tested in accordance with AAMA 501.2 and shall not evidence water penetration.
 - a. Perform at least 3 tests in areas as directed by Architect.
 2. Air Leakage: ASTM E 783 at 1.5 times the rate specified for laboratory testing in "Performance Requirements" Article but not more than 0.09 cfm/sq. ft. at a static-air-pressure differential of 1.57 lbf/sq. ft.
 - a. Perform at least 3 tests in areas as directed by Architect.
 3. Water Penetration: ASTM E 1105 at a minimum uniform static-air-pressure differential of at least 0.67 times the static-air-pressure differential specified for laboratory testing in "Performance Requirements" Article, but not less than 6.24 lbf/sq. ft., and shall not evidence water penetration.
- D Glazed aluminum curtain walls will be considered defective if they do not pass tests and inspections.
- E Prepare test and inspection reports.

END OF SECTION 08 44 13

SECTION 08 71 00 - DOOR HARDWARE

PART 1 GENERAL

1.1 SUMMARY

- A Section includes:
 - 1. Mechanical and electrified door hardware.
 - 2. Electronic access control system components.

1.2 REFERENCES

- A UL LLC
 - 1. UL 10B - Fire Test of Door Assemblies
 - 2. UL 10C - Positive Pressure Test of Fire Door Assemblies
 - 3. UL 1784 - Air Leakage Tests of Door Assemblies
 - 4. UL 305 - Panic Hardware
- B DHI - Door and Hardware Institute
 - 1. Sequence and Format for the Hardware Schedule
 - 2. Recommended Locations for Builders Hardware
 - 3. Keying Systems and Nomenclature
 - 4. Installation Guide for Doors and Hardware
- C NFPA – National Fire Protection Association
 - 1. NFPA 70 – National Electric Code
 - 2. NFPA 80 – 2016 Edition – Standard for Fire Doors and Other Opening Protectives
 - 3. NFPA 101 – Life Safety Code
 - 4. NFPA 105 – Smoke and Draft Control Door Assemblies
 - 5. NFPA 252 – Fire Tests of Door Assemblies
- D ANSI - American National Standards Institute
 - 1. ANSI A117.1 – 2017 Edition – Accessible and Usable Buildings and Facilities
 - 2. ANSI/BHMA A156.1 - A156.29, and ANSI/BHMA A156.31 - Standards for Hardware and Specialties
 - 3. ANSI/BHMA A156.28 - Recommended Practices for Keying Systems
 - 4. ANSI/WDMA I.S. 1A - Interior Architectural Wood Flush Doors
 - 5. ANSI/SDI A250.8 - Standard Steel Doors and Frames

1.3 SUBMITTALS

- A General:
 - 1. Submit in accordance with Conditions of Contract and Division 01 Submittal Procedures.
 - 2. Prior to forwarding submittal:
 - a. Review drawings and Sections from related trades to verify compatibility with specified hardware.
 - b. Highlight, encircle, or otherwise specifically identify on submittals: deviations from Contract Documents, issues of incompatibility or other issues which may detrimentally affect the Work.
- B Action Submittals:
 - 1. Product Data: Submit technical product data for each item of door hardware, installation instructions, maintenance of operating parts and finish, and other information necessary to show compliance with requirements.
 - 2. Riser and Wiring Diagrams: After final approval of hardware schedule, submit details of electrified door hardware, indicating:
 - a. Wiring Diagrams: For power, signal, and control wiring and including:
 - 1) Details of interface of electrified door hardware and building safety and security systems.
 - 2) Schematic diagram of systems that interface with electrified door hardware.
 - 3) Point-to-point wiring.

- 4) Risers.
3. Samples for Verification: If requested by Architect, submit production sample of requested door hardware unit in finish indicated and tagged with full description for coordination with schedule.
 - a. Samples will be returned to supplier. Units that are acceptable to Architect may, after final check of operations, be incorporated into Work, within limitations of key coordination requirements.
4. Door Hardware Schedule:
 - a. Submit concurrent with submissions of Product Data, Samples, and Shop Drawings. Coordinate submission of door hardware schedule with scheduling requirements of other work to facilitate fabrication of other work critical in Project construction schedule.
 - b. Submit under direct supervision of a Door Hardware Institute (DHI) certified Architectural Hardware Consultant (AHC) or Door Hardware Consultant (DHC) with hardware sets in vertical format as illustrated by Sequence of Format for the Hardware Schedule published by DHI.
 - c. Indicate complete designations of each item required for each opening, include:
 - 1) Door Index: door number, heading number, and Architect's hardware set number.
 - 2) Quantity, type, style, function, size, and finish of each hardware item.
 - 3) Name and manufacturer of each item.
 - 4) Fastenings and other pertinent information.
 - 5) Location of each hardware set cross-referenced to indications on Drawings.
 - 6) Explanation of all abbreviations, symbols, and codes contained in schedule.
 - 7) Mounting locations for hardware.
 - 8) Door and frame sizes and materials.
 - 9) Degree of door swing and handing.
 - 10) Operational Description of openings with electrified hardware covering egress, ingress (access), and fire/smoke alarm connections.
5. Key Schedule:
 - a. After Keying Conference, provide keying schedule that includes levels of keying, explanations of key system's function, key symbols used, and door numbers controlled.
 - b. Use ANSI/BHMA A156.28 "Recommended Practices for Keying Systems" as guideline for nomenclature, definitions, and approach for selecting optimal keying system.
 - c. Provide 3 copies of keying schedule for review prepared and detailed in accordance with referenced DHI publication. Include schematic keying diagram and index each key to unique door designations.
 - d. Index keying schedule by door number, keyset, hardware heading number, cross keying instructions, and special key stamping instructions.
 - e. Provide one complete bitting list of key cuts and one key system schematic illustrating system usage and expansion. Forward bitting list, key cuts and key system schematic directly to Owner, by means as directed by Owner.
 - f. Prepare key schedule by or under supervision of supplier, detailing Owner's final keying instructions for locks.
- C Informational Submittals:
 1. Provide Qualification Data for Supplier, Installer and Architectural Hardware Consultant.
 2. Provide Product Data:
 - a. Certify that door hardware approved for use on types and sizes of labeled fire-rated doors complies with listed fire-rated door assemblies.
 - b. Include warranties for specified door hardware.
- D Closeout Submittals:
 1. Operations and Maintenance Data: Provide in accordance with Division 01 and include:
 - a. Complete information on care, maintenance, and adjustment; data on repair and replacement parts, and information on preservation of finishes.
 - b. Catalog pages for each product.
 - c. Final approved hardware schedule edited to reflect conditions as installed.

- d. Final keying schedule
 - e. Copy of warranties including appropriate reference numbers for manufacturers to identify project.
 - f. As-installed wiring diagrams for each opening connected to power, both low voltage and 110 volts.
- E Inspection and Testing:
- 1. Submit written reports to the Owner and Authority Having Jurisdiction (AHJ) of the results of functional testing and inspection for:
 - a. Fire door assemblies, in compliance with NFPA 80.
 - b. Required egress door assemblies, in compliance with NFPA 101.

1.4 QUALITY ASSURANCE

A Qualifications and Responsibilities:

- 1. Supplier: Recognized architectural hardware supplier with a minimum of 5 years documented experience supplying both mechanical and electromechanical door hardware similar in quantity, type, and quality to that indicated for this Project. Supplier to be recognized as a factory direct distributor by the manufacturer of the primary materials with a warehousing facility in the Project's vicinity. Supplier to have on staff, a certified Architectural Hardware Consultant (AHC) or Door Hardware Consultant (DHC) available to Owner, Architect, and Contractor, at reasonable times during the Work for consultation.
- 2. Installer: Qualified tradesperson skilled in the application of commercial grade hardware with experience installing door hardware similar in quantity, type, and quality as indicated for this Project.
- 3. Architectural Hardware Consultant: Person who is experienced in providing consulting services for door hardware installations that are comparable in material, design, and extent to that indicated for this Project and meets these requirements:
 - a. For door hardware: DHI certified AHC or DHC.
 - b. Can provide installation and technical data to Architect and other related subcontractors.
 - c. Can inspect and verify components are in working order upon completion of installation.
 - d. Capable of producing wiring diagram and coordinating installation of electrified hardware with Architect and electrical engineers.
- 4. Single Source Responsibility: Obtain each type of door hardware from single manufacturer.

B Certifications:

- 1. Fire-Rated Door Openings:
 - a. Provide door hardware for fire-rated openings that complies with NFPA 80 and requirements of authorities having jurisdiction.
 - b. Provide only items of door hardware that are listed products tested by UL LLC, Intertek Testing Services, or other testing and inspecting organizations acceptable to authorities having jurisdiction for use on types and sizes of doors indicated, based on testing at positive pressure and according to NFPA 252 or UL 10C and in compliance with requirements of fire-rated door and door frame labels.
- 2. Smoke and Draft Control Door Assemblies:
 - a. Provide door hardware that meets requirements of assemblies tested according to UL 1784 and installed in compliance with NFPA 105
 - b. Comply with the maximum air leakage of 0.3 cfm/sq. ft. (3 cu. m per minute/sq. m) at tested pressure differential of 0.3-inch wg (75 Pa) of water.
- 3. Electrified Door Hardware:
 - a. Listed and labeled as defined in NFPA 70, Article 100, by testing agency acceptable to authorities having jurisdiction.
- 4. Accessibility Requirements:
 - a. Comply with governing accessibility regulations cited in "REFERENCES" article 1.02.D3 herein for door hardware on doors in an accessible route. This project must

comply with all Federal Americans with Disability Act regulations and all Local Accessibility Regulations.

C Pre-Installation Meetings:

1. Keying Conference:
 - a. Incorporate keying conference decisions into final keying schedule after reviewing door hardware keying system including:
 - 1) Function of building, flow of traffic, purpose of each area, degree of security required, and plans for future expansion.
 - 2) Preliminary key system schematic diagram.
 - 3) Requirements for key control system.
 - 4) Requirements for access control.
 - 5) Address for delivery of keys.
2. Pre-installation Conference:
 - a. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
 - b. Inspect and discuss preparatory work performed by other trades.
 - c. Inspect and discuss electrical roughing-in for electrified door hardware.
 - d. Review sequence of operation for each type of electrified door hardware.
 - e. Review required testing, inspecting, and certifying procedures.
 - f. Review questions or concerns related to proper installation and adjustment of door hardware.
3. Electrified Hardware Coordination Conference:
 - a. Prior to ordering electrified hardware, schedule and hold meeting to coordinate door hardware with security, electrical, doors and frames, and other related suppliers.

1.5 DELIVERY, STORAGE, AND HANDLING

- A Inventory door hardware on receipt and provide secure lock-up for hardware delivered to Project site. Promptly replace products damaged during shipping
- B Tag each item or package separately with identification coordinated with final door hardware schedule, and include installation instructions, templates, and necessary fasteners with each item or package. Deliver each article of hardware in manufacturer's original packaging.
- C Maintain manufacturer-recommended environmental conditions throughout storage and installation periods.
- D Provide secure lock-up for door hardware delivered to Project. Control handling and installation of hardware items so that completion of Work will not be delayed by hardware losses both before and after installation.
- E Handle hardware in manner to avoid damage, marring, or scratching. Correct, replace or repair products damaged during Work. Protect products against malfunction due to paint, solvent, cleanser, or any chemical agent.
- F Deliver keys to manufacturer of key control system for subsequent delivery to Owner.

1.6 COORDINATION

- A Coordinate layout and installation of floor-recessed door hardware with floor construction. Cast anchoring inserts into concrete.
- B Installation Templates: Distribute for doors, frames, and other work specified to be factory or shop prepared. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing door hardware to comply with indicated requirements.
- C Security: Coordinate installation of door hardware, keying, and access control with Owner's security consultant.
- D Electrical System Roughing-In: Coordinate layout and installation of electrified door hardware with connections to power supplies and building safety and security systems.

1.7 WARRANTY

- A Manufacturer's standard form in which manufacturer agrees to repair or replace components of door hardware that fail in materials or workmanship within published warranty period.
 - 1. Warranty does not cover damage or faulty operation due to improper installation, improper use or abuse.
 - 2. Warranty Period: Beginning from date of Final Acceptance, for durations indicated in manufacturer's published listings.

1.8 MAINTENANCE

- A Furnish complete set of special tools required for maintenance and adjustment of hardware, including changing of cylinders.
- B Turn over unused materials to Owner for maintenance purposes.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A The Owner requires use of certain products for their unique characteristics and project suitability to ensure continuity of existing and future performance and maintenance standards. After investigating available product offerings, the Awarding Authority has elected to prepare proprietary specifications. These products are specified with the notation: "No Substitute."
- B Approval of alternate manufacturers and/or products other than those listed as "Scheduled Manufacturer" or "Acceptable Manufacturers" in the individual article for the product category are only to be considered by official substitution request in accordance with section 01 25 00.
- C Approval of products from manufacturers indicated in "Acceptable Manufacturers" is contingent upon those products providing all functions and features and meeting all requirements of scheduled manufacturer's product.
- D Where specified hardware is not adaptable to finished shape or size of members requiring hardware, furnish suitable types having same operation and quality as type specified, subject to Architect's approval.

2.2 MATERIALS

- A Fabrication
 - 1. Provide door hardware manufactured to comply with published templates generally prepared for machine, wood, and sheet metal screws. provide screws according to manufacturer's recognized installation standards for application intended.
 - 2. Finish exposed screws to match hardware finish, or, if exposed in surfaces of other work, to match finish of this other work including prepared for paint surfaces to receive painted finish.
 - 3. Provide concealed fasteners wherever possible for hardware units exposed when door is closed. Coordinate with "Metal Doors and Frames", "Flush Wood Doors", "Stile and Rail Wood Doors" to ensure proper reinforcements. Advise the Architect where visible fasteners, such as thru bolts, are required.
- B Provide screws, bolts, expansion shields, drop plates and other devices necessary for hardware installation.
 - 1. Where fasteners are exposed to view: Finish to match adjacent door hardware material.
- C Cable and Connectors:
 - 1. Where scheduled in the hardware sets, provide each item of electrified hardware and wire harnesses with number and gage of wires enough to accommodate electric function of specified hardware.
 - 2. Provide Molex connectors that plug directly into connectors from harnesses, electric locking and power transfer devices.
 - 3. Provide through-door wire harness for each electrified locking device installed in a door and wire harness for each electrified hinge, electrified continuous hinge, electrified pivot, and electric power transfer for connection to power supplies.

2.3 HINGES

A Manufacturers and Products:

1. Scheduled Manufacturer and Product:
 - a. Ives 5BB series
2. Acceptable Manufacturers and Products:
 - a. Hager BB1191/1279 series
 - b. McKinney TB series

B Requirements:

1. Provide hinges conforming to ANSI/BHMA A156.1.
2. Provide five knuckle, ball bearing hinges.
3. 1-3/4 inch (44 mm) thick doors, up to and including 36 inches (914 mm) wide:
 - a. Exterior: Standard weight, bronze or stainless steel, 4-1/2 inches (114 mm) high
 - b. Interior: Standard weight, steel, 4-1/2 inches (114 mm) high
4. 1-3/4 inch (44 mm) thick doors over 36 inches (914 mm) wide:
 - a. Exterior: Heavy weight, bronze/stainless steel, 5 inches (127 mm) high
 - b. Interior: Heavy weight, steel, 5 inches (127 mm) high
5. 2 inches or thicker doors:
 - a. Exterior: Heavy weight, bronze or stainless steel, 5 inches (127 mm) high
 - b. Interior: Heavy weight, steel, 5 inches (127 mm) high
6. Adjust hinge width for door, frame, and wall conditions to allow proper degree of opening.
7. Provide three hinges per door leaf for doors 90 inches (2286 mm) or less in height, and one additional hinge for each 30 inches (762 mm) of additional door height.
8. Hinge Pins: Except as otherwise indicated, provide hinge pins as follows:
 - a. Steel Hinges: Steel pins
 - b. Non-Ferrous Hinges: Stainless steel pins
 - c. Out-Swinging Exterior Doors: Non-removable pins
 - d. Out-Swinging Interior Lockable Doors: Non-removable pins
 - e. Interior Non-lockable Doors: Non-rising pins
9. Provide hinges with electrified options as scheduled in the hardware sets. Provide with number and gage of wires enough to accommodate electric function of specified hardware. Locate electric hinge at second hinge from bottom or nearest to electrified locking component. Provide mortar guard for each electrified hinge specified.

2.4 CONTINUOUS HINGES

A Manufacturers:

1. Scheduled Manufacturer:
 - a. Select (Owner Preferred)
2. Acceptable Manufacturers:
 - a. Ives
 - b. Roton

B Requirements:

1. Provide aluminum geared continuous hinges conforming to ANSI/BHMA A156.26, Grade 1.
2. Provide aluminum geared continuous hinges, where specified in the hardware sets, fabricated from 6063-T6 aluminum.
3. Provide split nylon bearings at each hinge knuckle for quiet, smooth, self-lubricating operation.
4. Provide hinges capable of supporting door weights up to 450 pounds, and successfully tested for 1,500,000 cycles.
5. On fire-rated doors, provide aluminum geared continuous hinges classified for use on rated doors by testing agency acceptable to authority having jurisdiction.
6. Provide aluminum geared continuous hinges with electrified option scheduled in the hardware sets. Provide with number and gage of wires enough to accommodate electric function of specified hardware.

7. Provide hinges 1 inch (25 mm) shorter in length than nominal height of door, unless otherwise noted or door details require shorter length and with symmetrical hole pattern.

2.5 ELECTRIC POWER TRANSFER

A Manufacturers:

1. Scheduled Manufacturer and Product:
 - a. Von Duprin EPT-10 (Owner Preferred)
2. Acceptable Manufacturers and Products:
 - a. ABH PT1000
 - b. Precision EPT-12C

B Requirements:

1. Provide power transfer with electrified options as scheduled in the hardware sets. Provide with number and gage of wires enough to accommodate electric function of specified hardware.
2. Locate electric power transfer per manufacturer's template and UL requirements, unless interference with operation of door or other hardware items.

2.6 MORTISE LOCKS

A Manufacturers and Products:

1. Scheduled Manufacturer and Product:
 - a. Best 45H series (Owner Preferred)
2. Acceptable Manufacturers and Products:
 - a. Corbin Russwin ML2000 (Owner Preferred)
 - b. Schlage L9000

2.7 FLUSH BOLTS

A Manufacturers:

1. Scheduled Manufacturer:
 - a. Ives
2. Acceptable Manufacturers:
 - a. Rockwood
 - b. Trimco

B Requirements:

1. Provide automatic, constant latching, and manual flush bolts with forged bronze or stainless-steel face plates, extruded brass levers, and with wrought brass guides and strikes. Provide 12 inch (305 mm) steel or brass rods at doors up to 90 inches (2286 mm) in height. For doors over 90 inches (2286 mm) in height increase top rods by 6 inches (152 mm) for each additional 6 inches (152 mm) of door height. Provide dust-proof strikes at each bottom flush bolt.

2.8 COORDINATORS

A Manufacturers:

1. Scheduled Manufacturer:
 - a. Ives
2. Acceptable Manufacturers:
 - a. Trimco
 - b. Rockwood

B Requirements:

1. Where pairs of doors are equipped with automatic flush bolts, an astragal, or other hardware that requires synchronized closing of the doors, provide bar-type coordinating device, surface applied to underside of stop at frame head.
2. Provide filler bar of correct length for unit to span entire width of opening, and appropriate brackets for parallel arm door closers, surface vertical rod exit device strikes, or other stop mounted hardware. Factory-prepared coordinators for vertical rod devices as specified.

2.9 EXIT DEVICES

A Manufacturers and Products:

1. Scheduled Manufacturer and Product:
 - a. Von Duprin 98/35A series (Owner Preferred)
2. Acceptable Manufacturers and Products:
 - a. Detex Advantex series
 - b. Sargent PE80 series

B Requirements:

1. Provide exit devices tested to ANSI/BHMA A156.3 Grade 1 and UL listed for Panic Exit or Fire Exit Hardware.
2. Cylinders: Refer to "KEYING" article, herein.
3. Provide smooth touchpad type exit devices, fabricated of brass, bronze, stainless steel, or aluminum, plated to standard architectural finishes to match balance of door hardware.
4. Touchpad must extend a minimum of one half of door width. No plastic inserts are allowed in touchpads.
5. Provide exit devices with deadlatching feature for security and for future addition of alarm kits and/or other electrified requirements.
6. Provide exit devices with weather resistant components that can withstand harsh conditions of various climates and corrosive cleaners used in outdoor pool environments.
7. Provide flush end caps for exit devices.
8. Provide exit devices with manufacturer's approved strikes.
9. Provide exit devices cut to door width and height. Install exit devices at height recommended by exit device manufacturer, allowable by governing building codes, and approved by Architect.
10. Mount mechanism case flush on face of doors or provide spacers to fill gaps behind devices. Where glass trim or molding projects off face of door, provide glass bead kits.
11. Provide cylinder or hex-key dogging as specified at non fire-rated openings.
12. Removable Mullions: 2 inches (51 mm) x 3 inches (76 mm) steel tube. Where scheduled as keyed removable mullion, provide type that can be removed by use of a keyed cylinder, which is self-locking when re-installed.
13. Provide factory drilled weep holes for exit devices used in full exterior application, highly corrosive areas, and where noted in hardware sets.
14. Provide electrified options as scheduled.
15. Top latch mounting: double- or single-tab mount for steel doors, face mount for aluminum doors eliminating requirement of tabs, and double tab mount for wood doors.
16. Provide exit devices with optional trim designs to match other lever and pull designs used on the project.

2.10 POWER SUPPLIES

A Manufacturers and Products:

1. Scheduled Manufacturer and Product:
 - a. Schlage/Von Duprin PS900 Series (Owner Preferred)
2. Acceptable Manufacturers and Products:
 - a. Sargent 3500 series
 - b. Securitron BPS series

B Requirements:

1. Provide power supplies approved by manufacturer of supplied electrified hardware.
2. Provide appropriate quantity of power supplies necessary for proper operation of electrified locking components as recommended by manufacturer of electrified locking components with consideration for each electrified component using power supply, location of power supply, and approved wiring diagrams. Locate power supplies as directed by Architect.
3. Provide regulated and filtered 24 VDC power supply, and UL class 2 listed.
4. Provide power supplies with the following features:
 - a. 12/24 VDC Output, field selectable.

- b. Class 2 Rated power limited output.
- c. Universal 120-240 VAC input.
- d. Low voltage DC, regulated and filtered.
- e. Polarized connector for distribution boards.
- f. Fused primary input.
- g. AC input and DC output monitoring circuit w/LED indicators.
- h. Cover mounted AC Input indication.
- i. Tested and certified to meet UL294.
- j. NEMA 1 enclosure.
- k. Hinged cover w/lock down screws.
- l. High voltage protective cover.

2.11 CYLINDERS

A Manufacturers and Products:

- 1. Scheduled Manufacturer and Product:
 - a. Schlage Everest 29 R (Owner Preferred)

B Requirements:

- 1. Provide cylinders/cores compliant with ANSI/BHMA A156.5; latest revision; cylinder face finished to match lockset; manufacturer's series as indicated. Refer to "KEYING" article, herein.
- 2. Provide cylinders in the below-listed configuration(s), distributed throughout the Project as indicated.
 - a. Patented Restricted Small Format: cylinder with small format interchangeable cores (SFIC) with restricted, patented keyway.
- 3. Patent Protection: Cylinders/cores requiring use of restricted, patented keys, patent protected.
- 4. Nickel silver bottom pins.

2.12 KEYING

A Scheduled System:

- 1. Existing factory registered system:
 - a. Provide a factory registered keying system, complying with guidelines in ANSI/BHMA A156.28, incorporating decisions made at keying conference.

B Requirements:

- 1. Construction Keying:
 - a. Replaceable Construction Cores.
 - 1) Provide temporary construction cores replaceable by permanent cores, furnished in accordance with the following requirements.
 - (a) 3 construction control keys
 - (b) 12 construction change (day) keys.
 - 2) Owner or Owner's Representative will replace temporary construction cores with permanent cores.
- 2. Permanent Keying:
 - a. Provide permanent cylinders/cores keyed by the manufacturer according to the following key system.
 - 1) Master Keying system as directed by the Owner.
 - b. Forward bitting list and keys separately from cylinders, by means as directed by Owner. Failure to comply with forwarding requirements will be cause for replacement of cylinders/cores involved at no additional cost to Owner.
 - c. Provide keys with the following features:
 - 1) Material: Nickel silver; minimum thickness of .107-inch (2.3mm)
 - 2) Patent Protection: Keys and blanks protected by one or more utility patent(s).

- 3) Geographically Exclusive: Where High Security or Security cylinders/cores are indicated, provide nationwide, geographically exclusive key system complying with the following restrictions.
- d. Identification:
 - 1) Mark permanent cylinders/cores and keys with applicable blind code for identification. Do not provide blind code marks with actual key cuts.
 - 2) Identification stamping provisions must be approved by the Architect and Owner.
 - 3) Stamp cylinders/cores and keys with Owner's unique key system facility code as established by the manufacturer; key symbol and embossed or stamped with "DO NOT DUPLICATE" along with the "PATENTED" or patent number to enforce the patent protection.
 - 4) Failure to comply with stamping requirements will be cause for replacement of keys involved at no additional cost to Owner.
 - 5) Forward permanent cylinders/cores to Owner, separately from keys, by means as directed by Owner.
- e. Quantity: Furnish in the following quantities.
 - 1) Permanent Control Keys: 3.
 - 2) Master Keys: 6.
 - 3) Change (Day) Keys: 3 per cylinder/core that is keyed differently
 - 4) Key Blanks: Quantity as determined in the keying meeting.

2.13 KEY CONTROL SYSTEM

- A Manufacturers:
 1. Scheduled Manufacturer:
 - a. Lund
 2. Acceptable Manufacturers:
 - a. HPC
- B Requirements:
 1. Provide key control system, including envelopes, labels, tags with self-locking key clips, receipt forms, 3-way visible card index, temporary markers, permanent markers, and standard metal cabinet, all as recommended by system manufacturer, with capacity for 150% of number of locks required for Project.
 - a. Provide complete cross index system set up by hardware supplier, and place keys on markers and hooks in cabinet as determined by final key schedule.
 - b. Provide hinged-panel type cabinet for wall mounting.

2.14 DOOR CLOSERS

- A Manufacturers and Products:
 1. Scheduled Manufacturer and Product:
 - a. LCN 4040XP series (Owner Preferred)
 2. Acceptable Manufacturers and Products:
 - a. Norton 9500 series
 - b. Sargent 281 series
- B Requirements:
 1. Provide door closers conforming to ANSI/BHMA A156.4 Grade 1 requirements by BHMA certified independent testing laboratory. ISO 9000 certify closers. Stamp units with date of manufacture code.
 2. Provide door closers with fully hydraulic, full rack and pinion action with high strength cast iron cylinder, and full complement bearings at shaft.
 3. Cylinder Body: 1-1/2-inch (38 mm) diameter piston with 5/8-inch (16 mm) diameter double heat-treated pinion journal. QR code with a direct link to maintenance instructions.
 4. Hydraulic Fluid: Fireproof, passing requirements of UL10C, and requiring no seasonal closer adjustment for temperatures ranging from 120 degrees F to -30 degrees F.

5. Spring Power: Continuously adjustable over full range of closer sizes, and providing reduced opening force as required by accessibility codes and standards. Provide snap-on cover clip, with plastic covers, that secures cover to spring tube.
6. Hydraulic Regulation: By tamper-proof, non-critical valves, with separate adjustment for latch speed, general speed, and backcheck. Provide graphically labelled instructions on the closer body adjacent to each adjustment valve. Provide positive stop on reg valve that prevents reg screw from being backed out.
7. Provide closers with solid forged steel main arms and factory assembled heavy-duty forged forearms for parallel arm closers.
8. Pressure Relief Valve (PRV) Technology: Not permitted.
9. Finish for Closer Cylinders, Arms, Adapter Plates, and Metal Covers: Powder coating finish which has been certified to exceed 100 hours salt spray testing as described in ANSI Standard A156.4 and ASTM B117, or has special rust inhibitor (SRI).
10. Provide special templates, drop plates, mounting brackets, or adapters for arms as required for details, overhead stops, and other door hardware items interfering with closer mounting.
11. Closers shall be capable of being upgraded by adding modular mechanical or electronic components in the field.

2.15 ELECTROMECHANICAL AUTOMATIC OPERATORS

A Manufacturers and Products:

1. Scheduled Manufacturer and Product:
 - a. Norton 6300 (Owner Preferred)
2. Acceptable Manufacturers and Products:
 - a. Dormakaba ED 100 (Owner Preferred)
 - b. LCN Senior Swing

B Requirements:

1. Provide low energy automatic operator units that are electromechanical design complying with ANSI/BHMA A156.19.
 - a. Opening: Powered by DC motor working through reduction gears.
 - b. Closing: Spring force.
 - c. Operation: Motor is off when door is in closing mode. Door can be manually operated with power on or off without damage to operator. Provide variable adjustments, including opening and closing speed adjustment.
 - d. Cover: Aluminum.
2. Provide units with manual off/auto/hold-open switch, push and go function to activate power operator, vestibule interface delay, electric lock delay, hold-open delay adjustable from 1 to 32 seconds, and logic terminal to interface with accessories, mats, and sensors.
3. Provide drop plates, brackets, and adapters for arms as required to suit details.
4. Provide motion sensors and/or actuator switches, and receivers for operation as specified. Provide weather-resistant actuators at exterior applications.
5. Provide key switches, with LED's, recommended and approved by manufacturer of automatic operator as required for function as described in operation description of hardware sets. Cylinders: Refer to "KEYING" article, herein.
6. Provide complete assemblies of controls, switches, power supplies, relays, and parts/material recommended and approved by manufacturer of automatic operator for each individual leaf. Actuators control both doors simultaneously at pairs. Sequence operation of exterior and vestibule doors with automatic operators to allow ingress or egress through both sets of openings as directed by Architect. Locate actuators, key switches, and other controls as directed by Architect.

2.16 DOOR TRIM

A Manufacturers:

1. Scheduled Manufacturer:
 - a. Ives

2. Acceptable Manufacturers:
 - a. Trimco
 - b. Rockwood
- B Requirements:
 1. Provide push plates, push bars, pull plates, pulls, and hands-free reversible door pulls with diameter and length as scheduled.

2.17 PROTECTION PLATES

- A Manufacturers:
 1. Scheduled Manufacturer:
 - a. Ives
 2. Acceptable Manufacturers:
 - a. Trimco
 - b. Rockwood
- B Requirements:
 1. Provide protection plates with a minimum of 0.050 inch (1 mm) thick, beveled four edges as scheduled. Furnish with sheet metal or wood screws, finished to match plates.
 2. Sizes plates 2 inches (51 mm) less width of door on single doors, pairs of doors with a mullion, and doors with edge guards. Size plates 1 inch (25 mm) less width of door on pairs without a mullion or edge guards.
 3. At fire rated doors, provide protection plates over 16 inches high with UL label.

2.18 OVERHEAD STOPS AND OVERHEAD STOP/HOLDERS

- A Manufacturers:
 1. Scheduled Manufacturers:
 - a. Glynn-Johnson
 2. Acceptable Manufacturers:
 - a. Rixson
 - b. Sargent
- B Requirements:
 1. Provide overhead stop at any door where conditions do not allow for a wall stop or floor stop presents tripping hazard.

2.19 DOOR STOPS AND HOLDERS

- A Manufacturers:
 1. Scheduled Manufacturer:
 - a. Ives
 2. Acceptable Manufacturers:
 - a. Trimco
 - b. Rockwood
- B Provide door stops at each door leaf:
 1. Provide wall stops wherever possible. Provide concave type where lockset has a push button of thumbturn.
 2. Where a wall stop cannot be used, provide universal floor stops.
 3. Where wall or floor stop cannot be used, provide overhead stop.
 4. Provide roller bumper where doors open into each other and overhead stop cannot be used.

2.20 SILENCERS

- A Manufacturers:
 1. Scheduled Manufacturer:
 - a. Ives
 2. Acceptable Manufacturers:
 - a. Rockwood
 - b. Trimco

B Requirements:

1. Provide "push-in" type silencers for hollow metal or wood frames.
2. Provide one silencer per 30 inches (762 mm) of height on each single frame, and two for each pair frame.
 - a. Zero International
 - b. National Guard
 - c. Reese
 - d. Pemko
3. Omit where gasketing is specified.

2.21 THRESHOLDS, SEALS, DOOR SWEEPS, AUTOMATIC DOOR BOTTOMS, AND GASKETING**A Manufacturers:**

1. Scheduled Manufacturer:
 - a. Zero International
2. Acceptable Manufacturers:
 - a. National Guard
 - b. Reese

B Seals and Gasketing: Provide continuous gasketing on exterior openings, to the head and jambs, forming a continuous seal between the door and the frame. Provide smoke, light, or sound gasketing on interior doors where indicated.

1. Provide self-tapping fasteners for aluminum extruded gasketing being applied to hollow metal frames.
 - a. Provide non-corrosive fasteners for all exterior applications.
 - b. Provide security fasteners where indicated.
2. Provide neoprene, EPDM, silicone, or nylon brush inserts as specified in hardware sets. Provide non brush inserts of solid or sponge cell, as specified in hardware sets. Vinyl inserts are not allowed except where specified in hardware sets.

C Smoke Labeled Gasketing: At all smoke labeled openings, provide smoke listed perimeter gasketing assemblies complying with NFPA 105 listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction for smoke control ratings indicated based on testing according to UL 1784.**D Fire Listed Gasketing:** Assemblies complying with NFPA 80 that are listed by a testing and inspecting agency acceptable to authorities having jurisdiction for fire ratings indicated based on testing according to UL-10C.

1. Where frame-applied intumescent seals are required by the manufacturer, provide gaskets that comply with UL 10C Standard for Positive Pressure Fire Tests of Door Assemblies and UBC 7-2, Fire Tests of Door Assemblies.

E Sound-Rated Gasketing: Provide acoustic gasketing to meet Sound Transmission Class (STC) rating required.**F Meeting-Stile Gasketing:** Provide meeting-stile gasketing that fastens to the meeting stiles forming a continuous seal when doors are closed.**G Door Sweeps or Shoes:** Apply to the bottom of the door to close the gap between the door bottom and finished floor or saddle threshold.

1. Provide solid neoprene, EPDM, silicone, or nylon brush type of seal as specified in hardware sets. Vinyl inserts are not allowed except where specified in hardware sets.

H Automatic Door Bottoms:

1. Provide closed cell sponge, bulb neoprene, or EPDM type of seal as specified in hardware sets.
2. Door bottom to be mortised, semi mortised, or surface mount as with a minimum thickness as specified in hardware sets.

I Rain Drips:

1. Provide overhead rain drips for out-swinging hollow metal doors that are not covered against 45 degree blowing rain. Aluminum extrusion to be a minimum of .088 inches thick and extend 2.50 inches from the face of the frame, in anodized finish to match door.

2. Door sweeps or shoes with integral rain drip must meet ADA requirements
- J Thresholds: Provide threshold units not less than 4 inches wide, formed to accommodate change in floor elevation where indicated, and fabricated to accommodate door hardware and fit door frames.
 1. Threshold extrusion to be a minimum thickness as specified in hardware sets.

2.22 ROLLER LATCHES

- A Manufacturers:
 1. Scheduled Manufacturer:
 - a. Ives
 2. Acceptable Manufacturers:
 - a. Burns
 - b. Trimco
- B Requirements:
 1. Provide roller latches with 4-7/8 inches (124 mm) strike at single doors to fit ANSI frame prep. If dummy levers are used in conjunction with roller latch mount roller latch at a height as to not interfere with proper mounting and height of dummy lever.
 2. Provide roller latches with 2-1/4 inches (57 mm) full lip strike at pair doors. Mount roller in top rail of each leaf per manufacturer's template.

2.23 DOOR POSITION SWITCHES

- A Manufacturers:
 1. Scheduled Manufacturer:
 - a. Schlage
 2. Acceptable Manufacturers:
 - a. GE-Interlogix
 - b. Sargent
- B Requirements:
 1. Provide recessed or surface mounted type door position switches as specified.
 2. Coordinate door and frame preparations with door and frame suppliers. If switches are being used with magnetic locking device, provide minimum of 4 inches (102 mm) between switch and magnetic locking device.

2.24 COAT HOOKS

- A Manufacturers:
 1. Scheduled Manufacturer:
 - a. Ives
 2. Acceptable Manufacturers:
 - a. Burns
 - b. Trimco
- B Provide coat hooks as specified.

2.25 FINISHES

- A FINISH: BHMA 626/652 (US26D); EXCEPT:
 1. Hinges at Exterior Doors: BHMA 630 (US32D)
 2. Aluminum Geared Continuous Hinges: BHMA 628 (US28)
 3. Push Plates, Pulls, and Push Bars: BHMA 630 (US32D)
 4. Protection Plates: BHMA 630 (US32D)
 5. Overhead Stops and Holders: BHMA 630 (US32D)
 6. Door Closers: Powder Coat to Match
 7. Wall Stops: BHMA 630 (US32D)
 8. Latch Protectors: BHMA 630 (US32D)
 9. Weatherstripping: Clear Anodized Aluminum
 10. Thresholds: Mill Finish Aluminum

PART 3 EXECUTION

3.1 EXAMINATION

- A Prior to installation of hardware, examine doors and frames, with Installer present, for compliance with requirements for installation tolerances, labeled fire-rated door assembly construction, wall and floor construction, and other conditions affecting performance. Verify doors, frames, and walls have been properly reinforced for hardware installation.
- B Examine roughing-in for electrical power systems to verify actual locations of wiring connections before electrified door hardware installation.
- C Submit a list of deficiencies in writing and proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A Mount door hardware units at heights to comply with the following, unless otherwise indicated or required to comply with governing regulations.
 - 1. Standard Steel Doors and Frames: ANSI/SDI A250.8.
 - 2. Custom Steel Doors and Frames: HMMA 831.
 - 3. Interior Architectural Wood Flush Doors: ANSI/WDMA I.S. 1A
 - 4. Installation Guide for Doors and Hardware: DHI TDH-007-20
- B Install door hardware in accordance with NFPA 80, NFPA 101 and provide post-install inspection, testing as specified in section 1.03.E unless otherwise required to comply with governing regulations.
- C Install each hardware item in compliance with manufacturer's instructions and recommendations, using only fasteners provided by manufacturer.
- D Do not install surface mounted items until finishes have been completed on substrate. Protect all installed hardware during painting.
- E Set units level, plumb and true to line and location. Adjust and reinforce attachment substrate as necessary for proper installation and operation.
- F Drill and countersink units that are not factory prepared for anchorage fasteners. Space fasteners and anchors according to industry standards.
- G Install operating parts so they move freely and smoothly without binding, sticking, or excessive clearance.
- H Hinges: Install types and in quantities indicated in door hardware schedule but not fewer than quantity recommended by manufacturer for application indicated.
- I Lock Cylinders:
 - 1. Install construction cores to secure building and areas during construction period.
 - 2. Replace construction cores with permanent cores as indicated in keying section.
 - 3. Furnish permanent cores to Owner for installation.
- J Wiring: Coordinate with Division 26, ELECTRICAL and Division 28 ELECTRONIC SAFETY AND SECURITY sections for:
 - 1. Conduit, junction boxes and wire pulls.
 - 2. Connections to and from power supplies to electrified hardware.
 - 3. Connections to fire/smoke alarm system and smoke evacuation system.
 - 4. Connection of wire to door position switches and wire runs to central room or area, as directed by Architect.
 - 5. Connections to panel interface modules, controllers, and gateways.
 - 6. Testing and labeling wires with Architect's opening number.
- K Key Control System: Tag keys and place them on markers and hooks in key control system cabinet, as determined by final keying schedule.
- L Continuous Hinges: Re-locate the door and frame fire rating labels where they will remain visible so that the hinge does not cover the label once installed.
- M Door Closers & Auto Operators: Mount closers/operators on room side of corridor doors, inside of exterior doors, and stair side of stairway doors from corridors. Mount closers/operators so they are not visible in corridors, lobbies and other public spaces unless approved by Architect.

- N Overhead Stops/Holders: Mount overhead stops/holders on room side of corridor doors, inside of exterior doors, and stair side of stairway doors.
- O Power Supplies: Locate power supplies as indicated or, if not indicated, above accessible ceilings or in equipment room, or alternate location as directed by Architect.
- P Thresholds:
 - 1. Set thresholds in full bed of sealant complying with requirements specified in Division 07 Section "Joint Sealants."
 - 2. Aluminum thresholds to be cut-in, and scribed around mullions, frame members, and stops. Do not butt to thresholds. Provide a continuous surface across full width of opening from jamb to jamb.
 - 3. Where aluminum panic-type (rabbeted) thresholds with neoprene inserts are specified, undercut doors as required to properly mate with seal in threshold.
- Q Stops: Provide floor stops for doors unless wall or other type stops are indicated in door hardware schedule. Do not mount floor stops where they may impede traffic or present tripping hazard.
- R Perimeter Gasketing:
 - 1. Apply to head and jamb, forming seal between door and frame.
 - 2. Install gasketing in a manner eliminating need to cut any seal to install surface mounted hardware. Install compatible mounting bracket for surface mounted hardware unless minimum 1/4 inch thick solid aluminum seals are provided for mounting of surface applied hardware.
- S Meeting Stile Gasketing: Fasten to meeting stiles, forming seal when doors are closed.
- T Door Bottoms and Sweeps: Apply to bottom of door, forming seal with threshold when door is closed.

3.3 ADJUSTING

- A Initial Adjustment: Adjust and check each operating item of door hardware and each door to ensure proper operation or function of every unit. Replace units that cannot be adjusted to operate as intended. Adjust door control devices to compensate for final operation of heating and ventilating equipment and to comply with referenced accessibility requirements.
 - 1. Spring Hinges: Adjust to achieve positive latching when door can close freely from an open position of 30 degrees.
 - 2. Electric Strikes: Adjust horizontal and vertical alignment of keeper to properly engage lock bolt.
 - 3. Door Closers: Adjust sweep period to comply with accessibility requirements and requirements of authorities having jurisdiction.
- B Occupancy Adjustment: Approximately three to six months after date of Final Acceptance, examine and readjust each item of door hardware, including adjusting operating forces, as necessary to ensure function of doors and door hardware.

3.4 CLEANING AND PROTECTION

- A Clean adjacent surfaces soiled by door hardware installation.
- B Clean operating items per manufacturer's instructions to restore proper function and finish.
- C Provide final protection and maintain conditions that ensure door hardware is without damage or deterioration at time of Final Acceptance.

3.5 DOOR HARDWARE SCHEDULE

- A The intent of the hardware specification is to specify the hardware for interior and exterior doors, and to establish a type, continuity, and standard of quality. However, it is the door hardware supplier's responsibility to thoroughly review existing conditions, schedules, specifications, drawings, and other Contract Documents to verify the suitability of the hardware specified.
- B Discrepancies, conflicting hardware, and missing items are to be brought to the attention of the architect with corrections made prior to the bidding process. Omitted items not included in a hardware set should be scheduled with the appropriate additional hardware required for proper application.

- C Hardware items are referenced in the following hardware schedule. Refer to the above specifications for special features, options, cylinders/keying, and other requirements.
- D Hardware Sets:

Abbreviation	Name
BES	Best Locking Systems
BYO	By Others
GLY	Glynn-Johnson Corp
IVE	H.B. Ives
LCN	LCN Commercial Division
NOR	Norton Door Controls
SCE	Schlage Electronic Security
SCH	Schlage Lock Company
VON	Von Duprin
ZER	Zero International Inc

Legend:

 Link to catalog cut sheet

 Electrified Opening

Hardware Group No. 01

Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5		652	IVE
1	EA	Dormitory Lock	45H0T(UNT)14HS1626 (LESS CYLINDER)		626	BES
1	EA	SFIC MORTISE CYL W/CONST. CORE	80-131		626	SCH
1	EA	SFIC EVEREST CORE	80-037		626	SCH
1	EA	OH STOP	90S		689	GLY
1	EA	SURFACE CLOSER	4040XP RW/PA		689	LCN
1	EA	MOUNTING PLATE	4040XP-18/18PA AS REQ'D		689	LCN
1	EA	GASKETING	188SBK PSA		BK	ZER
1	EA	VIEWER	U698 (2 QTY @ ADA UNITS)		626	IVE

Hardware Group No. 02

Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5		652	IVE
1	EA	Dormitory Lock	45H0T(UNT)14HS1626 (LESS CYLINDER)		626	BES
1	EA	SFIC MORTISE CYL W/CONST. CORE	80-131		626	SCH
1	EA	SFIC EVEREST CORE	80-037		626	SCH
1	EA	SURFACE CLOSER	4040XP RW/PA		689	LCN
1	EA	WALL STOP	WS406/407CCV		630	IVE
1	EA	GASKETING	188SBK PSA		BK	ZER
1	EA	VIEWER	U698 (2 QTY @ ADA UNITS)		626	IVE

Hardware Group No. 03

Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
4	EA	HINGE	5BB1HW 4.5 X 4.5 NRP		630	IVE
1	EA	Dormitory Lock	45H0T(UNT)14HS1626 (LESS CYLINDER)		626	BES
1	EA	SFIC MORTISE CYL W/CONST. CORE	80-131		626	SCH
1	EA	SFIC EVEREST CORE	80-037		626	SCH
1	EA	SURFACE CLOSER	4040XP SCUSH		689	LCN
1	EA	MOUNTING PLATE	4040XP-18/18PA AS REQ'D		689	LCN
1	EA	CUSH SHOE SUPPORT	4040XP-30 SRT		689	LCN
1	EA	BLADE STOP SPACER	4040XP-61 SRT		689	LCN
1	SET	WEATHERSTRIPPING	BY DOOR/FRAME MANUFACTURER			BYO
1	EA	DOOR SWEEP	8197AA		AA	ZER
1	EA	THRESHOLD	65A		A	ZER
1	EA	VIEWER	U698 (2 QTY @ ADA UNITS)		626	IVE

Hardware Group No. 04 – NOT USED

Hardware Group No. 05

Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
4	EA	HINGE	5BB1HW 4.5 X 4.5		652	IVE
1	EA	CLASSROOM MORTISE DEADLOCK	48H0RS1626 (LESS CYLINDER)		626	BES
1	EA	PUSH PLATE	8200 4" X 16" CFC		630	IVE
1	EA	PULL PLATE	8303 10" 4" X 16" CFT		630	IVE
1	EA	OH STOP	90S		689	GLY
1	EA	SURFACE CLOSER	4040XP RW/PA		689	LCN
1	EA	MOUNTING PLATE	4040XP-18/18PA AS REQ'D		689	LCN
1	EA	MOP PLATE	8400 4" X 1" LDW B-CS		630	IVE
1	EA	KICK PLATE	8400 8" X 2" LDW B-CS		630	IVE
1	EA	GASKETING	188SBK PSA		BK	ZER

Hardware Group No. 06

Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5		652	IVE
1	EA	PRIVACY LOCK	45H0L(UNT)14HS1626		626	BES
1	EA	SURFACE CLOSER	4040XP RW/PA		689	LCN
1	EA	MOP PLATE	8400 4" X 1" LDW B-CS		630	IVE
1	EA	KICK PLATE	8400 8" X 2" LDW B-CS		630	IVE
1	EA	WALL STOP	WS406/407CCV		630	IVE
1	EA	GASKETING	188SBK PSA		BK	ZER
1	EA	COAT AND HAT HOOK	582		626	IVE

Hardware Group No. 07 – NOT USED

Hardware Group No. 08

Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5		652	IVE
1	EA	PRIVACY LOCK	45H0L(UNT)14HS1626		626	BES
1	EA	WALL STOP	WS406/407CCV		630	IVE
1	EA	COAT AND HAT HOOK	582		626	IVE
3	EA	SILENCER	SR64/SR65 AS REQUIRED		GRY	IVE

Hardware Group No. 09

Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5		652	IVE
1	EA	PRIVACY LOCK	45H0L(UNT)14HS1626		626	BES
1	EA	WALL STOP	WS406/407CCV		630	IVE
3	EA	SILENCER	SR64/SR65 AS REQUIRED		GRY	IVE

Hardware Group No. 10

Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5 NRP		652	IVE
1	EA	Classroom Lock	45H0R(UNR)14HS1626 (LESS CYLINDER)		626	BES
1	EA	SFIC MORTISE CYL W/CONST. CORE	80-131		626	SCH
1	EA	SFIC EVEREST CORE	80-037		626	SCH
1	EA	OH STOP	450S		652	GLY
3	EA	SILENCER	SR64/SR65 AS REQUIRED		GRY	IVE

Hardware Group No. 11

Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
3	EA	HINGE	5BB1HW 4.5 X 4.5		652	IVE
1	EA	PASSAGE LOCK	45H0N(UNR)14HS1626		626	BES
1	EA	SURFACE CLOSER	4040XP RW/PA		689	LCN
1	EA	KICK PLATE	8400 8" X 2" LDW B-CS		630	IVE
1	EA	WALL STOP	WS406/407CCV		630	IVE
1	EA	GASKETING	188SBK PSA		BK	ZER

Hardware Group No. 12

Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5 NRP		652	IVE
1	EA	STOREROOM LOCK	45H0D(UNR)14HS1626 (LESS CYLINDER)		626	BES
1	EA	SFIC MORTISE CYL W/CONST. CORE	80-131		626	SCH
1	EA	SFIC EVEREST CORE	80-037		626	SCH
1	EA	SURFACE CLOSER	4040XP CUSH		689	LCN
1	EA	GASKETING	188SBK PSA		BK	ZER

Hardware Group No. 13

Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
2	EA	HINGE	5BB1 4.5 X 4.5		652	IVE
1	EA	ELECTRIC HINGE	5BB1 4.5 X 4.5 CON TW8		✂ 652	IVE
1	EA	Electrified Lock - FSE	45HW0TDEU14J626IDH (LESS CYLINDER)		✂ 626	BES
1	EA	SFIC MORTISE CYL W/CONST. CORE	80-131		626	SCH
1	EA	SFIC EVEREST CORE	80-037		626	SCH
1	EA	SURFACE CLOSER	4040XP RW/PA		689	LCN
1	EA	KICK PLATE	8400 8" X 2" LDW B-CS		630	IVE
1	EA	FLOOR STOP	FS436/FS438 AS REQ'D		626	IVE
3	EA	SILENCER	SR64/SR65 AS REQUIRED		GRY	IVE
1	EA	WIRE HARNESS	CON-XXP (HINGE TO POWER SUPPLY)		✂	SCH
1	EA	WIRE HARNESS	CON-XXP (EXIT/LOCK TO EPT/HINGE)		✂	SCH
1	EA	CARD READER	BY DIVISION 28		✂	BYO
1	EA	DOOR CONTACT	679-05 HM/WD (AS REQ'D)		✂ BLK	SCE
1	EA	POWER SUPPLY	PS902 120/240 VAC		✂	VON

ELECTRICAL OPERATIONAL DESCRIPTION: THE DOOR IS NORMALLY CLOSED AND LOCKED. FROM THE SECURE SIDE PRESENTING VALID CREDENTIALS TO THE READER WILL MOMENTARILY UNLOCK THE LEVER, ALLOWING ENTRY. A KEY OVERRIDE WILL ALSO ENABLE ENTRY. FROM THE NON-SECURE SIDE, THE LEVER RETRACTS LATCH ALLOWING EGRESS. DURING A POWER OUTAGE, THE DOOR WILL REMAIN LOCKED AND WILL CONTINUE TO ALLOW FREE EGRESS AT ALL TIMES. THE DOOR POSITION SWITCH MONITORS THE DOOR FOR OPEN/CLOSED POSITION. REQUEST TO EXIT (RX) FOR REMOTE MONITORING.

Hardware Group No. 14

Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5		652	IVE
1	EA	STOREROOM LOCK	45H0D(UNR)14HS1626 (LESS CYLINDER)		626	BES
1	EA	SFIC MORTISE CYL W/CONST. CORE	80-131		626	SCH
1	EA	SFIC EVEREST CORE	80-037		626	SCH
1	EA	SURFACE CLOSER	4040XP RW/PA		689	LCN
1	EA	KICK PLATE	8400 8" X 2" LDW B-CS		630	IVE
1	EA	FLOOR STOP	FS436/FS438 AS REQ'D		626	IVE
1	EA	GASKETING	188SBK PSA		BK	ZER

Hardware Group No. 15

Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5		652	IVE
1	EA	STOREROOM LOCK	45H0D(UNR)14HS1626 (LESS CYLINDER)		626	BES
1	EA	SFIC MORTISE CYL W/CONST. CORE	80-131		626	SCH
1	EA	SFIC EVEREST CORE	80-037		626	SCH
1	EA	SURFACE CLOSER	4040XP RW/PA		689	LCN
1	EA	KICK PLATE	8400 8" X 2" LDW B-CS		630	IVE
1	EA	WALL STOP	WS406/407CCV		630	IVE
1	EA	GASKETING	188SBK PSA		BK	ZER

Hardware Group No. 16

Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
4	EA	HINGE	5BB1 4.5 X 4.5		652	IVE
1	EA	STOREROOM LOCK	45H0D(UNR)14HS1626 (LESS CYLINDER)		626	BES
1	EA	SFIC MORTISE CYL W/CONST. CORE	80-131		626	SCH
1	EA	SFIC EVEREST CORE	80-037		626	SCH
1	EA	OH STOP	90S		689	GLY
1	EA	SURFACE CLOSER	4040XP RW/PA		689	LCN
1	EA	MOUNTING PLATE	4040XP-18/18PA AS REQ'D		689	LCN
1	EA	KICK PLATE	8400 8" X 2" LDW B-CS		630	IVE
1	EA	GASKETING	188SBK PSA		BK	ZER

Hardware Group No. 17

Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5		630	IVE
1	EA	STOREROOM LOCK	45H0D(UNR)14HS1626 (LESS CYLINDER)		626	BES
1	EA	SFIC MORTISE CYL W/ KEYED CONST. CORE	80-132		626	SCH
1	EA	SFIC EVEREST CORE	80-037		626	SCH
1	EA	SURFACE CLOSER	4040XP SCUSH		689	LCN
1	EA	KICK PLATE	8400 8" X 2" LDW B-CS		630	IVE
1	SET	GASKETING	429AA-S		AA	ZER
1	EA	DOOR SWEEP	39A		A	ZER
1	EA	THRESHOLD	65A		A	ZER

CYLINDER @ STAIR SIDE OF DOOR. FREE EGRESS FROM ROOF.

Hardware Group No. 18

Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
4	EA	HINGE	5BB1 4.5 X 4.5		652	IVE
1	EA	STOREROOM LOCK	45H0D(UNR)14HS1626 (LESS CYLINDER)		626	BES
1	EA	SFIC MORTISE CYL W/CONST. CORE	80-131		626	SCH
1	EA	SFIC EVEREST CORE	80-037		626	SCH
1	EA	SURFACE CLOSER	4040XP RW/PA		689	LCN
1	EA	KICK PLATE	8400 8" X 2" LDW B-CS		630	IVE
1	EA	WALL STOP	WS406/407CCV		630	IVE
3	EA	SILENCER	SR64/SR65 AS REQUIRED		GRY	IVE

Hardware Group No. 19

Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
4	EA	HINGE	5BB1 4.5 X 4.5 NRP		652	IVE
1	EA	STOREROOM LOCK	45H0D(UNR)14HS1626 (LESS CYLINDER)		626	BES
1	EA	SFIC MORTISE CYL W/CONST. CORE	80-131		626	SCH
1	EA	SFIC EVEREST CORE	80-037		626	SCH
1	EA	SURFACE CLOSER	4040XP CUSH		689	LCN
1	EA	GASKETING	188SBK PSA		BK	ZER

Hardware Group No. 20

Provide each PR door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
6	EA	HINGE	5BB1 4.5 X 4.5		652	IVE
2	EA	SINGLE DUMMY TRIM	45H01DT14HS1626		626	BES
2	EA	ROLLER LATCH	RL32/ RL32A		626	IVE
1	EA	OH STOP	450S		652	GLY
1	EA	WALL STOP	WS406/407CCV		630	IVE
2	EA	SILENCER	SR64/SR65 AS REQUIRED		GRY	IVE

Hardware Group No. 21

Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
4	EA	HINGE	5BB1 4.5 X 4.5		652	IVE
1	EA	OFFICE LOCK	45H0AT(UNR)14HS1626 (LESS CYLINDER)		626	BES
1	EA	SFIC MORTISE CYL W/CONST. CORE	80-131		626	SCH
1	EA	SFIC EVEREST CORE	80-037		626	SCH
1	EA	WALL STOP	WS406/407CCV		630	IVE
3	EA	SILENCER	SR64/SR65 AS REQUIRED		GRY	IVE

Hardware Group No. 22

Provide each PR door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
8	EA	HINGE	5BB1 4.5 X 4.5 NRP		652	IVE
2	EA	MANUAL FLUSH BOLT	FB458/FB358 AS REQ'D		626	IVE
1	EA	DUST PROOF STRIKE	DP2		626	IVE
1	EA	Classroom Lock	45H0R(UNR)14HS1626 (LESS CYLINDER)		626	BES
1	EA	SFIC MORTISE CYL W/CONST. CORE	80-131		626	SCH
1	EA	SFIC EVEREST CORE	80-037		626	SCH
1	EA	OH STOP	90S		689	GLY
1	EA	SURFACE CLOSER	4040XP SCUSH		689	LCN
2	EA	SILENCER	SR64/SR65 AS REQUIRED		GRY	IVE

Hardware Group No. 23

Provide each PR door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
6	EA	HINGE	5BB1 4.5 X 4.5 NRP		652	IVE
2	EA	MANUAL FLUSH BOLT	FB458/FB358 AS REQ'D		626	IVE
1	EA	DUST PROOF STRIKE	DP2		626	IVE
1	EA	STOREROOM LOCK	45H0D(UNR)14HS1626 (LESS CYLINDER)		626	BES
1	EA	SFIC MORTISE CYL W/CONST. CORE	80-131		626	SCH
1	EA	SFIC EVEREST CORE	80-037		626	SCH
1	EA	OH STOP	450S		652	GLY
1	EA	SURFACE CLOSER	4040XP SCUSH		689	LCN
1	EA	GASKETING	188SBK PSA		BK	ZER

Hardware Group No. 24

Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5 NRP		652	IVE
1	EA	Classroom Lock	45H0R(UNR)14HS1626VIT (LESS CYLINDER)		626	BES
1	EA	SFIC MORTISE CYL W/CONST. CORE	80-131		626	SCH
1	EA	SFIC EVEREST CORE	80-037		626	SCH
1	EA	SURFACE CLOSER	4040XP RW/PA		689	LCN
1	EA	KICK PLATE	8400 8" X 2" LDW B-CS		630	IVE
1	EA	WALL STOP	WS406/407CCV		630	IVE
1	EA	GASKETING	188SBK PSA		BK	ZER

Hardware Group No. 25

Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5		652	IVE
1	EA	Classroom Lock	45H0R(UNR)14HS1626VIT (LESS CYLINDER)		626	BES
1	EA	SFIC MORTISE CYL W/CONST. CORE	80-131		626	SCH
1	EA	SFIC EVEREST CORE	80-037		626	SCH
1	EA	SURFACE CLOSER	4040XP RW/PA		689	LCN
1	EA	KICK PLATE	8400 8" X 2" LDW B-CS		630	IVE
1	EA	WALL STOP	WS406/407CCV		630	IVE
1	EA	GASKETING	188SBK PSA		BK	ZER

Hardware Group No. 26

Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5		652	IVE
1	EA	Classroom Lock	45H0R(UNR)14HS1626VIT (LESS CYLINDER)		626	BES
1	EA	SFIC MORTISE CYL W/CONST. CORE	80-131		626	SCH
1	EA	SFIC EVEREST CORE	80-037		626	SCH
1	EA	SURFACE CLOSER	4040XP RW/PA		689	LCN
1	EA	KICK PLATE	8400 8" X 2" LDW B-CS		630	IVE
1	EA	WALL STOP	WS406/407CCV		630	IVE
3	EA	SILENCER	SR64/SR65 AS REQUIRED		GRY	IVE

Hardware Group No. 27

Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5 NRP		652	IVE
1	EA	OFFICE LOCK	45H0AT(UNR)14HS1626 (LESS CYLINDER)		626	BES
1	EA	SFIC MORTISE CYL W/ KEYED CONST. CORE	80-132		626	SCH
1	EA	SFIC EVEREST CORE	80-037		626	SCH
1	EA	SURFACE CLOSER	4040XP CUSH		689	LCN
1	EA	KICK PLATE	8400 8" X 2" LDW B-CS		630	IVE
1	EA	GASKETING	188SBK PSA		BK	ZER

Hardware Group No. 28

Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5		652	IVE
1	EA	OFFICE LOCK	45H0AT(UNR)14HS1626 (LESS CYLINDER)		626	BES
1	EA	SFIC MORTISE CYL W/ KEYED CONST. CORE	80-132		626	SCH
1	EA	SFIC EVEREST CORE	80-037		626	SCH
1	EA	SURFACE CLOSER	4040XP RW/PA		689	LCN
1	EA	KICK PLATE	8400 8" X 2" LDW B-CS		630	IVE
1	EA	WALL STOP	WS406/407CCV		630	IVE
1	EA	GASKETING	188SBK PSA		BK	ZER

Hardware Group No. 29

Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5		652	IVE
1	EA	FIRE EXIT HARDWARE	98-L-BE-F-17		626	VON
1	EA	SURFACE CLOSER	4040XP RW/PA		689	LCN
1	EA	KICK PLATE	8400 8" X 2" LDW B-CS		630	IVE
1	EA	FLOOR STOP	FS436/FS438 AS REQ'D		626	IVE
1	EA	GASKETING	188SBK PSA		BK	ZER

Hardware Group No. 30

Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5		630	IVE
1	EA	STOREROOM LOCK	45H0D(UNR)14HS1626 (LESS CYLINDER)		626	BES
1	EA	SFIC MORTISE CYL W/CONST. CORE	80-131		626	SCH
1	EA	SFIC EVEREST CORE	80-037		626	SCH
1	EA	OH STOP	90S		630	GLY
		INACTIVE LEAF				
1	EA	SURFACE CLOSER	4040XP RW/PA		689	LCN
1	EA	MOUNTING PLATE	4040XP-18/18PA AS REQ'D		689	LCN
1	EA	RAIN DRIP	142AA (IF EXPOSED ABOVE)		AA	ZER
1	SET	GASKETING	429AA-S		AA	ZER
1	EA	DOOR SWEEP	8197AA		AA	ZER
1	EA	THRESHOLD	65A		A	ZER

Hardware Group No. 31

Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
1	EA	CONTINUOUS HINGE	SL27 LL		CLR	SEL
1	EA	ELEC PANIC HARDWARE	RX-98-EO-ALK-CON 9-VOLT BATTERY WITH HARDWIRED OPTION		⚡ 626	VON
1	EA	SFIC MORTISE CYL.	80-132 @ALK KIT		626	SCH
1	EA	SFIC EVEREST CORE	80-037		626	SCH
1	EA	SURFACE CLOSER	4040XP SCUSH TBSRT		689	LCN
1	EA	MOUNTING PLATE	4040XP-18/18PA AS REQ'D		689	LCN
1	EA	CUSH SHOE SUPPORT	4040XP-30 SRT		689	LCN
1	EA	BLADE STOP SPACER	4040XP-61 SRT		689	LCN
1	EA	RAIN DRIP	142AA (IF EXPOSED ABOVE)		AA	ZER
1	SET	WEATHERSTRIPPING	BY ALUMINUM DOOR/FRAME MANUFACTURER			BYO
1	EA	DOOR SWEEP	8197AA		AA	ZER
1	EA	THRESHOLD	65A		A	ZER
1	EA	DOOR CONTACT	679-05 HM/WD (AS REQ'D)		⚡ BLK	SCE

ELECTRICAL OPERATIONAL DESCRIPTION: THE DOOR IS NORMALLY CLOSED AND LOCKED.EXIT ALARM TOGGLED ON/OFF BY KEYED CYLINDER ON DEVICE PUSH RAIL. THE PUSH SIDE EXIT DEVICE ALWAYS ALLOWS FREE EGRESS WITH LOCAL ALARM SOUND AT THE DOOR.THE DOOR POSITION SWITCH MONITORS THE DOOR FOR OPEN/CLOSED POSITION.

Hardware Group No. 32

Provide each PR door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
2	EA	CONTINUOUS HINGE	SL27 LL		CLR	SEL
2	EA	DUMMY PUSH BAR	350		626	VON
2	EA	90 DEG OFFSET PULL	8190EZHD 12" O		630-316	IVE
2	EA	SURFACE CLOSER	4040XP SCUSH TBSRT		689	LCN
2	EA	MOUNTING PLATE	4040XP-18/18PA AS REQ'D		689	LCN
2	EA	CUSH SHOE SUPPORT	4040XP-30 SRT		689	LCN
2	EA	BLADE STOP SPACER	4040XP-61 SRT		689	LCN
1	SET	SEALS	BY ALUMINUM DOOR/FRAME MANUFACTURER			BYO

Hardware Group No. 33

Provide each PR door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
2	EA	CONTINUOUS HINGE	SL27 LL		CLR	SEL
1	EA	REMOVABLE MULLION	KR4954 STAB		689	VON
2	EA	ELEC PANIC HARDWARE	RX-98-EO-ALK-CON 9-VOLT BATTERY WITH HARDWIRED OPTION	 ⚡	626	VON
2	EA	SFIC MORTISE CYL.	80-132 @ALK KIT		626	SCH
1	EA	SFIC MORTISE CYL W/ KEYED CONST. CORE	80-132		626	SCH
3	EA	SFIC EVEREST CORE	80-037		626	SCH
2	EA	SURFACE CLOSER	4040XP SCUSH TBSRT		689	LCN
2	EA	MOUNTING PLATE	4040XP-18/18PA AS REQ'D		689	LCN
2	EA	CUSH SHOE SUPPORT	4040XP-30 SRT		689	LCN
2	EA	BLADE STOP SPACER	4040XP-61 SRT		689	LCN
1	EA	RAIN DRIP	142AA (IF EXPOSED ABOVE)		AA	ZER
1	SET	WEATHERSTRIPPING	BY ALUMINIUM DOOR/FRAME MANUFACTURER			BYO
2	EA	DOOR SWEEP	8197AA		AA	ZER
1	EA	THRESHOLD	65A		A	ZER
2	EA	DOOR CONTACT	679-05 HM/WD (AS REQ'D)	 ⚡	BLK	SCE

ELECTRICAL OPERATIONAL DESCRIPTION: THE DOOR IS NORMALLY CLOSED AND LOCKED.EXIT ALARM TOGGLED ON/OFF BY KEYED CYLINDER ON DEVICE PUSH RAIL. THE PUSH SIDE EXIT DEVICE ALWAYS ALLOWS FREE EGRESS WITH LOCAL ALARM SOUND AT THE DOOR.THE DOOR POSITION SWITCH MONITORS THE DOOR FOR OPEN/CLOSED POSITION.

Hardware Group No. 34

Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5 NRP		652	IVE
1	EA	ELECTRIC HINGE	5BB1 4.5 X 4.5 CON TW8	 ⚡	652	IVE
1	EA	ELEC FIRE EXIT HARDWARE	RX-98-L-F-M996-17-FSE-CON	 ⚡	626	VON
1	EA	SFIC RIM W/ CONST. CORE	80-159		626	SCH
1	EA	SFIC EVEREST CORE	80-037		626	SCH
1	EA	SURFACE CLOSER	4040XP SCUSH		689	LCN
1	EA	KICK PLATE	8400 8" X 2" LDW B-CS		630	IVE
1	EA	GASKETING	188SBK PSA		BK	ZER
1	EA	WIRE HARNESS	CON-XXP (HINGE TO POWER SUPPLY)	⚡		SCH
1	EA	WIRE HARNESS	CON-XXP (EXIT/LOCK TO EPT/HINGE)	⚡		SCH
1	EA	CARD READER	BY DIVISION 28	⚡		BYO
1	EA	DOOR CONTACT	679-05 HM/WD (AS REQ'D)	 ⚡	BLK	SCE
1	EA	POWER SUPPLY	PS902 120/240 VAC	 ⚡		VON

ELECTRICAL OPERATIONAL DESCRIPTION: THE DOOR NORMALLY CLOSED AND LOCKED. FROM THE SECURE SIDE PRESENTING VALID CREDENTIALS TO THE READER WILL MOMENTARILY UNLOCK THE LEVER, ALLOWING ENTRY. AFTER ENTRY THE DOOR RETURNS TO THE CLOSED AND LATCHED POSITION. A KEY OVERRIDE WILL ALSO ENABLE ENTRY. FROM THE NON-SECURE SIDE, PRESSING THE PUSH PAD RETRACTS LATCH ALLOWING EGRESS. DURING A POWER OUTAGE, THE DOOR WILL REMAIN UNLOCKED. FREE EGRESS AT ALL TIMES.

Hardware Group No. 35

Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5 NRP		652	IVE
1	EA	ELECTRIC HINGE	5BB1 4.5 X 4.5 CON TW8		⚡ 652	IVE
1	EA	Electrified Lock - FSE	45HW0TDEU14J626IDH (LESS CYLINDER)		⚡ 626	BES
1	EA	SFIC MORTISE CYL W/CONST. CORE	80-131		626	SCH
1	EA	SFIC EVEREST CORE	80-037		626	SCH
1	EA	SURFACE CLOSER	4040XP SCUSH		689	LCN
1	EA	KICK PLATE	8400 8" X 2" LDW B-CS		630	IVE
3	EA	SILENCER	SR64/SR65 AS REQUIRED		GRY	IVE
1	EA	WIRE HARNESS	CON-XXP (HINGE TO POWER SUPPLY)		⚡	SCH
1	EA	WIRE HARNESS	CON-XXP (EXIT/LOCK TO EPT/HINGE)		⚡	SCH
1	EA	CARD READER	BY DIVISION 28		⚡	BYO
1	EA	DOOR CONTACT	679-05 HM/WD (AS REQ'D)		⚡ BLK	SCE
1	EA	POWER SUPPLY	PS902 120/240 VAC		⚡	VON

ELECTRICAL OPERATIONAL DESCRIPTION: THE DOOR IS NORMALLY CLOSED AND LOCKED. FROM THE SECURE SIDE PRESENTING VALID CREDENTIALS TO THE READER WILL MOMENTARILY UNLOCK THE LEVER, ALLOWING ENTRY. A KEY OVERRIDE WILL ALSO ENABLE ENTRY. FROM THE NON-SECURE SIDE, THE LEVER RETRACTS LATCH ALLOWING EGRESS. DURING A POWER OUTAGE, THE DOOR WILL REMAIN LOCKED AND WILL CONTINUE TO ALLOW FREE EGRESS AT ALL TIMES. THE DOOR POSITION SWITCH MONITORS THE DOOR FOR OPEN/CLOSED POSITION. REQUEST TO EXIT (RX) FOR REMOTE MONITORING.

Hardware Group No. 36 – NOT USED

Hardware Group No. 37

Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
2	EA	HINGE	5BB1 4.5 X 4.5 NRP		630	IVE
1	EA	ELECTRIC HINGE	5BB1 4.5 X 4.5 CON TW8		⚡ 630	IVE
1	EA	Electrified Lock - FSE	45HW0TDEU14J626IDH (LESS CYLINDER)		⚡ 626	BES
1	EA	SFIC MORTISE CYL W/CONST. CORE	80-131		626	SCH
1	EA	SFIC EVEREST CORE	80-037		626	SCH
1	EA	SURFACE CLOSER	4040XP RW/PA		689	LCN
1	EA	KICK PLATE	8400 8" X 2" LDW B-CS		630	IVE
1	EA	WALL STOP	WS406/407CCV		630	IVE
1	EA	GASKETING	188SBK PSA		BK	ZER
1	EA	WIRE HARNESS	CON-XXP (HINGE TO POWER SUPPLY)		⚡	SCH
1	EA	WIRE HARNESS	CON-XXP (EXIT/LOCK TO EPT/HINGE)		⚡	SCH
1	EA	CARD READER	BY DIVISION 28		⚡	BYO
1	EA	DOOR CONTACT	679-05 HM/WD (AS REQ'D)		⚡ BLK	SCE
1	EA	POWER SUPPLY	PS902 120/240 VAC		⚡	VON

ELECTRICAL OPERATIONAL DESCRIPTION: THE DOOR IS NORMALLY CLOSED AND LOCKED. FROM THE SECURE SIDE PRESENTING VALID CREDENTIALS TO THE READER WILL MOMENTARILY UNLOCK THE LEVER, ALLOWING ENTRY. A KEY OVERRIDE WILL ALSO ENABLE ENTRY. FROM THE NON-SECURE SIDE, THE LEVER RETRACTS LATCH ALLOWING EGRESS. DURING A POWER OUTAGE, THE DOOR WILL REMAIN LOCKED AND WILL CONTINUE TO ALLOW FREE EGRESS AT ALL TIMES. THE DOOR POSITION SWITCH MONITORS THE DOOR FOR OPEN/CLOSED POSITION. REQUEST TO EXIT (RX) FOR REMOTE MONITORING.

Hardware Group No. 38

Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
2	EA	HINGE	5BB1 4.5 X 4.5 NRP		652	IVE
1	EA	ELECTRIC HINGE	5BB1 4.5 X 4.5 CON TW8		⚡ 652	IVE
1	EA	Electrified Lock - FSA	45HW0TDEL14J626IDH (LESS CYLINDER)		⚡ 626	BES
1	EA	SFIC MORTISE CYL W/CONST. CORE	80-131		626	SCH
1	EA	SFIC EVEREST CORE	80-037		626	SCH
1	EA	SURFACE CLOSER	4040XP RW/PA		689	LCN
1	EA	KICK PLATE	8400 8" X 2" LDW B-CS		630	IVE
1	EA	FLOOR STOP	FS436/FS438 AS REQ'D		626	IVE
1	EA	GASKETING	188SBK PSA		BK	ZER
1	EA	WIRE HARNESS	CON-XXP (HINGE TO POWER SUPPLY)		⚡	SCH
1	EA	WIRE HARNESS	CON-XXP (EXIT/LOCK TO EPT/HINGE)		⚡	SCH
1	EA	CARD READER	BY DIVISION 28		⚡	BYO
1	EA	DOOR CONTACT	679-05 HM/WD (AS REQ'D)		⚡ BLK	SCE
1	EA	POWER SUPPLY	PS902 120/240 VAC		⚡	VON

ELECTRICAL OPERATIONAL DESCRIPTION: THE DOOR IS NORMALLY CLOSED AND LOCKED. FROM THE SECURE SIDE PRESENTING VALID CREDENTIALS TO THE READER WILL MOMENTARILY UNLOCK THE LEVER, ALLOWING ENTRY. AFTER ENTRY THE DOOR RETURNS TO THE CLOSED AND LATCHED POSITION. A KEY OVERRIDE WILL ALSO ENABLE ENTRY. FROM THE NON-SECURE SIDE, THE LEVER RETRACTS LATCH ALLOWING EGRESS. DURING A POWER OUTAGE, THE DOOR WILL REMAIN UNLOCKED AND WILL CONTINUE TO ALLOW FREE EGRESS AT ALL TIMES. THE DOOR POSITION SWITCH MONITORS THE DOOR FOR OPEN/CLOSED POSITION. REQUEST TO EXIT (RX) FOR REMOTE MONITORING.

Hardware Group No. 39

Provide each PR door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
7	EA	HINGE	5BB1HW 5 X 4.5 NRP		630	IVE
1	EA	ELECTRIC HINGE	5BB1 4.5 X 4.5 CON TW8	⚡	630	IVE
1	EA	MANUAL FLUSH BOLT	FB458		626	IVE
1	EA	MANUAL FLUSH BOLT	FB458 24"		626	IVE
1	EA	DUST PROOF STRIKE	DP2		626	IVE
1	EA	Electrified Lock - FSE	45HW0TDEU14J626IDH (LESS CYLINDER)	⚡	626	BES
2	EA	SURFACE CLOSER	4040XP SCUSH		689	LCN
2	EA	KICK PLATE	8400 8" X 1" LDW B-CS		630	IVE
1	EA	RAIN DRIP	142AA (IF EXPOSED ABOVE)		AA	ZER
1	SET	ASTRAGAL	328AA-S		AA	ZER
1	SET	GASKETING	429AA-S		AA	ZER
2	EA	DOOR SWEEP	8197AA		AA	ZER
1	EA	THRESHOLD	65A		A	ZER
1	EA	WIRE HARNESS	CON-XXP (HINGE TO POWER SUPPLY)	⚡		SCH
1	EA	WIRE HARNESS	CON-XXP (EXIT/LOCK TO EPT/HINGE)	⚡		SCH
1	EA	CARD READER	BY DIVISION 28	⚡		BYO
2	EA	DOOR CONTACT	679-05 HM/WD (AS REQ'D)	⚡	BLK	SCE
1	EA	POWER SUPPLY	PS902 120/240 VAC	⚡		VON

ELECTRICAL OPERATIONAL DESCRIPTION: THE DOOR IS NORMALLY CLOSED AND LOCKED. FROM THE SECURE SIDE PRESENTING VALID CREDENTIALS TO THE READER WILL MOMENTARILY UNLOCK THE LEVER, ALLOWING ENTRY. A KEY OVERRIDE WILL ALSO ENABLE ENTRY. FROM THE NON-SECURE SIDE, THE LEVER RETRACTS LATCH ALLOWING EGRESS. DURING A POWER OUTAGE, THE DOOR WILL REMAIN LOCKED AND WILL CONTINUE TO ALLOW FREE EGRESS AT ALL TIMES. THE DOOR POSITION SWITCH MONITORS THE DOOR FOR OPEN/CLOSED POSITION. REQUEST TO EXIT (RX) FOR REMOTE MONITORING.

Hardware Group No. 40

Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
1	EA	CONTINUOUS HINGE	SL27 LL EPT		CLR	SEL
1	EA	POWER TRANSFER	EPT10 CON	 ⚡	689	VON
1	EA	ELEC PANIC HARDWARE	RX-QEL-98-NL-OP-110MD-CON 24 VDC	 ⚡	626	VON
1	EA	90 DEG OFFSET PULL	8190EZHD 12" O		630- 316	IVE
1	EA	SURFACE CLOSER	4040XP SCUSH TBSRT		689	LCN
1	EA	MOUNTING PLATE	4040XP-18/18PA AS REQ'D		689	LCN
1	EA	CUSH SHOE SUPPORT	4040XP-30 SRT		689	LCN
1	EA	BLADE STOP SPACER	4040XP-61 SRT		689	LCN
1	EA	RAIN DRIP	142AA (IF EXPOSED ABOVE)		AA	ZER
1	SET	WEATHERSTRIPPING	BY ALUMINIUM DOOR/FRAME MANUFACTURER			BYO
1	EA	DOOR SWEEP	8197AA		AA	ZER
1	EA	THRESHOLD	65A		A	ZER
1	EA	WIRE HARNESS	CON-XXP (HINGE TO POWER SUPPLY)		⚡	SCH
1	EA	WIRE HARNESS	CON-XXP (EXIT/LOCK TO EPT/HINGE)		⚡	SCH
1	EA	CARD READER	BY DIVISION 28		⚡	BYO
1	EA	DOOR CONTACT	679-05 HM/WD (AS REQ'D)	 ⚡	BLK	SCE
1	EA	POWER SUPPLY	PS902 120/240 VAC	 ⚡		VON

ELECTRICAL OPERATIONAL DESCRIPTION: THE DOOR NORMALLY CLOSED AND LOCKED. FROM THE SECURE SIDE PRESENTING VALID CREDENTIALS TO THE READER WILL MOMENTARILY RETRACT THE LATCH, ALLOWING ENTRY. AFTER ENTRY THE DOOR RETURNS TO THE CLOSED AND LATCHED POSITION. A KEY OVERRIDE WILL ALSO ENABLE ENTRY. FROM THE NON-SECURE SIDE, PRESSING THE PUSH PAD RETRACTS LATCH ALLOWING EGRESS. DURING A POWER OUTAGE, THE DOOR WILL REMAIN LOCKED. THE DOOR POSITION SWITCH MONITORS THE DOOR FOR OPEN/CLOSED POSITION. FREE EGRESS AT ALL TIMES. REQUEST TO EXIT (RX) FOR REMOTE MONITORING.

Hardware Group No. 41

Provide each PR door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
2	EA	CONTINUOUS HINGE	SL27 LL EPT		CLR	SEL
2	EA	POWER TRANSFER	EPT10 CON	 ⚡	689	VON
1	EA	REMOVABLE MULLION	KR4954 STAB		689	VON
1	EA	ELEC PANIC HARDWARE	RX-QEL-98-EO-CON 24 VDC	 ⚡	626	VON
1	EA	ELEC PANIC HARDWARE	RX-QEL-98-NL-OP-110MD-CON 24 VDC	 ⚡	626	VON
1	EA	SFIC MORTISE CYL W/ KEYED CONST. CORE	80-132		626	SCH
1	EA	SFIC RIM W/ CONST. CORE	80-159		626	SCH
2	EA	SFIC EVEREST CORE	80-037		626	SCH
2	EA	90 DEG OFFSET PULL	8190EZHD 12" O		630-316	IVE
1	EA	OH STOP	104S @ LEAF W/ AUTO OPENER		630	GLY
1	EA	SURFACE CLOSER	4040XP SCUSH TBSRT		689	LCN
1	EA	LOW ENERGY ELECTRO-MECHANICAL AUTO OPERATOR	6361	⚡	689	NOR
1	EA	MOUNTING PLATE	4040XP-18/18PA AS REQ'D		689	LCN
1	EA	CUSH SHOE SUPPORT	4040XP-30 SRT		689	LCN
1	EA	BLADE STOP SPACER	4040XP-61 SRT		689	LCN
2	EA	ACTUATOR	502	⚡	630	NOR
1	EA	RAIN DRIP	142AA (IF EXPOSED ABOVE)		AA	ZER
1	SET	WEATHERSTRIPPING	BY ALUMINIUM DOOR/FRAME MANUFACTURER			BYO
2	EA	DOOR SWEEP	8197AA		AA	ZER
1	EA	THRESHOLD	65A		A	ZER
2	EA	WIRE HARNESS	CON-XXP (HINGE TO POWER SUPPLY)	⚡		SCH
2	EA	WIRE HARNESS	CON-XXP (EXIT/LOCK TO EPT/HINGE)	⚡		SCH
1	EA	CARD READER	BY DIVISION 28	⚡		BYO
2	EA	DOOR CONTACT	679-05 HM/WD (AS REQ'D)	 ⚡	BLK	SCE
1	EA	POWER SUPPLY	PS904 900-4RL 120/240 VAC	 ⚡	LGR	SCE

ELECTRICAL OPERATIONAL DESCRIPTION:

THE DOOR IS NORMALLY CLOSED AND LOCKED. FROM THE SECURE SIDE PRESENTING VALID CREDENTIALS TO THE READER WILL MOMENTARILY RETRACT THE LATCH AND ACTIVATE THE OUTSIDE ACTUATOR AND PUSHING THE ACTUATOR ENGAGES THE AUTOMATIC OPERATOR, ALLOWING ENTRY.

A KEY OVERRIDE WILL ALSO ENABLE ENTRY. FROM THE NON-SECURE SIDE, INSIDE ACTUATOR IS ALWAYS ACTIVE. PRESSING THE PUSH PAD OR PUSHING AT THE ACTUATOR, RETRACTS THE LATCH AND ENGAGES THE AUTOMATIC OPERATOR ALLOWING EGRESS.

DURING A POWER OUTAGE, THE DOOR WILL REMAIN LOCKED. FREE EGRESS AT ALL TIMES. THE DOOR POSITION SWITCH MONITORS THE DOOR FOR OPEN/CLOSED POSITION.

Hardware Group No. 42

Provide each PR door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
2	EA	CONTINUOUS HINGE	SL27 LL		CLR	SEL
2	EA	DUMMY PUSH BAR	350		626	VON
2	EA	90 DEG OFFSET PULL	8190EZHD 12" O		630-316	IVE
1	EA	OH STOP	104S @ LEAF W/ AUTO OPENER		630	GLY
1	EA	SURFACE CLOSER	4040XP SCUSH TBSRT		689	LCN
1	EA	LOW ENERGY ELECTRO-MECHANICAL AUTO OPERATOR	6361		689	NOR
1	EA	MOUNTING PLATE	4040XP-18/18PA AS REQ'D		689	LCN
1	EA	CUSH SHOE SUPPORT	4040XP-30 SRT		689	LCN
1	EA	BLADE STOP SPACER	4040XP-61 SRT		689	LCN
2	EA	ACTUATOR	502		630	NOR
1	SET	WEATHERSTRIPPING	BY ALUMINIUM DOOR/FRAME MANUFACTURER			BYO

ELECTRICAL OPERATIONAL DESCRIPTION: PUSHING AT THE ACTUATOR ON EITHER SIDE OF THE DOOR WILL CAUSE THE DOOR TO OPEN AUTOMATICALLY.

Hardware Group No. 43

Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5		630	IVE
1	EA	PRIVACY LOCK	45H0L(UNT)14HS1626		626	BES
1	EA	SURFACE CLOSER	4040XP RW/PA		689	LCN
1	EA	MOP PLATE	8400 4" X 1" LDW B-CS		630	IVE
1	EA	WALL STOP	WS406/407CCV		630	IVE
1	EA	GASKETING	188SBK PSA		BK	ZER
1	EA	COAT AND HAT HOOK	582		626	IVE

Hardware Group No. 44

Provide each PR door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
8	EA	HINGE	5BB1 4.5 X 4.5 NRP		652	IVE
2	EA	MANUAL FLUSH BOLT	FB458/FB358 AS REQ'D		626	IVE
1	EA	DUST PROOF STRIKE	DP2		626	IVE
1	EA	STOREROOM LOCK	45H0D(UNR)14HS1626 (LESS CYLINDER)		626	BES
1	EA	SFIC MORTISE CYL W/CONST. CORE	80-131		626	SCH
1	EA	SFIC EVEREST CORE	80-037		626	SCH
1	EA	OH STOP	450S		652	GLY
1	EA	SURFACE CLOSER	4040XP SCUSH		689	LCN
2	EA	SILENCER	SR64/SR65 AS REQUIRED		GRY	IVE

Hardware Group No. 45

Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
1	EA	CONTINUOUS HINGE	SL11 LL		CLR	SEL
1	EA	ELEC PANIC HARDWARE	RX-98-EO-ALK-CON 9-VOLT BATTERY WITH HARDWIRED OPTION	 ✎	626	VON
1	EA	SFIC MORTISE CYL.	80-132 @ALK KIT		626	SCH
1	EA	SFIC EVEREST CORE	80-037		626	SCH
1	EA	SURFACE CLOSER	4040XP SCUSH		689	LCN
1	EA	MOUNTING PLATE	4040XP-18/18PA AS REQ'D		689	LCN
1	EA	CUSH SHOE SUPPORT	4040XP-30 SRT		689	LCN
1	EA	BLADE STOP SPACER	4040XP-61 SRT		689	LCN
1	EA	RAIN DRIP	142AA (IF EXPOSED ABOVE)		AA	ZER
1	SET	WEATHERSTRIPPING	BY DOOR/FRAME MANUFACTURER			BYO
1	EA	DOOR SWEEP	8197AA		AA	ZER
1	EA	THRESHOLD	65A		A	ZER
1	EA	DOOR CONTACT	679-05 HM/WD (AS REQ'D)	 ✎	BLK	SCE

ELECTRICAL OPERATIONAL DESCRIPTION: THE DOOR IS NORMALLY CLOSED AND LOCKED. EXIT ALARM TOGGLED ON/OFF BY KEYED CYLINDER ON DEVICE PUSH RAIL. THE PUSH SIDE EXIT DEVICE ALWAYS ALLOWS FREE EGRESS WITH LOCAL ALARM SOUND AT THE DOOR. THE DOOR POSITION SWITCH MONITORS THE DOOR FOR OPEN/CLOSED POSITION.

January 15, 2026

University of North Carolina at Wilmington
Housing Village Phase 3
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Hardware Group No. ATTIC STOCK

Provide each SGL door(s) with the following:

QTY	DESCRIPTION	CATALOG NUMBER	FINISH	MFR
-	EA SFIC EVEREST CORE	80-037	 626	SCH

FURNISH ADDITIONAL SFIC CORES EQUAL TO 10 PERCENT OF THE TOTAL QUANTITY OF
INSTALLED CORES FOR EACH PROJECT.

END OF SECTION 08 71 00

SECTION 08 80 00 - GLAZING

PART 1 GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A Section Includes:
 - 1. Glass products.
 - 2. Insulating glass.
 - 3. Glazing sealants.
 - 4. Glazing tapes.
 - 5. Miscellaneous glazing materials.
 - 6. Supplementary components and accessories normally furnished or otherwise necessary for a complete installation.

1.3 REFERENCES

- A Acronyms and Abbreviations:
 - 1. AHJ: Authority (Authorities) Having Jurisdiction.
 - 2. FGA: Fenestration and Glazing Industry Alliance.
 - 3. IGCC: Insulating Glass Certification Council.
 - 4. IGU: Insulated Glass Unit.
 - 5. LBL: Lawrence Berkeley National Laboratory.
 - 6. LSG: Light to Solar Gain Ratio.
 - 7. NFRC: National Fenestration Rating Council.
 - 8. NGA: National Glass Association.
 - 9. SHGC: Solar Heat Gain Coefficient.
 - 10. SGCC: Safety Glazing Certification Council.
- B Definitions:
 - 1. Glass Thicknesses: Indicated by thickness designations in millimeters in accordance with ASTM C 1036.
 - 2. Interspace: Means the space between lites of an IGU.
 - 3. Manufacturer: Means the glass manufacturer unless otherwise indicated.

1.4 COORDINATION

- A Coordinate glazing channel dimensions to provide necessary bite on glass, minimum edge and face clearances, and adequate sealant thicknesses, with reasonable tolerances to achieve proper safety margins for glazing retention under each design load case, load case combination, and service condition.

1.5 SUBMITTALS

- A Action Submittals:
 - 1. Product Data: For each type of product.
 - 2. Delegated Design Submittal: For glass indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by qualified professional engineer licensed in the State of North Carolina responsible for their preparation.
- B Informational Submittals:
 - 1. Qualification Data: For installer, glass testing agency, and professional engineer.
 - 2. Product Certificates: For glass.
 - 3. Product Test Reports: For fabricated glass and glazing sealants, for tests performed by a qualified testing agency.

- a. For glazing sealants, provide test reports based on testing current sealant formulations within previous 36-month period.
4. Sample Warranties: For special warranties.

1.6 QUALITY ASSURANCE

- A Installer Qualifications: A qualified glazing contractor for this Project who is certified under the North American Contractor Certification Program (NACC) for Architectural Glass & Metal (AG&M) contractors and who employs glazing technicians certified under the Architectural Glass and Metal Technician (AGMT) certification program, or who can demonstrate compliance with its certification program requirements.
- B Professional Engineer Qualifications: A professional engineer experienced with providing delegated design engineering services of the kind indicated, including documentation that engineer is a licensed engineer in the state of North Carolina.
- C Glass Testing Agency Qualifications: A qualified independent testing agency accredited according to the NFRC CAP 1 Certification Agency Program.
- D Sealant Testing Agency Qualifications: An independent testing agency qualified according to ASTM C 1021 to conduct the testing indicated.

1.7 PRECONSTRUCTION TESTING

- A Preconstruction Adhesion and Compatibility Testing: Test each glass product, tape sealant, gasket, glazing accessory, and glass-framing member for adhesion to and compatibility with elastomeric glazing sealants.
 1. Testing is not required if data are submitted based on previous testing of current sealant products and glazing materials matching those submitted.
 2. Use ASTM C 1087 to determine whether priming and other specific joint-preparation techniques are required to obtain rapid, optimum adhesion of glazing sealants to glass, tape sealants, gaskets, and glazing channel substrates.
 3. Test no fewer than 8 Samples of each type of material, including joint substrates, shims, sealant backings, secondary seals, and miscellaneous materials.
 4. Schedule enough time for testing and analyzing results to prevent delaying the Work.
 5. For materials failing tests, submit sealant manufacturer's written instructions for corrective measures including use of specially formulated primers.

1.8 DELIVERY, STORAGE, AND HANDLING

- A Protect glazing materials in accordance with manufacturer's written instructions. Prevent damage to glass and glazing materials from condensation, temperature changes, direct exposure to sun, or other causes.
- B If insulating glass is air freighted to the Project site or otherwise exposed to substantial altitude changes, comply with insulating-glass manufacturer's written instructions for venting and sealing units to avoid hermetic seal ruptures due to altitude change.

1.9 WARRANTY

- A Manufacturer's Special Warranty for Coated-Glass Products: Manufacturer agrees to replace coated-glass units that deteriorate within specified warranty period. Deterioration of coated glass is defined as defects developed from normal use that are not attributed to glass breakage or to maintaining and cleaning coated glass contrary to manufacturer's written instructions. Defects include peeling, cracking, and other indications of deterioration in coating.
 1. Warranty Period: 10 years from date of Final Acceptance.
- B Manufacturer's Special Warranty for Insulating Glass: Manufacturer agrees to replace insulating-glass units that deteriorate within specified warranty period. Deterioration of insulating glass is defined as failure of hermetic seal under normal use that is not attributed to glass breakage or to maintaining and cleaning insulating glass contrary to manufacturer's written instructions. Evidence of failure is obstruction of vision by dust, moisture, or film on interior surfaces of glass.
 1. Warranty Period: 10 years from date of Final Acceptance.

- C Manufacturer's Special Warranty for Heat-Soaked Tested Tempered Glass: Manufacturer agrees to replace heat-soaked tested tempered glass units that spontaneously break due to nickel sulfide (NiS) inclusions at a rate exceeding 0.3 percent (3/1000) within specified warranty period. Coverage for any other cause is excluded.
1. Warranty Period: 10 years from date of Final Acceptance.

PART 2 PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A General: Installed glazing systems shall withstand normal thermal movement and wind and impact loads (where applicable) without failure, including loss or glass breakage attributable to defective manufacture, fabrication, or installation; failure of sealants or gaskets to remain watertight and airtight; deterioration of glazing materials; or other defects in construction.
- B Delegated Design: Engage a qualified professional engineer licensed in the state of North Carolina to design glazing.
1. Engineering services are defined as those performed for installations of the system, assembly, or product that are similar in material, design, and extent to those indicated for this Project.
- C Structural Performance: Glazing shall withstand the following design loads within limits and under conditions indicated determined in accordance with the NCBC and ASTM E 1300:
1. Design Wind Pressures: As indicated on the Drawings.
 2. Maximum Lateral Deflection: For glass supported on all 4 edges, limit center-of-glass deflection at design wind pressure to not more than 1/50 times the short-side length or 1 inch, whichever is less.
- D Safety Glazing: Where safety glazing is indicated, provide glazing that complies with 16 CFR 1201, Category II.
- E Thermal and Optical Performance Properties: Provide glass with performance properties specified, as indicated in manufacturer's published test data, based on procedures indicated below:
1. For monolithic-glass lites, properties are based on units with lites at least 6 mm thick.
 2. For insulating-glass units, properties are based on units of thickness indicated for overall unit and for each lite.
 3. U-Factors: Center-of-glazing values, in accordance with NFRC 100 and based on most current non-beta version of LBL's WINDOW computer program, expressed as Btu/sq. ft. x h x deg F.
 4. SHGC and Visible Transmittance: Center-of-glazing values, in accordance with NFRC 200 and based on most current non-beta version of LBL's WINDOW computer program.
 5. Visible Reflectance: Center-of-glazing values, in accordance with NFRC 300.

2.2 GLASS PRODUCTS, GENERAL

- A Glazing Publications: Comply with published recommendations of glass product manufacturers and organizations below unless more stringent requirements are indicated. See these publications for glazing terms not otherwise defined in this Section or in referenced standards.
1. NGA Publication: Glazing Manual.
 2. FGI Publication for Insulating Glass: North American Glazing Guidelines for Sealed Insulating Glass Units for Commercial and Residential Use.
- B Safety Glazing Labeling: Where safety glazing is indicated, permanently mark glazing with certification label of the SGCC or another certification agency acceptable to the AHJ, or manufacturer if acceptable to the AHJ. Label shall indicate manufacturer's name, type of glass, thickness, and safety glazing standard with which glass complies.
- C Insulating-Glass Certification Program: Permanently marked either on spacers or on at least one component lite of units with appropriate certification label of the IGCC.
- D Thickness: Where glass thickness is indicated, it is a minimum. Provide glass that complies with performance requirements and is not less than thickness indicated.

2.3 MANUFACTURERS

A Manufacturers:

1. Basis-of-Design Manufacturer: Subject to compliance with the Contract Documents, design is based on products by the following.
 - a. Guardian Glass.
2. Acceptable Manufacturers: Subject to compliance with the Contract Documents provide products by the basis-of-design manufacturer or comparable products by one of the following.
 - a. Viracon.
 - b. Vitro Architectural Glass.

2.4 GLASS PRODUCTS

A Clear Annealed Float Glass: ASTM C 1036, Type I, Class 1 (clear), Quality-Q3.

B Fully Tempered Float Glass: ASTM C 1048, Kind FT (fully tempered), Condition A (uncoated) unless otherwise indicated, Type I, Class 1 (clear), Quality-Q3.

1. Fabrication Process: By horizontal (roller-hearth) process with roll-wave distortion parallel to bottom edge of glass as installed unless otherwise indicated.

C Low-E-Coated Vision Glass: ASTM C 1376.

2.5 INSULATING GLASS

A IGUs: Factory-assembled units consisting of sealed lites of glass separated by a dehydrated interspace, qualified in accordance with ASTM E 2190.

1. Sealing System: Dual seal, with manufacturer's standard primary and secondary sealants.
2. Perimeter Spacer: Manufacturer's standard spacer material and construction.
3. Desiccant: Molecular sieve or silica gel, or a blend of both.

2.6 GLAZING SEALANTS

A General:

1. Compatibility: Compatible with one another and with other materials they contact, including glass products, seals of insulating-glass units, and glazing channel substrates, under conditions of service and application, as demonstrated by sealant manufacturer based on testing and field experience.
2. Suitability: Comply with sealant and glass manufacturers' written instructions for selecting glazing sealants suitable for applications indicated and for conditions existing at time of installation.
3. Colors of Exposed Glazing Sealants: As selected by Architect from manufacturer's full range of industry colors.

B Neutral-Curing Silicone Glazing Sealant, Class 50: Complying with ASTM C 920, Type S, Grade NS, Class 50, Use NT.

2.7 GLAZING TAPES

A Glazing Tape, General: Provide tape as recommended in writing by the glazing accessory and glass manufacturer suitable for application indicated, and compatible with one another and with other materials they contact, including glass products, laminated glass, seals of insulating-glass units, and glazing channel substrates.

1. Back-Bedding Mastic Glazing Tapes: Preformed, butyl-based, 100 percent solids elastomeric tape; nonstaining and nonmigrating in contact with nonporous surfaces; with or without spacer rod as recommended in writing by tape and glass manufacturers for application indicated; and complying with ASTM C 1281 and AAMA 800.

2.8 MISCELLANEOUS GLAZING MATERIALS

- A General: Provide products of material, size, and shape complying with referenced glazing standard, recommended in writing by manufacturers of glass and other glazing materials for application indicated, and with a proven record of compatibility with surfaces contacted in installation.
- B Cleaners, Primers, and Sealers: Types recommended by sealant or gasket manufacturer.
- C Setting Blocks: Shore A durometer hardness of 85, plus or minus 5.
- D Spacers: Blocks or continuous extrusions of hardness required by manufacturer to maintain glass lites in place for installation indicated.
- E Edge Blocks: Shore A durometer hardness per manufacturer's written instructions.
- F Cylindrical Glazing Sealant Backing: ASTM C 1330, Type O (open-cell material), of size and density to control glazing sealant depth and otherwise produce optimum glazing sealant performance.

2.9 FABRICATION OF GLAZING UNITS

- A Fabricate glazing units in sizes required to fit openings indicated for Project, with edge and face clearances, edge and surface conditions, and bite complying with written instructions of product manufacturer and referenced glazing publications, to comply with system performance requirements.
 - 1. Allow for thermal movements from ambient and surface temperature changes acting on glass framing members and glazing components.
 - a. Temperature Change: 120 deg F, ambient; 180 deg F, material surfaces.

PART 3 EXECUTION

3.1 EXAMINATION

- A Examine framing, glazing channels, and stops, with installer present, for compliance with the following:
 - 1. Manufacturing and installation tolerances, including those for size, squareness, and offsets at corners.
 - 2. Presence and functioning of weep systems.
 - 3. Minimum required face and edge clearances.
 - 4. Effective sealing between joints of glass-framing members.
- B Do not proceed with installation until unsatisfactory conditions have been corrected.
 - 1. Installation of glazing indicates acceptance of surfaces and conditions.

3.2 PREPARATION

- A Clean glazing channels and other framing members receiving glass immediately before glazing. Remove coatings not firmly bonded to substrates.
- B Examine glazing units to locate exterior and interior surfaces. Label or mark units as needed so that exterior and interior surfaces are readily identifiable. Do not use materials that leave visible marks in the completed Work.

3.3 GLAZING, GENERAL

- A Comply with combined written instructions of manufacturers of glass, sealants, gaskets, and other glazing materials, unless more stringent requirements are indicated, including those in referenced glazing publications.
- B Protect glass edges from damage during handling and installation. Remove damaged glass from Project site and legally dispose of off Project site. Damaged glass includes glass with edge damage or other imperfections that, when installed, could weaken glass, impair performance, or impair appearance.
- C Apply primers to joint surfaces where required for adhesion of sealants, as determined by preconstruction testing.

- D Install setting blocks in sill rabbets, sized and located to comply with referenced glazing publications, unless otherwise required by glass manufacturer. Set blocks in thin course of compatible sealant suitable for heel bead.
- E Do not exceed edge pressures stipulated by glass manufacturers for installing glass lites.
- F Provide spacers for glass lites where length plus width is larger than 50 inches.
 - 1. Locate spacers directly opposite each other on both inside and outside faces of glass. Install correct size and spacing to preserve required face clearances, unless gaskets and glazing tapes are used that have demonstrated ability to maintain required face clearances and to comply with system performance requirements.
 - 2. Provide at least 1/8-inch bite of spacers on glass and use thickness equal to sealant width. With glazing tape, use thickness slightly less than final compressed thickness of tape.
- G Provide edge blocking where indicated or needed to prevent glass lites from moving sideways in glazing channel, as recommended in writing by glass manufacturer and in accordance with requirements in referenced glazing publications.
- H Set glass lites in each series with uniform pattern, draw, bow, and similar characteristics.
- I Set glass lites with proper orientation so that coatings face exterior or interior as specified.
- J Where wedge-shaped gaskets are driven into one side of channel to pressurize sealant or gasket on opposite side, provide adequate anchorage so gasket cannot walk out when installation is subjected to movement.
- K Square cut wedge-shaped gaskets at corners and install gaskets in a manner recommended by gasket manufacturer to prevent corners from pulling away; seal corner joints and butt joints with sealant recommended in writing by gasket manufacturer.

3.4 TAPE GLAZING

- A Position tapes on fixed stops so that, when compressed by glass, their exposed edges are flush with or protrude slightly above sightline of stops.
- B Install tapes continuously, but not necessarily in one continuous length. Do not stretch tapes to make them fit opening.
- C Cover vertical framing joints by applying tapes to heads and sills first, then to jambs. Cover horizontal framing joints by applying tapes to jambs, then to heads and sills.
- D Place joints in tapes at corners of opening with adjoining lengths butted together, not lapped. Seal joints in tapes with compatible sealant approved by tape manufacturer.
- E Do not remove release paper from tape until right before each glazing unit is installed.
- F Apply heel bead of elastomeric sealant if required.
- G Center glass lites in openings on setting blocks, and press firmly against tape by inserting dense compression gaskets formed and installed to lock in place against faces of removable stops. Start gasket applications at corners and work toward centers of openings.
- H If glazing fixed stop is located on the exterior, apply cap bead of elastomeric sealant over exposed edge of tape.

3.5 GASKET GLAZING (DRY)

- A Cut compression gaskets to lengths recommended by gasket manufacturer to fit openings exactly, with allowance for stretch during installation.

3.6 INTERIOR MONOLITHIC GLASS SCHEDULE

- A Clear Glass: Kind FT (fully tempered) float glass; minimum thickness at least 6 mm, or as otherwise indicated or required.
- B Backpainted Glass: As selected by the Architect.
- C Acid-Etched Glass: As selected by the Architect.

3.7 INSULATING GLASS SCHEDULE

- A Low-E-Coated, Insulating Glass Type:
 - 1. Product: "SunGuard SNX 51/23".
 - 2. Overall Unit Thickness: 1-inch (25mm).

3. Minimum Thickness of Each Glass Lite: At least 0.24 inch.
4. Outdoor Lite: Low-iron heat strengthened (Kind HS) or low-iron fully tempered (Kind FT) float glass as indicated on the Drawings and as necessary to meet applicable codes and performance requirements.
5. Interspace Content: Air.
6. Indoor Lite: Low-iron heat strengthened (Kind HS) or low-iron fully tempered (Kind FT) float glass as indicated on the Drawings and as necessary to meet applicable codes and performance requirements.
7. Low-E Coating: Sputtered on second surface.
8. Winter Nighttime U-Factor: No more than 0.286.
9. Summer Daytime U-Factor: No more than 0.266.
10. VLT: At least 51 percent.
11. SHGC: No more than 0.23.
12. LSG: 2.18.
13. Safety glazing required.

END OF SECTION 08 80 00

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SECTION 08 83 00 - MIRRORS

PART 1 GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A Section Includes:
 - 1. Silvered flat glass mirrors.
 - 2. Supplementary components and accessories normally furnished or otherwise necessary for a complete installation.

1.3 REFERENCES

- A Acronyms and Abbreviations:
 - 1. NGA: National Glass Association (with GANA).
 - 2. SCAQMD: South Coast Air Quality Management District.
 - 3. VOC: Volatile Organic Compound.
- B Definitions:
 - 1. Manufacturer: Means the mirror manufacturer unless otherwise indicated.

1.4 SUBMITTALS

- A Action Submittals:
 - 1. Product Data: For each type of product. Include the following.
 - a. Mastic VOC content disclosure data.
 - 2. Shop Drawings: Include mirror elevations, edge details, mirror hardware, and attachment details.
 - 3. Samples:
 - a. Mirror Trim: 12 inches long.
- B Informational Submittals:
 - 1. Preconstruction Test Reports: From manufacturer indicating that mirror mastic was tested for compatibility and adhesion with mirror backing and substrates on which mirrors are installed.
 - 2. Sample Warranty: For special warranty.
- C Closeout Submittals:
 - 1. Maintenance Data: For mirrors to include in maintenance manuals.

1.5 PRECONSTRUCTION TESTING

- A Preconstruction Mirror Mastic Compatibility Test: Submit mirror mastic products to manufacturer for testing to determine compatibility of mastic with mirror backing.
 - 1. Testing is not required if data are submitted based on previous testing of mirror mastic products and mirror backing matching those submitted.

1.6 DELIVERY, STORAGE, AND HANDLING

- A Protect mirrors in accordance with the manufacturer's written instructions and as needed to prevent damage to mirrors from moisture, condensation, temperature changes, direct exposure to sun, or other causes.
- B Comply with manufacturer's written instructions and NGA recommendations for shipping, storing, and handling mirrors as needed to prevent deterioration of silvering, damage to edges, and abrasion of glass surfaces and applied coatings. Store indoors.

1.7 FIELD CONDITIONS

- A Environmental Limitations: Do not install mirrors until ambient temperature and humidity conditions are maintained at levels indicated for final occupancy.

1.8 WARRANTY

- A Special Warranty: Manufacturer agrees to replace mirrors that deteriorate within specified warranty period. Deterioration of mirrors is defined as defects developed from normal use that are not attributed to mirror breakage or to maintaining and cleaning mirrors contrary to manufacturer's written instructions. Defects include discoloration, black spots, and clouding of the silver film.
 - 1. Warranty Period: 5 years from date of Final Acceptance.

PART 2 PRODUCTS

2.1 SOURCE LIMITATIONS

- A Source Limitations for Mirrors: Obtain mirrors from single source from single manufacturer.
- B Source Limitations for Mirror Accessories: Obtain mirror-glazing accessories from single source.

2.2 SILVERED FLAT GLASS MIRRORS

- A Mirrors, General: ASTM C 1503.
- B Annealed Monolithic Glass Mirrors: Mirror Select Quality, clear.
 - 1. Nominal Thickness: 0.24 inch.

2.3 MISCELLANEOUS MATERIALS

- A Setting Blocks: Elastomeric material with a Shore, Type A durometer hardness of 85, plus or minus 5.
- B Edge Sealer: Coating compatible with glass coating and approved by mirror manufacturer for use in protecting against silver deterioration at mirrored glass edges.
- C Mirror Mastic: A low-VOC adhesive setting compound, asbestos-free, produced specifically for setting mirrors and certified by both mirror and mastic manufacturer as compatible with glass coating and substrates on which mirrors will be installed.

2.4 MIRROR HARDWARE

- A Aluminum J-Channels: Aluminum extrusions with a return deep enough to produce a glazing channel to accommodate mirrors of thickness indicated and in lengths required to cover edges of mirrors in a single piece.
 - 1. Manufacturers:
 - a. Basis-of-Design Products: Subject to compliance with the Contract Documents, design is based on the following.
 - 1) Bottom Trim: Catalog Number "D363A" Satin Anodized 1/4" Standard Aluminum J-Channel manufactured by C.R. Laurence Co., Inc.
 - 2) Top Trim: Catalog Number "D645A" Satin Anodized 1/4" Deep Nose Aluminum J-Channel manufactured by C.R. Laurence Co., Inc.
 - b. Acceptable Manufacturers: Subject to compliance with the Contract Documents provide the basis-of-design products or comparable approved products by one of the following.
 - 1) Extrude-A-Trim Inc.
 - 2) Frameless Hardware Company (FHC).
- B Fasteners: Fabricated of same basic metal and alloy as fastened metal and matching it in finished color and texture where fasteners are exposed.

2.5 FABRICATION

- A Mirror Edge Treatment: Verify with Architect.
 - 1. Seal edges of mirrors with edge sealer after edge treatment to prevent chemical or atmospheric penetration of glass coating.

PART 3 EXECUTION

3.1 EXAMINATION

- A Examine substrates, over which mirrors are indicated to be mounted, with installer present, for compliance with installation tolerances, substrate preparation, and other conditions affecting performance of the work.
- B Verify compatibility with and suitability of substrates, including compatibility of existing finishes or primers with mirror mastic.
- C Do not proceed with installation until unsatisfactory conditions have been corrected and surfaces are dry.
 - 1. Installation of mirrors indicates acceptance of surfaces and conditions.

3.2 PREPARATION

- A Comply with mastic manufacturer's written installation instructions for preparation of substrates, including coating substrates with mastic manufacturer's special bond coating where applicable.

3.3 INSTALLATION

- A General: Install mirrors to comply with manufacturer's written instructions and with referenced NGA publications. Mount mirrors accurately in place in a manner that avoids distorting reflected images.
 - 1. NGA Publications: *Glazing Manual* and *Installation Techniques Designed to Prolong the Life of Flat Glass Mirrors*.
- B Provide an airspace of at least 1/8 inch between back of mirrors and mounting surface for air circulation between back of mirrors and face of mounting surface.
- C Install mirrors with mastic and mirror hardware. Attach mirror hardware securely to mounting surfaces with mechanical fasteners installed with anchors or inserts as applicable. Install fasteners so heads do not impose point loads on backs of mirrors.
 - 1. Aluminum J-Channels: Provide setting blocks 1/8 inch thick by 4 inches long at quarter points. To prevent trapping water, provide, between setting blocks, 2 slotted weeps not less than 1/4 inch wide by 3/8 inch long at bottom channel.
 - 2. Install mastic as follows:
 - a. Apply barrier coat to mirror backing where approved in writing by manufacturers of mirrors and backing material.
 - b. Apply mastic to comply with mastic manufacturer's written instructions for coverage and to allow air circulation between back of mirrors and face of mounting surface.
 - c. After mastic is applied, align mirrors and press into place while maintaining a minimum airspace of 1/8 inch between back of mirrors and mounting surface.

3.4 CLEANING AND PROTECTION

- A Protect mirrors from breakage and contaminating substances resulting from construction operations.
- B Do not permit edges of mirrors to be exposed to standing water.
- C Maintain environmental conditions that prevent mirrors from being exposed to moisture from condensation or other sources for continuous periods of time.
- D Clean exposed surface of mirrors not more than 4 days before date scheduled for inspections that establish date of Final Acceptance. Clean mirrors as recommended in writing by the manufacturer and the NGA publication *Proper Procedures for Cleaning Flat Glass Mirrors*.

END OF SECTION 08 83 00

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SECTION 08 88 13 - FIRE-RATED GLAZING

PART 1 GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A Section Includes:
 - 1. Fire-protection-rated glazing for glazed fire-rated doors.
 - 2. Supplementary components and accessories normally furnished or otherwise necessary for a complete installation.

1.3 REFERENCES

- A Acronyms and Abbreviations:
 - 1. AHJ: Authority (Authorities) Having Jurisdiction.
 - 2. NGA: National Glass Association.
 - 3. SGCC: North American Safety Glass Certification Committee.
- B Definitions:
 - 1. Fire-Protection-Rated Glazing: Means glazing that prevents spread of fire and smoke and complies with requirements for rated openings; incapable of blocking radiant heat
 - 2. Glass Manufacturers: Means firms that produce primary glass, fabricated glass, or both, as defined in referenced glazing publications.
 - 3. Glass Thicknesses: Indicated by thickness designations in millimeters in accordance with ASTM C 1036.
 - 4. Manufacturer: Means the glass manufacturer unless otherwise indicated.

1.4 COORDINATION

- A Coordinate glazing channel dimensions to provide necessary bite on glass, minimum edge and face clearances, and adequate sealant thicknesses, with reasonable tolerances.

1.5 SUBMITTALS

- A Action Submittals:
 - 1. Product Data: For each type of product. Include current Environmental Product Declaration and Health Product Declaration.
 - 2. Glazing Schedule: List glass types and thicknesses for each size opening and location. Use same designations indicated on Drawings.
- B Informational Submittals:
 - 1. Qualification Data: For installer and glass testing agency.
 - 2. Product Certificates: For each type of glass and glazing product.
 - 3. Sample Warranties: For special warranties.

1.6 QUALITY ASSURANCE

- A Installer Qualifications: A qualified installer who employs glass installers for this Project who are certified under the NGA's Certified Glass Installer Program or who can demonstrate compliance with its certification program requirements.

1.7 DELIVERY, STORAGE, AND HANDLING

- A Protect glazing materials in accordance with manufacturer's written instructions. Prevent damage to glass and glazing materials from condensation, temperature changes, direct exposure to sun, or other causes.

1.8 FIELD CONDITIONS

- A Environmental Limitations: Do not deliver or install fire-resistant glazing until spaces are enclosed and weathertight and temporary HVAC system is operating and maintaining ambient temperature conditions at occupancy levels during remainder of construction period.

1.9 WARRANTY

- A Manufacturer's Special Warranty for Laminated Glass: Manufacturer agrees to replace laminated-glass units that deteriorate within specified warranty period. Deterioration of laminated glass is defined as defects developed from normal use that are not attributed to glass breakage or to maintaining and cleaning laminated glass contrary to manufacturer's written instructions. Defects include edge separation, delamination materially obstructing vision through glass, and blemishes exceeding those allowed by referenced laminated-glass standard.
 - 1. Warranty Period: 5 years from date of Final Acceptance.

PART 2 PRODUCTS

2.1 SOURCE LIMITATIONS

- A Glass: For each glass type, obtain from single source from the same manufacturer.
- B Glazing Accessories: For each product and installation method, obtain from single source from single manufacturer.

2.2 PERFORMANCE REQUIREMENTS

- A General: Installed glazing systems shall withstand normal thermal movement and impact loads (where applicable) without failure, including loss or glass breakage attributable to defective manufacture, fabrication, or installation; deterioration of glazing materials; or other defects in construction.

2.3 GLASS PRODUCTS, GENERAL

- A Glazing Publications: Comply with published recommendations of glass product manufacturers and organization below unless more stringent requirements are indicated. See these publications for glazing terms not otherwise defined in this Section or in referenced standards.
 - 1. NGA Publication: Glazing Manual.
- B Safety Glazing Labeling: Where safety glazing is indicated, permanently mark glazing with certification label of the SGCC or another certification agency acceptable to the AHJ or manufacturer. Label shall indicate manufacturer's name, type of glass, glass thickness, and safety glazing standard with which glass complies.

2.4 GLASS PRODUCTS

- A Float Glass: ASTM C 1036, Type I, Quality-Q3, Class I (clear) unless otherwise indicated.
- B Tempered Float Glass: ASTM C1048, Kind FT (fully tempered), Condition A (uncoated) unless otherwise indicated, Type I, Class I (clear) unless otherwise indicated, Quality-Q3.
 - 1. Fabrication Process: By horizontal (roller-hearth) process with roll-wave distortion parallel to bottom edge of glass as installed unless otherwise indicated.

2.5 FIRE-PROTECTION-RATED GLAZING

- A General: Listed and labeled by a testing agency acceptable to the AHJ, for fire-protection ratings indicated, based on positive-pressure testing in accordance with NFPA 257 or UL 9, including hose-stream test, and shall comply with NFPA 80.
 - 1. Fire-protection-rated glazing required to have a fire-protection rating of 20 minutes shall be exempt from hose-stream test.

- B Fire-Protection-Rated Glazing Labeling: Permanently mark fire-protection-rated glazing with certification label of a testing agency acceptable to the AHJ. Label shall indicate manufacturer's name; test standard; whether glazing is permitted to be used in doors or openings; if permitted in openings, whether glazing has passed hose-stream test; whether glazing meets 450 deg F temperature-rise limitation; and fire-resistance rating in minutes.
- C Fire-Protection-Rated Laminated Glass with Intumescent Interlayer: Laminated glass made from multiple plies of uncoated, clear float glass; with intumescent interlayers; complying with 16 CFR 1201, Category II.
- D Fire-Protection-Rated Laminated Glass, or Tempered Glazing Units, with Intumescent Interlayer: Laminated glass made from multiple plies of uncoated clear float glass with intumescent interlayers or double glazing units made from two or more lites of uncoated, fully tempered, clear float glass with a perimeter edge seal enclosing a cavity filled with optically clear, semi-solid, intumescent polymer; complying with 16 CFR 1201, Category II.
 - 1. Products: Subject to compliance with the Contract Documents, provide one of the following.
 - a. "Pilkington Pyrostop" manufactured by the Pilkington Group.
 - b. "SuperLite X-45/60/90" manufactured by SAFTI FIRST.
 - c. "Contraflam" manufactured by Vetrotech Saint-Gobain International AG.

2.6 GLAZING ACCESSORIES

- A Provide glazing gaskets, glazing sealants, glazing tapes, setting blocks, spacers, edge blocks, and other glazing accessories that are compatible with glazing products and each other and are approved by testing agencies that listed and labeled fire-resistant glazing products with which products are used for applications and fire-protection ratings indicated.
- B Glazing Sealants for Fire-Rated Glazing Products: Neutral-curing silicone glazing sealant complying with ASTM C 920, Type S, Grade NS, Class 50, Use NT. Comply with sealant and glass manufacturers' written instructions for selecting glazing sealants suitable for applications indicated.
 - 1. Colors of Exposed Glazing Sealants: As selected by Architect from manufacturer's full range of industry colors.

2.7 MISCELLANEOUS GLAZING MATERIALS

- A General: Provide products of material, size, and shape complying with referenced glazing standard, recommended in writing by manufacturers of glass and other glazing materials for application indicated, and with a proven record of compatibility with surfaces contacted in installation.
- B Accessories: As supplied, recommended, or required by the manufacturer and as necessary for a complete installation.

2.8 FABRICATION OF GLAZING UNITS

- A Fabricate glazing units in sizes required to fit openings indicated for Project, with edge and face clearances, edge and surface conditions, and bite complying with written instructions of product manufacturer and referenced glazing publications, to comply with system performance requirements.

PART 3 EXECUTION

3.1 EXAMINATION

- A Examine framing, glazing channels, and stops, with installer present, for compliance with manufacturing and installation tolerances, including those for size, squareness, and offsets at corners, and for compliance with minimum required face and edge clearances.
- B Do not proceed with installation until unsatisfactory conditions have been corrected.
 - 1. Installation of fire-rated glazing indicates acceptance of surfaces and conditions.

3.2 PREPARATION

- A Clean glazing channels and other framing members receiving glass immediately before glazing. Remove coatings not firmly bonded to substrates.
- B Examine glazing units to locate fire side and protected side. Label or mark units as needed so that fire side and protected side are readily identifiable. Do not use materials that leave visible marks in the completed Work.

3.3 GLAZING, GENERAL

- A Use methods approved by testing agencies that listed and labeled fire-resistant glazing products.
- B Comply with combined written instructions of manufacturers of glass, sealants, gaskets, and other glazing materials unless more stringent requirements are indicated, including those in referenced glazing publications.
- C Protect glass edges from damage during handling and installation. Remove damaged glass from Project site and legally dispose of off Project site. Damaged glass is glass with edge damage or other imperfections that, when installed, could weaken glass and impair performance and appearance.
- D Apply primers to joint surfaces where required for adhesion of sealants, as determined by preconstruction testing.
- E Install setting blocks in sill rabbets, sized and located to comply with referenced glazing publications unless otherwise required by glass manufacturer. Set blocks in thin course of compatible sealant suitable for heel bead.
- F Do not exceed edge pressures stipulated by glass manufacturers for installing glass lites.
- G Provide spacers for glass lites where length plus width is larger than 50 inches.
 - 1. Locate spacers directly opposite each other on both inside and outside faces of glass. Install correct size and spacing to preserve required face clearances unless gaskets and glazing tapes are used that have demonstrated ability to maintain required face clearances and to comply with system performance requirements.
 - 2. Provide 1/8-inch-minimum bite of spacers on glass and use thickness equal to sealant width. With glazing tape, use thickness slightly less than final compressed thickness of tape.
- H Provide edge blocking where indicated or needed to prevent glass lites from moving sideways in glazing channel, as recommended in writing by glass manufacturer and in accordance with requirements in referenced glazing publications.
- I Set glass lites with proper orientation so that coatings face fire side or protected side as specified.

3.4 SEALANT GLAZING (WET)

- A Install continuous spacers, or spacers combined with cylindrical sealant backing, between glass lites and glazing stops to maintain glass face clearances. Secure spacers or spacers and backings in place and in position to control depth of installed sealant relative to edge clearance for optimum sealant performance.
- B Force sealants into glazing channels to eliminate voids and to ensure complete wetting or bond of sealant to glass and channel surfaces.
- C Tool exposed surfaces of sealants to provide a substantial wash away from glass.

3.5 CLEANING AND PROTECTION

- A Immediately after installation, remove nonpermanent labels and clean surfaces.
- B Protect glass from contact with contaminating substances resulting from construction operations. Examine glass surfaces adjacent to or below exterior concrete and other masonry surfaces at frequent intervals during construction, but not less than once a month, for buildup of dirt, scum, alkaline deposits, or stains.
 - 1. If, despite such protection, contaminating substances do contact with glass, remove substances immediately as recommended in writing by glass manufacturer.
- C Remove and replace glass that is damaged during construction period.

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- D Wash glass on both exposed surfaces not more than 4 days before date scheduled for inspections that establish date of Final Acceptance. Wash glass as recommended in writing by the manufacturer.

END OF SECTION 08 88 13

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SECTION 09 05 61 - MOISTURE VAPOR EMISSION CONTROL

PART 1 GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A Section Includes:
 - 1. Fluid-applied, resin-based, membrane-forming systems that control the moisture-vapor-emission rate of high-moisture, interior concrete to prepare it for floor covering installation.
 - 2. Supplementary components and accessories normally furnished or otherwise necessary for a complete application.

1.3 REFERENCES

- A Acronyms and Abbreviations:
 - 1. ICRI: International Concrete Repair Institute.
 - 2. MVE: Moisture Vapor Emission.
 - 3. MVER: Moisture Vapor Emission Rate.
- B Definitions:
 - 1. Manufacturer: Means the MVE-control system manufacturer unless otherwise indicated.

1.4 COORDINATION

- A Where MVE-control systems are applied, coordinate with moisture-testing requirements in other Division 09 Sections for floor coverings.
 - 1. Do not use ASTM F 1869 test method to evaluate MVE where coatings are installed on concrete.
 - 2. To maintain the integrity of the cured membrane, do not perform destructive tests such as ASTM F 2170, which uses in situ probes, after installing MVE-control systems.

1.5 SUBMITTALS

- A Action Submittals:
 - 1. Product Data: For each type of product.
- B Informational Submittals:
 - 1. Qualification Data: For installer.
 - 2. Product Test Reports: For each MVE-control system, for tests performed by a qualified testing agency or by the manufacturer and witnessed by a qualified testing agency.
 - 3. Preinstallation testing reports.
 - 4. Field quality-control reports.

1.6 QUALITY ASSURANCE

- A Manufacturer Qualifications: Employs factory-trained personnel who are available for consultation and Project-site inspection.
- B Installer Qualifications: An authorized representative who is trained and approved by manufacturer.

1.7 DELIVERY, STORAGE, AND HANDLING

- A Deliver materials in original packages and containers, with seals unbroken, bearing manufacturer's labels indicating directions for storage and mixing with other components.

1.8 FIELD CONDITIONS

- A Environmental Limitations: Comply with the manufacturer's written instructions for substrate and ambient temperatures, humidity, ventilation, and other conditions affecting system installation.

1. Store system components in a temperature-controlled environment and protected from weather and at ambient temperature of not less than 65 deg F and not more than 85 deg F at least 48 hours before use.
2. Maintain ambient temperature and relative humidity in installation areas within range recommended in writing by the manufacturer, but not less than 65 deg F or more than 85 deg F and not less than 40 or more than 60 percent relative humidity, for 48 hours before installation, during installation, and for 48 hours after installation unless longer period is recommended in writing by the manufacturer.
3. Install MVE-control systems where concrete surface temperatures will remain a minimum of 5 deg F higher than the dew point for ambient temperature and relative humidity conditions in installation areas for 48 hours before installation, during installation, and for 48 hours after installation unless longer period is recommended in writing by the manufacturer.

PART 2 PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A MVE-Control System Capabilities: Capable of suppressing MVE without failure where installed on concrete that exhibits the following conditions:
 1. MVER: No more than 15 lb of water/1000 sq. ft. when tested according to ASTM F 1869.
 2. Relative Humidity: Maximum 100 percent when tested according to ASTM F 2170 using in situ probes.
- B Water-Vapor Transmission: Through MVE-control system, no more than 0.06 perm when tested according to ASTM E 96/E 96M.
- C Tensile Bond Strength: For MVE-control system, greater than 200 psi with failure in the concrete according to ASTM D 7234.

2.2 MVE-CONTROL SYSTEM

- A MVE-Control System: ASTM F 3010-qualified, fluid-applied, 2-component, epoxy-resin, membrane-forming system; formulated for application on concrete substrates to reduce MVER to level required for installation of floor coverings indicated and acceptable to manufacturers of floor covering products indicated, including adhesives.
- B Products: Subject to compliance with the Contract Documents, provide one of the following.
 1. "VAP 1-2000" as manufactured by Koster American Corporation.
 2. "VAPOR BAN ER" as manufactured by LATICRETE International, Inc.
 3. "Planiseal VS" as manufactured by MAPEI Corporation.

2.3 ACCESSORIES

- A Substrate Primer: Provide manufacturer's concrete-substrate primer if required for system indicated by substrate conditions.
- B Cementitious Underlayment Primer: If required for subsequent installation of cementitious underlayment products, provide manufacturer's primer to ensure adhesion of products to MVE-control system.
- C Patching and Leveling Material: Moisture-, mildew-, and alkali-resistant product recommended in writing by the manufacturer and with at least 3000-psi compressive strength after 28 days when tested according to ASTM C 109/C 109M.
- D Crack-Filling Material: Resin-based material recommended in writing by the manufacturer for sealing concrete substrate crack repair.
- E Cementitious Underlayment: If required to maintain manufacturer's warranty, provide manufacturer's hydraulic cement-based underlayment.

PART 3 EXECUTION**3.1 EXAMINATION**

- A Examine substrates and conditions, with installer present, for compliance with requirements for maximum moisture content, installation tolerances, and other conditions affecting performance of the work.
- B Do not proceed with installation until unsatisfactory conditions have been corrected.
 - 1. Installation of system indicates acceptance of surfaces and conditions.

3.2 PREPARATION

- A Preinstallation Testing:
 - 1. Testing Agency: Engage a qualified testing agency to perform tests.
 - 2. Alkalinity Testing: Perform pH testing according to ASTM F710. Install MVE-control system in areas where pH readings are less than 7.0 and in areas where pH readings are greater than 8.5 unless otherwise required by floor covering manufacturers specified in other Division 09 floor covering Specification Sections.
 - 3. Moisture Testing: Perform tests so that each test area does not exceed 1000 sq. ft., and perform no fewer than 3 tests in each installation area and with test areas evenly spaced in installation areas.
 - a. Anhydrous Calcium Chloride Test: ASTM F 1869. Install MVE-control system in locations where concrete substrate MVER exceeds 3 lb of water/1000 sq. ft. in 24 hours.
 - b. Internal Relative Humidity Test: Using in situ probes, ASTM F 2170. Install MVE-control system in locations where concrete substrates exhibit relative humidity level greater than 75 percent.
 - 4. Tensile-Bond-Strength Testing: For typical locations indicated to receive installation of MVE-control system, install at least 100-sq. ft. area of MVE-control system to prepared concrete substrate and test according to ASTM D 7234.
 - a. Do not proceed with installation until tensile bond strength is greater than 200 psi with failure in the concrete.
- B Concrete Substrates: Prepare and clean substrates according to the manufacturer's written instructions to ensure adhesion of system to concrete.
 - 1. Remove coatings and other substances that are incompatible with MVE-control system and that contain soap, wax, oil, or silicone, using mechanical methods recommended in writing by the manufacturer. Do not use solvents.
 - 2. Provide concrete surface profile complying with ICRI 310.2R CSP 3 by shot blasting using apparatus that abrades the concrete surface with shot, contains the dispensed shot within the apparatus, and recirculates the shot by vacuum pickup.
 - 3. After shot blasting, repair damaged and deteriorated concrete according to the manufacturer's written instructions.
 - 4. Protect substrate voids and joints to prevent resins from flowing into or leaking through them.
 - 5. Fill surface depressions and irregularities with patching and leveling material.
 - 6. Fill surface cracks, grooves, control joints, and other nonmoving joints with crack-filling material.
 - 7. Allow concrete to dry, undisturbed, for period recommended in writing by the manufacturer after surface preparation, but not less than 24 hours.
 - 8. Before installing MVE-control systems, broom sweep and vacuum prepared concrete.
- C Protect walls, floor openings, electrical openings, door frames, and other obstructions during installation.

3.3 INSTALLATION

- A Install MVE-control system according to ASTM F 3010 and manufacturer's written instructions to produce a uniform, monolithic surface free of surface deficiencies such as pin holes, fish eyes, and voids.

1. Install primers as required to comply with manufacturer's written instructions.
- B Do not apply MVE-control system across substrate expansion, isolation, and other moving joints.
- C Apply system, including component coats if any, in thickness recommended in writing by the manufacturer for MVER indicated by preinstallation testing.
- D Cure MVE-control system components according to manufacturer's written instructions. Prevent contamination or other damage during installation and curing processes.
- E After curing, examine MVE-control system for surface deficiencies. Repair surface deficiencies according to manufacturer's written instructions.
- F Install cementitious underlayment over cured membrane if required to maintain manufacturer's warranty and in thickness required to maintain the warranty.

3.4 FIELD QUALITY CONTROL

- A Testing Agency: Engage a qualified testing agency to perform installation inspections.
- B Installation Inspections: Inspect substrate preparation and installation of system components to ensure compliance with manufacturer's written instructions and to ensure that a complete MVE-control system is installed without deficiencies.
 1. Verify that surface preparation meets requirements.
 2. Verify that component coats and complete MVE-control-system film thicknesses comply with manufacturer's written instructions.
 3. Verify that MVE-control-system components and installation areas that evidence deficiencies are repaired according to manufacturer's written instructions.
- C MVE-control system will be considered defective if it does not pass inspections.

3.5 PROTECTION

- A Protect MVE-control system from damage, wear, dirt, dust, and other contaminants before floor covering installation. Use protective methods and materials, including temporary coverings, recommended in writing by the manufacturer.
- B Do not allow subsequent preinstallation examination and testing for floor covering installation to damage, puncture, or otherwise compromise the MVE-control system membrane.

END OF SECTION 09 05 61

SECTION 09 21 16 - GYPSUM BOARD SHAFT WALL ASSEMBLIES

PART 1 GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A Section Includes:
 - 1. Gypsum board shaft wall assemblies.
 - 2. Supplementary components and accessories normally furnished or otherwise necessary for a complete application.

1.3 REFERENCES

- A Abbreviations and Acronyms:
 - 1. AISI: American Iron and Steel Institute.
 - 2. GA: Gypsum Association.
 - 3. STC: Sound Transmission Class.
- B Definitions:
 - 1. Manufacturer: Means the gypsum board shaft wall assembly component manufacturer unless otherwise indicated.

1.4 SUBMITTALS

- A Action Submittals:
 - 1. Product Data: For each component of gypsum board shaft wall assembly. Include current Health Product Declaration and Environmental Product Declaration.
- B Informational Submittals:
 - 1. Evaluation Reports: For shaft wall assemblies and firestop tracks, from ICC-ES.

1.5 DELIVERY, STORAGE, AND HANDLING

- A General: Deliver, store, and handle materials in conformance with GA publication *GA-801, Handling and Storage of Gypsum Panel Products*.
- B Store materials inside under cover and keep them dry and protected against weather, condensation, direct sunlight, construction traffic, and other potential causes of damage. Stack panels flat and support them on risers on a flat platform to prevent sagging.

1.6 FIELD CONDITIONS

- A Environmental Limitations: Comply with the manufacturer's written instructions.
- B Do not install finish panels until installation areas are enclosed and conditioned.
- C Do not install wet, moisture-, or mold-damaged panels.
 - 1. Indications that panels are wet or moisture damaged include discoloration, sagging, and irregular shape.
 - 2. Indications that panels are mold damaged include fuzzy or splotchy surface contamination and discoloration.

PART 2 PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A Fire-Resistance-Rated Assemblies: For fire-resistance-rated assemblies, provide materials and construction identical to those tested in assembly indicated according to ASTM E 119 by an independent testing agency.

- B STC-Rated Assemblies: Provide materials and construction identical to those of assemblies tested according to ASTM E 90 and classified according to ASTM E 413 by a testing and inspecting agency.

2.2 GYPSUM BOARD SHAFT WALL ASSEMBLIES

- A Fire-Resistance Rating: As indicated on the Drawings.
- B STC Rating: As indicated on the Drawings.
- C Gypsum Shaftliner Board:
1. Moisture- and Mold-Resistant Type X: Conforming to ASTM C 1396/C 1396M; manufacturer's proprietary fire-resistive liner panels with ASTM D 3273 mold-resistance score of 10 as rated according to ASTM D 3274, 1 inch thick, and with double beveled long edges.
 - a. Products: Subject to compliance with the Contract Documents, provide one of the following.
 - 1) "M-BLOC Shaft Liner Panel" manufactured by American Gypsum Company, LLC.
 - 2) "M2Tech Shaftliner" manufactured by CertainTeed; Saint-Gobain.
 - 3) "Gold Bond Shaftliner XP" manufactured by Gold Bond Building Products, LLC; National Gypsum.
 - 4) "USG Sheetrock Brand Mold Tough Gypsum Liner Panels" manufactured by United States Gypsum Company (USG).
- D Non-Load-Bearing Steel Framing, General: Complying with ASTM C 645 requirements for metal unless otherwise indicated and complying with requirements for fire-resistance-rated assembly indicated.
1. Protective Coating: ASTM A 653/A 653M, G40, hot-dip galvanized unless otherwise indicated.
- E Studs: Manufacturer's standard profile for repetitive, corner, and end members as follows:
1. Depth: As indicated.
 2. Minimum Base-Metal Thickness: As required to comply with structural performance requirements computed to conform with the AISI publication North American Specification for the Design of Cold-Formed Steel Structural Members.
- F Runner Tracks: Manufacturer's standard J-profile track with manufacturer's standard long-leg length, but at least 2 inches long and matching studs in depth.
1. Minimum Base-Metal Thickness: Matching steel studs.
- G Firestop Tracks: Top runner manufactured to allow partition heads to expand and contract with movement of the structure while maintaining continuity of fire-resistance-rated assembly indicated; in thickness not less than indicated for studs and in width to accommodate depth of studs.
1. Products: Subject to compliance with the Contract Documents, provide one of the following, or comparable product.
 - a. "BlazeFrame RipTRAK Shaftwall" manufactured by ClarkDietrich.
 - b. "Fire Trak System" manufactured by Fire Trak Corp.
 - c. "FAS J-Track" manufactured by Marino\WARE.
- H Finish Panels: As indicated, and as specified in Section 09 29 00 Gypsum Board.
- I Sound Attenuation Blankets: As specified in Section 09 81 00 Acoustical Insulation, Sealants, and Accessories.

2.3 AUXILIARY MATERIALS

- A Provide auxiliary materials that comply with the manufacturer's written instructions.
- B Trim Accessories: Cornerbead, edge trim, and control joints of material and shapes as specified in Section 09 29 00 Gypsum Board that comply with the manufacturer's written instructions for application indicated.
- C Steel Drill Screws: ASTM C 1002 unless otherwise indicated.

- D Track Fasteners: Power-driven fasteners of size and material required to withstand loading conditions imposed on shaft wall assemblies without exceeding allowable design stress of track, fasteners, or structural substrates in which anchors are embedded.
 - 1. Expansion Anchors: Fabricated from corrosion-resistant materials, with allowable load or strength design capacities calculated according to ICC-ES AC193 and ACI 318 greater than or equal to the design load, as determined by testing per ASTM E 488/E 488M conducted by a qualified testing agency.
 - 2. Power-Actuated Anchors: Fastener system of type suitable for application indicated, fabricated from corrosion-resistant materials, with allowable load capacities calculated according to ICC-ES AC70, greater than or equal to the design load, as determined by testing per ASTM E 1190 conducted by a qualified testing agency.
- E Reinforcing: For support for items, such as handrails, that are attached to shaft wall assemblies, provide galvanized-steel reinforcing strips with an uncoated base metal thickness of at least 0.033-inch.
- F Acoustical Sealant: As specified in Section 09 81 00 Acoustical Insulation, Sealants, and Accessories.
- G Accessories: As supplied, recommended, or required by the manufacturer and as necessary for a complete installation.

PART 3 EXECUTION

3.1 EXAMINATION

- A Examine substrates and conditions, with installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the work.
- B Examine panels before installation. Reject wet, moisture-, or mold-damaged panels.
- C Do not proceed with installation until unsatisfactory conditions have been corrected.
 - 1. Installation of gypsum shaft wall assemblies indicates acceptance of surfaces and conditions.

3.2 INSTALLATION

- A General: Install gypsum board shaft wall assemblies to comply with requirements of fire-resistance-rated assemblies indicated and manufacturer's written installation instructions.
- B Do not bridge building expansion joints with shaft wall assemblies; frame both sides of expansion joints with furring and other support.
- C Install supplementary framing in gypsum board shaft wall assemblies around openings and as required for blocking, bracing, and support of gravity and pullout loads of fixtures, equipment, services, heavy trim, furnishings, wall-mounted door stops, and similar items that cannot be supported directly by shaft wall assembly framing.
 - 1. Elevator Hoistway: At elevator hoistway-entrance door frames, provide jamb struts on each side of door frame.
 - 2. Reinforcing: Provide where items attach directly to shaft wall assembly as indicated on Drawings; accurately position and secure behind at least one layer of face panel.
- D Penetrations: At penetrations in shaft wall, maintain fire-resistance rating of shaft wall assembly by installing supplementary steel framing around perimeter of penetration and fire protection behind boxes containing wiring devices, elevator call buttons and floor indicators, and similar items.
- E Isolate perimeter of gypsum panels from building structure to prevent cracking of panels while maintaining continuity of fire-rated construction.
- F Firestop Tracks: Where indicated, install to maintain continuity of fire-resistance-rated assembly indicated.
- G Control Joints: Install control joints at locations indicated on Drawings, or if not indicated, according to ASTM C 840 and in specific locations approved by Architect while maintaining fire-resistance rating of gypsum board shaft wall assemblies.

- H Sound-Rated Shaft Wall Assemblies: Seal gypsum board shaft walls with acoustical sealant at perimeter of each assembly where it abuts other work and at joints and penetrations within each assembly.
- I Installation Tolerance: Install framing members so fastening surfaces vary not more than 1/8 inch from the plane formed by faces of adjacent framing.

3.3 PROTECTION

- A Protect installed products from damage from weather, condensation, direct sunlight, construction, and other causes during remainder of the construction period.
- B Remove and replace wet, moisture-, or mold-damaged panels.
 - 1. Indications that panels are wet or moisture damaged include discoloration, sagging, and irregular shape.
 - 2. Indications that panels are mold damaged include fuzzy or splotchy surface contamination and discoloration.

END OF SECTION 09 21 16

SECTION 09 22 16 - NON-STRUCTURAL METAL FRAMING

PART 1 GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A Section Includes:
 - 1. Non-load-bearing steel framing systems for interior partitions.
 - 2. Suspension systems for interior ceilings and soffits.
 - 3. Grid suspension systems for gypsum board ceilings.
 - 4. Supplementary components and accessories normally furnished or otherwise necessary for a complete installation.

1.3 REFERENCES

- A Acronyms and Abbreviations:
 - 1. AHJ: Authority (Authorities) Having Jurisdiction.
 - 2. AISI: American Iron and Steel Institute.
 - 3. STC: Sound Transmission Class.
- B Definitions:
 - 1. Manufacturer: Means the non-structural metal framing manufacturer unless otherwise indicated.

1.4 SUBMITTALS

- A Action Submittals:
 - 1. Product Data: For each type of product indicated. Include Environmental Product Declaration.
- B Informational Submittals:
 - 1. Evaluation Reports: For firestop tracks, and power-actuated fasteners, from ICC-ES or other qualified testing agency acceptable to the AHJ.

1.5 QUALITY ASSURANCE

- A Code-Compliance Certification of Studs and Tracks: Provide documentation that framing members are certified according to the product-certification program of one of the following:
 - 1. The Certified Steel Stud Association.
 - 2. The Steel Framing Industry Association.
 - 3. The Steel Stud Manufacturers Association.
 - 4. The Supreme Steel Framing System Association.

1.6 DELIVERY, STORAGE, AND HANDLING

- A Notify manufacturer of damaged materials received prior to installation.
- B Deliver materials in manufacturer's original, unopened, undamaged containers with identification labels intact.
- C Protect cold-formed metal framing from corrosion, deformation, and other damage during delivery, storage, and handling as required by the AISI publication AISI S202, Code of Standard Practice for Cold-Formed Steel Structural Framing.

PART 2 PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A Fire-Test-Response Characteristics: For fire-resistance-rated assemblies that incorporate non-load-bearing steel framing, provide materials and construction identical to those tested in assembly indicated, in accordance with ASTM E 119 by an independent testing agency.

- B STC-Rated Assemblies: For STC-rated assemblies, provide materials and construction identical to those tested in assembly indicated according to ASTM E 90 and classified according to ASTM E 413 by an independent testing agency.
- C Design framing systems in accordance with the AISI publication AISI S220, North American Standard for Cold-Formed Steel Framing - Nonstructural Members, unless otherwise indicated.
- D Design Loads: As indicated on the Drawings, or at least 5 lbf/sq. ft. as required by the IBC.
- E Design framing systems to accommodate deflection of primary building structure and construction tolerances and to withstand design loads.

2.2 MANUFACTURERS

- A Manufacturers: Subject to compliance with the Contract Documents, provide products by one of the following.
 - 1. ClarkDietrich Building Systems.
 - 2. Marino\WARE.
 - 3. The Steel Network, Inc.

2.3 NON-LOAD-BEARING STEEL FRAMING, GENERAL

- A Framing Members, General: Comply with AISI S220 for conditions indicated.
 - 1. Steel Sheet Components: Comply with AISI S220 requirements for metal unless otherwise indicated.
 - 2. Protective Coating: Comply with AISI S220; ASTM A 653, G40, or coating with equivalent corrosion resistance. Galvannealed products are unacceptable.
 - a. Coating demonstrates equivalent corrosion resistance with an evaluation report acceptable

2.4 STEEL FRAMING FOR FRAMED ASSEMBLIES

- A Steel Studs and Runners: AISI S220.
 - 1. Minimum Base-Metal Thickness: At least 0.0312 inch.
 - 2. Depth: As indicated on Drawings.
- B Slip-Type Head Joints: Where indicated, provide one of the following:
 - 1. Double-Runner System: ASTM C 645 top runners, inside runner with 2-inch-deep flanges in thickness not less than indicated for studs and fastened to studs, and outer runner sized to friction fit inside runner.
 - 2. Deflection Track: Steel sheet top runner manufactured to prevent cracking of finishes applied to interior partition framing resulting from deflection of structure above; in thickness not less than indicated for studs and in width to accommodate depth of studs.
 - a. Manufacturers: Subject to compliance with the Contract Documents, provide products by one of the following:
 - 1) ClarkDietrich Building Systems.
 - 2) Marino\WARE.
 - 3) The Steel Network, Inc.
- C Firestop Tracks: Top track manufactured to allow partition heads to expand and contract with movement of the structure while maintaining continuity of fire-resistance-rated assembly indicated; in thickness not less than indicated for studs and in width to accommodate depth of studs.
 - 1. Manufacturers: Subject to compliance with the Contract Documents, provide products by one of the following, or comparable:
 - a. ClarkDietrich Building Systems.
 - b. Fire Trak Corp.
 - c. Marino\WARE.
- D Flat Strap and Backing Plate: Steel sheet for blocking and bracing in length and width indicated.
 - 1. Base-Metal Thickness: As indicated on the Drawings.
- E Cold-Rolled Channel Bridging: 0.0538-inch bare-steel thickness, with at least 1/2-inch-wide flanges.

1. Depth: As indicated on the Drawings.
2. Clip Angle: Not less than 1-1/2 by 1-1/2 inches, 0.068-inch-thick, galvanized steel.
- F Hat-Shaped, Rigid Furring Channels: ASTM C 645.
 1. Minimum Base Metal Thickness: As indicated on the Drawings.
 2. Depth: As indicated on Drawings.
- G Resilient Furring Channels: 1/2-inch-deep, steel sheet members designed to reduce sound transmission.
 1. Configuration: Asymmetrical or hat shaped.
- H Cold-Rolled Furring Channels: 0.0538-inch bare-steel thickness, with at least 1/2-inch-wide flanges.
 1. Depth: As indicated on the Drawings.
 2. Furring Brackets: Adjustable, corrugated-edge type of steel sheet with minimum bare-steel thickness of 0.0312 inch.
 3. Tie Wire: ASTM A 641/A 641M, Class 1 zinc coating, soft temper, 0.0625-inch-diameter wire, or double strand of 0.0475-inch-diameter wire.
- I Z-Shaped Furring: With slotted or nonslotted web, face flange of 1-1/4 inches, wall attachment flange of 7/8 inch, bare-metal thickness of at least 0.0179 inch, and depth required to fit insulation thickness indicated.

2.5 SUSPENSION SYSTEM COMPONENTS

- A Tie Wire: ASTM A 641/A 641M, Class 1 zinc coating, soft temper, 0.0625-inch-diameter wire, or double strand of 0.0475-inch-diameter wire.
- B Wire Hangers: ASTM A 641/A 641M, Class 1 zinc coating, soft temper, 0.162-inch diameter.
- C Flat Hangers: Steel sheet, 1 by 3/16 inch by length indicated.
- D Carrying Channels: Cold-rolled, commercial-steel sheet with a base-metal thickness of at least 0.0538 inch and at least 1/2-inch-wide flanges.
 1. Depth: 2-1/2 inches.
- E Furring Channels (Furring Members):
 1. Cold-Rolled Channels: 0.0538-inch bare-steel thickness, with at least 1/2-inch-wide flanges, 3/4 inch deep.
 2. Steel Studs: ASTM C 645.
 - a. Minimum Base-Metal Thickness: At least 0.0312 inch.
 - b. Depth: As indicated on Drawings.
 3. Hat-Shaped, Rigid Furring Channels: ASTM C 645, 7/8 inch deep.
 - a. Minimum Base Metal Thickness: At least 0.0312 inch.
 4. Resilient Furring Channels: 1/2-inch-deep members designed to reduce sound transmission.
 - a. Configuration: Asymmetrical or hat shaped.
- F Grid Suspension System for Ceilings: ASTM C 645, direct-hung system composed of main beams and cross-furring members that interlock.
 1. Products: Subject to compliance with the Contract Documents provide one of the following:
 - a. "Drywall Grid Systems" manufactured by Armstrong World Industries, Inc.
 - b. "Chicago Metallic Drywall Grid" manufactured by Rockfon.
 - c. "Drywall Suspension System" manufactured by USG Corporation.

2.6 AUXILIARY MATERIALS

- A General: Provide auxiliary materials that comply with referenced installation standards.
 1. Fasteners for Metal Framing: Of type, material, size, corrosion resistance, holding power, and other properties required to fasten steel members to substrates.
- B Isolation Strip at Exterior Walls: Provide one of the following:
 1. Asphalt-Saturated Organic Felt: ASTM D 226, Type I (No. 15 asphalt felt), nonperforated.
 2. Foam Gasket: Adhesive-backed, closed-cell vinyl foam strips that allow fastener penetration without foam displacement, 1/8 inch thick, in width to suit steel stud size.

PART 3 EXECUTION**3.1 EXAMINATION**

- A Examine areas and substrates, with Installer present, and including welded hollow-metal frames, cast-in anchors, and structural framing, for compliance with requirements and other conditions affecting performance.
 - 1. Do not proceed with installation until unsatisfactory conditions have been corrected.
 - a. Installation of non-structural metal framing indicates acceptance of surfaces and conditions.

3.2 PREPARATION

- A Suspended Assemblies: Coordinate installation of suspension systems with installation of overhead structure to ensure that inserts and other provisions for anchorages to building structure have been installed to receive hangers at spacing required to support the Work and that hangers will develop their full strength.
 - 1. Furnish concrete inserts and other devices indicated to other trades for installation in advance of time needed for coordination and construction.

3.3 INSTALLATION, GENERAL

- A Installation Standard: ASTM C 754, except comply with framing sizes and spacing indicated.
 - 1. Gypsum Board Assemblies: Also comply with requirements in ASTM C 840 that apply to framing installation.
- B Install framing and accessories plumb, square, and true to line, with connections securely fastened.
- C Install supplementary framing, and blocking to support fixtures, equipment services, heavy trim, grab bars, toilet accessories, furnishings, or similar construction.
- D Install bracing at terminations in assemblies.
- E Do not bridge building control and expansion joints with non-load-bearing steel framing members. Frame both sides of joints independently.

3.4 INSTALLING FRAMED ASSEMBLIES

- A Install framing system components according to spacings indicated, but not greater than spacings required by referenced installation standards for assembly types.
 - 1. Space studs as follows:
 - a. Single-Layer Application: 16 inches on center unless otherwise indicated.
 - b. Multilayer Application: 16 inches on center unless otherwise indicated.
 - c. Tile Backing Panels: 16 inches on center unless otherwise indicated.
- B Where studs are installed directly against exterior masonry walls or dissimilar metals at exterior walls, install isolation strip between studs and exterior wall.
- C Install studs so flanges within framing system point in same direction.
- D Install tracks (runners) at floors and overhead supports. Extend framing full height to structural supports or substrates above suspended ceilings, except where partitions are indicated to terminate at suspended ceilings. Continue framing around ducts penetrating partitions above ceiling.
 - 1. Slip-Type Head Joints: Where framing extends to overhead structural supports, install to produce joints at tops of framing systems that prevent axial loading of finished assemblies.
 - 2. Door Openings: Screw vertical studs at jambs to jamb anchor clips on door frames; install runner track section (for cripple studs) at head and secure to jamb studs.
 - a. Install 2 studs at each jamb, unless otherwise indicated.
 - b. Install cripple studs at head adjacent to each jamb stud, with a minimum 1/2-inch clearance from jamb stud to allow for installation of control joint in finished assembly.
 - 3. Other Framed Openings: Frame openings other than door openings the same as required for door openings, unless otherwise indicated. Install framing below sills of openings to match framing required above door heads.

4. Fire-Resistance-Rated Partitions: Install framing to comply with fire-resistance-rated assembly indicated and support closures and to make partitions continuous from floor to underside of solid structure.
 - a. Firestop Track: Where indicated, install to maintain continuity of fire-resistance-rated assembly indicated.
5. Sound-Rated Partitions: Install framing to comply with sound-rated assembly indicated.
- E Direct Furring: Attach to concrete or masonry with stub nails, screws designed for masonry attachment, or powder-driven fasteners spaced 24 inches on center.
- F Z-Furring Members:
 1. Erect insulation vertically and hold in place with Z-furring members spaced 24 inches on center.
 2. Except at exterior corners, securely attach narrow flanges of furring members to wall with concrete stub nails, screws designed for masonry attachment, or powder-driven fasteners spaced 24 inches on center.
 3. At exterior corners, attach wide flange of furring members to wall with short flange extending beyond corner; on adjacent wall surface, screw-attach short flange of furring channel to web of attached channel. At interior corners, space second member no more than 12 inches from corner and cut insulation to fit.
- G Installation Tolerance: Install each framing member so fastening surfaces vary not more than 1/8 inch from the plane formed by faces of adjacent framing.

3.5 INSTALLING CEILING SUSPENSION SYSTEMS

- A Install suspension system components in sizes and spacings indicated on Drawings, but not less than those required by referenced installation standards for assembly types and other assembly components indicated.
- B Isolate suspension systems from building structure where they abut or are penetrated by building structure to prevent transfer of loading imposed by structural movement.
- C Suspend hangers from building structure as follows:
 1. Install hangers plumb and free from contact with insulation or other objects within ceiling plenum that are not part of supporting structural or suspension system.
 - a. Splay hangers only where required to miss obstructions and offset resulting horizontal forces by bracing, countersplaying, or other equally effective means.
 2. Where width of ducts and other construction within ceiling plenum produces hanger spacings that interfere with locations of hangers required to support standard suspension system members, install supplemental suspension members and hangers in the form of trapezes or equivalent devices.
 - a. Size supplemental suspension members and hangers to support ceiling loads within performance limits established by referenced installation standards.
 3. Wire Hangers: Secure by looping and wire tying, either directly to structures or to inserts, eye screws, or other devices and fasteners that are secure and appropriate for substrate, and in a manner that will not cause hangers to deteriorate or otherwise fail.
 4. Flat Hangers: Secure to structure, including intermediate framing members, by attaching to inserts, eye screws, or other devices and fasteners that are secure and appropriate for structure and hanger, and in a manner that will not cause hangers to deteriorate or otherwise fail.
 5. Do not attach hangers to steel roof deck.
 6. Do not attach hangers to rolled-in hanger tabs of composite steel floor deck.
 7. Do not connect or suspend steel framing from ducts, pipes, or conduit.
- D Fire-Resistance-Rated Assemblies: Wire tie furring channels to supports.

3.6 INSTALLATION OF GRID SUSPENSION SYSTEMS

- A Grid Suspension Systems: Attach perimeter wall track or angle where grid suspension systems meet vertical surfaces. Mechanically join main beam and cross-furring members to each other and butt-cut to fit into wall track.

3.7 FIELD QUALITY CONTROL

- A Installation Tolerances: Install suspension systems that are level to within 1/8 inch in 12 feet measured lengthwise on each member that will receive finishes and transversely between parallel members that will receive finishes.

END OF SECTION 09 22 16

SECTION 09 28 00 - TILE BACKING BOARD

PART 1 GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A Section Includes:
 - 1. Tile backing panels.
 - 2. Supplementary components and accessories normally furnished or otherwise necessary for a complete installation.

1.3 REFERENCES

- A Abbreviations and Acronyms:
 - 1. GA: Gypsum Association.
- B Definitions:
 - 1. Manufacturer: Means the tile backing panel manufacturer unless otherwise indicated.

1.4 ACTION SUBMITTALS

- A Product Data: For each type of product. Include Health Product Declaration and Environmental Product Declaration.

1.5 DELIVERY, STORAGE AND HANDLING

- A Comply with the applicable requirements of GA Publication *GA-801, Handling and Storage of Gypsum Panel Products*.
- B Store materials inside under cover, dry and protected against weather, condensation, direct sunlight, construction traffic, and other potential causes of damage. Stack panels flat and supported on risers on a flat platform to prevent sagging.

1.6 FIELD CONDITIONS

- A Environmental Limitations: Comply with applicable ASTM C 840 requirements or manufacturer's written instructions, whichever are more stringent.

PART 2 PRODUCTS

2.1 TILE BACKING PANELS

- A Glass-Mat, Water-Resistant Backing Board: ASTM C 1178/C 1178, with manufacturer's standard edges.
 - 1. Products: Subject to compliance with the Contract Documents, provide one of the following.
 - a. "GlasRoc Tile Backer" manufactured by CertainTeed.
 - b. "Gold Bond Brand eXP Tile Backer" manufactured by National Gypsum Company.
 - c. "USG Durock Brand Glass-Mat Tile Backerboard" manufactured by USG Corporation.
 - 2. Core: 5/8 inch, Type X, unless otherwise indicated.
 - 3. Mold Resistance: ASTM D 3273, score of 10 as rated according to ASTM D 3274.

2.2 JOINT TREATMENT MATERIALS

- A General: Comply with ASTM C 475.
- B Glass-Fiber Mesh Joint Tape: Alkali-resistant self-adhering glass-fiber tape, at least 2 inches wide, 10 by 10, or 10 by 20 threads/inch, or as otherwise recommended by the manufacturer.
- C Joint Compound for Tile Backing Panels:
 - 1. Glass-Mat, Water-Resistant Backing Panel: As recommended by the manufacturer.

2.3 AUXILIARY MATERIALS

- A General: Provide auxiliary materials that comply with referenced installation standards and manufacturer's written instructions.
- B Steel Drill Screws: ASTM C 1002 unless otherwise indicated.
 - 1. Use at least 1-1/4-inch-long screws complying with ASTM C 954 for fastening panels to steel members from 0.033 to 0.112 inch thick.
- C Accessories: Provide other accessories supplied, recommended, or required by the manufacturer as necessary for a complete installation.

PART 3 EXECUTION

3.1 EXAMINATION

- A Examine areas and substrates with installer present, for compliance with requirements and other conditions affecting performance of the work.
- B Examine panels before installation. Reject wet, moisture-, or mold-damaged panels.
- C Do not proceed with installation until unsatisfactory conditions have been corrected.
 - 1. Installation of tile backing panels indicates acceptance of surfaces and conditions.

3.2 INSTALLING TILE BACKING PANELS

- A General: Comply with manufacturer's written installation instructions and install at locations indicated to receive tile.
 - 1. Glass-Mat, Water-Resistant Backing Panels: Install with 1/4-inch gap where panels abut other construction or penetrations.
- B Prefill joints and then immediately embed joint tape and level joints.
- C Where tile backing panels abut other types of panels in same plane that are thinner, shim surfaces to produce a uniform plane across panel surfaces.

3.3 FINISHING TILE BACKING PANELS

- A General: Treat tile backing panels as required to prepare tile backing panel surfaces for decoration. Promptly remove residual joint compound from adjacent surfaces.
- B Glass-Mat Faced Panels: Finish according to manufacturer's written instructions.

3.4 PROTECTION

- A Protect installed products from damage until finished with concealing finishes.

END OF SECTION 09 28 00

SECTION 09 29 00 - GYPSUM BOARD

PART 1 GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A Section Includes:
 - 1. Interior gypsum board.
 - 2. Supplementary components and accessories normally furnished or otherwise necessary for a complete installation.
- B Related Requirements:
 - 1. 01 23 00 Alternates.

1.3 REFERENCES

- A Definitions:
 - 1. Manufacturer: Means the gypsum board manufacturer unless otherwise indicated.

1.4 ACTION SUBMITTALS

- A Product Data: For each type of product. Include current Health Product Declaration and Environmental Product Declaration.

1.5 DELIVERY, STORAGE AND HANDLING

- A Store materials inside under cover and keep them dry and protected against weather, condensation, direct sunlight, construction traffic, and other potential causes of damage. Stack panels flat and supported on risers on a flat platform to prevent sagging.

1.6 FIELD CONDITIONS

- A Environmental Limitations: Comply with ASTM C 840 requirements or manufacturer's written recommendations, whichever are more stringent.
- B Do not install paper-faced gypsum panels until installation areas are enclosed and conditioned.
- C Do not install wet, moisture-, or mold-damaged panels.
 - 1. Indications that panels are wet or moisture damaged include discoloration, sagging, or irregular shape.
 - 2. Indications that panels are mold damaged include fuzzy or splotchy surface contamination and discoloration.

PART 2 PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A Fire-Resistance-Rated Assemblies: For fire-resistance-rated assemblies, provide materials and construction identical to those tested in assembly indicated in accordance with ASTM E 119 by an independent testing agency.
- B STC-Rated Assemblies: For STC-rated assemblies, provide materials and construction identical to those tested in assembly indicated according to ASTM E 90 and classified according to ASTM E 413 by an independent testing agency.

2.2 GYPSUM BOARD, GENERAL

- A Size: Provide maximum lengths and widths available that will minimize joints in each area and that correspond with support system indicated.

2.3 INTERIOR GYPSUM BOARD

- A Manufacturers: Subject to compliance with the Contract Documents, provide products by one of the following:
 - 1. CertainTeed.
 - 2. Georgia-Pacific.
 - 3. National Gypsum Company.
 - 4. USG Corporation.
- B Mold-Resistant Gypsum Board: ASTM C 1396/C 1396M. With moisture- and mold-resistant core and paper surfaces.
 - 1. Core: 5/8 inch, Type X.
 - 2. Long Edges: Tapered.
 - 3. Mold Resistance: ASTM D 3273, score of 10 as rated in accordance with ASTM D 3274.
- C Impact-Resistant Gypsum Board: ASTM C 1396/C 1396M gypsum board tested in accordance with ASTM C 1629/C 1629M.
 - 1. Core: 5/8 inch, Type X.
 - 2. Surface Abrasion, Indentation, Soft- and Hard-Body Impact: ASTM C 1629/C 1629M, meets or exceeds Level 3 requirements.
 - 3. Long Edges: Tapered.
 - 4. Mold Resistance: ASTM D 3273, score of 10 as rated in accordance with ASTM D 3274.

2.4 TRIM ACCESSORIES

- A Interior Trim: ASTM C 1047.
 - 1. Material: Galvanized or aluminum-coated steel sheet, rolled zinc, plastic, or paper-faced galvanized steel sheet.
 - 2. Shapes:
 - a. Cornerbead.
 - b. LC-Bead: J-shaped; exposed long flange receives joint compound.
 - c. L-Bead: L-shaped; exposed long flange receives joint compound.
 - d. Expansion (control) joint.
 - e. Curved-Edge Cornerbead: With notched or flexible flanges.

2.5 JOINT TREATMENT MATERIALS

- A General: Comply with ASTM C 475/C 475M.
- B Joint Tape: Paper.
- C Joint Compound for Interior Gypsum Board: For each coat use formulation that is compatible with other compounds applied on previous or for successive coats.
 - 1. Embedding and First Coat: For embedding tape and first coat on joints, fasteners, and trim flanges, use drying-type, all-purpose compound.
 - a. Use setting-type compound for installing paper-faced metal trim accessories.
 - 2. Fill Coat: For second coat, use drying-type, all-purpose compound.
 - 3. Finish Coat: For third coat, use drying-type, all-purpose compound.
 - 4. Skim Coat: For final coat of Level 5 finish, use drying-type, all-purpose compound or high-build interior coating product designed for application by airless sprayer and to be used instead of skim coat to produce Level 5 finish.

2.6 AUXILIARY MATERIALS

- A General: Provide auxiliary materials that comply with referenced installation standards and manufacturer's written recommendations.
- B Steel Drill Screws: ASTM C 1002, unless otherwise indicated.
 - 1. Use screws complying with ASTM C 954 for fastening panels to steel members from 0.033 to 0.112 inch thick.
- C Foam Gasket: Adhesive-backed, closed-cell vinyl or neoprene foam strips at least 1/8 inch thick, in width to suit mullion size.

- D Sound-Attenuation Blankets: ASTM C 665, Type I (blankets without membrane facing) produced by combining thermosetting resins with mineral fibers manufactured from glass, slag wool, or rock wool as specified in Section 09 81 00 Acoustical Insulation, Sealants, and Accessories.
 - 1. Fire-Resistance-Rated Assemblies: Comply with mineral-fiber requirements of assembly.
- E Acoustical Sealant: As specified in Section 09 81 00 Acoustical Insulation, Sealants, and Accessories.
- F Accessories: As supplied, recommended, or required by the manufacturer as necessary for a complete installation.

PART 3 EXECUTION

3.1 EXAMINATION

- A Examine areas and substrates including welded hollow-metal frames and framing, with installer present, for compliance with requirements and other conditions affecting performance.
- B Examine panels before installation. Reject wet, moisture-, or mold-damaged panels.
- C Do not proceed with installation until unsatisfactory conditions have been corrected.
 - 1. Installation of gypsum board indicates acceptance of surfaces and conditions.

3.2 INSTALLATION AND FINISHING OF PANELS, GENERAL

- A Comply with ASTM C 840.
- B Install ceiling panels across framing to minimize the number of abutting end joints and to avoid abutting end joints in central area of each ceiling. Stagger abutting end joints of adjacent panels not less than one framing member.
- C Install panels with face side out. Butt panels together for a light contact at edges and ends with not more than 1/16 inch of open space between panels. Do not force into place.
- D Locate edge and end joints over supports, except in ceiling applications where intermediate supports or gypsum board back-blocking is provided behind end joints. Do not place tapered edges against cut edges or ends. Stagger vertical joints on opposite sides of partitions. Do not make joints other than control joints at corners of framed openings.
- E Form control and expansion joints with space between edges of adjoining gypsum panels.
- F Cover both faces of support framing with gypsum panels in concealed spaces (above ceilings, etc.), except in chases braced internally.
 - 1. Unless concealed application is indicated or required for sound, fire, air, or smoke ratings, coverage may be accomplished with scraps of not less than 8 sq. ft. in area.
 - 2. Fit gypsum panels around ducts, pipes, and conduits.
 - 3. Where partitions intersect structural members projecting below underside of floor/roof slabs and decks, cut gypsum panels to fit profile formed by structural members; allow 1/4- to 3/8-inch-wide joints to install sealant.
- G Isolate perimeter of gypsum board applied to non-load-bearing partitions at structural abutments, except floors. Provide 1/4- to 1/2-inch-wide spaces at these locations and trim edges with edge trim where edges of panels are exposed. Seal joints between edges and abutting structural surfaces with acoustical sealant.
- H Attachment to Steel Framing: Attach panels so leading edge or end of each panel is attached to open (unsupported) edges of stud flanges first.

3.3 INSTALLATION OF INTERIOR GYPSUM BOARD

- A Install interior gypsum board in the following locations:
 - 1. Mold-Resistant Type: At vertical surfaces and horizontal surfaces unless otherwise indicated.
 - 2. Impact-Resistant Gypsum Board: Corridors, lobbies, and stairs.
- B Single-Layer Application:
 - 1. On ceilings, apply gypsum panels before wall/partition board application to greatest extent possible and at right angles to framing unless otherwise indicated.
 - 2. On partitions/walls, apply gypsum panels vertically (parallel to framing) unless otherwise indicated or required by fire-resistance-rated assembly, and minimize end joints.

- a. Stagger abutting end joints not less than one framing member in alternate courses of panels.
 - b. At high walls, install panels horizontally unless otherwise indicated or required by fire-resistance-rated assembly.
- 3. Fastening Methods: Apply gypsum panels to supports with steel drill screws.
- C Multilayer Application:
 - 1. On ceilings, apply gypsum board indicated for base layers before applying base layers on walls/partitions; apply face layers in same sequence. Apply base layers at right angles to framing members and offset face-layer joints one framing member, 16 inches minimum, from parallel base-layer joints, unless otherwise indicated or required by fire-resistance-rated assembly.
 - 2. On partitions/walls, apply gypsum board indicated for base layers and face layers vertically (parallel to framing) with joints of base layers located over stud or furring member and face-layer joints offset at least one stud or furring member with base-layer joints, unless otherwise indicated or required by fire-resistance-rated assembly. Stagger joints on opposite sides of partitions.
 - 3. Fastening Methods: Fasten base layers and face layers separately to supports with screws.

3.4 INSTALLING TRIM ACCESSORIES

- A General: For trim with back flanges intended for fasteners, attach to framing with same fasteners used for panels. Otherwise, attach trim according to manufacturer's written instructions.
- B Control Joints: Install control joints according to ASTM C 840 and in specific locations approved by Architect for visual effect.
- C Interior Trim:
 - 1. Cornerbead: Use at outside corners unless otherwise indicated.
 - 2. LC-Bead: Use at exposed panel edges.
 - 3. L-Bead: Use where indicated.
 - 4. Curved-Edge Cornerbead: Use at curved openings.

3.5 FINISHING GYPSUM BOARD

- A General: Treat gypsum board joints, interior angles, edge trim, control joints, penetrations, fastener heads, surface defects, and elsewhere as required to prepare gypsum board surfaces for decoration. Promptly remove residual joint compound from adjacent surfaces.
- B Apply joint tape over gypsum board joints, except for trim products specifically indicated as not intended to receive tape.
- C Gypsum Board Finish Levels: Finish panels to levels indicated below and according to ASTM C 840:
 - 1. Level 1: Ceiling plenum areas, concealed areas, and where indicated.
 - 2. Level 2: Panels that are substrate for tile.
 - 3. Level 4: At panel surfaces that will be exposed to view in utility rooms including mechanical, electrical, and telephone data rooms.
 - a. Primer and its application to surfaces are specified in Section 09 91 23 Interior Painting.
 - 4. Level 5 (Typical): At panel surfaces exposed to view unless otherwise indicated.
 - a. Primer and its application to surfaces are specified in Section 09 91 23 Interior Painting.

3.6 PROTECTION

- A Protect adjacent surfaces from drywall compound and promptly remove from floors and other non-drywall surfaces. Repair surfaces stained, marred, or otherwise damaged during drywall application.
- B Protect installed products from damage during remainder of the construction period.
- C Remove and replace wet, moisture-, or mold-damaged panels.
 - 1. Indications that panels are wet or moisture damaged include discoloration, sagging, or irregular shape.

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2. Indications that panels are mold damaged include fuzzy or splotchy surface contamination and discoloration.

END OF SECTION 09 29 00

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SECTION 09 30 00 - TILING

PART 1 GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A Section Includes:
 - 1. Wall tile.
 - 2. Floor tile. (Alternate)
 - 3. Waterproofing / crack isolation membranes.
 - 4. Supplementary components and accessories normally furnished or otherwise necessary for a complete installation.
- B Related Requirements:
 - 1. Section 01 23 00 Alternates.

1.3 REFERENCES

- A Acronyms and Abbreviations:
 - 1. TCNA: The Tile Council of North America.
- B Definitions:
 - 1. Definitions in the ANSI A108 series of tile installation standards and in ANSI A137.1 apply to the work of this Specification Section unless otherwise specified.
 - 2. Manufacturer: Means the tile manufacturer, as applicable, unless otherwise indicated.

1.4 SUBMITTALS

- A Action Submittals:
 - 1. Product Data: For each type of product indicated; include current Health Product Declaration and Environmental Product Declaration.
 - 2. Shop Drawings: Show locations of each type of tile and tile pattern. Show widths, details, and locations of expansion, contraction, control, and isolation joints in tile substrates and finished tile surfaces.
 - 3. Samples: Only required, in standard size, from specified "Acceptable Manufacturer" if other than the basis-of-design product(s) will be provided for the Project.
- B Informational Submittals:
 - 1. Qualification Data: For installer.
 - 2. Product Certificates: For each type of product.
 - 3. Product Test Reports: For tile-setting and -grouting products.
- C Closeout Submittals:
 - 1. Maintenance Data: For tiling to include in maintenance manuals

1.5 QUALITY ASSURANCE

- A Installer Qualifications:
 - 1. Installer is a Five-Star member of the National Tile Contractors Association, or a Trowel of Excellence member of the Tile Contractors' Association of America, or who can demonstrate compliance with its certification program requirements.
 - 2. Installer employs at least one installer for Project who has completed the Advanced Certification for Tile Installers (ACT) certification for installation of large format tile, or who can demonstrate compliance with its certification program requirements.

1.6 DELIVERY, STORAGE, AND HANDLING

- A Deliver and store packaged materials in original containers with seals unbroken and labels intact until time of use. Comply with requirement in ANSI A137.1 for labeling tile packages.

- B Store tile and cementitious materials on elevated platforms, under cover, and in a dry location.
- C Store aggregates where grading and other required characteristics can be maintained and contamination avoided.
- D Store liquid materials in unopened containers and protected from freezing.

1.7 FIELD CONDITIONS

- A Environmental Limitations: Do not install tile until construction in spaces is complete and ambient temperature and humidity conditions are maintained at the levels indicated in referenced standards and manufacturer's written instructions.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A Source Limitations for Tile: Obtain tile of each type and color or finish from single source or producer.
 - 1. Obtain tile of each type and color or finish from same production run and of consistent quality in appearance and physical properties for each contiguous area.
- B Source Limitations for Setting and Grouting Materials: Obtain ingredients of a uniform quality for each mortar, adhesive, and grout component from single manufacturer and each aggregate from single source or producer.
 - 1. Obtain setting and grouting materials, except for unmodified Portland cement and aggregate, from single manufacturer.
 - 2. Obtain waterproof/crack isolation membrane from manufacturer of setting and grouting materials.

2.2 PRODUCTS, GENERAL

- A ANSI Ceramic Tile Standard: Provide tile that complies with ANSI A137.1 for types, compositions, and other characteristics indicated.
 - 1. Provide tile complying with Standard grade requirements.
- B ANSI Standards for Tile Installation Materials: Provide materials complying with ANSI A108.02, ANSI standards referenced in other Part 2 articles, ANSI standards referenced by TCNA installation methods specified in tile installation schedules, and other requirements specified.
- C Factory Blending: For tile exhibiting color variations within ranges, blend tile in factory and package so tile units taken from one package show same range in colors as those taken from other packages and match approved Samples.

2.3 TILE PRODUCTS

- A Floor Tile:
 - 1. Basis-of-Design Products (PFT-1, PFT-2, PFT-3) Subject to compliance with the Contract Documents design is based on products indicated in the Finish Material Schedule on the Drawings as manufactured by the following.
 - a. Stone Source.
 - 2. Acceptable Manufacturers: Subject to compliance with the Contract Documents provide the basis-of-design products or comparable approved products by one of the following.
 - a. Best Tile.
 - b. Trinity Surfaces.
- B Wall Tile:
 - 1. Basis-of-Design Products: Subject to compliance with the Contract Documents design is based on products indicated in the Finish Material Schedule on the Drawings as manufactured by the following.
 - a. CT-1: Tilebar.
 - b. CT-2: American Olean.
 - 2. Acceptable Manufacturers: Subject to compliance with the Contract Documents provide the basis-of-design products or comparable approved products by one of the following.

- a. Best Tile.
 - b. Trinity Surfaces.
- C Tile Base:
 - 1. Basis-of-Design Product (PTB-1): Subject to compliance with the Contract Documents the design is based on products indicated in the Finish Material Schedule on the Drawings as manufactured by the following.
 - a. Stone Source.
 - 2. Acceptable Manufacturers: Subject to compliance with the Contract Documents provide the basis-of-design products or comparable approved products by one of the following.
 - a. Best Tile.
 - b. Trinity Surfaces.

2.4 WATERPROOFING / CRACK ISOLATION MEMBRANES

- A General: Manufacturer's standard product that exceeds ANSI A118.10 and ANSI A118.12 and is recommended by the membrane manufacturer for the application indicated. Include reinforcement and accessories recommended by membrane manufacturer.
- B Product: Subject to compliance with the Contract Documents, provide one of the following.
 - 1. "RedGard Waterproofing and Crack Prevention Membrane" manufactured by Custom Building Products.
 - 2. "TEC HydraFlex Waterproofing Crack Isolation Membrane" manufactured by H.B. Fuller Construction Products, Inc.
 - 3. "HYDRO BAN" manufactured by LATICRETE International, Inc.
 - 4. "Mapelastic AquaDefense" manufactured by Mapei Corporation.

2.5 SETTING MATERIALS

- A Improved Modified Dry-Set Mortar (Thinset): ANSI A118.15.
 - 1. Product: Subject to compliance with the Contract Documents, provide the following:
 - a. "Porcelain Tile Professional Thin-Set Mortar" manufactured by Custom Building Products.
 - b. "TEC 3N1 Performance Mortar" manufactured by H.B. Fuller Construction Products, Inc.
 - c. "254 Platinum" manufactured by LATICRETE International, Inc.
 - d. "Ultraflex 3" manufactured by MAPEI Corporation.
 - 2. Provide prepackaged, dry-mortar mix containing dry, redispersible, vinyl acetate or acrylic additive to which only water must be added at Project site.
 - 3. For wall applications, provide mortar that complies with requirements for nonsagging mortar in addition to the other requirements in ANSI A118.15.
- B Large Format Tile Modified Dry-Set Mortar: Exceeds ANSI A118.15HT, ANSI A118.4HT, and ANSI A118.11.
 - 1. Products: Subject to compliance with the Contract Documents, provide one of the following:
 - a. "ProLite Premium Large Format Tile Mortar" manufactured by Custom Building Products.
 - b. "TEC Ultimate Large Tile Mortar" manufactured by H.B. Fuller Construction Products Inc.
 - c. "4-XLT" manufactured by LATICRETE International, Inc.
 - d. "Ultraflex LFT" manufactured by MAPEI Corporation.
 - 2. Provide where individual tile size has a dimensional length greater than 15 inches on any side of the tile.
 - 3. Provide premium, prepackaged, polymer-enriched, dry-mortar mix combined with water at Project site.

2.6 GROUT MATERIALS

- A Water-Cleanable Epoxy Grout: ANSI A118.3.

1. Product: Subject to compliance with the Contract Documents, provide one of the following and as acceptable to the Architect.
 - a. "Kerapoxy CQ" as manufactured by MAPEI.
 - b. "CEG-Lite 100% Solids Commercial Epoxy Grout" manufactured by Custom Building Products.
 - c. "SPECTRALOCK PRO Premium Grout" manufactured by LATICRETE International, Inc.
 - d. "Kerapoxy" manufactured by MAPEI.
- B Grout Colors: As indicated in the Interior Finish Schedule on the Drawings.

2.7 MISCELLANEOUS MATERIALS

- A Trowelable Underlayments and Patching Compounds: Latex-modified, portland cement-based formulation supplied, recommended, or required by manufacturer of tile-setting materials for installations indicated.
- B Tile Cleaner: A neutral cleaner capable of removing soil and residue without harming tile and grout surfaces, specifically approved for materials and installations indicated by tile and grout manufacturers.
- C Accessories: As supplied, recommended, or required by the manufacturer and as necessary for a complete installation.

2.8 MIXING MORTARS AND GROUT

- A Mix mortars and grouts to comply with referenced standards and mortar and grout manufacturers' written instructions.
- B Add materials, water, and additives in accurate proportions.
- C Obtain and use type of mixing equipment, mixer speeds, mixing containers, mixing time, and other procedures to produce mortars and grouts of uniform quality with optimum performance characteristics for installations indicated.

PART 3 EXECUTION

3.1 EXAMINATION

- A Examine substrates, areas, and conditions where tile is indicated to be installed, with installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the work.
 1. Verify that substrates for setting tile are firm; dry; clean; free of coatings that are incompatible with tile-setting materials, including curing compounds and other substances that contain soap, wax, oil, or silicone.
 2. Verify substrates comply with the flatness tolerances required by ANSI A108.01 and the following:
 - a. Tile with no edge larger than 15 inches: 1/4-inch in 10 feet.
 - b. Large Format Tile (15 inches or more on a side): 1/8 inch in 10 feet.
 3. Verify that installation of grounds, anchors, recessed frames, electrical and mechanical units of work, and similar items located in or behind tile has been completed.
 4. Verify that joints and cracks in tile substrates are coordinated with tile joint locations; if not coordinated, adjust joint locations in consultation with Architect.
- B Do not proceed with installation until unsatisfactory conditions have been corrected.
 1. Installation of tile indicates acceptance of surfaces and conditions.

3.2 PREPARATION

- A Fill cracks, holes, and depressions in concrete substrates for tile floors installed with thinset mortar with trowelable leveling and patching compound specifically recommended by tile-setting material manufacturer.

- B Blending: For tile exhibiting color variations, verify that tile has been factory blended and packaged so tile units taken from one package show same range of colors as those taken from other packages and match approved Samples. If not factory blended, either return to manufacturer or blend tiles at Project site before installing.

3.3 INSTALLATION OF WATERPROOFING / CRACK ISOLATION MEMBRANES

- A Install waterproof membrane to comply with manufacturer's written instructions to produce membrane of uniform thickness that is bonded securely to substrate.
- B Allow membrane to cure and verify by testing that it is watertight before installing tile or setting materials over it.

3.4 TILE INSTALLATION

- A Comply with the TCNA publication *Handbook for Ceramic, Glass, and Stone Tile Installation* for TCNA installation methods specified in tile installation schedules. Comply with parts of the ANSI A108 series "Specifications for Installation of Ceramic Tile" that are referenced in TCNA installation methods, specified in tile installation schedules, and apply to types of setting and grouting materials used.
 - 1. For the following installations, follow procedures in the ANSI A108 series of tile installation standards for providing 95 percent mortar coverage.
 - a. Tile floors consisting of tiles 8 by 8 inches or larger.
- B Extend tile work into recesses and under or behind equipment and fixtures to form complete covering without interruptions unless otherwise indicated. Terminate work neatly at obstructions, edges, and corners without disrupting pattern or joint alignments.
- C Accurately form intersections and returns. Perform cutting and drilling of tile without marring visible surfaces. Carefully grind cut edges of tile abutting trim, finish, or built-in items for straight aligned joints. Fit tile closely to electrical outlets, piping, fixtures, and other penetrations so plates, collars, or covers overlap tile.
- D Where accent tile differs in thickness from field tile, vary setting-bed thickness so that tiles are flush.
- E Jointing Pattern: Lay tile in grid pattern unless otherwise indicated. Lay out tile work and center tile fields in both directions in each space or on each wall area. Lay out tile work to minimize the use of pieces that are less than half of a tile. Provide uniform joint widths unless otherwise indicated.
 - 1. Where adjoining tiles on floor, base, walls, or trim are specified or indicated to be same size, align joints.
 - 2. Where tiles are specified or indicated to be whole integer multiples of adjoining tiles on floor, base, walls, or trim, align joints unless otherwise indicated.
- F Joint Widths: Install tile with the joint widths as indicated in the Material Finish Legend on the Drawings, or if not indicated, as selected by the Architect.
- G Lay out tile wainscots to dimensions indicated or to next full tile beyond dimensions indicated.
- H Movement Joints: Provide movement joints and other sealant-filled joints, including control, contraction, and isolation joints, where indicated on Drawings. Form joints during installation of setting materials, mortar beds, and tile. Keep joints free of dirt, debris, and setting materials prior to filling with sealants. Do not saw-cut joints after installing tiles.
 - 1. Where joints occur in concrete substrates, locate joints in tile surfaces directly above them and of equal or greater widths.
 - 2. Where tilework abuts restraining surfaces such as perimeter walls, curbs, columns, and ceilings.
 - 3. Where there is a change in substrate material.
 - 4. Interior Tilework: 20 to 25 feet in each direction.
 - 5. Above-Ground Concrete Substrates: 8 to 12 feet in each direction.
 - 6. Interior Tilework Exposed to Direct Sunlight: 8 to 12 feet in each direction.
 - 7. Interior Tilework Exposed to Moisture: 8 to 12 feet in each direction.

3.5 ADJUSTING AND CLEANING

- A Remove and replace tile that is damaged or that does not match adjoining tile. Provide new matching units, installed as specified and in a manner to eliminate evidence of replacement.
- B Cleaning: On completion of placement and grouting, clean all ceramic tile surfaces so they are free of foreign matter.
 - 1. Remove grout residue from tile as soon as possible.
 - 2. Clean grout smears and haze from tile according to tile and grout manufacturer's written instructions but no sooner than 10 days after installation. Use only cleaners recommended by tile and grout manufacturers and only after determining that cleaners are safe to use by testing on samples of tile and other surfaces to be cleaned. Protect metal surfaces and plumbing fixtures from effects of cleaning. Flush surfaces with clean water before and after cleaning.

3.6 PROTECTION

- A Protect installed tile work with kraft paper or other heavy covering during construction period to prevent staining, damage, and wear. If recommended by the manufacturer, apply coat of neutral protective cleaner to completed tile walls.
- B Prohibit foot and wheel traffic from tiled floors for at least 7 days after grouting is completed.
- C Before final inspection, remove protective coverings and rinse neutral protective cleaner from tile surfaces.

3.7 FLOOR TILE INSTALLATION SCHEDULE

- A Interior Floor Installations, Concrete Subfloor:
 - 1. Tile Installation: TCNA F122; thinset mortar on waterproof/crack isolation membrane; medium mortar bed for large format tiles.
 - a. Tile Type: As indicated in the Interior Finish Schedule on the Drawings.
 - b. Thinset Mortar: Improved modified dry-set mortar.
 - c. Grout: Water-cleanable epoxy grout.

3.8 WALL TILE INSTALLATION SCHEDULE

- A Interior Wall Installations, Metal Studs:
 - 1. Ceramic Tile Installation: TCNA W245; thinset mortar on glass-mat, water-resistant gypsum backer board.
 - a. Tile Type: As indicated in the Interior Finish Schedule on the Drawings.
 - b. Thinset Mortar: Improved modified dry-set mortar.
 - c. Grout: Water-cleanable epoxy grout.

END OF SECTION 09 30 00

SECTION 09 51 00 - PVC CEILING PANELS

PART 1 GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A Section Includes:
 - 1. PVC ceiling panels.
 - 2. Metal suspension systems.
 - 3. Metal edge moldings and trim.
 - 4. Supplementary components and accessories normally furnished or otherwise necessary for a complete installation or application.
- B Products furnished, but not installed under this Specification Section, include anchors, clips, and other ceiling attachment devices to be cast in concrete.

1.3 REFERENCES

- A Acronyms and Abbreviations:
 - 1. PVC: Polyvinyl Chloride.
- B Definitions:
 - 1. Panel(s): Means the ceiling panel(s).
 - 2. Manufacturer: Means the panel and suspension system manufacturer unless otherwise indicated.

1.4 SUBMITTALS

- A Action Submittals:
 - 1. Product Data:
 - a. Panels.PV
 - b. Metal suspension systems.
 - c. Edge moldings and trim.
 - d. Current Health Product Declaration.
 - e. Current Environmental Product Declaration.
- B Informational Submittals:
 - 1. Coordination Drawings: Reflected ceiling plans, drawn to scale, on which the following items are shown and coordinated with each other, using input from installers of the items involved:
 - a. Ceiling suspension-system members.
 - b. Structural members to which suspension systems will be attached.
 - c. Method of attaching hangers to building structure.
 - 1) Furnish layouts for cast-in-place anchors, clips, and other ceiling attachment devices whose installation is specified in other Sections.
 - d. Carrying channels or other supplemental support for hanger-wire attachment where conditions do not permit installation of hanger wires at required spacing.
 - e. Size and location of initial access modules for panels.
 - f. Items penetrating finished ceiling and ceiling-mounted items.
 - g. Minimum Drawing Scale: 1/4 inch = 1 foot.
 - 2. Product Test Reports: For each panel ceiling, for tests performed by a qualified testing agency or by the manufacturer and witnessed by a qualified testing agency.
 - 3. Evaluation Reports: For anchor and fastener type, from ICC-ES.
- C Closeout Submittals:
 - 1. Maintenance Data: For finishes to include in maintenance manuals.

1.5 DELIVERY, STORAGE, AND HANDLING

- A Deliver panels, suspension-system components, and accessories to Project site and store them in a fully enclosed, conditioned space where they will be protected against damage from moisture, humidity, temperature extremes, direct sunlight, surface contamination, and other causes.
- B Before installing panels, permit them to reach room temperature and a stabilized moisture content.

1.6 FIELD CONDITIONS

- A Environmental Limitations: Do not install panel ceilings until spaces are enclosed and weathertight, wet-work in spaces is complete and dry, work above ceilings is complete, and ambient temperature and humidity conditions are maintained at the levels indicated for Project when occupied for its intended use.
 - 1. Pressurized Plenums: Operate ventilation system for not less than 48 hours before beginning panel ceiling installation.

PART 2 PRODUCTS

2.1 SOURCE LIMITATIONS

- A Source Limitations for Ceiling System: Obtain each type of ceiling panel and its supporting suspension system from single source from the same manufacturer.

2.2 PERFORMANCE REQUIREMENTS

- A Surface-Burning Characteristics: Comply with ASTM E 84; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
 - 1. Flame-Spread Index: Class A in accordance with ASTM E 1264.
 - 2. Smoke-Developed Index: 50 or less.

2.3 PVC CEILING PANELS

- A PVC Ceiling Panels:
 - 1. Basis-of-Design Product (APC2): Subject to compliance with the Contract Documents the design is based on the product indicated in the Interior Finish Schedule on the Drawings as manufactured by the following.
 - a. ACP (Genesis).
 - 2. Acceptable Manufacturers: Subject to compliance with the Contract Documents provide the basis-of-design product or comparable approved product by one of the following.
 - a. Kanopi by Armstrong World Industries.
 - b. uDecor.

2.4 METAL SUSPENSION SYSTEMS

- A Metal Suspension Systems: Subject to compliance with the Contract Documents provide product indicated in the Interior Finish Schedule on the Drawings as manufactured by the ceiling panel manufacturer.
- B Metal Suspension-System Standard: Provide manufacturer's standard, direct-hung, metal suspension system and accessories in accordance with ASTM C 635/C 635M and designated by type, structural classification, and finish indicated.
 - 1. Structural Classification: Heavy duty.
 - 2. Color: "White".

2.5 ACCESSORIES

- A Attachment Devices: Size for 5 times the design load indicated in ASTM C 635/C 635M, Table 1, "Direct Hung," unless otherwise indicated.
 - 1. Anchors in Concrete: Anchors with holes or loops for attaching hangers of type indicated and with capability to sustain, without failure, a load equal to 5 times that imposed by ceiling construction, as determined by testing in accordance with ASTM E 488/E 488M or ASTM E 1512 as applicable, conducted by a qualified testing and inspecting agency.

- B Wire Hangers, Braces, and Ties: Provide wires as follows:
 - 1. Zinc-Coated, Carbon-Steel Wire: ASTM A 641/A 641M, Class 1 zinc coating, soft temper.
 - 2. Size: Wire diameter sufficient for its stress at 3 times hanger design load (ASTM C 635/C 635M, Table 1, "Direct Hung") will be less than yield stress of wire, but not less than 0.106-inch-diameter wire.
- C Accessories: As supplied, recommended, or required by the manufacturer and as necessary for a complete installation.

2.6 METAL EDGE MOLDINGS AND TRIM

- A Roll-Formed, Sheet-Metal Edge Moldings and Trim: Type and profile indicated or, if not indicated, manufacturer's standard moldings for edges and penetrations; formed from sheet metal of same material, finish, and color as that used for exposed flanges of suspension-system runners.
 - 1. Edge moldings to fit panel edge details and suspension systems indicated and match width and configuration of exposed runners unless otherwise indicated.
 - 2. For circular penetrations of ceiling, provide edge moldings fabricated to diameter required to fit penetration exactly.

2.7 SEALANT

- A Sealant: As specified in Section 09 81 00 Insulation, Sealants, and Accessories.

PART 3 EXECUTION

3.1 EXAMINATION

- A Examine substrates, areas, and conditions, including structural framing to which panel ceilings attach or abut, with installer present, for compliance with requirements specified in this and other Specification Sections that affect ceiling installation and anchorage and with requirements for installation tolerances and other conditions affecting performance of panel ceilings.
- B Examine panels before installation. Reject wet, moisture-, or mold-damaged panels.
- C Do not proceed with installation until unsatisfactory conditions have been corrected.
 - 1. Installation of panel ceilings indicates acceptance of surfaces and conditions.

3.2 PREPARATION

- A Measure each ceiling area and establish layout of panels to balance border widths at opposite edges of each ceiling. Avoid using less-than-half-width panels at borders unless otherwise indicated, and comply with layout shown on reflected ceiling plans.
- B Layout openings for penetrations centered on the penetrating items.

3.3 INSTALLATION OF PANEL CEILINGS

- A Install panel ceilings in accordance with ASTM C 636/C 636M and manufacturer's written instructions.
- B Suspend ceiling hangers from building's structural members and as follows:
 - 1. Install hangers plumb and free from contact with insulation or other objects within ceiling plenum that are not part of supporting structure or of ceiling suspension system.
 - 2. Splay hangers only where required to miss obstructions; offset resulting horizontal forces by bracing, countersplaying, or other equally effective means.
 - 3. Where width of ducts and other construction within ceiling plenum produces hanger spacings that interfere with location of hangers at spacings required to support standard suspension-system members, install supplemental suspension members and hangers in form of trapezes or equivalent devices.
 - 4. Secure wire hangers to ceiling-suspension members and to supports above with at least 3 tight turns. Connect hangers directly to structure or to inserts, eye screws, or other devices that are secure and appropriate for substrate and that will not deteriorate or otherwise fail due to age, corrosion, or elevated temperatures.

5. Do not support ceilings directly from permanent metal forms or floor deck. Fasten hangers to cast-in-place hanger inserts, postinstalled mechanical or adhesive anchors, or power-actuated fasteners that extend through forms into concrete.
 6. When steel framing does not permit installation of hanger wires at spacing required, install carrying channels or other supplemental support for attachment of hanger wires.
 7. Do not attach hangers to steel deck tabs.
 8. Do not attach hangers to steel roof deck. Attach hangers to structural members.
 9. Space hangers not more than 48 inches on center along each member supported directly from hangers unless otherwise indicated; provide hangers not more than 8 inches from ends of each member.
 10. Size supplemental suspension members and hangers to support ceiling loads within performance limits established by referenced standards.
- C Install edge moldings and trim of type indicated at perimeter of ceiling area and where necessary to conceal edges of panels.
1. Apply sealant in a continuous ribbon concealed on back of vertical legs of moldings before they are installed.
 2. Screw attach moldings to substrate at intervals not more than 16 inches on center and not more than 3 inches from ends. Miter corners accurately and connect securely.
 3. Do not use exposed fasteners, including pop rivets, on moldings and trim.
- D Install suspension-system runners so they are square and securely interlocked with one another. Remove and replace dented, bent, or kinked members.
- E Install panels with undamaged edges and fit accurately into suspension-system runners and edge moldings. Scribe and cut panels at borders and penetrations to provide precise fit.
1. Arrange directionally patterned panels as indicated on reflected ceiling plans, or if not indicated, as directed by the Architect.
 2. For square-edged panels, install panels with edges fully hidden from view by flanges of suspension-system runners and moldings.
 3. For reveal-edged panels on suspension-system runners, install panels with bottom of reveal in firm contact with top surface of runner flanges.
 4. For reveal-edged panels on suspension-system members with box-shaped flanges, install panels with reveal surfaces in firm contact with suspension-system surfaces and panel faces flush with bottom face of runners.
 5. Paint cut edges of panel remaining exposed after installation; match color of exposed panel surfaces using coating recommended in writing for this purpose by panel manufacturer.

3.4 ERECTION TOLERANCES

- A Suspended Ceilings: Install main and cross runners level to a tolerance of 1/8 inch in 12 feet, non-cumulative.
- B Moldings and Trim: Install moldings and trim to substrate and level with ceiling suspension system to a tolerance of 1/8 inch in 12 feet, non-cumulative.

3.5 CLEANING

- A Clean exposed surfaces of panel ceilings, including trim, edge moldings, and suspension-system members. Comply with manufacturer's written instructions for cleaning and touchup of minor finish damage.
- B Remove and replace ceiling components that cannot be successfully cleaned and repaired to permanently eliminate evidence of damage.

END OF SECTION 09 51 00

SECTION 09 51 13 - ACOUSTICAL PANEL CEILINGS

PART 1 GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A Section Includes:
 - 1. Mineral-fiber acoustical panels.
 - 2. Metal suspension systems.
 - 3. Metal edge moldings and trim.
 - 4. Supplementary components and accessories normally furnished or otherwise necessary for a complete installation or application.
- B Products furnished, but not installed under this Specification Section, include anchors, clips, and other ceiling attachment devices to be cast in concrete.

1.3 REFERENCES

- A Definitions:
 - 1. Manufacturer: Means the acoustical panel and suspension system manufacturer unless otherwise indicated.

1.4 SUBMITTALS

- A Action Submittals:
 - 1. Product Data:
 - a. Panels.
 - b. Metal suspension systems.
 - c. Edge moldings and trim.
 - d. Current Health Product Declaration.
 - e. Current Environmental Product Declaration.
- B Informational Submittals:
 - 1. Coordination Drawings: Reflected ceiling plans, drawn to scale, on which the following items are shown and coordinated with each other, using input from installers of the items involved:
 - a. Ceiling suspension-system members.
 - b. Structural members to which suspension systems will be attached.
 - c. Method of attaching hangers to building structure.
 - 1) Furnish layouts for cast-in-place anchors, clips, and other ceiling attachment devices whose installation is specified in other Specification Sections.
 - d. Carrying channels or other supplemental support for hanger-wire attachment where conditions do not permit installation of hanger wires at required spacing.
 - e. Size and location of initial access modules for acoustical panels.
 - f. Items penetrating finished ceiling and ceiling-mounted items.
 - g. Minimum Drawing Scale: 1/4 inch = 1 foot.
 - 2. Product Test Reports: For each acoustical panel ceiling for tests performed by a qualified testing agency or by the manufacturer and witnessed by a qualified testing agency.
 - 3. Evaluation Reports: For anchor and fastener type, from ICC-ES.
- C Closeout Submittals:
 - 1. Maintenance Data: For finishes to include in maintenance manuals.

1.5 DELIVERY, STORAGE, AND HANDLING

- A Deliver acoustical panels, suspension-system components, and accessories to Project site and store them in a fully enclosed, conditioned space where they will be protected against damage from moisture, humidity, temperature extremes, direct sunlight, surface contamination, and other causes.
- B Before installing acoustical panels, permit them to reach room temperature and a stabilized moisture content.

1.6 FIELD CONDITIONS

- A Environmental Limitations: Do not install acoustical panel ceilings until spaces are enclosed and weathertight, wet-work in spaces is complete and dry, work above ceilings is complete, and ambient temperature and humidity conditions are maintained at the levels indicated for Project when occupied for its intended use.
 - 1. Pressurized Plenums: Operate ventilation system for not less than 48 hours before beginning acoustical panel ceiling installation.

PART 2 PRODUCTS

2.1 SOURCE LIMITATIONS

- A Source Limitations for Ceiling System: Obtain each type of acoustical ceiling panel and its supporting suspension system from single source from the same manufacturer.

2.2 PERFORMANCE REQUIREMENTS

- A Surface-Burning Characteristics: Comply with ASTM E 84; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
 - 1. Flame-Spread Index: Class A in accordance with ASTM E 1264.
 - 2. Smoke-Developed Index: 50 or less.

2.3 ACOUSTICAL PANELS

- A Mineral-Fiber Acoustical Panels:
 - 1. Basis-of-Design Products (APC-1, APC-3): Subject to compliance with the Contract Documents the design is based on products indicated in the Finish Material Schedule on the Drawings as manufactured by the following.
 - a. Armstrong World Industries.
 - 2. Acceptable Manufacturers: Subject to compliance with the Contract Documents provide the basis-of-design products or comparable approved products by one of the following.
 - a. CertainTeed.
 - b. USG Corporation.

2.4 METAL SUSPENSION SYSTEMS

- A Metal Suspension Systems:
 - 1. Basis-of-Design Products (APC-1, APC-3): Subject to compliance with the Contract Documents the design is based on products indicated in the Finish Material Schedule on the Drawings as manufactured by the following.
 - a. Armstrong World Industries.
 - 2. Acceptable Manufacturers: Subject to compliance with the Contract Documents provide the basis-of-design product or comparable approved products by one of the following.
 - a. CertainTeed.
 - b. USG Corporation.
- B Metal Suspension-System Standard: Provide manufacturer's standard, direct-hung, metal suspension system and accessories in accordance with ASTM C 635/C 635M and designated by type, structural classification, and finish indicated.
 - 1. Structural Classification: Heavy duty.

2.5 ACCESSORIES

- A Attachment Devices: Size for 5 times the design load indicated in ASTM C 635/C 635M, Table 1, "Direct Hung," unless otherwise indicated.
 - 1. Anchors in Concrete: Anchors with holes or loops for attaching hangers of type indicated and with capability to sustain, without failure, a load equal to 5 times that imposed by ceiling construction, as determined by testing in accordance with ASTM E 488/E 488M or ASTM E 1512 as applicable, conducted by a qualified testing and inspecting agency.
- B Wire Hangers, Braces, and Ties: Provide wires as follows:
 - 1. Zinc-Coated, Carbon-Steel Wire: ASTM A 641/A 641M, Class 1 zinc coating, soft temper.
 - 2. Size: Wire diameter sufficient for its stress at 3 times hanger design load (ASTM C 635/C 635M, Table 1, "Direct Hung") will be less than yield stress of wire, but not less than 0.106-inch-diameter wire.
- C Other Accessories: As supplied, recommended, or required by the manufacturer and as necessary for a complete installation.

2.6 METAL EDGE MOLDINGS AND TRIM

- A Roll-Formed, Sheet-Metal Edge Moldings and Trim: Type and profile indicated or, if not indicated, manufacturer's standard moldings for edges and penetrations; formed from sheet metal of same material, finish, and color as that used for exposed flanges of suspension-system runners.
 - 1. Edge moldings to fit acoustical panel edge details and suspension systems indicated and match width and configuration of exposed runners unless otherwise indicated.
 - 2. For circular penetrations of ceiling, provide edge moldings fabricated to diameter required to fit penetration exactly.

2.7 ACOUSTICAL SEALANT

- A Acoustical Sealant: As specified in Section 09 81 00 Acoustical Insulation, Sealants, and Accessories.

PART 3 EXECUTION

3.1 EXAMINATION

- A Examine substrates, areas, and conditions, including structural framing to which acoustical panel ceilings attach or abut, with installer present, for compliance with requirements specified in this and other Specification Sections that affect ceiling installation and anchorage and with requirements for installation tolerances and other conditions affecting performance of acoustical panel ceilings.
- B Examine acoustical panels before installation. Reject wet, moisture-, or mold-damaged acoustical panels.
- C Do not proceed with installation until unsatisfactory conditions have been corrected.
 - 1. Installation of acoustical panel ceilings indicates acceptance of surfaces and conditions.

3.2 PREPARATION

- A Measure each ceiling area and establish layout of acoustical panels to balance border widths at opposite edges of each ceiling. Avoid using less-than-half-width panels at borders unless otherwise indicated, and comply with layout shown on reflected ceiling plans.
- B Layout openings for penetrations centered on the penetrating items.

3.3 INSTALLATION OF ACOUSTICAL PANEL CEILINGS

- A Install acoustical panel ceilings in accordance with ASTM C 636/C 636M and manufacturer's written instructions.
- B Suspend ceiling hangers from building's structural members and as follows:
 - 1. Install hangers plumb and free from contact with insulation or other objects within ceiling plenum that are not part of supporting structure or of ceiling suspension system.

2. Splay hangers only where required to miss obstructions; offset resulting horizontal forces by bracing, countersplaying, or other equally effective means.
 3. Where width of ducts and other construction within ceiling plenum produces hanger spacings that interfere with location of hangers at spacings required to support standard suspension-system members, install supplemental suspension members and hangers in form of trapezes or equivalent devices.
 4. Secure wire hangers to ceiling-suspension members and to supports above with at least 3 tight turns. Connect hangers directly to structure or to inserts, eye screws, or other devices that are secure and appropriate for substrate and that will not deteriorate or otherwise fail due to age, corrosion, or elevated temperatures.
 5. Do not support ceilings directly from permanent metal forms or floor deck. Fasten hangers to cast-in-place hanger inserts, postinstalled mechanical or adhesive anchors, or power-actuated fasteners that extend through forms into concrete.
 6. When steel framing does not permit installation of hanger wires at spacing required, install carrying channels or other supplemental support for attachment of hanger wires.
 7. Do not attach hangers to steel deck tabs.
 8. Do not attach hangers to steel roof deck. Attach hangers to structural members.
 9. Space hangers not more than 48 inches on center along each member supported directly from hangers unless otherwise indicated; provide hangers not more than 8 inches from ends of each member.
 10. Size supplemental suspension members and hangers to support ceiling loads within performance limits established by referenced standards.
- C Install edge moldings and trim of type indicated at perimeter of acoustical ceiling area and where necessary to conceal edges of acoustical panels.
1. Apply acoustical sealant in a continuous ribbon concealed on back of vertical legs of moldings before they are installed.
 2. Screw attach moldings to substrate at intervals not more than 16 inches on center and not more than 3 inches from ends. Miter corners accurately and connect securely.
 3. Do not use exposed fasteners, including pop rivets, on moldings and trim.
- D Install suspension-system runners so they are square and securely interlocked with one another. Remove and replace dented, bent, or kinked members.
- E Install acoustical panels with undamaged edges and fit accurately into suspension-system runners and edge moldings. Scribe and cut panels at borders and penetrations to provide precise fit.
1. Arrange directionally patterned acoustical panels as indicated on reflected ceiling plans, or if not indicated, as directed by the Architect.
 2. For square-edged panels, install panels with edges fully hidden from view by flanges of suspension-system runners and moldings.
 3. For reveal-edged panels on suspension-system runners, install panels with bottom of reveal in firm contact with top surface of runner flanges.
 4. Paint cut edges of panel remaining exposed after installation; match color of exposed panel surfaces using coating recommended in writing for this purpose by the manufacturer.
- 3.4 ERECTION TOLERANCES
- A Suspended Ceilings: Install main and cross runners level to a tolerance of 1/8 inch in 12 feet, non-cumulative.
- B Moldings and Trim: Install moldings and trim to substrate and level with ceiling suspension system to a tolerance of 1/8 inch in 12 feet, non-cumulative.
- 3.5 CLEANING
- A Clean exposed surfaces of acoustical panel ceilings, including trim, edge moldings, and suspension-system members. Comply with manufacturer's written instructions for cleaning and touchup of minor finish damage.

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- B Remove and replace ceiling components that cannot be successfully cleaned and repaired to permanently eliminate evidence of damage.

END OF SECTION 09 51 13

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SECTION 09 65 13 - RESILIENT BASE AND ACCESSORIES

PART 1 GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A Section Includes:
 - 1. Resilient base.
 - 2. Supplementary components and accessories normally furnished or otherwise necessary for a complete installation.

1.3 REFERENCES

- A Acronyms and Abbreviations:
 - 1. SCAQMD: South Coast Air Quality Management District.
 - 2. VOC: Volatile Organic Compounds.
- B Definitions:
 - 1. Manufacturer: Means the resilient base or resilient stair accessories manufacturer as applicable unless otherwise indicated.

1.4 ACTION SUBMITTALS

- A Product Data: For each type of product. Include the following.
 - 1. Current Health Product Declaration.
 - 2. Current Environmental Product Declaration.
 - 3. Indicate VOC content for adhesive.

1.5 DELIVERY, STORAGE, AND HANDLING

- A Store resilient products and installation materials in dry spaces protected from the weather, with ambient temperatures maintained within range recommended by manufacturer, but not less than 50 deg F or more than 90 deg F.

1.6 FIELD CONDITIONS

- A Maintain ambient temperatures within range recommended by manufacturer, but not less than 70 deg F or more than 95 deg F, in spaces to receive resilient products during the following time periods:
 - 1. For 48 hours before and after installation.
 - 2. During installation.
- B After installation and until Substantial Completion, maintain ambient temperatures within range recommended by manufacturer, but not less than 55 deg F or more than 95 deg F.
- C Install resilient products after other finishing operations, including painting, have been completed.

PART 2 PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A Fire-Test-Response Characteristics, Rubber Stair Accessories: As determined by testing identical products according to ASTM E 648 or NFPA 253 by a qualified testing agency.
 - 1. Critical Radiant Flux Classification: Class I, not less than 0.45 W/sq. cm.

2.2 RESILIENT BASE

- A Resilient Base Product Standard: ASTM F 1861, Type TP (rubber, thermoplastic), Group 1.

1. Basis-of-Design Products (RB-1 through RB-5): Subject to compliance with the Contract Documents, design is based on products indicated in the Finish Material Schedule on the Drawings as manufactured by the following.
 - a. Tarkett. (Johnsonite)
 2. Acceptable Manufacturers: Subject to compliance with the Contract Documents provide the basis-of-design products or comparable approved products by one of the following.
 - a. Flexco Floors.
 - b. Roppe Corporation.
- B Lengths: Coils in manufacturer's standard length.
- C Outside and Inside Corners: Job formed.

2.3 INSTALLATION MATERIALS

- A Adhesives: Water-resistant type supplied, recommended, or required by the resilient product and adhesive manufacturers to suit products and substrate conditions indicated.
1. Allowable VOC Content: Adhesives, adhesive bonding primers, and adhesive primers must comply with SCAQMD Rule 1168 VOC limits.
 - a. Such products also shall comply with the Rule 1168 prohibition on the use of certain toxic compounds (chloroform, ethylene dichloride, methylene chloride, perchloroethylene, and trichloroethylene).
- B Accessories: As supplied, recommended, or required by the manufacturer and as necessary for a complete installation.

PART 3 EXECUTION

3.1 EXAMINATION

- A Examine substrates, with installer present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the work.
1. Verify that finishes of substrates comply with tolerances and other requirements specified in other Specification Sections and that substrates are free of cracks, ridges, depressions, scale, and foreign deposits that might interfere with adhesion of resilient products.
- B Do not proceed with installation until unsatisfactory conditions have been corrected.
1. Installation of resilient products indicates acceptance of surfaces and conditions.

3.2 RESILIENT BASE INSTALLATION

- A Comply with manufacturer's written instructions for installing resilient base.
- B Apply resilient base to walls, columns, pilasters, casework and cabinets in toe spaces, and other permanent fixtures in rooms and areas indicated to receive resilient base.
- C Install resilient base in lengths as long as practicable without gaps at seams and with tops of adjacent pieces aligned.
- D Tightly adhere resilient base to substrate throughout length of each piece, with base in continuous contact with horizontal and vertical substrates.
- E Do not stretch resilient base during installation.
- F Job-Formed Corners:
1. Outside Corners: Use straight pieces of maximum lengths possible and form with returns not less than 3 inches in length.
 - a. Form without producing discoloration (whitening) at bends.
 2. Inside Corners: Use straight pieces of maximum lengths possible and form with returns not less than 3 inches in length.
 - a. Miter corners to minimize open joints.

3.3 CLEANING AND PROTECTION

- A Comply with manufacturer's written instructions for cleaning and protection of resilient products.
- B Perform the following operations immediately after completing resilient product installation:
1. Remove adhesive and other blemishes from surfaces.

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- C Protect resilient products from damage from construction operations and placement of equipment and fixtures during remainder of construction period.

END OF SECTION 09 65 13

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SECTION 09 65 19 - RESILIENT TILE FLOORING

PART 1 GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A Section Includes:
 - 1. Solid (luxury) vinyl floor tile.
 - 2. Acoustical mat underlayment. (Alternate)
 - 3. Supplementary components and accessories normally furnished or otherwise necessary for a complete installation.
- B Related Requirements:
 - 1. Section 01 23 00 Alternates.

1.3 REFERENCES

- A Acronyms and Abbreviations:
 - 1. INSTALL: International Standards & Training Alliance.
 - 2. LVT: Luxury Vinyl Tile.
 - 3. SCAQMD: South Coast Air Quality Management District.
 - 4. VOC: Volatile Organic Compounds.
- B Definitions:
 - 1. Floor Tile: Means the LVT.
 - 2. Manufacturer: Means the LVT manufacturer unless otherwise indicated.

1.4 SUBMITTALS

- A Action Submittals:
 - 1. Product Data: For each type of product; include Health Product Declaration and Environmental Product Declaration. Indicate VOC content for adhesive.
 - 2. Shop Drawings: For each type of resilient floor tile.
 - a. Include floor tile layouts, edges, columns, doorways, enclosing partitions, built-in furniture, cabinets, and cutouts.
 - b. Show details of special patterns.
 - 3. Product Schedule: For floor tile. Use same designations indicated on the Drawings.
 - 4. Samples: Only required, in standard size, from specified "Acceptable Manufacturer" if other than the basis-of-design product(s) will be provided for the Project.
- B Informational Submittals:
 - 1. Qualification Data: For installer.
- C Closeout Submittals:
 - 1. Maintenance Data: For floor tile to include in maintenance manuals.

1.5 QUALITY ASSURANCE

- A Installer Qualifications: An entity that employs installers and supervisors who are competent in techniques required by manufacturer for floor tile installation, or a certified INSTALL resilient floor covering installer.

1.6 DELIVERY, STORAGE, AND HANDLING

- A Store floor tile and installation materials in dry spaces protected from the weather, with ambient temperatures maintained within range recommended by manufacturer, but not less than 55 deg F or more than 85 deg F. Store floor tiles on flat surfaces.

1.7 FIELD CONDITIONS

- A Maintain ambient temperatures within range recommended by manufacturer, but not less than 70 deg F or more than 95 deg F, in spaces to receive floor tile during the following time periods:
 - 1. 48 hours before installation.
 - 2. During installation.
 - 3. 48 hours after installation.
- B After installation and until Substantial Completion, maintain ambient temperatures within range recommended by manufacturer, but not less than 55 deg F or more than 95 deg F.
- C Close spaces to traffic during, and for 48 hours after, floor tile installation.
- D Install floor tile after other finishing operations, including painting, have been completed.

PART 2 PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A Fire-Test-Response Characteristics: For resilient tile flooring, as determined by testing identical products according to ASTM E 648 or NFPA 253 by a qualified testing agency.
 - 1. Critical Radiant Flux Classification: Class I, not less than 0.45 W/sq. cm.

2.2 SOLID (LUXURY) VINYL FLOOR TILE

- A LVT:
 - 1. Basis-of-Design Products (LVT-1, LVT-2, LVT-3): Subject to compliance with the Contract Documents design is based on the products indicated in the Finish Material Schedule on the Drawings as manufactured by the following.
 - a. Interface, Inc.
 - 2. Acceptable Manufacturers: Subject to compliance with the Contract Documents provide the basis-of-design products or comparable approved products by one of the following.
 - a. Patcraft.
 - b. Shaw Industries Group (Shaw Contract).
- B Tile Standard: ASTM F 1700.
- C Thickness: At least 0.120 inch thick.
- D Wear Layer: At least 22 mil thick.

2.3 INSTALLATION MATERIALS

- A Acoustical Mat Underlayment: Provide product selected by the Architect from one of following.
 - 1. Foam Products Corp.
 - 2. Leggett & Platt.
 - 3. MP Global Products.
 - 4. SoundAway.
- B Trowelable Leveling and Patching Compounds: Latex-modified, portland cement based or blended hydraulic-cement-based formulation provided or approved by manufacturer for applications indicated.
- C Adhesives: Water-resistant type supplied, recommended, or required by the flooring and adhesive manufacturers to suit products and substrate conditions indicated.
 - 1. Allowable VOC Content: Adhesives, adhesive bonding primers, and adhesive primers must comply with SCAQMD Rule 1168 VOC limits.
 - a. Such products also shall comply with the Rule 1168 prohibition on the use of certain toxic compounds (chloroform, ethylene dichloride, methylene chloride, perchloroethylene, and trichloroethylene).
- D Accessories: As supplied, recommended, or required by the manufacturer and as necessary for a complete installation.

PART 3 EXECUTION**3.1 EXAMINATION**

- A Examine substrates, with installer present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the work.
 - 1. Verify that finishes of substrates comply with tolerances and other requirements specified in other Specification Sections and that substrates are free of cracks, ridges, depressions, scale, and foreign deposits that might interfere with adhesion of floor tile.
- B Do not proceed with installation until unsatisfactory conditions have been corrected.
 - 1. Installation of floor tile indicates acceptance of surfaces and conditions.

3.2 PREPARATION

- A Prepare substrates according to manufacturer's written instructions to ensure adhesion of resilient products.
- B Concrete Substrates: Prepare according to ASTM F 710.
 - 1. Verify that substrates are dry and free of curing compounds, sealers, and hardeners.
 - 2. Remove substrate coatings and other substances that are incompatible with adhesives and that contain soap, wax, oil, or silicone, using mechanical methods recommended by manufacturer. Do not use solvents.
 - 3. Alkalinity and Adhesion Testing: Perform tests recommended by the manufacturer. Do not proceed with installation until substrate alkalinity falls within range on pH scale recommended by manufacturer in writing, but not less than 5 or more than 10 pH.
 - 4. Moisture Testing: Perform tests so that each test area does not exceed 1000 sq. ft., and perform no fewer than 3 tests in each installation area and with test areas evenly spaced in installation areas.
 - a. Relative Humidity Test: Using in-situ probes, ASTM F 2170. Do not proceed with installation until substrates have a relative humidity level measurement of not more than 85 percent.
- C Fill cracks, holes, and depressions in substrates with trowelable leveling and patching compound and remove bumps and ridges to produce a uniform and smooth substrate.
- D Do not install floor tiles until they are same temperature as space where they are to be installed.
 - 1. At least 48 hours in advance of installation, move resilient floor tile and installation materials into spaces where they will be installed.
- E Immediately before installation, sweep and vacuum clean substrates indicated to be covered by resilient floor tile.

3.3 ACOUSTICAL MAT UNDERLAYMENT (ALTERNATE)

- A Install in accordance with the manufacturer's written installation instructions.

3.4 FLOOR TILE INSTALLATION

- A Comply with manufacturer's written instructions for installing floor tile.
- B Lay out floor tiles from center marks established with principal walls, discounting minor offsets, so tiles at opposite edges of room are of equal width. Adjust as necessary to avoid using cut widths that equal less than one-half tile at perimeter.
 - 1. Lay tiles in pattern indicated.
- C Match floor tiles for color and pattern by selecting tiles from cartons in the same sequence as manufactured and packaged, if so numbered. Discard broken, cracked, chipped, or deformed tiles.
 - 1. Lay tiles in pattern of colors and sizes indicated.
- D Scribe, cut, and fit floor tiles to butt neatly and tightly to vertical surfaces and permanent fixtures including built-in furniture, cabinets, pipes, outlets, and door frames.
- E Extend floor tiles into toe spaces, door reveals, closets, and similar openings. Extend floor tiles to center of door openings.

- F Maintain reference markers, holes, and openings that are in place or marked for future cutting by repeating on floor tiles as marked on substrates. Use chalk or other nonpermanent, nonstaining marking device.
- G Install floor tiles on covers for telephone and electrical ducts, building expansion-joint covers, and similar items in finished floor areas. Maintain overall continuity of color and pattern between pieces of tile installed on covers and adjoining tiles. Tightly adhere tile edges to substrates that abut covers and to cover perimeters.
- H Adhere floor tiles to flooring substrates using a full spread of adhesive applied to substrate to produce a completed installation without open cracks, voids, raising and puckering at joints, telegraphing of adhesive spreader marks, and other surface imperfections.

3.5 CLEANING AND PROTECTION

- A Comply with manufacturer's written instructions for cleaning and protection of floor tile.
- B Perform the following operations immediately after completing floor tile installation:
 - 1. Remove adhesive and other blemishes from exposed surfaces.
 - 2. Sweep and vacuum surfaces thoroughly.
 - 3. Damp-mop surfaces to remove marks and soil.
- C Protect floor tile products from damage from construction operations and placement of equipment and fixtures during remainder of construction period.
- D Cover floor tile using methods recommended in writing by the manufacturer until Final Acceptance.

END OF SECTION 09 65 19

SECTION 09 66 23 - RESINOUS MATRIX TERRAZZO FLOORING (ALTERNATE)

PART 1 GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A Section Includes:
 - 1. Thin-set, epoxy-resin terrazzo flooring.
 - 2. Precast terrazzo wall base.
 - 3. Supplementary components and accessories normally furnished or otherwise necessary for a complete installation.

1.3 REFERENCES

- A Abbreviations and Acronyms:
 - 1. NTMA: National Terrazzo and Mosaic Association.
 - 2. SCAQMD: South Coast Air Quality Management District.
 - 3. VOC: Volatile Organic Compounds.
- B Definitions:
 - 1. Manufacturer: Means the terrazzo material manufacturer unless otherwise indicated.

1.4 PREINSTALLATION MEETINGS

- A Preinstallation Conference: Conduct conference at Project site.
 - 1. Review methods and procedures related to terrazzo including the following:
 - a. Inspect and discuss condition of substrate and other preparatory work performed by other trades.
 - b. Review and finalize construction schedule and verify availability of materials, installer's personnel, equipment, and facilities needed to make progress and avoid delays.

1.5 SUBMITTALS

- A Action Submittals:
 - 1. Product Data: For each type of product; include Health Product Declaration and Environmental Product Declaration. Indicate VOC content for primer and sealer.
 - 2. Shop Drawings: Include terrazzo installation requirements. Include plans, sections, component details, and relationship to other work. Show layout of the following as applicable:
 - a. Divider strips.
 - b. Control-joint strips.
 - c. Accessory strips.
 - d. Precast terrazzo jointing and edge configurations.
 - 3. Samples: For each type, material, color, and pattern of terrazzo and accessory required showing the full range of color, texture, and pattern variations expected. Label each terrazzo Sample to identify manufacturer's matrix color and aggregate types, sizes, and proportions. Prepare Samples of same thickness and from same material to be used for the work, in sizes indicated below:
 - a. Terrazzo: 6-inch square Samples.
 - b. Precast Terrazzo: 6-inch square Samples.
 - c. Accessories: 6-inch long Samples of each exposed strip item required.
- B Informational Submittals:
 - 1. Qualification Data: For installer.
 - 2. Material Certificates: For each type of terrazzo material or product.

3. Installer Certificates: Signed by manufacturers certifying that installers comply with requirements.
4. Preinstallation moisture-testing reports.
- C Closeout Submittals:
 1. Maintenance Data: For terrazzo to include in maintenance manuals.

1.6 QUALITY ASSURANCE

- A Installer Qualifications:
 1. Engage an installer who is a contractor member of NTMA.
 2. Engage an installer who is certified in writing by manufacturer as qualified to install manufacturer's products.

1.7 DELIVERY, STORAGE, AND HANDLING

- A Deliver materials to Project site in supplier's original wrappings and containers, labeled with source's or manufacturer's name, material or product brand name, and lot number if any.
- B Store materials in their original, undamaged packages and containers, inside a well-ventilated area protected from weather, moisture, soiling, extreme temperatures, and humidity.

1.8 FIELD CONDITIONS

- A Environmental Limitations: Comply with manufacturer's written instructions for substrate temperature, ambient temperature, moisture, ventilation, and other conditions affecting terrazzo installation.
- B Field Measurements: Verify dimensions of construction contiguous with precast terrazzo by field measurements before fabrication.
- C Provide permanent lighting or, if permanent lighting is not in place, simulate permanent lighting conditions during terrazzo installation.
- D Close spaces to traffic during terrazzo application and for not less than 24 hours after application unless manufacturer recommends a longer period.
- E Control and collect water and dust produced by grinding operations. Protect adjacent construction from detrimental effects of grinding operations.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A Source Limitations: Obtain primary terrazzo materials from single source from the same manufacturer. Provide secondary materials including patching and fill material, joint sealant, and repair materials of type and from source recommended by manufacturer of primary materials.

2.2 PERFORMANCE REQUIREMENTS

- A NTMA Standards: Comply with NTMA's written recommendations for terrazzo type indicated unless more stringent requirements are specified.
- B Allowable VOC Content: Architectural coatings intended to be field applied must comply with SCAQMD Rule 1113 VOC limits.

2.3 EPOXY-RESIN TERRAZZO

- A Epoxy-Resin Terrazzo: Comply with manufacturer's written instructions for matrix and aggregate proportions and mixing.
 1. Basis-of-Design Manufacturer: Subject to compliance with the Contract Documents provide the product indicated in the Finish Schedule on the Drawings as manufactured by the following.
 - a. Master Terrazzo Technologies (MTT).
 2. Acceptable Manufacturers: Subject to compliance with the Contract Documents provide basis-of-design product or one of the following comparable products.
 - a. Concord Terrazzo Company (TERRAZZCO).

- b. The Sherwin Williams Company.
- B Mix Color and Pattern: As selected by the Architect; match Architect's approved Sample.
- C Materials: Provide the following as recommended or required by the manufacturer for the application.
 - 1. Moisture-Vapor-Emission-Control Membrane: 2-component, high-solids, high-density, low-VOC, epoxy-based membrane-forming product produced by the manufacturer that reduces moisture emission from concrete substrate to not more than 3 lb of water/1000 sq. ft. in 24 hours.
 - 2. Substrate-Crack-Suppression Membrane: Product of manufacturer, having at least 120 percent elongation potential according to ASTM D 412.
 - a. Reinforcement: Fiberglass scrim.
 - 3. Primer: Manufacturer's low-VOC product recommended for substrate and use indicated.
 - 4. Epoxy-Resin Matrix: Manufacturer's standard recommended for use indicated and in color required for mix indicated.
 - 5. Finishing Grout: Resin based.

2.4 PRECAST AND MANUFACTURED TERRAZZO

- A Precast and Manufactured Units (TB1): Terrazzo units indicated on the Drawing including wall base. Comply with manufacturer's written instructions for fabricating precast units in sizes and profiles indicated. Reinforce units as required by unit sizes, profiles, and thicknesses and as recommended by manufacturer. Finish exposed-to-view edges and reveals to match face finish. Ease exposed edges to 1/8-inch radius unless otherwise indicated.
 - 1. Profile: As indicated on the Drawings, or if not indicated, as selected by the Architect.
 - 2. Color, Pattern, and Finish: Match adjacent poured-in-place terrazzo flooring unless otherwise indicated.

2.5 STRIP MATERIALS

- A Divider Strips: L-type angle in depth required for topping thickness indicated.
 - 1. Material: Aluminum.
 - 2. Top Width: As indicated on the Drawings, or if not indicated, as selected by the Architect.
- B Control-Joint Strips: Separate, double L-type angles, positioned back to back, that match material and color of divider strips and in depth required for topping thickness indicated.
 - 1. Top Width: 1/16 inch.

2.6 MISCELLANEOUS ACCESSORIES

- A Anchoring Devices:
 - 1. Strips: Provide adhesives for strip materials as recommended by manufacturer and as required for secure attachment to substrate.
 - 2. Precast Terrazzo: Provide mechanical anchoring devices as recommended by fabricator for proper anchorage and support of units for conditions of installation and support.
- B Patching and Fill Material: Terrazzo manufacturer's resinous product approved and recommended by manufacturer for application indicated.
- C Joint Compound: Terrazzo manufacturer's resinous product approved and recommended by manufacturer for application indicated.
- D Resinous Matrix Terrazzo Cleaner: Chemically neutral cleaner with pH factor between 7 and 10 that is biodegradable, phosphate free, and recommended by sealer manufacturer for use on terrazzo type indicated.
- E Sealer: Low-VOC, slip- and stain-resistant, penetrating-type sealer that is chemically neutral; does not affect terrazzo color or physical properties; and is recommended by sealer manufacturer. Compliant with SCAQMD requirements.
 - 1. Surface Friction: Not less than 0.6 according to ASTM D 2047.
 - 2. Acid-Base Properties: With pH factor between 7 and 10.

PART 3 EXECUTION

3.1 EXAMINATION

- A Examine substrates and areas, with installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the work.
- B Do not proceed with installation until unsatisfactory conditions, including levelness tolerances, have been corrected.
 - 1. Installation of terrazzo flooring and manufactured and precast units indicates acceptance of surfaces and conditions.

3.2 PREPARATION

- A Clean substrates of substances, including oil, grease, and curing compounds, that might impair terrazzo bond. Provide clean, dry, and neutral substrate for terrazzo application.
- B Concrete Slabs:
 - 1. Provide sound concrete surfaces free of laitance, glaze, efflorescence, curing compounds, form-release agents, dust, dirt, grease, oil, and other contaminants incompatible with terrazzo.
 - a. Shot-blast surfaces with an apparatus that abrades the concrete surface, contains the dispensed shot within the apparatus, and recirculates the shot by vacuum pickup.
 - b. Repair damaged and deteriorated concrete according to terrazzo manufacturer's written instructions.
 - c. Use patching and fill material to fill holes and depressions in substrates according to terrazzo manufacturer's written instructions.
- C Verify that concrete substrates are dry and moisture-vapor emissions are within acceptable levels according to manufacturer's written instructions.
- D Preinstallation Moisture Testing:
 - 1. Testing Agency: Engage a qualified testing agency to perform tests.
 - 2. Moisture Testing: Perform tests so that each test area does not exceed 200 sq. ft., and perform no fewer than three tests in each installation area and with test areas evenly spaced in installation areas.
 - a. Moisture-Vapor-Emission Test: Maximum moisture-vapor-emission rate of 3 lb of water/1000 sq. ft. in 24 hours when tested according to ASTM F1869 using anhydrous calcium chloride.
 - b. Relative Humidity Test: Maximum 75 percent relative humidity measurement when tested according to ASTM F2170 using in-situ probes.
 - 3. Do not proceed with terrazzo installation until concrete substrates pass moisture testing or after installation of moisture-vapor-emission-control membrane on substrate areas that fail testing.
- E Moisture-Vapor-Emission-Control Membrane: Install according to manufacturer's written instructions.
 - 1. Install on concrete substrates that incorporate lightweight aggregates.
 - 2. Install concrete substrates that fail preinstallation moisture testing.
- F Substrate-Crack-Suppression Membrane: Install to isolate and suppress substrate cracks according to manufacturer's written instructions.
 - 1. Prepare and prefill substrate cracks with membrane material.
 - 2. Install membrane to produce full substrate coverage in areas to receive terrazzo.
 - 3. Reinforce membrane with fiberglass scrim if recommended or required by manufacturer for application.
- G Protect other work from water and dust generated by grinding operations. Control water and dust to comply with environmental protection regulations.
 - 1. Erect and maintain temporary enclosures and other suitable methods to limit water damage and dust migration and to ensure adequate ambient temperatures and ventilation conditions during installation.

3.3 EPOXY-RESIN TERRAZZO INSTALLATION

- A Comply with NTMA's written recommendations for terrazzo and accessory installation.
- B Strip Materials:
 - 1. Divider and Control-Joint Strips:
 - a. Locate divider strips in locations indicated.
 - b. Install control-joint strips in locations indicated.
 - c. Install control-joint strips with 1/4-inch gap between strips, and install sealant in gap.
 - d. Install strips in adhesive setting bed without voids below strips, or mechanically anchor strips as required to attach strips to substrate, as recommended by strip manufacturer.
 - 2. Accessory Strips: Install as required to provide a complete installation in locations indicated.
- C Apply primer to terrazzo substrates according to manufacturer's written instructions.
- D Place, rough grind, grout, cure grout, fine grind, and finish terrazzo according to manufacturer's written instructions.
 - 1. Installed Thickness: 1/4 inch nominal.
 - 2. Terrazzo Finishing: Ensure that matrix components and fluids from grinding operations do not stain terrazzo by reacting with divider and control-joint strips.
 - a. Rough Grinding: Grind with 24-grit or finer stones or with comparable diamond abrasives. Follow initial grind with 60/80-grit stones or with comparable diamond abrasives.
 - b. Grouting: Before grouting, clean terrazzo with water, rinse, and allow to dry. Apply and cure epoxy grout.
 - c. Fine Grinding/Polishing: Delay fine grinding until heavy trade work is complete and construction traffic through area is restricted. Grind with grit stones or with comparable diamond abrasives until grout is removed from surface.
 - 3. Installation Tolerance: Limit variation in terrazzo surface from level to 1/4 inch in 10 feet; noncumulative.

3.4 PRECAST TERRAZZO INSTALLATION

- A Install precast terrazzo units using method recommended in writing by NTMA and manufacturer unless otherwise indicated.
- B Do not install units that are chipped, cracked, discolored, or improperly finished.
- C Seal joints between units with joint compound matching precast terrazzo matrix or joint sealant as recommended or required by the manufacturer.

3.5 REPAIR

- A Cut out and replace terrazzo areas that evidence lack of bond with substrate. Cut out terrazzo areas in panels defined by strips and replace to match adjacent terrazzo, or repair panels according to NTMA's written recommendations, as approved by Architect.

3.6 CLEANING AND PROTECTION

- A Cleaning:
 - 1. Remove grinding dust from installation and adjacent areas.
 - 2. Wash surfaces with cleaner according to NTMA's written recommendations and manufacturer's written instructions; rinse surfaces with water and allow them to dry thoroughly.
- B Sealing:
 - 1. Seal surfaces according to NTMA's written recommendations.
 - 2. Apply sealer according to sealer manufacturer's written instructions.
- C Protection: Provide final protection and maintain conditions, in a manner acceptable to installer, that ensure that terrazzo is without damage or deterioration at time of Final Acceptance.

END OF SECTION 09 66 23

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SECTION 09 67 23 - RESINOUS FLOORING

PART 1 GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A Section Includes:
 - 1. Resinous flooring system.
 - 2. Supplementary components and accessories normally furnished or otherwise necessary for a complete installation, whether or not such items are included in the Specifications or indicated on the Drawings.

1.3 REFERENCES

- A Definitions:
 - 1. Manufacturer: Means the resinous flooring manufacturer unless otherwise indicated.

1.4 SUBMITTALS

- A Action Submittals:
 - 1. Product Data: For each type of product. Include the following:
 - a. Manufacturer's technical data, application instructions, and recommendations for each resinous flooring component required.
 - b. VOC content of primer.
 - c. Current Health Product Declaration.
 - d. Current Environmental Product Declaration.
 - 2. Shop Drawings: Mark locations of expansion, control, and other joints on copies of floor plans.
 - 3. Samples: For each resinous flooring system required, 6 inches square, applied to a rigid backing.
- B Informational Submittals:
 - 1. Installer Certificates: Signed by manufacturer certifying that installers comply with specified requirements.
 - 2. Material Certificates: For each resinous flooring component, from manufacturer.
 - 3. Material Test Reports: For each resinous flooring system, by a qualified testing agency.
- C Closeout Submittals:
 - 1. Maintenance Data: For resinous flooring to include in maintenance manuals.

1.5 QUALITY ASSURANCE

- A Installer Qualifications: An authorized representative who is trained and approved by manufacturer.

1.6 DELIVERY, STORAGE, AND HANDLING

- A Deliver materials in original packages and containers, with seals unbroken, bearing manufacturer's labels indicating brand name and directions for storage and mixing with other components.

1.7 FIELD CONDITIONS

- A Environmental Limitations: Comply with resinous flooring manufacturer's written instructions for substrate temperature, ambient temperature, moisture, ventilation, and other conditions affecting resinous flooring application.
- B Lighting: Provide permanent lighting or, if permanent lighting is not in place, simulate permanent lighting conditions during resinous flooring application.

- C Close spaces to traffic during resinous flooring application and for 24 hours after application unless manufacturer recommends a longer period.

PART 2 PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A Flammability: Self-extinguishing according to ASTM D 635.

2.2 MANUFACTURERS

- A Source Limitations: Obtain primary resinous flooring materials, including primers, resins, hardening agents, grouting coats, and topcoats, from single source from the same manufacturer. Obtain secondary materials, including patching and fill material, joint sealant, and repair materials, of type and from manufacturer recommended in writing by manufacturer of primary materials.

2.3 RESINOUS FLOORING

- A Resinous Flooring: Subject to compliance with the Contract Documents, provide product as selected by the Architect from one of the following.
1. Dur-A-Flex, Inc.
 2. Sherwin Williams High Performance Flooring.
 3. Stonhard.
- B System Characteristics:
1. Color and Pattern: As selected by the Architect.
 2. Wearing Surface: Manufacturer's standard wearing surface.
 3. Overall System Thickness: 2 mm.
- C System Physical Properties:
1. Tensile Strength: At least 5,200 psi in accordance with ASTM D 638.
 2. Flexural Strength: At least 4,000 psi in accordance with ASTM D 790.
 3. Flexural Modulus of Elasticity: At least 1.7×10^6 psi in accordance with ASTM D 790.
 4. Hardness: 0.85 to 0.90, Shore D in accordance with ASTM D 2240.
 5. Linear Coefficient of Thermal Expansion: At least 17×10^{-6} in./in. deg F in accordance with ASTM C 531.
 6. Impact Resistance: Exceeds 160 in. lbs. in accordance with ASTM D 4060, CS-17.
 7. Abrasion Resistance: No more than 0.03 gm weight loss in accordance with ASTM D 4060, CS-17.
 8. Critical Radiant Flux: 0.45 W/sq. cm or greater in accordance with NFPA 253.
- D Primer: Type recommended by manufacturer for substrate and resinous flooring system indicated.
1. Formulation Description: 2-component 100 percent solids.
- E Body Coats:
1. Resin: Epoxy.
 2. Formulation Description: High solids.
 3. Number of Coats: 1.
 4. Thickness of Coats: 25 to 30 mils with standard primer coat.
 5. Aggregates: Manufacturer's standard decorative flakes.
- F Topcoat: Sealing or finish coats.
1. Resin: Epoxy.
 2. Type: Clear.
 3. Number of Coats: 2.
- G Cove Base: Seamless cove base, cove base filler product, and metal termination (cap) strip, unless otherwise indicated.

2.4 ACCESSORIES

- A Patching and Fill Material: Resinous product of or approved by the manufacturer and recommended by manufacturer for application indicated.

- B Other Accessories: As supplied, required, or recommended by the manufacturer as necessary for a complete installation.

PART 3 EXECUTION

3.1 PREPARATION

- A Prepare and clean substrates according to manufacturer's written instructions for substrate indicated. Provide clean, dry substrate for resinous flooring application.
- B Concrete Substrates: Provide sound concrete surfaces free of laitance, glaze, efflorescence, curing compounds, form-release agents, dust, dirt, grease, oil, and other contaminants incompatible with resinous flooring.
1. Roughen concrete substrates by one of the following methods as recommended or required by the manufacturer in writing:
 - a. Shot-blast surfaces with an apparatus that abrades the concrete surface, contains the dispensed shot within the apparatus, and recirculates the shot by vacuum pickup.
 - b. Comply with NACE No. 6/SSPC-SP13, with a Concrete Surface Profile (CSP) of 3 or greater in accordance with the International Concrete Repair Institute (ICRI) Technical Guideline No. 310.2R, unless manufacturer's written instructions are more stringent.
 2. Repair damaged and deteriorated concrete according to manufacturer's written instructions.
 3. Verify that concrete substrates are dry and moisture-vapor emissions are within acceptable levels according to manufacturer's written instructions. Perform the following in accordance with manufacturer's written recommendations or requirements.
 - a. Anhydrous Calcium Chloride Test: ASTM F 1869. Do not proceed with application of resinous flooring until substrates have a moisture-vapor-emission rate of no more than 3 lb of water/1000 sq. ft. of slab area in 24 hours.
 - b. Relative Humidity Test: Use in situ probes, ASTM F 2170. Do not proceed with installation until substrates have a maximum relative humidity level measurement of no more than 75 percent.
 - c. Alkalinity and Adhesion Testing: Verify that concrete substrates have pH within acceptable range. Perform tests recommended by manufacturer. Do not proceed with application until substrates pass testing.
- C Patching and Filling: Use patching and fill material to fill holes and depressions in substrates according to manufacturer's written instructions.
1. Control Joint Treatment: Treat control joints and other nonmoving substrate cracks to prevent cracks from reflecting through resinous flooring according to manufacturer's written instructions.
- D Resinous Materials: Mix components and prepare materials according to manufacturer's written instructions.

3.2 INSTALLATION

- A Apply components of resinous flooring system according to manufacturer's written instructions to produce a uniform, monolithic wearing surface of thickness indicated.
1. Coordinate application of components to provide optimum adhesion of resinous flooring system to substrate, and optimum intercoat adhesion.
 2. Cure resinous flooring components according to manufacturer's written instructions. Prevent contamination during application and curing processes.
 3. Expansion and Isolation Joint Treatment: At substrate expansion and isolation joints, comply with resinous flooring manufacturer's written instructions.
- B Primer: Apply primer over prepared substrate at manufacturer's recommended spreading rate.
- C Waterproofing Membrane: Apply waterproofing membrane in manufacturer's recommended thickness.
1. Apply waterproofing membrane to integral cove base substrates.
- D Reinforcing Membrane: Apply reinforcing membrane to substrate cracks or to entire substrate surface in accordance with manufacturer's recommendations.

- E Integral Cove Base: Apply cove base mix to wall surfaces before applying flooring. Apply according to manufacturer's written instructions and details, including those for taping, mixing, priming, troweling, sanding, and top coating of cove base. Round internal and external corners. Provide metal termination (cap) strip.
 - 1. Integral Cove Base: 4 inches high, unless otherwise indicated.
- F Self-Leveling Body Coats: Apply self-leveling slurry body coats in thickness indicated for flooring system.
- G Troweled or Screeded Body Coats: Apply troweled or screeded body coats in thickness indicated for flooring system. Hand or power trowel and grout to fill voids. When body coats are cured, remove trowel marks and roughness using method recommended by manufacturer.
- H Grout Coat: Apply grout coat, of type recommended by resinous flooring manufacturer, to fill voids in surface of final body coat.
- I Topcoats: Apply topcoats in number indicated for flooring system and at spreading rates recommended in writing by manufacturer and to produce wearing surface indicated.

3.3 FIELD QUALITY CONTROL

- A Material Sampling: Owner may, at any time and any number of times during resinous flooring application, require material samples for testing for compliance with requirements.
 - 1. Owner will engage an independent testing agency to take samples of materials being used. Material samples will be taken, identified, sealed, and certified in presence of Contractor.
 - 2. Testing agency will test samples for compliance with requirements, using applicable referenced testing procedures or, if not referenced, using testing procedures listed in manufacturer's product data.
 - 3. If test results show applied materials do not comply with specified requirements, pay for testing, remove noncomplying materials, prepare surfaces coated with unacceptable materials, and reapply flooring materials to comply with requirements.

3.4 PROTECTION

- A Protect resinous flooring from damage and wear during the remainder of construction period. Use protective methods and materials, including temporary covering, recommended in writing by the manufacturer.

END OF SECTION 09 67 23

SECTION 09 68 13 - TILE CARPETING

PART 1 GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A Section Includes:
 - 1. Modular carpet tile.
 - 2. Supplementary components and accessories normally furnished or otherwise necessary for a complete installation.

1.3 REFERENCES

- A Abbreviations and Acronyms:
 - 1. AATCC: American Association of Textile Chemists and Colorists.
 - 2. AFU: AATCC Fading Units.
 - 3. CRI: The Carpet and Rug Institute, Inc.
 - 4. SCAQMD: South Coast Air Quality Management District.
 - 5. VOC: Volatile Organic Compounds.
- B Definitions:
 - 1. Manufacturer: Means the carpet tile manufacturer unless otherwise indicated.

1.4 SUBMITTALS

- A Action Submittals:
 - 1. Product Data: For each type of product, include the following:
 - a. Manufacturer's written data on physical characteristics, durability, and fade resistance.
 - b. Manufacturer's installation recommendations for each type of substrate.
 - c. Current Health Product Declaration.
 - d. Current Environmental Product Declaration.
 - 2. Shop Drawings: For carpet tile installation, plans showing the following:
 - a. Columns, doorways, enclosing walls or partitions, built-in cabinets, and locations where cutouts are required in carpet tiles.
 - b. Carpet tile type, color, and dye lot.
 - c. Type of subfloor.
 - d. Type of installation.
 - e. Pattern of installation.
 - f. Pattern type, location, and direction.
 - g. Pile direction.
 - h. Type, color, and location of edge, transition, and other accessory strips.
 - i. Transition details to other flooring materials.
 - 3. Samples: Only required, in standard size, from specified "Acceptable Manufacturer" if other than the basis-of-design product(s) will be provided for the Project.
 - 4. Product Schedule: For carpet tile. Use same designations indicated on Drawings.
- B Informational Submittals:
 - 1. Qualification Data: For installer.
 - 2. Product Test Reports: For carpet tile, for tests performed by a qualified testing agency.
 - 3. Sample Warranty: For special warranty.
- C Closeout Submittals:
 - 1. Maintenance Data: For carpet tiles to include in maintenance manuals. Include the following:
 - a. Methods for maintaining carpet tile, including cleaning and stain-removal products and procedures and manufacturer's recommended maintenance schedule.
 - b. Precautions for cleaning materials and methods that could be detrimental to carpet tile.

1.5 QUALITY ASSURANCE

- A Installer Qualifications: An experienced installer who is certified by the International Certified Floorcovering Installers Association or who can demonstrate compliance with its certification program requirements.

1.6 DELIVERY, STORAGE, AND HANDLING

- A Comply with the CRI publication CRI 104 Carpet Installation Standard for Commercial Carpet.

1.7 FIELD CONDITIONS

- A Comply with the CRI publication CRI 104 Carpet Installation Standard for Commercial Carpet for temperature, humidity, and ventilation limitations.
- B Environmental Limitations: Do not deliver or install carpet tiles until spaces are enclosed and weathertight, wet-work in spaces is complete and dry, and ambient temperature and humidity conditions are maintained at levels planned for building occupants during the remainder of the construction period.
- C Do not install carpet tiles over concrete slabs until slabs have cured and are sufficiently dry to bond with adhesive and concrete slabs have pH range recommended in writing by the manufacturer.
- D Where demountable partitions or other items are indicated for installation on top of carpet tiles, install carpet tiles before installing these items.

1.8 WARRANTY

- A Special Warranty for Carpet Tiles: Manufacturer's standard form in which manufacturer agrees to repair or replace components of carpet tile installation that fail in materials or workmanship within specified warranty period.
 - 1. Warranty does not include deterioration or failure of carpet tile due to unusual traffic, failure of substrate, vandalism, or abuse.
 - 2. Failures include more than 10 percent loss of face fiber, edge raveling, snags, runs, loss of tuft bind strength, dimensional stability, excess static discharge, and delamination.
 - 3. Warranty Periods: Manufacturer's standard commercial warranties.

PART 2 PRODUCTS

2.1 CARPET TILE

- A Carpet Tile:
 - 1. Basis-of-Design Products: Subject to compliance with the Contract Documents the design is based on products indicated in the Finish Material Schedule on the Drawings as manufactured by the following.
 - a. Interface.
 - 2. Acceptable Manufacturers: Subject to compliance with the Contract Documents, provide the basis-of-design products, or comparable approved products by one of the following.
 - a. Shaw Industries Group, Inc. (Shaw Contract).
 - b. Patcraft.
- B

2.2 INSTALLATION ACCESSORIES

- A Trowelable Leveling and Patching Compounds: Latex-modified, hydraulic-cement-based formulation provided or recommended by the manufacturer.
- B Adhesives: Water-resistant, mildew-resistant, nonstaining, pressure-sensitive type to suit products and subfloor conditions indicated, that complies with flammability requirements for installed carpet tile and is supplied, recommended, or required by the manufacturer for releasable installation.
 - 1. Allowable VOC Content: Adhesives, adhesive bonding primers, and adhesive primers must comply with SCAQMD Rule 1168 VOC limits.

- a. Such products also shall comply with the Rule 1168 prohibition on the use of certain toxic compounds (chloroform, ethylene dichloride, methylene chloride, perchloroethylene, and trichloroethylene).

PART 3 EXECUTION

3.1 EXAMINATION

- A Examine substrates, areas, and conditions, with installer present, for compliance with requirements for maximum moisture content, alkalinity range, installation tolerances, and other conditions affecting carpet tile performance.
- B Examine carpet tile for type, color, pattern, and potential defects.
- C Concrete Slabs: Verify that finishes comply with requirements specified in Section 03 30 00 Cast-in-Place Concrete and that surfaces are free of cracks, ridges, depressions, scale, and foreign deposits.
 1. Moisture Testing: Perform tests so that each test area does not exceed 1000 sq. ft. and perform no fewer than 3 tests in each installation area and with test areas evenly spaced in installation areas.
 - a. Anhydrous Calcium Chloride Test: ASTM F 1869. Do not proceed with installation until substrates have a moisture-vapor-emission rate of no more than 3 lb of water/1000 sq. ft. in 24 hours unless otherwise required or recommended in writing by the carpet tile and adhesive manufacturers.
 - b. Relative Humidity Test: Using in situ probes, ASTM F 2170. Do not proceed with installation until substrates have a relative humidity level measurement of no more than 75 percent, unless otherwise required or recommended in writing by the carpet tile manufacturer and adhesive manufacturer.
 2. Perform additional moisture tests recommended in writing by adhesive and carpet tile manufacturers. Do not proceed with installation only after substrates pass testing.
- D Do not proceed with installation until unsatisfactory conditions have been corrected.
 1. Installation of carpet tile indicates acceptance of surfaces and conditions.

3.2 PREPARATION

- A General: Comply with the CRI publication CRI 104 Standard for Installation of Commercial Carpet and with the manufacturer's written installation instructions for preparing substrates indicated to receive carpet tile.
- B Use trowelable leveling and patching compounds, according to manufacturer's written instructions, to fill cracks, holes, depressions, and protrusions in substrates. Fill or level cracks, holes, and depressions 1/8 inch wide or wider and protrusions more than 1/32 inch, unless more stringent requirements are required by manufacturer's written instructions.
- C Concrete Substrates: Remove coatings, including curing compounds, and other substances that are incompatible with adhesives and that contain soap, wax, oil, or silicone, without using solvents. Use mechanical methods recommended in writing by adhesive and carpet tile manufacturers.
- D Broom and vacuum clean substrates indicated to receive carpet tile immediately before installing carpet tile.

3.3 INSTALLATION

- A General: Comply with the CRI publication *CRI 104 Standard for Installation of Commercial Carpet*, Section 10, "Carpet Tile," and with the manufacturer's written installation instructions.
- B Installation Method: As recommended in writing by the manufacturer.
- C Maintain dye lot integrity. Do not mix dye lots in same area.
- D Maintain pile-direction patterns indicated on Drawings.
- E Cut and fit carpet tile to butt tightly to vertical surfaces, permanent fixtures, and built-in furniture including cabinets, pipes, outlets, edgings, thresholds, and nosings. Bind or seal cut edges as recommended in writing by the manufacturer.

- F Extend carpet tile into toe spaces, door reveals, closets, open-bottomed obstructions, removable flanges, alcoves, and similar openings.
- G Maintain reference markers, holes, and openings that are in place or marked for future cutting by repeating on finish flooring as marked on subfloor. Use nonpermanent, nonstaining marking device.
- H Install pattern parallel to walls and borders unless otherwise indicated.

3.4 CLEANING AND PROTECTION

- A Perform the following operations immediately after installing carpet tile:
 - 1. Remove excess adhesive, seam sealer, and other surface blemishes using cleaner recommended in writing by the manufacturer.
 - 2. Remove yarns that protrude from carpet tile surface.
 - 3. Vacuum carpet tile using commercial machine with face-beater element.
- B Protect installed carpet tile to comply with the CRI publication *CRI 104 Standard for Installation of Commercial Carpet*, Section 13.7.
- C Protect carpet tile against damage from construction operations and placement of equipment and fixtures during the remainder of construction period. Use protection methods indicated or recommended in writing by the manufacturer.

END OF SECTION 09 68 13 09 68 13

SECTION 09 72 00 - WALL COVERINGS (ALTERNATE)

PART 1 GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A Section Includes:
 - 1. Wall coverings.
 - 2. Supplementary components and accessories normally furnished or otherwise necessary for a complete installation.
- B Related Requirements:
 - 1. Section 01 23 00 Alternates.

1.3 REFERENCES

- A Acronyms and Abbreviations:
 - 1. SCAQMD: South Coast Air Quality Management District.
 - 2. VOC: Volatile Organic Compounds.
- B Definitions:
 - 1. Manufacturer: Means the wall covering manufacturer unless otherwise indicated.

1.4 SUBMITTALS

- A Action Submittals:
 - 1. Product Data: For each type of product; include the following:
 - a. Data on physical characteristics, durability, fade resistance, and fire-test-response characteristics.
 - b. Indicate VOC content for adhesive and primer/sealer.
 - c. Current Health Product Declaration.
 - d. Current Environmental Product Declaration.
 - 2. Shop Drawings: Show location and extent of each wall-covering type. Indicate pattern placement, seams, and termination points.
 - 3. Samples: Only required, in standard size, from specified "Acceptable Manufacturer" if other than the basis-of-design product(s) will be provided for the Project.
 - 4. Product Schedule: For wall coverings. Use same designations indicated on Drawings.
- B Informational Submittals:
 - 1. Product Test Reports: For each wall covering, for tests performed by a qualified testing agency.
- C Closeout Submittals:
 - 1. Maintenance Data: For wall coverings to include in maintenance manuals.

1.5 FIELD CONDITIONS

- A Environmental Limitations: Do not deliver or install wall coverings until spaces are enclosed and weathertight, wet-work in spaces is complete and dry, work above ceilings is complete, and HVAC system is operating and maintaining ambient temperature and humidity conditions at levels intended for occupants after Project completion during the remainder of the construction period.
- B Lighting: Do not install wall covering until lighting that matches conditions intended for occupants after Project completion is provided on the surfaces indicated to receive wall covering.
- C Ventilation: Provide continuous ventilation during installation and for not less than the time recommended by the manufacturer for full drying or curing.

PART 2 PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A Fire-Test-Response Characteristics: As determined by testing identical wall coverings applied with identical adhesives to substrates in accordance with test method indicated below by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
 - 1. Surface-Burning Characteristics: Comply with ASTM E 84; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
 - a. Flame-Spread Index: 25 or less.
 - b. Smoke-Developed Index: 450 or less.

2.2 WALL COVERINGS

- A General: Provide each type of wall covering in rolls from same production run.
- B Vinyl Wall Covering:
 - 1. Basis-of-Design Product (WC-1): Subject to compliance with the Contract Documents design is based on the product indicated in the Finish Material Schedule on the Drawings as manufactured by the following.
 - a. Designtex.
 - 2. Acceptable Manufacturers: Subject to compliance with the Contract Documents, provide the basis-of-design product, or comparable approved products by one of the following.
 - a. kirei by Carnegie.
 - b. Wolf-Gordon Inc.

2.3 ACCESSORIES

- A Adhesive: Mildew-resistant, nonstaining, strippable adhesive, for use with specific wall covering and substrate application indicated and as recommended in writing by the manufacturer.
 - 1. Allowable VOC Content: Adhesives, adhesive bonding primers, and adhesive primers must comply with SCAQMD Rule 1168 VOC limits.
 - a. Such products also shall comply with the Rule 1168 prohibition on the use of certain toxic compounds (chloroform, ethylene dichloride, methylene chloride, perchloroethylene, and trichloroethylene).
- B Primer/Sealer: Mildew resistant, complying with application requirements in Section 09 91 23 Interior Painting and if recommended in writing by primer/sealer and wall-covering manufacturers for intended substrate.
 - 1. Allowable VOC Content: Adhesives, adhesive bonding primers, and adhesive primers must comply with SCAQMD Rule 1168 VOC limits.
 - a. Such products also shall comply with the Rule 1168 prohibition on the use of certain toxic compounds (chloroform, ethylene dichloride, methylene chloride, perchloroethylene, and trichloroethylene).
- C Other Accessories: As supplied, recommended, or required in writing by the manufacturer.

PART 3 EXECUTION

3.1 EXAMINATION

- A Examine substrates and conditions, with installer present, for compliance with requirements for installation surfaces being true in plane and vertical and horizontal alignment, maximum moisture content, and other conditions affecting performance of the work.
- B Do not proceed with installation until unsatisfactory conditions have been corrected.
 - 1. Installation of wallcovering indicates acceptance of surfaces and conditions.

3.2 PREPARATION

- A Comply with manufacturer's written instructions for surface preparation.
- B Clean substrates of substances that could impair bond of wall covering, including dirt, oil, grease, mold, and mildew.

- C Prepare substrates to achieve a smooth, dry, clean, structurally sound surface free of flaking, unsound coatings, cracks, and defects.
 - 1. Gypsum Board: Apply primer/sealer as recommended in writing by primer/sealer manufacturer and wall-covering manufacturer.
 - 2. Painted Surfaces:
 - a. Check for pigment bleeding. Apply primer/sealer to areas susceptible to pigment bleeding as recommended in writing by primer/sealer manufacturer.
 - b. Sand gloss, semigloss, and eggshell finishes with fine sandpaper.
- D Remove hardware and hardware accessories, electrical plates and covers, light fixture trims, and similar items.
- E Acclimatize wall-covering materials by removing them from packaging in the installation areas not less than 24 hours before installation.

3.3 INSTALLATION OF WALL COVERING

- A Comply with manufacturers' written installation instructions applicable to products and applications indicated.
- B Cut wall-covering strips in roll number sequence. Change the roll numbers at partition breaks and corners.
- C Install strips in same order as cut from roll.
 - 1. For solid-color, even-texture, or random-match wall coverings, reverse every other strip if recommended in writing by the manufacturer.
- D Install wall covering without lifted or curling edges and without visible shrinkage.
- E Match pattern 72 inches above the finish floor.
- F Install seams vertical and plumb at least 6 inches from outside corners and at least 3 inches from inside corners unless a change of pattern or color exists at corner. Horizontal seams are not permitted, except where indicated.
- G Trim edges and seams for color uniformity, pattern match, and tight closure. Butt seams without overlaps or gaps between strips.
- H Fully bond wall covering to substrate. Remove air bubbles, wrinkles, blisters, and other defects.

3.4 CLEANING

- A Remove excess adhesive at seams, perimeter edges, and adjacent surfaces.
- B Use cleaning methods recommended in writing by wall-covering manufacturer.
- C Replace strips that cannot be cleaned.
- D Reinstall hardware and hardware accessories, electrical plates and covers, light fixture trims, and similar items.

END OF SECTION 09 72 00

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SECTION 09 81 00 - ACOUSTICAL INSULATION, SEALANTS, AND ACCESSORIES

PART 1 GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A Section Includes:
 - 1. Concealed blanket/batt insulation.
 - 2. Acoustical joint sealants.
 - 3. Acoustical putty pads.
 - 4. Supplementary components and accessories normally furnished or otherwise necessary for a complete installation or application.

1.3 REFERENCES

- A Acronyms and Abbreviations:
 - 1. SCAQMD: South Coast Air Quality Management District.
 - 2. STC: Sound Transmission Class.
 - 3. VOC: Volatile Organic Compounds.
- B Definitions:
 - 1. Manufacturer: Means the applicable acoustical product manufacturer unless otherwise indicated.

1.4 SUBMITTALS

- A Action Submittals:
 - 1. Product Data: For each type of product; include Health Product Declaration and Environmental Product Declaration.
 - a. Indicate VOC content for sealants, sealant primers, and caulks.
 - 2. Samples:
 - a. Joint Sealants: Manufacturer's color charts consisting of strips of cured sealants for each kind and color of exposed-to-view acoustical joint sealant required.
- B Informational Submittals:
 - 1. Qualification Data: For acoustical joint sealant and spray-applied exposed insulation installers.
 - 2. Product Test Reports: For each kind of acoustical joint sealant and acoustical insulation, for tests performed by a qualified testing agency.
 - 3. Sample Warranties: For special warranties.

1.5 QUALITY ASSURANCE

- A Acoustical Joint Sealant Installer Qualifications: An authorized representative who is trained and approved by manufacturer.
- B Testing Agency Qualifications: Qualified according to ASTM C 1021 to conduct the testing indicated.

1.6 DELIVERY, STORAGE, AND HANDLING

- A Protect materials from damage and from deterioration due to moisture, soiling, and other sources. Store inside and in a dry location. Comply with manufacturer's written instructions for handling, storing, and protecting during installation.

1.7 WARRANTY

- A Special Installer's Warranty, Acoustical Joint Sealants: Installer agrees to repair or replace acoustical joint sealants that do not comply with performance and other requirements specified in this specification Section within specified warranty period.
1. Warranty Period: 2 years from date of Final Acceptance.

PART 2 PRODUCTS

2.1 CONCEALED SOUND ATTENUATION BLANKET/BATT INSULATION

- A Sound Attenuation Blanket/Batt Insulation: ASTM C 665, Type I (blankets without membrane facing). Comply with mineral-fiber requirements of assembly.
1. Products: Subject to compliance with the Contract Documents provide one of the following.
 - a. "MinWool SAFB (Sound Attenuation Fire Batts)" manufactured by Johns Manville.
 - b. "ROCKWOOL AFB (Acoustical Fire Batt)" manufactured by ROCKWOOL.
 - c. "Thermafiber SAFB (Sound Attenuation Fire Blankets)" manufactured by Owens Corning Insulating Systems, LLC.
 2. Thickness: As indicated on the Drawings.
 3. Performance Requirements:
 - a. Surface-Burning Characteristics: Complying with ASTM E 84; tested by a qualified testing agency.
 - 1) Flame-Spread Index: 0.
 - 2) Smoke-Developed Index: 0.

2.2 ACOUSTICAL JOINT SEALANTS

- A Acoustical Joint Sealants, General:
1. Provide acoustical joint-sealant products that effectively reduce airborne sound transmission through perimeter joints and openings in building construction, as demonstrated by testing representative assemblies in accordance with ASTM E 90.
 2. Allowable VOC Content: Sealants, sealant primers, and caulks must comply with SCAQMD Rule 1168 VOC limits.
 - a. Such products also shall comply with the Rule 1168 prohibition on the use of certain toxic compounds (chloroform, ethylene dichloride, methylene chloride, perchloroethylene, and trichloroethylene).
- B Acoustical Sealant for Exposed Joints: Manufacturer's standard nonsag, paintable, nonstaining latex acoustical sealant complying with ASTM C 834.
1. Products: Subject to compliance with the Contract Documents provide one of the following.
 - a. "RCS20" manufactured by Momentive Performance Materials; GE Silicone.
 - b. "SC-175" manufactured by OSI.
 - c. "Pecora AIS-919" manufactured by Pecora Corporation.
 2. Colors of Exposed Acoustical Joint Sealants: As selected by the Architect from manufacturer's full range of colors.
- C Acoustical Sealant for Concealed Joints: Manufacturer's standard nonsag, nondrying, nonhardening, nonskinning, nonstaining, gunnable, synthetic-rubber acoustical sealant.
1. Products: Subject to compliance with the Contract Documents provide one of the following.
 - a. "QuietSeal Pro" manufactured by PABCO Gypsum.
 - b. "Pecora BA-98" manufactured by Pecora Corporation.
 - c. "Sikaflex NP 1" manufactured by Sika Corporation.
- D Fire-Rated Acoustical Sealant: Manufacturer's acrylic latex sealant.
1. Products: Subject to compliance with the Contract Documents provide one of the following, or comparable product.
 - a. "Acoustical Sound & Smoke Sealant" manufactured by Grabber.
 - b. "AC-20 FTR" manufactured by Pecora Corporation.
 - c. "Sheetrock Brand Acoustical Sealant" manufactured by USG.

2. Locations: At head and floor joints at acoustical- and fire-rated assemblies; not for use for penetration firestopping.

2.3 AUXILIARY MATERIALS

- A Insulation Fasteners: Mechanical fasteners, prong anchors, pins, or pointed rods. Subject to compliance with the Contract Documents, acceptable sources of comparable products include the following.
 1. AGM Industries, Inc.
 2. Duro Dyne Corporation.
 3. Midwest Fasteners, Inc.
- B Putty Pads: Designed to maintain the performance of acoustically-rated walls at electrical outlet penetrations. Subject to compliance with the Contract Documents, acceptable sources of comparable products include the following.
 1. ATS Acoustics.
 2. PABCO Gypsum.
 3. Soundproofing Company, Inc.
- C Primers: Material recommended by the manufacturer where required for adhesion of acoustical materials to substrates.
- D Cleaners for Nonporous Surfaces: Chemical cleaners acceptable to manufacturers of sealants and sealant backing materials, free of oily residues or other substances capable of staining or harming joint substrates and adjacent nonporous surfaces in any way, and formulated to promote optimum adhesion of sealants to joint substrates.
- E Masking Tape: Nonstaining, nonabsorbent material compatible with joint sealants and surfaces adjacent to joints.
- F Other Accessories: Provide other accessories as supplied, recommended, or required by the acoustical material manufacturers and as necessary for a complete installation or application.

PART 3 EXECUTION

3.1 EXAMINATION

- A Examine joints indicated as receiving acoustical joint sealants, with installer present, for compliance with requirements for joint configuration, installation tolerances, and other conditions affecting performance of the work.
- B Examine surfaces indicated to receive exposed acoustical insulation and verify if priming or sealing is required to ensure bonding or to prevent discoloration caused by migratory stains.
- C Examine outlet boxes to ensure they are properly installed and free of dirt, dust, and oil.
- D Do not proceed with installation or application until unsatisfactory conditions have been corrected.
 1. Installation of acoustical insulation, sealants, and accessories indicates acceptance of surfaces and conditions.

3.2 PREPARATION

- A Acoustical Joint Sealants:
 1. Surface Cleaning of Joints: Clean out joints immediately before installing acoustical joint sealants to comply with the manufacturer's written instructions.
 2. Joint Priming: Prime joint substrates where recommended by the manufacturer. Apply primer to comply with the manufacturer's written instructions. Confine primers to areas of joint-sealant bond; do not allow spillage or migration onto adjoining surfaces.
 3. Masking Tape: Use masking tape where required to prevent contact of sealant or primer with adjoining surfaces that otherwise would be permanently stained or damaged by such contact or by cleaning methods required to remove sealant smears. Remove tape immediately after tooling without disturbing joint seal.

3.3 INSTALLATION OF CONCEALED ACOUSTICAL BLANKET/BATT INSULATION

- A Blanket/Batt Insulation: Install in cavities formed by framing members according to the following requirements:
1. Install sound attenuation blankets before installing gypsum panels unless blankets are readily installed after panels have been installed on one side.
 2. Use insulation widths and lengths that fill the cavities formed by framing members. If more than one length is required to fill the cavities, provide lengths that will produce a snug fit between ends.
 3. Place insulation in cavities formed by framing members to produce a friction fit between edges of insulation and adjoining framing members.
 4. Maintain 3-inch clearance of insulation around recessed lighting fixtures not rated for or protected from contact with insulation.
 5. For metal-framed wall cavities where cavity heights exceed 96 inches, support unfaced blankets mechanically.
 6. Miscellaneous Voids: Install insulation in miscellaneous voids and cavity spaces where required to prevent gaps in insulation.

3.4 INSTALLATION OF ACOUSTICAL JOINT SEALANTS

- A General: Comply with the manufacturer's written installation instructions unless more stringent requirements apply.
- B STC-Rated Assemblies: Seal construction at perimeters, behind control joints, and at openings and penetrations with a continuous bead of acoustical joint sealant. Install acoustical joint sealants at both faces of partitions, at perimeters, and through penetrations, and as otherwise indicated on the Drawings.
1. Comply with ASTM C 919, ASTM C 1193, and manufacturer's written recommendations for closing off sound-flanking paths around or through assemblies, including sealing partitions to underside of floor slabs above acoustical ceilings.
- C Acoustical Ceiling Areas: Apply acoustical joint sealant at perimeter edge moldings of acoustical ceiling areas in a continuous ribbon concealed on back of vertical legs of moldings before they are installed.

3.5 INSTALLATION OF ACOUSTICAL PUTTY PADS

- A Remove release paper. Starting at the side of the outlet box, align the putty pad to front edge of box and overlap onto the stud.
- B Cut putty pad to fit around conduits or cables and pleat extra material at the corners.
- C Fold pleated corners into place and firmly press putty pad into place so the entire surface of the back of the outlet box is covered.

3.6 CLEANING

- A Clean off excess sealant or sealant smears adjacent to joints as the work progresses by methods and with cleaning materials approved in writing by manufacturers of acoustical joint sealant and of products in which joints occur.

3.7 PROTECTION

- A Acoustical Insulation: Protect installed insulation from damage. Provide temporary coverings or enclosures where insulation is subject to abuse and cannot be concealed and protected by permanent construction immediately after installation.
- B Acoustical Sealants: Protect acoustical joint sealants during and after curing period from contact with contaminating substances and from damage resulting from construction operations or other causes so sealants are without deterioration or damage at time of Final Acceptance.

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1. If, despite such protection, damage or deterioration occurs, cut out, remove, and repair damaged or deteriorated acoustical joint sealants immediately so installations with repaired areas are indistinguishable from original work.

END OF SECTION 09 81 00

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SECTION 09 84 33 - SOUND-ABSORBING WALL UNITS (ALTERNATE)

PART 1 GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A Section Includes:
 - 1. Wall panels tested for acoustical performance.
 - 2. Supplementary components and accessories normally furnished or otherwise necessary for a complete installation.
- B Related Requirements:
 - 1. Section 01 23 00 Alternates.

1.3 REFERENCES

- A Definitions:
 - 1. Manufacturer: Means the sound-absorbing wall unit manufacturer unless otherwise indicated.

1.4 SUBMITTALS

- A Action Submittals:
 - 1. Product Data: For each type of product; include Health Product Declaration and Environmental Product Declaration.
 - 2. Shop Drawings: For unit assembly and installation.
 - a. Include plans, elevations, sections, and mounting devices and details.
 - b. Include details at panel head, base, joints, and corners; and details at ceiling, floor base, and wall intersections. Indicate panel edge profile and core materials.
 - c. Include details at cutouts and penetrations for other work.
 - 3. Samples: Only required, in standard size, from specified "Acceptable Manufacturer" if other than the basis-of-design product(s) will be provided for the Project.
- B Informational Submittals:
 - 1. Coordination Drawings: Elevations and other details, drawn to scale, on which the following items are shown and coordinated with each other, using input from installers of the items involved:
 - a. Electrical outlets, switches, and thermostats.
 - b. Items penetrating or covered by units.
 - 2. Product Certificates: For each type of unit.
- C Closeout Submittals:
 - 1. Maintenance Data: For each type of unit to include in maintenance manuals.

1.5 DELIVERY, STORAGE, AND HANDLING

- A Comply with unit manufacturers' written instructions for minimum and maximum temperature and humidity requirements for shipment, storage, and handling.
- B Deliver materials and units in unopened bundles and store in a temperature-controlled dry place with adequate air circulation.
- C Protect panel edges from crushing and impact.

1.6 FIELD CONDITIONS

- A Environmental Limitations: Do not install units until spaces are enclosed and weathertight, wet-work in spaces is complete and dry, work at and above ceilings is complete, and ambient temperature and humidity conditions are maintained at the levels indicated for Project when occupied for its intended use.

- B Lighting: Do not install units until a lighting level of not less than 50 fc is provided on surfaces to receive the units.
- C Air-Quality Limitations: Protect units from exposure to airborne odors, such as tobacco smoke, and install units under conditions free from odor contamination of ambient air.
- D Field Measurements: Verify unit locations and actual dimensions of openings and penetrations by field measurements before fabrication, and indicate them on Shop Drawings.

PART 2 PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A Fire-Test-Response Characteristics: Units shall comply with "Surface-Burning Characteristics" or "Fire Growth Contribution" Subparagraph below, or both, as determined by testing identical products by UL or another testing and inspecting agency acceptable to the AHJ.
 - 1. Surface-Burning Characteristics: Comply with ASTM E 84 or UL 723; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
 - a. Flame-Spread Index: 25 or less.
 - b. Smoke-Developed Index: 450 or less.
 - 2. Fire Growth Contribution: Comply with acceptance criteria of local code and authorities having jurisdiction when tested according to NFPA 265 Method B Protocol or NFPA 286.

2.2 SOUND ABSORBING UNITS

- A Sound Absorbing Wall Units (SAW-1):
 - 1. Basis-of-Design Product: Subject to compliance with the Contract Documents design is based on the product indicated in the Interior Finish Materials Schedule on the Drawings as manufactured by the following.
 - a. MDC Zintra.
 - 2. Acceptable Manufacturers: Subject to compliance with the Contract Documents provide the basis-of-design product or comparable approved product by one of the following.
 - a. Artizin Acoustic Solutions.
 - b. MPS Acoustics.

2.3 ACCESSORIES

- A Fasteners and Mounting Devices: As supplied, recommended, or required by the manufacturer.
- B Adhesives: Water-resistant, mildew-resistant, type to suit products and conditions indicated, that complies with flammability requirements for installed units, and is supplied, recommended, or required by the manufacturer.
 - 1. Allowable VOC Content: Low emitting adhesives, adhesive bonding primers, and adhesive primers must comply with SCAQMD Rule 1168 VOC limits.
 - a. Such products also shall comply with the Rule 1168 prohibition on the use of certain toxic compounds (chloroform, ethylene dichloride, methylene chloride, perchloroethylene, and trichloroethylene).
- C Accessories: As supplied, recommended, or required by the manufacturer and as necessary for a complete installation.

PART 3 EXECUTION

3.1 EXAMINATION

- A Examine fabricated units, substrates, areas, and conditions for compliance with requirements, installation tolerances, and other conditions affecting unit performance.
- B Do not proceed with installation until unsatisfactory conditions have been corrected.
 - 1. Installation of wall units indicates acceptance of surfaces and conditions.

3.2 INSTALLATION

- A Install units in locations indicated. Unless otherwise indicated, install units with vertical surfaces and edges plumb, top edges level and in alignment with other units, faces flush, and scribed to fit adjoining work accurately at borders and at penetrations.
- B Comply with manufacturer's written instructions for installation of units using type of mounting devices or method indicated. Mount units securely to supporting substrate.

3.3 INSTALLATION TOLERANCES

- A Variation from Plumb and Level: Plus or minus 1/16 inch in 48 inches, noncumulative.

3.4 CLEANING

- A Clean panels on completion of installation to remove dust and other foreign materials according to manufacturer's written instructions.

END OF SECTION 09 84 33

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SECTION 09 84 36 - SOUND-ABSORBING CEILING UNITS (ALTERNATE)

PART 1 GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A Section includes shop-fabricated, acoustical units tested for acoustical performance, including the following:
 - 1. Sound-absorbing baffle panels.
 - 2. Supplementary components and accessories normally furnished or otherwise necessary for a complete installation.
- B Related Requirements:
 - 1. Section 01 23 00 Alternates.

1.3 REFERENCES

- A Acronyms and Abbreviations:
 - 1. AHJ: Authority (Authorities) Having Jurisdiction.
- B Definitions:
 - 1. Manufacturer: Means the sound-absorbing ceiling unit manufacturer unless otherwise indicated.

1.4 SUBMITTALS

- A Action Submittals:
 - 1. Product Data: For each type of product; include Health Product Declaration and Environmental Product Declaration.
 - 2. Shop Drawings: For unit assembly and installation.
 - a. Include reflected ceiling plans, elevations, sections, and mounting devices and details.
 - 3. Samples: Only required, in standard size, from specified "Acceptable Manufacturer" if other than the basis-of-design product(s) will be provided for the Project.
- B Informational Submittals:
 - 1. Coordination Drawings: Reflected ceiling plans and other details, drawn to scale, on which the following items are shown and coordinated with each other, using input from installers of the items involved:
 - a. Suspended ceiling components above ceiling units.
 - b. Structural members to which suspension devices will be attached.
 - c. Items penetrating or covered by units.

1.5 DELIVERY, STORAGE, AND HANDLING

- A Comply with the manufacturers' written instructions for minimum and maximum temperature and humidity requirements for shipment, storage, and handling.
- B Deliver materials and units in unopened bundles and store units flat in a temperature-controlled dry place with adequate air circulation; do not stand on end.
- C Acclimatize products for at least 24 hours prior to installation at ambient temperature and humidity levels indicated for Project when occupied for its intended use.

1.6 FIELD CONDITIONS

- A Environmental Limitations: Do not install units until spaces are enclosed and weathertight, wet-work in spaces is complete and dry, work at and above ceilings is complete, and ambient temperature and humidity conditions are maintained at the levels indicated for Project when occupied for its intended use.

- B Air-Quality Limitations: Protect units from exposure to airborne odors, such as tobacco smoke, and install units under conditions free from odor contamination of ambient air.

PART 2 PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A Fire-Test-Response Characteristics: Units shall comply with "Surface-Burning Characteristics" as determined by testing identical products by UL or another testing and inspecting agency acceptable to the AHJ.
 - 1. Surface-Burning Characteristics: Comply with ASTM E 84 or UL 723; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
 - a. Flame-Spread Index: 25 or less.
 - b. Smoke-Developed Index: 450 or less.

2.2 SOUND-ABSORBING CEILING UNITS

- A Sound Absorbing Baffle Panels:
 - 1. Basis-of-Design Product (SAC-1): Subject to compliance with the Contract Documents, the design is based on the product indicated in the Finish Material Schedule on the Drawings as manufactured by the following.
 - a. Turf Design, Inc.
 - 2. Acceptable Manufacturers: Subject to compliance with the Contract Documents provide the basis-of-design product or comparable approved product by one of the following.
 - a. Artizin Acoustic Solutions.
 - b. MSP Acoustics.

2.3 ACCESSORIES

- A Slotted Channel Framing: As specified in Section 05 50 00 Metal Fabrications and complying with manufacturer's requirements for ceiling assembly including caution against painting.
- B Accessories: As supplied, recommended, or required by the manufacturer as necessary for a complete installation.

PART 3 EXECUTION

3.1 EXAMINATION

- A Examine fabricated units, substrates, areas, and conditions for compliance with requirements, installation tolerances, and other conditions affecting unit performance.
- B Do not proceed with installation until unsatisfactory conditions have been corrected.
 - 1. Installation of sound-absorbing ceiling units indicates acceptance of surfaces and conditions.

3.2 INSTALLATION

- A Install units in locations indicated in accordance with manufacturer's written installation instructions and as indicated on the Drawings.
- B Align units accurately, with edges plumb and top edges level.

3.3 INSTALLATION TOLERANCES

- A Variation from Alignment with Surfaces: Plus or minus 1/16 inch in 48 inches, noncumulative.
- B Variation from Level or Slope: Plus or minus 1/16 inch.

3.4 CLEANING

- A Clean units on completion of installation to remove dust and other foreign materials according to manufacturer's written instructions.

3.5 PROTECTION

- A Provide final protection and maintain conditions, in a manner acceptable to manufacturer and that ensures that units are without damage or deterioration at time of Final Acceptance.
- B Replace damaged sound-absorbing ceiling units that cannot be repaired, in a manner approved by Architect, before time of Final Acceptance.

END OF SECTION 09 84 36

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SECTION 09 91 13 - EXTERIOR PAINTING

PART 1 GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A Section includes surface preparation and the application of paint systems on the following exterior substrates:
 - 1. Metal indicated on the Drawings, including hollow-metal doors and frames.
 - 2. Supplementary components and accessories normally furnished or otherwise necessary for a complete application.

1.3 REFERENCES

- A Acronyms and Abbreviations:
 - 1. MPI: Master Painters Institute.
 - 2. SCAQMD: South Coast Air Quality Management District.
 - 3. SSPC: The Society for Protective Coatings.
 - 4. VOC: Volatile Organic Compound.
- B Definitions:
 - 1. Gloss Level 5: Traditional semigloss finish. 35 to 70 units at 60 degrees, according to ASTM D 523.

1.4 ACTION SUBMITTALS

- A Product Data: For each type of product. Include Health Product Declaration and Environmental Product Declaration.
 - 1. Include preparation requirements and application instructions.
- B Samples: For each type of paint system and each color and gloss of topcoat.
 - 1. Submit Samples on rigid backing, 8 inches square.
 - 2. Apply coats on Samples in steps to show each coat required for system.
 - 3. Label each coat of each Sample.
 - 4. Label each Sample for location and application area.
- C Product Schedule: Use same designations indicated on Drawings and in the Exterior Painting Schedule to cross-reference paint systems specified in this Section. Include color designations.

1.5 DELIVERY, STORAGE, AND HANDLING

- A Store materials not in use in tightly covered containers in well-ventilated areas with ambient temperatures continuously maintained at not less than 45 deg F.
 - 1. Maintain containers in clean condition, free of foreign materials and residue.
 - 2. Remove rags and waste from storage areas daily.

1.6 FIELD CONDITIONS

- A Apply paints only when temperature of surfaces to be painted and ambient air temperatures are between 50 and 95 deg F.
- B Do not apply paints in snow, rain, fog, or mist; when relative humidity exceeds 85 percent; at temperatures less than 5 deg F above the dew point; or to damp or wet surfaces.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A Manufacturers:
 - 1. Basis-of-Design Manufacturers: Design is based on products manufactured by the following.

- a. The Sherwin-Williams Company.
- 2. Acceptable Manufacturers: Subject to compliance with the Contract Documents, acceptable sources of comparable products include the following.
 - a. Benjamin Moore & Co.
 - b. PPG Industries, Inc.
- B Source Limitations: Obtain each paint product from single source from the same manufacturer.

2.2 PAINT, GENERAL

- A Material Compatibility:
 - 1. Materials for use within each paint system shall be compatible with one another and substrates indicated, under conditions of service and application as demonstrated by manufacturer, based on testing and field experience.
 - 2. For each coat in a paint system, products shall be recommended in writing by topcoat manufacturers for use in paint system and on substrate indicated.
- B Allowable VOC Content: Architectural coatings intended to be field applied must comply with SCAQMD Rule 1113 VOC limits.
 - 1. Nonflat Paints and Coatings: 50 g/L.
 - 2. Primers, Sealers, and Undercoaters: 100 g/L.
 - 3. Rust-Preventive Coatings: 100 g/L.
- C Colors and Gloss Levels: As selected by the Architect.

PART 3 EXECUTION

3.1 EXAMINATION

- A Examine substrates and conditions, with Applicator present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.
- B Verify suitability of substrates, including surface conditions and compatibility, with existing finishes and primers.
- C Proceed with coating application only after unsatisfactory conditions have been corrected.
 - 1. Application of coating indicates acceptance of surfaces and conditions.

3.2 PREPARATION

- A Comply with manufacturer's written instructions and recommendations in the MPI publication MPI Architectural Painting Specification Manual applicable to substrates and paint systems indicated.
- B Remove hardware, covers, plates, and similar items already in place that are removable and are not to be painted. If removal is impractical or impossible because of size or weight of item, provide surface-applied protection before surface preparation and painting.
 - 1. After completing painting operations, use workers skilled in the trades involved to reinstall items that were removed. Remove surface-applied protection.
- C Clean substrates of substances that could impair bond of paints, including dust, dirt, oil, grease, and incompatible paints and encapsulants.
 - 1. Remove incompatible primers and reprime substrate with compatible primers or apply tie coat as required to produce paint systems indicated.
- D Steel Substrates: Remove rust, loose mill scale, and shop primer if any. Clean using methods recommended in writing by paint manufacturer.
- E Shop-Primed Steel Substrates: Clean field welds, bolted connections, and areas where shop paint is abraded. Paint exposed areas with the same material as used for shop priming to comply with SSPC-PA 1 for touching up shop-primed surfaces.
- F Galvanized-Metal Substrates: Remove grease and oil residue from galvanized sheet metal by mechanical methods to produce clean, lightly etched surfaces that promote adhesion of subsequently applied paints.

3.3 APPLICATION

- A Apply paints according to manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual."
 - 1. Use applicators and techniques suited for paint and substrate indicated.
 - 2. Paint surfaces behind movable items same as similar exposed surfaces. Before final installation, paint surfaces behind permanently fixed items with prime coat only.
 - 3. Paint both sides and edges of exterior doors and entire exposed surface of exterior door frames.
 - 4. Paint entire exposed surface of window frames and sashes.
 - 5. Do not paint over labels of independent testing agencies or equipment name, identification, performance rating, or nomenclature plates.
 - 6. Primers specified in painting schedules may be omitted on items that are factory primed or factory finished if acceptable to topcoat manufacturers.
- B Tint undercoats same color as topcoat, but tint each undercoat a lighter shade to facilitate identification of each coat if multiple coats of same material are to be applied. Provide sufficient difference in shade of undercoats to distinguish each separate coat.
- C If undercoats or other conditions show through topcoat, apply additional coats until cured film has a uniform paint finish, color, and appearance.
- D Apply paints to produce surface films without cloudiness, spotting, holidays, laps, brush marks, roller tracking, runs, sags, ropiness, or other surface imperfections. Cut in sharp lines and color breaks.

3.4 FIELD QUALITY CONTROL

- A Dry Film Thickness Testing: Owner may engage the services of a qualified testing and inspecting agency to inspect and test paint for dry film thickness.
 - 1. Contractor shall touch up and restore painted surfaces damaged by testing.
 - 2. If test results show that dry film thickness of applied paint does not comply with paint manufacturer's written recommendations, Contractor shall pay for testing and apply additional coats as needed to provide dry film thickness that complies with paint manufacturer's written recommendations.
- B Coating Material Sample Testing: Owner may engage the services of a qualified testing and inspecting agency to inspect and test coatings for compliance with specified requirements.
 - 1. Samples of material delivered to Project site will be taken, identified, sealed, and certified in presence of Contractor.
 - 2. Owner may direct Contractor to provide corrective materials if test results show materials being used do not comply with specified requirements.
 - a. Contractor shall remove noncomplying coating materials from Project site, pay for retesting, and recoat surfaces.
 - b. Contractor will be required to remove rejected materials from previously coated surfaces unless documentation is provided to show materials are compatible with replacement materials.

3.5 CLEANING AND PROTECTION

- A At end of each workday, remove rubbish, empty cans, rags, and other discarded materials from Project site.
 - 1. Do not clean equipment with free-draining water. Prevent solvents, thinners, cleaners, and other contaminants from entering into waterways, sanitary and storm drain systems, and ground.
 - 2. Dispose of contaminants in accordance with requirements of authorities having jurisdiction.
 - 3. Allow empty paint cans to dry before disposal.
 - 4. Collect waste paint by type and deliver to recycling or collection facility.
- B After completing paint application, clean spattered surfaces. Remove spattered paints by washing, scraping, or other methods. Do not scratch or damage adjacent finished surfaces.

- C Protect work of other trades against damage from paint application. Correct damage to work of other trades by cleaning, repairing, replacing, and refinishing, as approved by Architect, and leave in an undamaged condition.
- D At completion of construction activities of other trades, touch up and restore damaged or defaced painted surfaces.

3.6 EXTERIOR PAINTING SCHEDULE

- A Metal Substrates: Verify color and gloss with Architect.
 - 1. Primer: S-W Pro Industrial Pro-Cryl Universal Primer, B66-310 Series (5 to 10 mils wet 2-4 mils dry); apply if metal substrate has not been shop primed.
 - 2. Intermediate Coat: Matching topcoat; verify compatibility with shop-applied primer if any.
 - 3. Topcoat: S-W Pro Industrial WB Alkyd Urethane, B53-1150 Series (2.5 to 4.0 mils dry per coat)

END OF SECTION 09 91 13

SECTION 09 91 23 - INTERIOR PAINTING

PART 1 GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A Section Includes:
 - 1. Surface preparation and the application of paint systems on interior substrates.
 - 2. Supplementary components and accessories normally furnished or otherwise necessary for a complete application.

1.3 REFERENCES

- A Acronyms and Abbreviations:
 - 1. MPI: Master Painters Institute.
 - 2. SCAQMD: South Coast Air Quality Management District.
 - 3. SSPC: The Society for Protective Coatings.
 - 4. VOC: Volatile Organic Compound.
- B Definitions:
 - 1. Gloss Level 1: Traditional matte finish (flat). Not more than five units at 60 degrees and 10 units at 85 degrees, according to ASTM D 523.
 - 2. Gloss Level 3: Traditional eggshell-like finish. 10 to 25 units at 60 degrees and 10 to 35 units at 85 degrees, according to ASTM D 523.
 - 3. Gloss Level 5: Traditional semigloss finish. 35 to 70 units at 60 degrees, according to ASTM D 523.
 - 4. Manufacturer: Means the paint manufacturer unless otherwise indicated.

1.4 SUBMITTALS

- A Action Submittals:
 - 1. Product Data: For each type of product; include Health Product Declaration and Environmental Product Declaration. Include VOC content, preparation requirements, and application instructions.
 - 2. Product List: Use same designations indicated on the Drawings and in the Finish Schedule to cross-reference paint systems specified in this Specification Section. Include color designations.

1.5 DELIVERY, STORAGE, AND HANDLING

- A Store materials not in use in tightly covered containers in well-ventilated areas with ambient temperatures continuously maintained at not less than 45 deg F.
 - 1. Maintain containers in clean condition, free of foreign materials and residue.
 - 2. Remove rags and waste from storage areas daily.

1.6 FIELD CONDITIONS

- A Apply paints only when temperature of surfaces to be painted and ambient air temperatures are between 50 and 95 deg F.
- B Do not apply paints when relative humidity exceeds 85 percent; at temperatures less than 5 deg F above the dew point; or to damp or wet surfaces.

PART 2 PRODUCTS

2.1 INTERIOR PAINT

- A Manufacturers:

1. Basis-of-Design Manufacturer: Design is based on products manufactured by the following.
 - a. The Sherwin-Williams Company.
2. Acceptable Manufacturers: Subject to compliance with the Contract Documents, provide products by the basis-of-design manufacturer or comparable products by one of the following manufacturers.
 - a. Benjamin Moore & Co.
 - b. PPG.
- B Products, General: Refer to end of Part 3 of this Section for specific products and listing of applications for each product.
- C Colors and Gloss Levels (P-1 through P18): As indicated in the Finish Material Schedule on the Drawings.

2.2 PAINT, GENERAL

- A Material Compatibility:
 1. Materials for use within each paint system shall be compatible with one another and substrates indicated, under conditions of service and application as demonstrated by manufacturer, based on testing and field experience.
 2. Products shall be of same manufacturer for each coat in a coating system.
- B Allowable VOC Content: Architectural coatings intended to be field applied must comply with SCAQMD Rule 1113 VOC limits.
 1. Flat Paint and Coatings: 50 g/L.
 2. Nonflat Paints and Coatings: 50 g/L.
 3. Primers, Sealers, and Undercoaters: 100 g/L.
 4. Rust-Preventive Coatings: 100 g/L.

PART 3 EXECUTION

3.1 EXAMINATION

- A Examine substrates and conditions, with applicator present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the work.
- B Maximum Moisture Content of Substrates: When measured with an electronic moisture meter as follows:
 1. Gypsum Board: 12 percent.
- C Gypsum Board Substrates: Verify that finishing compound is sanded smooth.
- D Verify suitability of substrates, including surface conditions and compatibility, with existing finishes and primers.
- E Do not proceed with coating application until unsatisfactory conditions have been corrected.
 1. Application of coatings indicates acceptance of surfaces and conditions.

3.2 PREPARATION

- A Comply with manufacturer's written instructions and recommendations in the MPI publication MPI Architectural Painting Specification Manual applicable to substrates and paint systems indicated.
- B Remove hardware, covers, plates, and similar items already in place that are removable and are not to be painted. If removal is impractical or impossible because of size or weight of item, provide surface-applied protection before surface preparation and painting.
 1. After completing painting operations, use workers skilled in the trades involved to reinstall items that were removed. Remove surface-applied protection if any.
- C Clean substrates of substances that could impair bond of paints, including dust, dirt, oil, grease, and incompatible paints and encapsulants.
 1. Remove incompatible primers and reprime substrate with compatible primers or apply tie coat as required to produce paint systems indicated.
- D Shop-Primed Steel Substrates: Clean field welds, bolted connections, and areas where shop paint is abraded. Paint exposed areas with the same material as used for shop priming to comply with SSPC-PA 1 for touching up shop-primed surfaces.

3.3 APPLICATION

- A Apply paints according to the manufacturer's written instructions and to recommendations in the MPI publication MPI Architectural Painting Specification Manual.
 - 1. Use applicators and techniques suited for paint and substrate indicated.
 - 2. Paint surfaces behind movable equipment and furniture same as similar exposed surfaces. Before final installation, paint surfaces behind permanently fixed equipment or furniture with prime coat only.
 - 3. Paint front and backsides of access panels, removable or hinged covers, and similar hinged items to match exposed surfaces.
 - 4. Do not paint over labels of independent testing agencies or equipment name, identification, performance rating, or nomenclature plates.
 - 5. Primers specified in painting schedules may be omitted on items that are factory primed or factory finished if acceptable to topcoat manufacturers.
- B Tint each undercoat a lighter shade to facilitate identification of each coat if multiple coats of same material are to be applied. Tint undercoats to match color of topcoat, but provide sufficient difference in shade of undercoats to distinguish each separate coat.
- C If undercoats or other conditions show through topcoat, apply additional coats until cured film has a uniform paint finish, color, and appearance.
- D Apply paints to produce surface films without cloudiness, spotting, holidays, laps, brush marks, roller tracking, runs, sags, ropiness, or other surface imperfections. Cut in sharp lines and color breaks.
- E Apply primers and finish coats in accordance with manufacturer's recommended wet-film thickness, square foot per gallon, and mil thickness per coat. Do not add solvent or thinner to paint and coating products.
- F Allow adequate drying time before handling and before applying subsequent coats. Low VOC and water-based paint systems require longer drying times. Comply with manufacturer's written instructions. Protect in accordance with "Cleaning and Protection" Article below.
- G Painting Fire Suppression, Plumbing, HVAC, Electrical, Communication, and Electronic Safety and Security Work:
 - 1. Paint the following work where exposed in equipment rooms:
 - a. Equipment, including panelboards.
 - b. Uninsulated metal piping.
 - c. Uninsulated plastic piping.
 - d. Pipe hangers and supports.
 - e. Metal conduit.
 - f. Plastic conduit.
 - g. Tanks that do not have factory-applied final finishes.
 - h. Duct, equipment, and pipe insulation having cotton or canvas insulation covering or other paintable jacket material.
 - 2. Paint the following work where exposed in occupied spaces:
 - a. Equipment, including panelboards.
 - b. Uninsulated metal piping.
 - c. Uninsulated plastic piping.
 - d. Pipe hangers and supports.
 - e. Metal conduit.
 - f. Plastic conduit.
 - g. Duct, equipment, and pipe insulation having cotton or canvas insulation covering or other paintable jacket material.
 - h. Other items as directed by Architect.
 - 3. Paint portions of internal surfaces of metal ducts, without liner, behind air inlets and outlets that are visible from occupied spaces.

3.4 FIELD QUALITY CONTROL

- A Dry Film Thickness Testing: Owner may engage the services of a qualified testing and inspecting agency to inspect and test paint for dry film thickness.
 - 1. Contractor shall touch up and restore painted surfaces damaged by testing.
 - 2. If test results show that dry film thickness of applied paint does not comply with paint manufacturer's written recommendations, Contractor shall pay for testing and apply additional coats as needed to provide dry film thickness that complies with paint manufacturer's written recommendations.

3.5 CLEANING AND PROTECTION

- A At end of each workday, remove rubbish, empty cans, rags, and other discarded materials from Project site.
- B After completing paint application, clean spattered surfaces. Remove spattered paints by washing, scraping, or other methods. Do not scratch or damage adjacent finished surfaces.
- C Protect work of other trades against damage from paint application. Correct damage to work of other trades by cleaning, repairing, replacing, and refinishing, as approved by Architect, and leave in an undamaged condition.
- D At completion of construction activities of other trades, touch up and restore damaged or defaced painted surfaces.

3.6 INTERIOR PAINTING SCHEDULE

- A General: Verify colors and sheens with Architect.
- B Gypsum Board Substrates:
 - 1. Institutional low-odor/VOC latex system.
 - a. Prime Coat: Primer sealer, interior, institutional low odor/VOC.
 - 1) "ProMar 200 Zero VOC Latex Primer" B28W02600. Applied at a wet film thickness of 4 mils or 1.0 mils dry.
 - b. Intermediate Coat: Latex, interior, institutional low odor/VOC, matching topcoat.
 - c. Topcoat: Latex, interior, institutional low odor/VOC, eggshell (Gloss Level 3).
 - 1) "ProMar 200 Zero VOC Interior Eg-Shel Latex", B20-2600 Series. Applied at a wet film thickness of 4.0 mils or 1.7 mils dry.
 - 2. Epoxy-Modified Latex System.
 - a. Prime Coat: Primer sealer, interior.
 - 1) "ProMar 200 Zero VOC Latex Primer" B28W02600. Applied at a wet film thickness of 4 mils or 1.0 mils dry.
 - b. Intermediate Coat: Epoxy-modified latex, matching topcoat..
 - c. Topcoat: Latex, interior, institutional low odor/VOC, eggshell (Gloss Level 3).
 - 1) "Pro Industrial Pre-Catalyzed Water Based Epoxy" K46-150 Series. Applied at a wet film thickness of minimum 4.0 mils or 1.5 mils dry.
- C Metal Substrates: Institutional low-odor/VOC system.
 - 1. Prime Coat: Primer, rust inhibitive, water based. Apply if metal substrate has not been shop primed.
 - a. "Pro Industrial Pro-Cryl Universal Primer", B66-310 Series. Applied at a wet film thickness of 5.0 mils or 1.8 dry.
 - 2. Intermediate Coat: Water-based acrylic, interior, matching topcoat; verify compatibility with shop-applied primer if any.
 - 3. Topcoat: Interior, institutional low odor/VOC. Verify gloss level with Architect.
 - a. "Pro Industrial WB Alkyd Urethane", B53-1150 Series. Applied at a wet film thickness of 5.0 mils or 1.7 dry.

END OF SECTION 09 91 23

SECTION 10 14 23 - ROOM IDENTIFICATION SIGNAGE

PART 1 GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A Section Includes:
 - 1. Interior room-identification signs that are directly attached to the building.
 - 2. Supplementary components and accessories normally furnished or otherwise necessary for a complete installation.

1.3 REFERENCES

- A Acronyms and Abbreviations:
 - 1. ADA: Americans With Disabilities Act.
 - 2. USDOJ: United States Department of Justice.
 - 3. UV: Ultraviolet Radiation.
- B Definitions:
 - 1. Accessible: Means in accordance with the accessibility standard.
 - 2. Manufacturer: Means the panel signage manufacturer.

1.4 SUBMITTALS

- A Action Submittals:
 - 1. Product Data: For each type of product; include Health Product Declaration and Environmental Product Declaration.
 - 2. Shop Drawings: For room-identification signs.
 - a. Include fabrication and installation details and attachments to other work.
 - b. Show sign and character mounting heights.
 - c. Show message list, typestyles, graphic elements, including raised characters and Braille, and layout for each sign at least half size.
 - 3. Samples:
 - a. Room Identification Signage: For each type of sign assembly showing all components and with the required finish(es), as follows:
 - 1) Room-Identification Signs: Full-size Sample.
 - 2) Full-size Sample, if approved, will be returned to Contractor for use in Project.
 - 4. Product Schedule: For room-identification signs. Use same designations indicated on Drawings.
- B Closeout Submittals:
 - 1. Maintenance Data: For signs to include in maintenance manuals.

PART 2 PRODUCTS

2.1 ROOM-IDENTIFICATION SIGNS

- A Accessibility Standard: Comply with applicable provisions in the USDOJ publication *2010 ADA Standards for Accessible Design* and ICC A117.1-2009.
- B Room-Identification Signs: Signs with smooth, uniform surfaces; with message and characters having uniform faces, sharp corners, and precisely formed lines and profiles.
 - 1. Manufacturers: Subject to compliance with the Contract Documents, provide products by one of the following.
 - a. ASI Sign Systems, Inc.
 - b. Signature Signs, Inc.
 - c. 2/90 Sign Systems.

2. Material, Dimensions, and Colors: As indicated on the Drawings and to match Campus Standards.
- C Accessories: As supplied, recommended, or required by manufacturer and as necessary for a complete installation.

2.2 FABRICATION

- A General: Provide manufacturer's standard sign assemblies according to requirements indicated.

PART 3 EXECUTION

3.1 EXAMINATION

- A Examine substrates, areas, and conditions, with installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the work.
- B Verify that sign-support surfaces are within tolerances to accommodate signs without gaps or irregularities between backs of signs and support surfaces.
- C Do not proceed with installation until unsatisfactory conditions have been corrected.
 1. Installation of signage indicates acceptance of surfaces and conditions.

3.2 INSTALLATION

- A General: Install signs using mounting methods indicated and according to manufacturer's written instructions.
 1. Install signs level, plumb, true to line, and at locations and heights indicated, with sign surfaces free of distortion and other defects in appearance.
 2. Install signs so they do not protrude or obstruct according to the accessibility standard.
 3. Before installation, verify that sign surfaces are clean and free of materials or debris that would impair installation.
- B Room-Identification Signs:
 1. Accessibility: Install signs in locations on walls as indicated on Drawings and according to the accessibility standard.

3.3 ADJUSTING AND CLEANING

- A Remove and replace damaged or deformed signs and signs that do not comply with specified requirements. Replace signs with damaged or deteriorated finishes or components that cannot be successfully repaired by finish touchup or similar minor repair procedures.
- B Remove temporary protective coverings and strippable films, if any, as signs are installed.
- C On completion of installation, clean exposed surfaces of signs according to manufacturer's written instructions, and touch up minor nicks and abrasions in finish. Maintain signs in a clean condition during construction and protect from damage.

END OF SECTION 10 14 23

SECTION 10 21 13 - PHENOLIC-CORE TOILET COMPARTMENTS

PART 1 GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A Section Includes:
 - 1. Phenolic-core toilet compartments.
 - 2. Supplementary components and accessories normally furnished or otherwise necessary for a complete installation.

1.3 REFERENCES

- A Acronyms and Abbreviations:
 - 1. ADA: Americans With Disabilities Act.
 - 2. USDOJ: United States Department of Justice.
- B Definitions:
 - 1. Manufacturer: Means the toilet compartment manufacturer unless otherwise indicated.
 - 2. Toilet Compartment(s): Means the phenolic-core toilet compartment(s).

1.4 COORDINATION

- A Coordinate requirements for blocking, reinforcing, and other supports concealed within wall to ensure that toilet compartments can be supported and installed as indicated.

1.5 SUBMITTALS

- A Action Submittals:
 - 1. Product Data: For phenolic-core toilet compartments. Include Health Product Declaration and Environmental Product Declaration.
 - a. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for toilet compartments.
 - 2. Shop Drawings:
 - a. Include plans, elevations, sections, details, and attachment details.
 - b. Show locations of cutouts for compartment-mounted toilet accessories.
 - c. Show locations of centerlines of toilet fixtures.
 - d. Show locations of floor drains.
 - e. Show overhead bracing locations.
 - 3. Delegated Design Submittals: For grab bars mounted on toilet compartment panels, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.
 - a. Include structural design calculations indicating compliance with specified structural-performance requirements.
- B Closeout Submittals:
 - 1. Operation and Maintenance Data: For toilet compartments.

1.6 FIELD CONDITIONS

- A Field Measurements: Verify locations of toilet fixtures, walls, columns, ceilings, and other construction contiguous with toilet compartments by field measurements, and coordinate before fabrication.

PART 2 PRODUCTS

2.1 SOURCE LIMITATIONS

- A Source Limitations: Obtain toilet compartments from single source from the same manufacturer.

2.2 PERFORMANCE REQUIREMENTS

- A Surface-Burning Characteristics: Comply with ASTM E 84; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
1. Flame-Spread Index: 75 or less.
 2. Smoke-Developed Index: 450 or less.
- B Structural Performance: Where grab bars are mounted on toilet compartments, design panels to comply with the following requirements:
1. Panels are able to withstand a concentrated load on grab bar of at least 250 lbf applied at any direction and at any point, without deformation of panel.
- C Regulatory Requirements: Comply with applicable provisions in the USDOJ publication *2010 ADA Standards for Accessible Design* and ICC A117.1 for toilet compartments designated as accessible.

2.3 PHENOLIC-CORE TOILET COMPARTMENTS

- A Manufacturers:
1. Basis-of-Design Manufacturer: Subject to compliance with the Contract Documents, design is based on the following:
 - a. Partition Systems International of South Carolina (PSiSC); Columbia Systems International of South Carolina LLC (CSiSC).
 2. Acceptable Manufacturers: Subject to compliance with the Contract Documents, provide product by basis-of-design manufacturer or comparable product by one of the following.
 - a. ASI Global Partitions.
 - b. Bradley Corporation.
 - c. General Partitions Mfg. Corp.
- B Toilet-Enclosure Style: Overhead braced.
- C Urinal-Screen Style: Wall-mounted.
- D Door, Panel, and Pilaster Construction: Solid phenolic-core material with melamine facing on both sides fused to substrate during manufacture (not separately laminated), and with eased and polished edges. Provide at least 3/4-inch-thick doors and pilasters and at least 1/2-inch-thick panels. Provide with no-sightline system consisting of door and pilaster lapped edges on strike side of door and door and pilaster lapped edges on hinge side of door (unless continuous hinge is used).
- E Urinal-Screen Construction: Matching panel construction.
- F Pilaster Shoes: Formed from stainless steel sheet, not less than 0.031-inch nominal thickness and 3 inches high, finished to match hardware.
- G Full-Height (Continuous) Brackets (Fittings): Manufacturer's standard design, stainless steel.
- H Phenolic Compartment Finish: One color in each room.
1. Dark-Core Phenolic: Manufacturer's standard dark color core and edge.
 - a. Facing Sheet Color: As selected by Architect from manufacturer's full range.

2.4 HARDWARE AND ACCESSORIES

- A Door Hardware and Accessories: Manufacturer's operating hardware and accessories. Mount with through bolts.
1. Hinges: Manufacturer's standard stainless-steel hinges, allowing emergency access by lifting door.
 2. Latch and Keeper: Manufacturer's standard stainless steel, surface-mounted latch unit designed for emergency access and with combination rubber-faced door strike and keeper. Provide units that comply with regulatory requirements for accessibility at toilet enclosures designated as accessible.

3. Coat Hook: Manufacturer's standard stainless steel combination hook and rubber-tipped bumper, sized to prevent inswinging door from hitting compartment-mounted accessories.
 4. Door Bumper: Manufacturer's standard stainless steel, rubber-tipped bumper at outswinging doors.
 5. Door Pull: Manufacturer's standard stainless steel pull at outswinging doors that complies with regulatory requirements for accessibility. Provide units on both sides of doors at toilet enclosures designated as accessible.
- B Overhead Bracing: Manufacturer's standard continuous, extruded-aluminum head rail with antigrip profile and in manufacturer's standard finish.
- C Anchorages and Fasteners: Manufacturer's standard exposed fasteners of stainless steel, finished to match items they are securing, with theft-resistant-type heads. Provide sex-type bolts for through-bolt applications. For concealed anchors, use stainless steel, hot-dip galvanized-steel, or other rust-resistant, protective-coated steel compatible with related materials.

2.5 MATERIALS

- A Aluminum Extrusions: ASTM B 221.
- B Stainless Steel Sheet: ASTM A 240/A 240M or ASTM A 666, Type 304, stretcher-leveled standard of flatness.
- C Stainless Steel Castings: ASTM A 743/A 743M.

2.6 FABRICATION

- A Fabricate toilet compartment components to sizes indicated. Coordinate requirements and provide cutouts for through-partition toilet accessories where required for attachment of toilet accessories.
- B Overhead-Braced Units: Manufacturer's standard corrosion-resistant supports, leveling mechanism, and anchors at pilasters and walls to suit floor and wall conditions. Provide shoes at pilasters to conceal supports and leveling mechanism.
- C Door Size and Swings: Unless otherwise indicated, provide 24-inch-wide, inswinging doors for standard toilet enclosures and 36-inch-wide, outswinging doors with at least a 32-inch-wide, clear opening for toilet enclosures designated as accessible.

PART 3 EXECUTION

3.1 EXAMINATION

- A Examine areas and conditions, with installer present, for compliance with requirements for fastening, support, alignment, operating clearances, and other conditions affecting performance of the work.
1. Confirm location and adequacy of blocking and supports required for installation.
- B Do not proceed with installation until unsatisfactory conditions have been corrected.
1. Installation of toilet compartments indicates acceptance of surfaces and conditions.

3.2 INSTALLATION

- A General: Comply with manufacturer's written installation instructions. Install units rigid, straight, level, and plumb. Secure units in position with manufacturer's recommended anchoring devices.
1. Maximum Clearances:
 - a. Pilasters and Panels or Screens: 1/2 inch.
 - b. Panels or Screens and Walls: 1 inch.
 2. Full-Height (Continuous) Brackets: Secure panels or screens to walls and to pilasters with full-height brackets.
 - a. Locate bracket fasteners so holes for wall anchors occur in masonry or tile joints.
 - b. Align brackets at pilasters with brackets at walls.

- B Overhead-Braced Units: Secure pilasters to floor and level, plumb, and tighten. Set pilasters with anchors penetrating not less than 1-3/4 inches into structural floor unless otherwise indicated in manufacturer's written instructions. Secure continuous head rail to each pilaster with no fewer than 2 fasteners. Hang doors to align tops of doors with tops of panels, and adjust so tops of doors are parallel with overhead brace when doors are in closed position.
- C Urinal Screens: Attach with anchoring devices to suit supporting structure. Set units level and plumb, rigid, and secured to resist lateral impact.

3.3 ADJUSTING

- A Hardware Adjustment: Adjust and lubricate hardware in accordance with hardware manufacturer's written instructions for proper operation. Set hinges on in-swinging doors to hold doors open approximately 30 degrees from closed position when unlatched. Set hinges on out-swinging doors to return doors to fully closed position.

END OF SECTION 10 21 13

SECTION 10 28 00 - TOILET AND BATH ACCESSORIES

PART 1 GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A Section Includes:
 - 1. Public-use washroom accessories.
 - 2. Shower room accessories.
 - 3. Custodial accessories.
 - 4. Supplementary components and accessories normally furnished or otherwise necessary for a complete installation.

1.3 REFERENCES

- A Definitions:
 - 1. Manufacturer: Means the toilet and bath accessories manufacturer unless otherwise indicated.

1.4 COORDINATION

- A Coordinate accessory locations with other work to prevent interference with clearances required for access by people with disabilities, and for proper installation, adjustment, operation, cleaning, and servicing of accessories.
- B Deliver inserts and anchoring devices set into masonry as required to prevent delaying the work.

1.5 SUBMITTALS

- A Action Submittals
 - 1. Product Data: For each type of product.
 - a. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes.
 - b. Include anchoring and mounting requirements, including requirements for cutouts in other work and substrate preparation.
 - 2. Product Schedule: Indicating types, quantities, sizes, and installation locations by room of each accessory required.
 - a. Identify locations using room designations indicated.
- B Informational Submittals:
 - 1. Sample Warranty: For manufacturer's special warranties.
- C Closeout Submittals:
 - 1. Maintenance Data: For accessories to include in maintenance manuals.
 - 2. Keys: Provide universal keys for internal access to accessories for servicing and resupplying. Provide at least 6 keys to Owner's representative.

1.6 WARRANTY

- A Manufacturer's Special Warranty for Mirrors: Manufacturer agrees to repair or replace mirrors that fail in materials or workmanship within specified warranty period.
 - 1. Failures include visible silver spoilage defects.
 - 2. Warranty Period: 15 years from date of Final Acceptance.

PART 2 PRODUCTS**2.1 OWNER-FURNISHED MATERIALS**

- A Owner-Furnished Materials: The Owner will furnish the following accessories as indicated in the Toilet Accessories Legend on the Drawings.
1. Paper towel dispensers.
 2. Toilelet tissue dispensers.
 3. Soap dispensers.

2.2 PERFORMANCE REQUIREMENTS

- A Structural Performance: Design accessories and fasteners to comply with the following requirements:
1. Grab Bars: Installed units are able to resist 250 lbf concentrated load applied in any direction and at any point.
 2. Shower Seats: Installed units are able to resist at least 360 lbf concentrated load applied in any direction and at any point.

2.3 TOILET AND BATH ACCESSORIES

- A Source Limitations: Obtain each type of toilet and bath accessory from single source from the same manufacturer.
- B Toilet and Bath Accessories:
1. Basis-of-Design Products: Subject to compliance with the Contract Documents design is based on products as indicated in the Toilet Accessories Legend on the Drawings as manufactured by the following.
 - a. Bobrick Washroom Equipment.
 2. Acceptable Manufacturers: Subject to compliance with the Contract Documents provide the basis-of-design products or comparable approved products by one of the following.
 - a. American Specialties, Inc. (ASI)
 - b. Bradley Company, LLC.

2.4 FABRICATION

- A General: Fabricate units with tight seams and joints, and exposed edges rolled. Hang doors and access panels with full-length, continuous hinges. Equip units for concealed anchorage and with corrosion-resistant backing plates.

PART 3 EXECUTION**3.1 INSTALLATION**

- A Install accessories in accordance with manufacturers' written instructions, using fasteners appropriate to substrate indicated and recommended by unit manufacturer. Install units level, plumb, and firmly anchored in locations and at heights indicated.
1. Remove temporary labels and protective coatings.
- B Grab Bars: Install to comply with specified structural-performance requirements.

3.2 ADJUSTING AND CLEANING

- A Adjust accessories for unencumbered, smooth operation. Replace damaged or defective items.
- B Clean and polish exposed surfaces in accordance with manufacturer's written instructions.

END OF SECTION 10 28 00

SECTION 10 41 16 - EMERGENCY KEY VAULTS

PART 1 GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A Section Includes:
 - 1. Commercial key vaults.
 - 2. Supplementary components and accessories normally furnished or otherwise necessary for a complete installation.

1.3 REFERENCES

- A Acronyms and Abbreviations:
 - 1. AHJ: Authority (Authorities) Having Jurisdiction.
- B Definitions:
 - 1. Manufacturer: Means the commercial key vault manufacturer unless otherwise indicated.

1.4 ACTION SUBMITTALS

- A Product Data: For each type of product.
- B Shop Drawings: Include plans, elevations, sections, details, and attachments to other work.

1.5 COORDINATION

- A Verify with Architect if key vault is to be connected to building's alarm system.

PART 2 PRODUCTS

2.1 COMMERCIAL KEY VAULT

- A Description: Hinged-door, high-security vault-like key boxes for allowing fire department rapid access to properties when responding to emergencies.
 - 1. Key vault must meet requirements of, and be acceptable to, the AHJ.
- B Product:
 - 1. Basis-of-Design Product: Subject to compliance with the Contract Documents, design is based on the following.
 - a. "KnoxBox 3200" manufactured by Knox Company.
 - 2. Acceptable Manufacturers: Subject to compliance with the Contract documents, provide the basis-of-design product or comparable approved product by one of the following.
 - a. Emergency Access Systems (EAS).
 - b. Kidde.
 - 3. Model: Hinged door model with UL-listed "Tamper Alert" alarm tamper switches.
 - 4. Capacity: Up to 10 keys.
 - a. Can accommodate access cards and small entry items, but will reduce maximum key quantity.
 - 5. Mounting: Surface mount, unless otherwise indicated. Verify with Architect.
 - 6. Exterior Dimensions: 4 inches high by 5 inches wide by 3-7/8 inches deep.
 - 7. Construction: 1/4-inch welded steel plate housing; 1/2-inch steel plate door with interior gasket seal and stainless steel door hinge.
 - 8. Lock: UL listed double-action rotating tumblers and hardened steel pins accessed by a biased cut key.
 - 9. Color: As selected by the Architect from the manufacturer's full range of colors.
 - 10. Mounting Height: As indicated on the Drawings.

2.2 ACCESSORIES

- A Accessories: As supplied, recommended, or required by the manufacturer and as necessary for a complete installation.

2.3 GENERAL FINISH REQUIREMENTS

- A Protect mechanical finishes on exposed surfaces of fire protection cabinets from damage by applying a strippable, temporary protective covering before shipping.

PART 3 EXECUTION

3.1 INSTALLATION

- A General: Install key vaults in accordance with the manufacturer's written instructions and in locations and at mounting heights indicated or, if not indicated, at locations and heights acceptable to the AHJ.
- B Fasten boxes securely in place, square and plumb.

3.2 ADJUSTING AND CLEANING

- A Remove temporary protective coverings and strippable films, if any, as vaults are installed unless otherwise indicated in manufacturer's written installation instructions.
- B Adjust doors to operate easily without binding. Verify that integral locking devices operate properly.
- C On completion of installation, clean interior and exterior surfaces as recommended by manufacturer.
- D Touch up marred finishes, or replace key vaults that cannot be restored to factory-finished appearance. Use only materials and procedures recommended or furnished by the manufacturer.
- E Replace key vaults that have been damaged or have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.

END OF SECTION 10 41 16

SECTION 10 43 00 - EMERGENCY AID SPECIALTIES

PART 1 GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A Section Includes:
 - 1. Defibrillator cabinets for Owner-provided AED units.
 - 2. Supplementary components and accessories normally furnished or otherwise necessary for a complete installation.
- B Related Requirements:
 - 1. Section 01 23 00 Alternates.

1.3 REFERENCES

- A Acronyms and Abbreviations
 - 1. AED: Automated External Defibrillator.
 - 2. AAMA: Architectural Aluminum Manufacturers Association.
 - 3. NAAMM: National Association of Architectural Metal Manufacturers.
- B Definitions:
 - 1. Cabinet(s): Means the defibrillator cabinet(s).
 - 2. Manufacturer: Means the emergency aid cabinet manufacturer unless otherwise indicated.

1.4 SUBMITTALS

- A Action Submittals:
 - 1. Product Data: For cabinets.
 - a. Show door hardware, cabinet type, trim style, panel style, and identification. Include dimensions and details showing mounting method.
 - 2. Shop Drawings: For emergency aid cabinets.
 - a. Include plans, elevations, sections, details, and attachments to other work.
- B Closeout Submittals:
 - 1. Operation and Maintenance Data: For AED cabinets to include in maintenance manuals.

1.5 COORDINATION

- A Coordinate size of cabinets to ensure that type and capacity of AED unit is accommodated.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A Source Limitations: Obtain each type of cabinet from single source from the same manufacturer.

2.2 DEFIBRILLATOR CABINETS

- A Cabinet Type, General: AED cabinets with battery-powered alarm suitable for Owner-provided "ZOLL AED Plus" AEDs.
 - 1. Product: Subject to compliance with the Contract Documents provide cabinet manufactured by the following.
 - a. ZOLL Medical Corporation.
- B Cabinet Material: Cold-rolled steel.
- C Mounting: Surface.
- D Material: Cold-rolled steel; ASTM A 1008/A 1008M, Commercial Steel (CS), Type B.
- E Door Glazing: Manufacturer's standard.

- F Door Hardware: Manufacturer's standard door-operating hardware of proper type for cabinet type, trim style, and door material and style indicated.
- G Accessories:
 - 1. Identification: Lettering complying with the AHJ for letter style, size, spacing, and location.
 - a. Identify AED unit in defibrillator cabinet with AED graphic.
 - 1) Location: Applied to cabinet glazing.
 - 2) Application Process: Manufacturer's standard.
 - 2. Other Accessories: As supplied, recommended, or required by the manufacturer as necessary for a complete installation.

2.3 FABRICATION

- A Defibrillator Cabinets: Provide manufacturer's standard box (tub) with trim, frame, door, and hardware to suit cabinet type, trim style, and door style indicated.
 - 1. Weld joints and grind smooth.
 - 2. Miter corners and grind smooth.
 - 3. Provide factory-drilled mounting holes.
- B Cabinet Doors: Fabricate doors according to manufacturer's standards, from materials indicated and coordinated with cabinet types and trim styles.
- C Cabinet Trim: Fabricate cabinet trim in one piece with corners mitered, welded, and ground smooth.

2.4 GENERAL FINISH REQUIREMENTS

- A Comply with the NAAMM publication AMP 500, Metal Finishes Manual for Architectural and Metal Products, for recommendations for applying and designating finishes.
- B Protect mechanical finishes on exposed surfaces of defibrillator cabinets from damage by applying a strippable, temporary protective covering before shipping.
- C Appearance of Finished Work: Noticeable variations in same piece are unacceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.
- D AED Cabinet Finish: Manufacturer's standard baked enamel, polyester powder coat, epoxy powder coat, or polyester/epoxy hybrid powder coat, complying with AAMA 2603.
 - 1. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.
 - 2. Color: "White".

PART 3 EXECUTION

3.1 EXAMINATION

- A Examine walls and partitions for suitable substrate conditions for installing cabinets.
- B Do not proceed until unsatisfactory conditions have been corrected.
 - 1. Installation of cabinets indicates acceptance of surfaces and conditions.

3.2 INSTALLATION

- A General: Install cabinets in locations and at mounting heights indicated.

3.3 ADJUSTING AND CLEANING

- A Remove temporary protective coverings and strippable films, if any, as cabinets are installed unless otherwise indicated in manufacturer's written installation instructions.
- B Adjust cabinet doors to operate easily without binding. Verify that integral locking devices operate properly.
- C On completion of installation, clean interior and exterior surfaces as recommended in writing by manufacturer.
- D Touch up marred finishes, or replace cabinets that cannot be restored to factory-finished appearance. Use only materials and procedures recommended or supplied by the manufacturer.

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- E Replace cabinets that have been damaged or have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.

END OF SECTION 10 43 00

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SECTION 10 44 13 - FIRE-PROTECTION CABINETS

PART 1 GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A Section Includes:
 - 1. Fire-protection cabinets for portable fire extinguishers.
 - 2. Supplementary components and accessories normally furnished or otherwise necessary for a complete installation.

1.3 REFERENCES

- A Acronyms and Abbreviations
 - 1. AAMA: Architectural Aluminum Manufacturers Association.
 - 2. AHJ: Authority (Authorities) Having Jurisdiction.
 - 3. NAAMM: National Association of Architectural Metal Manufacturers.
- B Definitions:
 - 1. Manufacturer: Means the fire-protection cabinet manufacturer unless otherwise indicated.

1.4 SUBMITTALS

- A Action Submittals:
 - 1. Product Data: For each type of product; include Environmental Product Declaration.
 - a. Show door hardware, cabinet type, trim style, and panel style. Include roughing-in dimensions and details showing mounting method and relationships of box and trim to surrounding construction.
 - 2. Shop Drawings: For fire-protection cabinets.
 - a. Include plans, elevations, sections, details, and attachments to other work.
 - 3. Product Schedule: For fire-protection cabinets. Indicate whether recessed, semirecessed, or surface mounted. Coordinate final fire-protection cabinet schedule with fire-extinguisher schedule to ensure proper fit and function. Use same designations indicated on Drawings.
- B Closeout Submittals:
 - 1. Maintenance Data: For fire-protection cabinets to include in maintenance manuals.

1.5 COORDINATION

- A Coordinate size of fire-protection cabinets to ensure that type and capacity of fire extinguishers indicated are accommodated.
- B Coordinate sizes and locations of semi-recessed fire-protection cabinets with wall depths.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A Source Limitations: Obtain fire-protection cabinets from single source from the same manufacturer.

2.2 FIRE-PROTECTION CABINETS

- A Cabinet Type, General: Suitable for fire extinguisher.
 - 1. Basis-of-Design Product: Subject to compliance with the Contract Documents, design is based on the following.
 - a. "Cosmopolitan Series" manufactured by J.L. Industries; Activar Construction Products Group, Inc.

2. Acceptable Manufacturers: Subject to compliance with the Contract Documents, provide the basis-of-design product or comparable product by one of the following.
 - a. Larsen's Manufacturing Co.
 - b. Nystrom, Inc.
 - c. Potter Roemer.
- B Cabinet Construction: Nonrated, or rated for fire-resistance rating of walls where they are installed.
- C Cabinet Material: Stainless-steel sheet.
- D Semirecessed Cabinet: One-piece combination trim and perimeter door frame overlapping surrounding wall surface, with exposed trim face and wall return at outer edge (backbend).
 1. Square-Edge Trim: 1-1/4 to 1-1/2-inch backbend depth.
- E Cabinet Trim Material: Same material and finish as door.
- F Door Material: Stainless-steel sheet.
- G Glazed Door Style: Fully glazed panel with frame.
- H Door Glazing: Tempered float glass (clear).
- I Door Hardware: Manufacturer's standard door-operating hardware of proper type for cabinet type, trim style, and door material and style indicated.
 1. Provide projecting door pull and friction (roller) latch.
 2. Provide manufacturer's standard hinge permitting door to open 180 degrees.
- J Accessories:
 1. Mounting Bracket: Manufacturer's standard steel, designed to secure fire extinguisher to fire-protection cabinet, of sizes required for types and capacities of fire extinguishers indicated, with plated or baked-enamel finish.
 2. Identification: Lettering complying with the AHJ for letter style, size, spacing, and location.
 - a. Identify fire extinguisher in fire-protection cabinet with the words "FIRE EXTINGUISHER."
 - 1) Location: Applied to cabinet glazing.
 - 2) Application Process: Pressure-sensitive vinyl letters.
 - 3) Lettering Color: As selected by the Architect.
 - 4) Orientation: Vertical.
- K Materials:
 1. Stainless Steel: ASTM A 240/A 240M or ASTM A 666, Type 304.
 - a. Finish: ASTM A 480/A 480M No. 4 directional satin finish.
 2. Tempered Float Glass: ASTM C 1048, Kind FT, Condition A, Type I, Quality q3, 3mm thick, Glass 1 (clear).
- L Other Accessories: As supplied, recommended, or required by the manufacturer as necessary for a complete installation.

2.3 FABRICATION

- A Fire-Protection Cabinets: Provide manufacturer's standard box (tub) with trim, frame, door, and hardware to suit cabinet type, trim style, and door style indicated.
 1. Weld joints and grind smooth.
 2. Miter corners and grind smooth.
 3. Provide factory-drilled mounting holes.
- B Cabinet Doors: Fabricate doors according to manufacturer's standards, from materials indicated and coordinated with cabinet types and trim styles.
 1. Fabricate door frames with tubular stiles and rails and hollow-metal design, at least 1/2 inch thick.

2.4 GENERAL FINISH REQUIREMENTS

- A Comply with the NAAMM publication AMP 500, Metal Finishes Manual for Architectural and Metal Products, for recommendations for applying and designating finishes.
- B Protect mechanical finishes on exposed surfaces of fire-protection cabinets from damage by applying a strippable, temporary protective covering before shipping.
- C Finish fire-protection cabinets after assembly.

- D Appearance of Finished Work: Noticeable variations in same piece are unacceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

PART 3 EXECUTION

3.1 EXAMINATION

- A Examine walls and partitions for suitable framing depth and blocking where recessed and semi-recessed cabinets will be installed.
- B Do not proceed with installation until unsatisfactory conditions have been corrected.
1. Installation of fire-protection cabinets indicates acceptance of surfaces and conditions.

3.2 PREPARATION

- A Prepare recesses for recessed and semirecessed fire-protection cabinets as required by type and size of cabinet and trim style.

3.3 INSTALLATION

- A General: Install fire protection cabinets in locations and at mounting heights indicated or, if not indicated, at heights acceptable to the AHJ.
- B Fire Protection Cabinets: Fasten cabinets to structure, square and plumb.
1. Unless otherwise indicated, provide recessed fire-protection cabinets. If wall thickness is inadequate for recessed cabinets, provide semirecessed fire-protection cabinets.
 2. Fasten mounting brackets to inside surface of fire-protection cabinets, square and plumb.
- C Identification: Apply lettering at locations indicated.
- D Fasten mounting brackets to inside surface of fire-protection cabinets, square and plumb.

3.4 ADJUSTING AND CLEANING

- A Remove temporary protective coverings and strippable films, if any, as fire-protection cabinets are installed unless otherwise indicated in manufacturer's written installation instructions.
- B Adjust fire protection cabinet doors to operate easily without binding. Verify that integral locking devices operate properly.
- C On completion of fire-protection cabinet installation, clean interior and exterior surfaces as recommended in writing by manufacturer.
- D Touch up marred finishes, or replace fire-protection cabinets that cannot be restored to factory-finished appearance. Use only materials and procedures recommended or supplied by the manufacturer.
- E Replace fire-protection cabinets that have been damaged or have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.

END OF SECTION 10 44 13

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SECTION 10 44 16 - FIRE EXTINGUISHERS

PART 1 GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A Section Includes:
 - 1. Portable, hand-carried fire extinguishers (FE).
 - 2. Supplementary components and accessories normally furnished or otherwise necessary for a complete installation.

1.3 REFERENCES

- A Acronyms and Abbreviations:
 - 1. AHJ: Authority (Authorities) Having Jurisdiction.
 - 2. NFPA: National Fire Protection Association.
- B Definitions:
 - 1. Manufacturer: Means the fire extinguisher manufacturer unless otherwise indicated.

1.4 SUBMITTALS

- A Action Submittals:
 - 1. Product Data: For each type of product. Include rating and classification, material descriptions, dimensions of individual components and profiles, and finishes for fire extinguishers.
 - 2. Product Schedule: For fire extinguishers. Coordinate final fire-extinguisher schedule with fire-protection cabinet schedule to ensure proper fit and function. Use same designations indicated on Drawings.
- B Informational Submittals:
 - 1. Warranty: Sample of special warranty.
- C Closeout Submittals:
 - 1. Operation and Maintenance Data: For fire extinguishers to include in maintenance manuals.

1.5 COORDINATION

- A Coordinate type and capacity of fire extinguishers with fire-protection cabinets to ensure fit and function.

1.6 WARRANTY

- A Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace fire extinguishers that fail in materials or workmanship within specified warranty period.
 - 1. Failures include:
 - a. Failure of hydrostatic test according to NFPA 10.
 - b. Faulty operation of valves or release levers.
 - 2. Warranty Period: 6 years from date of Final Acceptance.

PART 2 PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A NFPA Compliance: Fabricate and label fire extinguishers to comply with NFPA publication, NFPA 10, Standard for Portable Fire Extinguishers.
- B Fire Extinguishers: Listed and labeled for type, rating, and classification by an independent testing agency acceptable to the AHJ.

2.2 PORTABLE, HAND-CARRIED FIRE EXTINGUISHERS

- A Fire Extinguishers: Type, size, and capacity for each fire-protection cabinet indicated.
 - 1. Manufacturers: Subject to compliance with the Contract Documents, provide products by one of the following.
 - a. Amerex Corporation.
 - b. JL Industries; Activar Construction Products Group, Inc.
 - c. Larsen's Manufacturing Co.; member of Morris Group International.
 - d. Potter Roemer; member of Morris Group International.
 - 2. Valves: Manufacturer's standard.
 - 3. Handles and Levers: Manufacturer's standard.
 - 4. Instruction Labels: Include pictorial marking system complying with NFPA 10, Appendix B, and bar coding for documenting fire-extinguisher location, inspections, maintenance, and recharging.
- B Multipurpose Dry-Chemical Type in Steel Container: UL-rated 4-A:60-B:C, 10-lb nominal capacity, with monoammonium phosphate-based dry chemical in enameled-steel container.

2.3 MOUNTING BRACKETS

- A Mounting Brackets: Manufacturer's standard steel, designed to secure fire extinguisher to wall or structure, of sizes required for types and capacities of fire extinguishers indicated, with plated or red baked-enamel finish.
 - 1. Source Limitations: Obtain mounting brackets and fire extinguishers from single source from the same manufacturer.
- B Identification: Lettering complying with the AHJ for letter style, size, spacing, and location. Locate as indicated by Architect.
 - 1. Identify bracket-mounted fire extinguishers with the words "FIRE EXTINGUISHER" in red letter decals applied to mounting surface.
 - a. Orientation: Vertical.

PART 3 EXECUTION

3.1 EXAMINATION

- A Examine fire extinguishers for proper charging and tagging.
 - 1. Remove and replace damaged, defective, or undercharged fire extinguishers.
- B Do not proceed with installation until unsatisfactory conditions have been corrected.
 - 1. Installation of fire extinguishers indicates acceptance of surfaces and conditions.

3.2 INSTALLATION

- A General: Install fire extinguishers and mounting brackets in locations indicated and in compliance with requirements of the AHJ.
- B Mounting Brackets: Fasten mounting brackets to surfaces, square and plumb, at locations indicated.

END OF SECTION 10 44 16

SECTION 11 52 13 - PROJECTION SCREENS

PART 1 GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A Section Includes:
 - 1. Electrically operated, front-projection screens.
 - 2. Supplementary components and accessories normally furnished or otherwise necessary for a complete installation, whether or not such items are included in the Specifications or indicated on the Drawings.

1.3 REFERENCES

- A Acronyms and Abbreviations:
 - 1. AHJ: Authority (Authorities) Having Jurisdiction.
- B Definitions:
 - 1. Manufacturer: Means the projection screen manufacturer unless otherwise indicated.

1.4 COORDINATION

- A Coordinate layout and installation of front-projection screens with adjacent construction.

1.5 SUBMITTALS

- A Action Submittals:
 - 1. Product Data: For each type of product.
 - 2. Shop Drawings: Show layouts and types of front-projection screens. Include the following:
 - a. Drop heights.
 - b. Anchorage details, including connection to supporting structure for suspended units.
 - c. Details of juncture of screen case or trim with adjacent finishes.
 - d. For electrically operated units, wiring diagrams and location of wiring connections.
 - e. Accessories.
- B Closeout Submittals:
 - 1. Maintenance Data: For front-projection screens to include in maintenance manuals.

1.6 DELIVERY, STORAGE, AND HANDLING

- A Environmental Limitations: Do not deliver front-projection screens until spaces are enclosed and weathertight, wet-work in installation spaces is complete and dry, and temporary or permanent HVAC system is operating and maintaining ambient temperature and humidity conditions planned for building occupants during the remainder of the construction period.
- B Store front-projection screens in manufacturer's protective packaging and according to manufacturer's written instructions.

PART 2 PRODUCTS

2.1 SOURCE LIMITATIONS

- A Source Limitations for Projection Screens: Obtain front-projection screens from single manufacturer. Obtain viewing surfaces and accessories, including mounting hardware, from screen manufacturer.

2.2 ELECTRICALLY OPERATED, FRONT-PROJECTION SCREENS

- A General Requirements: Manufacturer's standard units, consisting of case, screen, motor, controls, mounting accessories, and other components necessary for a complete installation. Provide units that are listed and labeled as an assembly by Underwriters Laboratories Inc. (UL) or another testing and inspecting agency acceptable to the AHJ.
 - 1. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
 - 2. Screen Mounting: Top edge securely anchored to rigid metal roller and bottom edge formed into a pocket holding a metal rod, with ends of rod protected by plastic caps.
- B Suspended, Recessed Electrically Operated Screen: Unit designed and fabricated for suspended recessed mounting.
 - 1. Basis-of-Design Product: Subject to compliance with the Contract Documents, design is based on the following.
 - a. "Da-Lite Tensioned Advantage Series" No. 39149B manufactured by Legrand AV Inc.
 - 2. Acceptable Manufacturers: Subject to compliance with the Contract Documents, provide the basis-of-design product or comparable product by one of the following.
 - a. Draper, Inc.
 - b. Screen Innovations.
 - 3. Motor: Instant-reversing motor of size and capacity recommended in writing by manufacturer; with permanently lubricated ball bearings, automatic thermal-overload protection, preset limit switches to automatically stop screen in up and down positions, and positive-stop action to prevent coasting.
 - 4. Wiring Compartment: Metal or metal lined.
 - 5. Controls: Manufacturer's standard remote, control switch installed in recessed device box with flush cover plate; verify with Architect.
 - a. Provide with number of control switches indicated on Drawings.
 - b. Provide power supply for low-voltage systems if required.
 - 6. Screen Case: Metal.
 - a. Ceiling Aperture: With closure, hinged to automatically open when screen is lowered and automatically close when screen is fully raised.
 - 1) Provide screen case with trim flange to receive ceiling finish.
 - b. Finish on Exposed Surfaces: Manufacturer's standard.
 - 7. Tensioned Screen: Electric screen tensioning system to provide optimal viewing surface smoothness.
 - 8. Drop: Cables in roller accommodate drop distance between the ceiling and the top of the screen. Verify maximum drop distance with the Architect.
 - 9. Screen Dimensions and Measurements:
 - a. Screen Diagonal: 119 inches.
 - b. Screen Height: 58 inches.
 - c. Size: 58 inches by 104 inches; 119 inches diagonal.
 - 10. Screen Format: HDTV (16:9).
 - 11. Screen Surface: High resolution, HD Progressive 1.0.

2.3 ACCESSORIES

- A Accessories: As supplied, recommended, or required by the manufacturer and as necessary for a complete installation.

PART 3 EXECUTION

3.1 EXAMINATION

- A Examine installation area for suitable depth and blocking where projection screens will be installed.
- B Do not proceed with installation until unsatisfactory conditions have been corrected.
 - 1. Installation of projection screens indicates acceptance of surfaces and conditions.

3.2 INSTALLATION

- A Install front-projection screens at locations indicated on Drawings to comply with manufacturer's written instructions.
- B Install front-projection screens with screen cases in position and in relation to adjoining construction indicated. Securely anchor them to supporting substrate in a manner that produces a smoothly operating screen that, when lowered, has flat viewing surface and plumb vertical edges.
 - 1. Install low-voltage controls in accordance with NFPA 70 and complying with manufacturer's written instructions.
 - a. Wiring Method: Install wiring in raceway, except in accessible ceiling spaces and in gypsum board partitions, where unenclosed wiring method may be used. Use UL-listed plenum cable in environmental air spaces, including plenum ceilings. Conceal raceway and cables, except in unfinished spaces.
 - 2. Test electrically operated units to verify that screen controls, limit switches, closures, and other operating components are in optimum functioning condition.

END OF SECTION 11 52 13

January 15, 2026

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SECTION 12 21 13 - HORIZONTAL LOUVER BLINDS

PART 1 GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A Section Includes:
 - 1. Horizontal louver blinds with aluminum slats.
 - 2. Supplementary components and accessories normally furnished or otherwise necessary for a complete installation.

1.3 REFERENCES

- A Acronyms and Abbreviations:
 - 1. WCMA: Window Covering Manufacturers Association.
- B Definitions:
 - 1. Manufacturer: Means the horizontal louver blind manufacturer unless otherwise indicated.

1.4 SUBMITTALS

- A Action Submittals:
 - 1. Product Data: For horizontal louver blinds. Include the following:
 - a. Construction details, material descriptions, dimensions of individual components and profiles, and finishes.
 - 2. Shop Drawings: For horizontal louver blinds, include fabrication and installation details.
 - 3. Product Schedule: For horizontal louver blinds. Use same designations indicated on the Drawings.
- B Informational Submittals:
 - 1. Safety Standards: Include proof of compliance with most current ANSI/WCMA A100.1 safety requirements.
- C Closeout Submittals:
 - 1. Maintenance Data: For horizontal louver blinds to include in maintenance manuals.

1.5 DELIVERY, STORAGE, AND HANDLING

- A Deliver horizontal louver blinds in factory packages, marked with manufacturer, product name, and location of installation using same designations indicated on Drawings.

1.6 FIELD CONDITIONS

- A Environmental Limitations: Do not install horizontal louver blinds until construction and wet-work and finish work in spaces, including painting, is complete and dry and ambient temperature and humidity conditions are maintained at the levels indicated for Project when occupied for its intended use.
- B Field Measurements: Where horizontal louver blinds are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication and indicate measurements on Shop Drawings. Allow clearances for operating hardware of operable glazed units through entire operating range. Notify Architect of installation conditions that vary from Drawings. Coordinate fabrication schedule with construction progress to avoid delaying the work.

PART 2 PRODUCTS

2.1 SOURCE LIMITATIONS

- A Source Limitations: Obtain horizontal louver blinds from single source from the same manufacturer.

2.2 PERFORMANCE REQUIREMENTS

- A Window Covering Safety Standard: Provide horizontal louver blinds that comply with the most current ANSI/WCMA A100.1.

2.3 HORIZONTAL LOUVER BLINDS, ALUMINUM SLATS

- A Horizontal Louver Blinds (WT3):
 - 1. Basis-of-Design Product: Subject to compliance with the Contract Documents design is based on the product indicated in the Finish Material Schedule on the Drawings as manufactured by the following.
 - a. SWF Contract.
 - 2. Acceptable Manufacturers: Subject to compliance with the Contract Documents provide the basis-of-design product or comparable approved product by one of the following.
 - a. Hunter Douglas Architectural.
 - b. Levolor Contract.
- B Slat Width: 1-inch.

2.4 HORIZONTAL LOUVER BLIND FABRICATION

- A Product Safety Standard: Fabricate horizontal louver blinds to comply with the most current ANSI/WCMA A 100.1 including requirements for corded, flexible, looped devices or no cords; lead content of components; and warning labels.
- B Unit Sizes: Fabricate units in sizes to fill window and other openings as follows, measured at 74 deg F:
 - 1. Between (Inside) Jamb Installation: Width equal to jamb-to-jamb dimension of opening in which blind is installed less 1/4 inch per side or 1/2 inch total, plus or minus 1/8 inch. Length equal to head-to-sill dimension of opening in which blind is installed less 1/4 inch, plus or minus 1/8 inch.
- C Concealed Components: Noncorrodible or corrosion-resistant-coated materials.
 - 1. Lift-and-Tilt Mechanisms: With permanently lubricated moving parts.
- D Mounting and Intermediate Brackets: Designed for removal and reinstallation of blind without damaging blind and adjacent surfaces, for supporting blind components, and for bracket positions and blind placement indicated.
- E Installation Fasteners: No fewer than 2 fasteners per bracket, fabricated from metal noncorrosive to brackets and adjoining construction; type designed for securing to supporting substrate; and supporting blinds and accessories under conditions of normal use.
- F Color-Coated Metal Finish: For components exposed to view, apply manufacturer's standard baked finish complying with manufacturer's written instructions for surface preparation including pretreatment, application, baking, and minimum dry film thickness.
 - 1. Color: As selected by the Architect.

PART 3 EXECUTION

3.1 EXAMINATION

- A Examine substrates, areas, and conditions, with installer present, for compliance with requirements for installation tolerances, operational clearances, and other conditions affecting performance of the work.
- B Do not proceed with installation until unsatisfactory conditions have been corrected.
 - 1. Installation of horizontal louver blinds indicates acceptance of surfaces and conditions.

3.2 INSTALLATION

- A Install horizontal louver blinds level and plumb, aligned and centered on openings, and aligned with adjacent units according to manufacturer's written instructions.
 - 1. Locate so exterior slat edges are not closer than 2 inches from interior faces of glass and not closer than 1-1/2 inches from interior faces of glazing frames through full operating ranges of blinds.

2. Install mounting and intermediate brackets to prevent deflection of headrails.
 3. Install with clearances that prevent interference with adjacent blinds, adjacent construction, and operating hardware of glazed openings, other window treatments, and similar building components and furnishings.
- B Locations: As indicated on the Drawings.

3.3 ADJUSTING

- A Adjust horizontal louver blinds to operate free of binding or malfunction through full operating ranges.

3.4 CLEANING AND PROTECTION

- A Clean horizontal louver blind surfaces after installation according to manufacturer's written instructions.
- B Provide final protection and maintain conditions in a manner acceptable to manufacturer and installer that ensures that horizontal louver blinds are without damage or deterioration at time of Final Acceptance.

END OF SECTION 12 21 13

SECTION 12 24 13 - ROLLER WINDOW SHADES

PART 1 GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A Section Includes:
 - 1. Manual roller shades.
 - 2. Motor-operated roller shades (Alternate).
 - 3. Supplementary components and accessories normally furnished or otherwise necessary for a complete installation.
- B Related Requirements:
 - 1. Section 01 23 00 Alternates.

1.3 REFERENCES

- A Acronyms and Abbreviations:
 - 1. WCMA: Window Covering Manufacturers Association.
- B References:
 - 1. Manufacturer: Means the roller window shade manufacturer unless otherwise indicated.

1.4 SUBMITTALS

- A Action Submittals:
 - 1. Product Data: For each type of product; include Health Product Declaration and Environmental Product Declaration.
 - a. Include styles, material descriptions, construction details, dimensions of individual components and profiles, features, finishes, and operating instructions for roller shades.
 - 2. Shop Drawings: Show fabrication and installation details for roller shades, including shadeband materials, their orientation to rollers, and their seam and batten locations.
 - a. Motor-Operated Shades: Include details of installation and diagrams for power, signal, and control wiring.
 - 3. Samples: For each exposed product and for each color and texture specified.
 - a. Shadeband Material: Not less than 3 inches square. Mark interior face of material if applicable.
 - b. Accessories: For each type involving color selection.
- B Informational Submittals:
 - 1. Qualification Data: For installer.
 - 2. Safety Standards: Include proof of compliance with most current WCMA A100.1 safety requirements.
 - 3. Product Certificates: For each type of shadeband material.
 - 4. Product Test Reports: For each type of shadeband material, for tests performed by the manufacturer and witnessed by a qualified testing agency, or by a qualified testing agency.
- C Closeout Submittals:
 - 1. Operation and Maintenance Data: For roller shades to include in maintenance manuals.

1.5 QUALITY ASSURANCE

- A Installer Qualifications: Fabricator of products.

1.6 DELIVERY, STORAGE, AND HANDLING

- A Deliver roller shades in factory packages, marked with manufacturer, product name, and location of installation using same designations indicated on Drawings.

1.7 FIELD CONDITIONS

- A Environmental Limitations: Do not install roller shades until construction and finish work in spaces, including painting, is complete and dry and ambient temperature and humidity conditions are maintained at the levels indicated for Project when occupied for its intended use.
- B Field Measurements: Where roller shades are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication and indicate measurements on Shop Drawings. Allow clearances for operating hardware of operable glazed units through entire operating range. Notify Architect of installation conditions that vary from Drawings. Coordinate fabrication schedule with construction progress to avoid delaying the work.

PART 2 PRODUCTS

2.1 SOURCE LIMITATIONS

- A Source Limitations: Obtain roller shades from single source from the same manufacturer.

2.2 MANUALLY OPERATED ROLLER SHADES

- A Roller Window Shades:
 - 1. Basis-of-Design Product (WT-2): Subject to compliance with the Contract Documents design is based on the product indicated in the Finish Material Schedule on the Drawings as manufactured by the following.
 - a. MechoShade Systems, LLC.
 - 2. Acceptable Manufacturers: Subject to compliance with the Contract Documents provide basis-of-design product or comparable products by one of the following.
 - a. Hunter Douglas Architectural.
 - b. Draper, Inc.
- B Chain-and-Clutch Operating Mechanisms: With continuous-loop bead chain and clutch that stops shade movement when bead chain is released; permanently adjusted and lubricated.
 - 1. Bead Chains: Manufacturer's standard nickel-plated metal or stainless steel.
 - a. Loop Length: Complying with current WCMA A100.1 requirements.
 - b. Limit Stops: Provide upper and lower ball stops.
 - c. Chain-Retainer Type: Chain tensioner complying with most current WCMA A100.1 requirements.
 - 2. Spring Lift-Assist Mechanisms: Manufacturer's standard for balancing roller shade weight and for lifting heavy roller shades, if applicable.
 - a. Provide for shadebands that weigh more than 10 lb., or for shades as recommended by manufacturer, whichever criterion is more stringent.
- C Rollers: Corrosion-resistant steel or extruded-aluminum tubes of diameters and wall thicknesses required to accommodate operating mechanisms and weights and widths of shadebands indicated without deflection. Provide with permanently lubricated drive-end assemblies and idle-end assemblies designed to facilitate removal of shadebands for service.
 - 1. Roller Mounting Configuration: Single roller and double roller as indicated .
 - 2. Roller Drive-End Location: As indicated on Drawings.
 - 3. Direction of Shadeband Roll: Regular, from back (exterior face) of roller; verify with Architect.
 - 4. Shadeband-to-Roller Attachment: Manufacturer's standard method.
- D Mounting Hardware: Brackets or endcaps, corrosion resistant and compatible with roller assembly, operating mechanism, installation accessories, and mounting location and conditions indicated.
- E Shadebands:
 - 1. Shadeband Material: As indicated in the Finish Material Schedule on the Drawings.
 - 2. Shadeband Bottom (Hem) Bar: Steel or extruded aluminum.
 - a. Type: Enclosed in sealed pocket of shadeband material.
- F Installation Accessories: As supplied, recommended, or required by the manufacturer and as necessary for a complete installation.
 - 1. Front Fascia (Perimeter Pocket): As specified in Section 09 51 13 Acoustical Panel Ceilings.

2.3 MOTOR-OPERATED ROLLER SHADES

A Roller Window Shades:

1. Basis-of-Design Product (WT-1): Subject to compliance with the Contract Documents design is based on the product indicated in the Finish Material Schedule on the Drawings as manufactured by the following.
 - a. MechoShade Systems, LLC.
2. Acceptable Manufacturers: Subject to compliance with the Contract Documents provide basis-of-design product or comparable products by one of the following.
 - a. Hunter Douglas Architectural.
 - b. Draper, Inc.

B Motorized Operating System: Provide factory-assembled, shade-operator system of size and capacity and with features, characteristics, and accessories suitable for conditions indicated, complete with electric motor and factory-prewired motor controls, power disconnect switch, enclosures protecting controls and operating parts, and accessories required for reliable operation without malfunction. Include wiring from motor controls to motors. Coordinate operator wiring requirements and electrical characteristics with building electrical system.

1. Electrical Components: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
2. Remote Control: Electric controls with NEMA ICS 6, Type 1 enclosure for surface or recessed or flush mounting, as indicated on the Drawings.

C Rollers: Extruded-aluminum tubes of diameters and wall thicknesses required to accommodate operating mechanisms and weights and widths of shadebands indicated without deflection. Provide with permanently lubricated drive-end assemblies and idle-end assemblies designed to facilitate removal of shadebands for service.

1. Roller Mounting Configuration: Single roller and double roller as indicated.
2. Roller Drive-End Location: As indicated on Drawings.
3. Direction of Shadeband Roll: Regular, from back (exterior face) of roller; verify with Architect.
4. Shadeband-to-Roller Attachment: Manufacturer's standard method.

D Mounting Hardware: Brackets or endcaps, corrosion resistant and compatible with roller assembly, operating mechanism, installation accessories, and mounting location and conditions indicated.

E Shadebands:

1. Shadeband Materials: As indicated in the Finish Material Schedule.
2. Shadeband Bottom (Hem) Bar: Steel or extruded aluminum.
 - a. Type: Enclosed in sealed pocket of shadeband material.

F Installation Accessories:

1. Exposed Headbox/Housing: Aluminum extrusion, as indicated on the Drawings.
2. Installation Accessories Color and Finish: As selected by the Architect.

2.4 SHADEBAND MATERIALS

A Shadeband Material Flame-Resistance Rating: Comply with NFPA 701. Testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

2.5 ROLLER-SHADE FABRICATION

A Product Safety Standard: Fabricate roller shades to comply with most current ANSI/WCMA A 100.1, including requirements for flexible, chain-loop devices; lead content of components; and warning labels.

B Unit Sizes: Fabricate units in sizes to fill window and other openings as follows and as indicated, measured at 74 deg F:

1. Between (Inside) Jamb Installation: Width equal to jamb-to-jamb dimension of opening in which shade is installed less 1/4 inch per side or 1/2-inch total, plus or minus 1/8 inch. Length equal to head-to-sill or -floor dimension of opening in which shade is installed less 1/4 inch, plus or minus 1/8 inch.

2. Outside of Jamb Installation: Width and length as indicated, with terminations between shades of end-to-end installations at centerlines of mullion or other defined vertical separations between openings.
- C Shadeband Fabrication: Fabricate shadebands without battens or seams to extent possible except as follows:
 1. Vertical Shades: Where width-to-length ratio of shadeband is equal to or greater than 1:4, provide battens and seams at uniform spacings along shadeband length to ensure shadeband tracking and alignment through its full range of movement without distortion of the material.

PART 3 EXECUTION

3.1 EXAMINATION

- A Examine substrates, areas, and conditions, with installer present, for compliance with requirements for installation tolerances, operational clearances, locations of connections to building electrical system, and other conditions affecting performance of the work.
- B Do not proceed with installation until unsatisfactory conditions have been corrected.
 1. Installation of roller window shades indicates acceptance of surfaces and conditions.

3.2 ROLLER SHADE INSTALLATION

- A Install roller shades level, plumb, and aligned with adjacent units, according to manufacturer's written instructions.
- B Electrical Connections: Connect motor-operated roller shades to building electrical system.
- C Roller Shade Locations: As indicated on the Drawings.

3.3 ADJUSTING

- A Adjust and balance roller shades to operate smoothly, easily, safely, and free from binding or malfunction throughout entire operational range.

3.4 CLEANING AND PROTECTION

- A Clean roller shade surfaces, after installation, according to manufacturer's written instructions.
- B Provide final protection and maintain conditions, in a manner acceptable to manufacturer and Installer, that ensure that roller shades are without damage or deterioration at time of Final Acceptance.

3.5 DEMONSTRATION

- A Engage a factory-authorized service representative to train Owner's designated personnel to adjust, operate, and maintain motor-operated roller shades.

END OF SECTION 12 24 13

SECTION 12 36 61 - SOLID SURFACING COUNTERTOPS

PART 1 GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A Section Includes:
 - 1. Solid surface material countertops.
 - 2. Supplementary components and accessories normally furnished or otherwise necessary for a complete installation.

1.3 REFERENCES

- A Acronyms and Abbreviations:
 - 1. AWI: Architectural Woodwork Institute.
 - 2. ISFA: International Surface Fabricators Association.
 - 3. SCAQMD: South Coast Air Quality Management District.
 - 4. VOC: Volatile Organic Compounds.
- B Definitions:
 - 1. Manufacturer: Means the solid surface material manufacturer unless otherwise indicated.

1.4 SUBMITTALS

- A Action Submittals:
 - 1. Product Data: Include the following.
 - a. Product data for countertop material.
 - b. Current Health Product Declaration.
 - c. Current Environmental Product Declaration.
 - d. Adhesive VOC content disclosure data.
 - 2. Shop Drawings: For countertops. Show materials, finishes, edge and backsplash profiles, methods of joining, and cutouts for plumbing fixtures.
- B Informational Submittals:
 - 1. Qualification Data: For fabricator.
- C Closeout Submittals:
 - 1. Maintenance Data: For solid surfacing countertops to include in maintenance manuals. Include product data for care products used or recommended by the manufacturer.

1.5 QUALITY ASSURANCE

- A Fabricator Qualifications: Shop that employs skilled workers who custom-fabricate countertops similar to that required for this Project, and whose products have a record of successful in-service performance.
- B Installer Qualifications: Fabricator of countertops.

1.6 FIELD CONDITIONS

- A Field Measurements: Verify dimensions of countertops by field measurements before countertop fabrication is complete.

1.7 COORDINATION

- A Coordinate locations of items that will penetrate countertops or backsplashes.

PART 2 PRODUCTS**2.1 SOLID SURFACE COUNTERTOP MATERIALS**

- A Solid Surface Material: Homogeneous-filled plastic resin complying with ISFA 2-01.
 - 1. Basis-of-Design Products (SSM-1, SSM-2): Subject to compliance with the Contract Documents design is based on the products indicated in the Finish Material Schedule on the Drawings as manufactured by the following.
 - a. LX Hausys. (HIMACS)
 - 2. Acceptable Manufacturers: Subject to compliance with the Contract Documents provide the basis-of-design products or comparable approved products by one of the following.
 - a. DuPont de Nemours, Inc. (CORIAN).
 - b. Formica Corporation.
- B Plywood: Exterior softwood plywood complying with DOC PS 1, Grade C-C Plugged, touch sanded.

2.2 FABRICATION

- A Fabricate countertops according to solid surface material manufacturer's written instructions and to the AWI publication Architectural Woodwork Standards.
 - 1. Grade: Custom.
- B Countertop and Backsplash Configuration: As indicated on the Drawings.
- C Fabricate tops with shop-applied edges unless otherwise indicated. Comply with the manufacturer's written instructions for adhesives, sealers, fabrication, and finishing.
- D Joints: Fabricate countertops without joints. If joints are unavoidable, join in field with joints at locations indicated and as follows:
 - 1. Joint Locations: Not within 18 inches of a sink and not where a countertop section less than 36 inches long would result, unless unavoidable.
- E Cutouts and Holes: Drill countertops in shop for items indicated on the Drawings.

2.3 INSTALLATION MATERIALS

- A Adhesives: Water-resistant type supplied, recommended, or required by the solid surfacing and adhesive manufacturers to suit products and substrate conditions indicated.
 - 1. Allowable VOC Content: Adhesives, adhesive bonding primers, and adhesive primers must comply with SCAQMD Rule 1168 VOC limits.
 - a. Such products also shall comply with the Rule 1168 prohibition on the use of certain toxic compounds (chloroform, ethylene dichloride, methylene chloride, perchloroethylene, and trichloroethylene).
- B Sealant: Comply with applicable requirements in Section 07 92 00 Joint Sealants.

2.4 ACCESSORIES

- A Accessories: As supplied, recommended, or required by the manufacturer and as necessary for a complete installation.

PART 3 EXECUTION**3.1 EXAMINATION**

- A Examine substrates to receive solid surface material countertops and backsplashes and conditions under which countertops will be installed, with installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of countertops.
- B Do not proceed with installation until unsatisfactory conditions have been corrected.
 - 1. Installation of solid surfacing countertops and backsplashes indicates acceptance of surfaces and conditions.

3.2 INSTALLATION

- A Install countertops level to a tolerance of 1/8 inch in 8 feet; no more than 1/4 inch. Do not exceed 1/64-inch difference between planes of adjacent units.
- B Install countertops by one of the following methods, as applicable and indicated on the Drawings:
 - 1. Direct to Base Units: Fasten countertops by screwing through corner blocks of base units into underside of countertop. Predrill holes for screws as recommended by manufacturer. Align adjacent surfaces and, using adhesive in color to match countertop, form seams to comply with manufacturer's written instructions. Carefully dress joints smooth, remove surface scratches, and clean entire surface.
 - 2. Subtops:
 - a. Fasten subtops to cabinets by screwing through subtops into cornerblocks of base cabinets. Shim as needed to align subtops in a level plane.
 - b. Secure countertops to subtops with adhesive according to manufacturer's written instructions. Align adjacent surfaces and, using adhesive in color to match countertop, form seams to comply with manufacturer's written instructions.
- C Joints in countertop material is not allowed. If joints are unavoidable, Bond joints with adhesive and draw tight as countertops are set. Mask areas of countertops adjacent to joints to prevent adhesive smears.
 - 1. Clamp units to temporary bracing, supports, or each other to ensure that countertops are properly aligned and joints are of specified width.
- D Install backsplashes by adhering to wall and countertops with adhesive. Mask areas of countertops and splashes adjacent to joints to prevent adhesive smears.
- E Install aprons to backing and countertops with adhesive. Mask areas of countertops and splashes adjacent to joints to prevent adhesive smears. Fasten by screwing through backing. Predrill holes for screws as recommended by manufacturer.
- F Complete cutouts not finished in shop. Mask areas of countertops adjacent to cutouts to prevent damage while cutting. Make cutouts to accurately fit items to be installed, and at right angles to finished surfaces unless beveling is required for clearance. Ease edges slightly to prevent snipping.

END OF SECTION 12 36 61

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SECTION 12 48 13 - ENTRANCE FLOOR MATS

PART 1 GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A Section Includes:
 - 1. Modular walk-off carpet tile.
 - 2. Supplementary components and accessories normally furnished or otherwise necessary for a complete installation.

1.3 REFERENCES

- A Abbreviations and Acronyms:
 - 1. SCAQMD: South Coast Air Quality Management District.
 - 2. VOC: Volatile Organic Compounds.
- B Definitions:
 - 1. Manufacturer: Means the modular walk-off carpet tile manufacturer unless otherwise indicated.

1.4 SUBMITTALS

- A Action Submittals:
 - 1. Product Data: For each type of product; include Health Product Declaration and Environmental Product Declaration.
 - a. Include manufacturer's written data on physical characteristics, durability, and fade resistance.
 - b. Include manufacturer's written installation recommendations for substrate.
 - c. Current Health Product Declaration.
 - d. Product-specific Declare Label.
 - e. Walk-off carpet tile VOC emissions report.
 - f. Adhesive VOC content disclosure data.
 - 2. Shop Drawings: For walk-off carpet tile installation, plans showing the following:
 - a. Columns, doorways, enclosing walls or partitions and locations where cutouts are required in tiles.
 - b. Carpet tile type, color, and dye lot.
 - c. Type of installation.
 - d. Pattern of installation.
 - e. Type, color, and location of edge, transition, and other accessory strips.
 - f. Transition details to other flooring materials.
 - 3. Samples: Only required, in standard size, from specified "Acceptable Manufacturer" if other than the basis-of-design product(s) will be provided for the Project.
- B Closeout Submittals:
 - 1. Maintenance Data: For walk-off carpet tile to include in maintenance manuals.

PART 2 PRODUCTS

2.1 MODULAR WALK-OFF CARPET TILE

- A Walk-Off Carpet Tile:
 - 1. Basis-of-Design Product (CPT6): Subject to compliance with the Contract Documents design is based on the product indicated in the Finish Material Schedule on the Drawings as manufactured by the following.
 - a. Interface.

2. Acceptable Manufacturers: Subject to compliance with the Contract Documents provide the basis-of-design product or comparable approved product by one of the following.
 - a. Shaw Industries Group, Inc. (Shaw Contract)
 - b. Patcraft.

2.2 INSTALLATION ACCESSORIES

- A Trowelable Leveling and Patching Compounds: Latex-modified, hydraulic-cement-based formulation supplied or recommended by the manufacturer.
- B Adhesives: Water-resistant, mildew-resistant, nonstaining, pressure-sensitive type to suit products and substrate conditions indicated, and as supplied, recommended, or required by the manufacturer.
 1. Allowable VOC Content: Adhesives, adhesive bonding primers, and adhesive primers must comply with SCAQMD Rule 1168 VOC limits.
 - a. Such products also shall comply with the Rule 1168 prohibition on the use of certain toxic compounds (chloroform, ethylene dichloride, methylene chloride, perchloroethylene, and trichloroethylene).
- C Accessories: As supplied, recommended, or required by the manufacturer and as necessary for a complete installation.

PART 3 EXECUTION

3.1 EXAMINATION

- A Examine substrates, areas, and conditions, with installer present, for compliance with requirements for maximum moisture content, alkalinity range, installation tolerances, and other conditions affecting walk-off carpet tile performance.
- B Do not proceed with installation until unsatisfactory conditions have been corrected.
 1. Installation of walk-off carpet tile indicates acceptance of surfaces and conditions.

3.2 INSTALLATION

- A Install walk-off carpet tile to comply with manufacturer's written instructions.

END OF SECTION 12 48 13