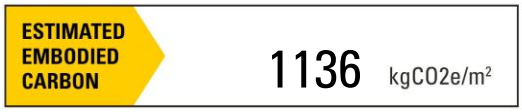
# PROJECT MANUAL

VGCC CENTER FOR ADVANCED MANUFACTURING AND APPLIED TECHNOLOGY
5612 TABBS CREEK ROAD
OXFORD, NORTH CAROLINA 27565

BID SET
5142098501 / SCO 24-28444-02A




NOVEMBER 04, 2026
VOLUME 1




LITTLE
DIVERSIFIED ARCHITECTURAL CONSULTING

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)



STRUCTURAL:

SEAL LOCATION:

NAME: Bowen Shen
(Print)

(Signature)

048747
(Professional Number)



PLUMBING:

SEAL LOCATION:

NAME: Maxwell B. Ammons
(Print)

Refer to Seal
(Signature)

049597
(Professional Number)



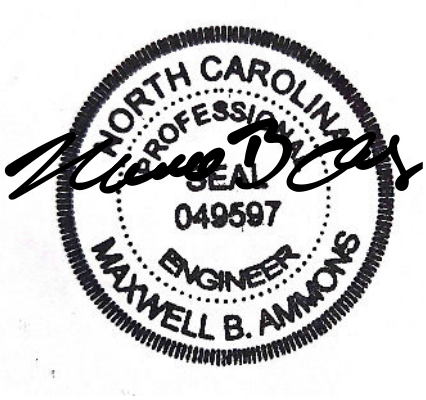
MECHANICAL:

SEAL LOCATION:

NAME: Maxwell B. Ammons
(Print)

Refer to Seal
(Signature)

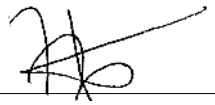
049597
(Professional Number)



ELECTRICAL:

SEAL LOCATION:

NAME: Herbert N. Bendillo, PE
(Print)



(Signature)




15363
(Professional Number)

FIRE PROTECTION:

SEAL LOCATION:

NAME: David Stacy, P.E.
(Print)

David F Stacy
(Signature)

046319
(Professional Number)



CIVIL:

SEAL LOCATION:

NAME: Daniela A. Lovera
(Print)

(Signature)

058231
(Professional Number)

LANDSCAPE:

NAME: Rachel Watson
(Print)

Rachel E. Watson
(Signature)

2221
(Professional Number)

SEAL LOCATION:




11/04/2026

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SECTION 00 65 36 - CONTRACTOR'S GENERAL WARRANTY

VGCC CENTER FOR ADVANCED MANUFACTURING
AND APPLIED TECHNOLOGY
5612 TABBS CREEK ROAD
OXFORD, NORTH CAROLINA 27565

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 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

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SECTION 00 65 37 - ASBESTOS-FREE WARRANTY

VGCC CENTER FOR ADVANCED MANUFACTURING
AND APPLIED TECHNOLOGY
5612 TABBS CREEK ROAD
OXFORD, NORTH CAROLINA 27565

The undersigned Contractor hereby warrants that no asbestos-containing materials of any kind were used in the construction of VGCC Center for Advanced Manufacturing and Applied Technology, 5612 Tabbs Creek Road, Oxford, North Carolina 27565.

Signed:_____

Name:_____

Title:_____

Date:_____

(Corporate Seal)

Subscribed and sworn before me this

_____ day of _____, 20____.

_____
(Notary Public)

END OF SECTION 00 65 37

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# ADVERTISEMENT FOR BIDS

Sealed bids will be received until 3:00 PM on Wednesday, December 16, 2026, at the Office of the Vice President of Finance and Operations located at 200 Community College Road, Henderson, NC 27537, or P.O. Box 917, Henderson, NC 27536; however, bids will be opened and read at Building #9, Main Floor, Seminar Room 2 at Vance-Granville Community College, 200 Community College Road, Henderson, NC 27537, for the construction of VGCC Center for Advanced Manufacturing and Applied Technology, Oxford, North Carolina.

Project Description: A new 35,380 square foot educational facility on a greenfield site with instructional laboratories, classrooms, and related support spaces. The building will be one-story, with masonry and metal panel exterior cladding.

Bids will be received for single prime contract. All proposals shall be lump sum.

A mandatory pre-bid meeting will be held for all interested bidders on Wednesday, December 2, 2026 at 1:00 PM at Vance Granville Community College, 200 Community College Rd., Henderson, NC 27537 Building 9, Main Floor, Seminar Room 2.

Electronic copies of complete plans and specifications for this project can be obtained from Little Diversified Architectural Consulting via e-mail by contacting joey.coker@littleonline.com, or kinsey.elshof@littleonline.com during normal office hours after Monday, November 9, 2026.

Vance-Granville Community College reserves the unqualified right to reject any and all bids.

Steven Graham – Vice President of Finance and Operations
Vance-Granville Community Collge
200 Community College Road
Henderson, NC
27537

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# N O T I C E  T O  B I D D E R S

Sealed bids will be received until 3:00 PM on Wednesday, December 16, 2026 at the Office of the Vice President of Finance and Operations located at 200 Community College Road, Henderson, NC 27537, or P.O. Box 917, Henderson, NC 27536.

Immediately thereafter, sealed bids will be publicly opened and read at Building #9, Main Floor, Seminar Room 2 at Vance-Granville Community College, 200 Community College Road, Henderson, NC 27537, for the furnishing of labor, material, and equipment entering into the construction of

VGCC CENTER FOR ADVANCED MANUFACTURING AND APPLIED TECHNOLOGY
SCO ID # 24-28444-02A

Project Description: A new 35,380 square foot educational facility on a greenfield site with instructional laboratories, classrooms, and related support spaces. The building will be one-story, with masonry and metal panel exterior cladding.

Bids will be received for single prime contract. All proposals shall be lump sum.

## Pre-Bid Meeting

A mandatory pre-bid meeting will be held for all interested bidders on Wednesday, December 2, 2026 at 1:00 p.m. at Vance Granville Community College, 200 Community College Rd., Henderson, NC 27537 Building 9, Main Floor, Seminar Room 2. The meeting will address project specific questions, issues, bidding procedures and bid forms.

Complete plans, specifications and contract documents will be open for inspection in Room 1206, Building 1, Vance-Granville Community College, 200 Community College Road Henderson, NC, 27537; and Little Diversified Architectural Consulting, 406 Blackwell Street, Suite 500, Durham, NC and in the plan rooms of the local North Carolina offices of McGraw-Hill Dodge Corporation, and in the Eastern Regional Office of Reed Construction Data in Norcross, GA, or may be obtained for purchase at Sharpe Images Raleigh, Sharpe Images, 5605 Chapel Hill road, Raleigh, NC 27607, (800) 688-0629.

All contractors are hereby notified that they must have proper license as required under the state laws governing their respective trades.

General contractors are notified that Chapter 87, Article 1, General Statutes of North Carolina, will be observed in receiving and awarding general contracts. General contractors submitting bids on this project must have license classification for Building.

> NOTE--SINGLE PRIME CONTRACTS: Under GS 87-1, a contractor that superintends or manages construction of any building, highway, public utility, grading, structure or improvement shall be deemed a "general contractor" and shall be so licensed. Therefore a single prime project that involves other trades will require the single prime contractor to hold a proper General Contractors license. **EXCEPT**: On public buildings being bid single prime, where the total value of the general construction does not exceed 25% of the total construction value, contractors under GS87- Arts 2 and 4 (Plumbing, Mechanical & Electrical) may bid and contract directly with the Owner as the SINGLE PRIME CONTRACTOR and may subcontract to other properly licensed trades. GS87-1.1- Rules .0210

Each proposal shall be accompanied by a cash deposit or a certified check drawn on some bank or trust company, insured by the Federal Deposit Insurance Corporation, of an amount equal to not less than five percent (5%) of the proposal, or in lieu thereof a bidder may offer a bid bond of five percent (5%) of the bid executed by a surety company licensed under the laws

of North Carolina to execute the contract in accordance with the bid bond. Said deposit shall be retained by the owner as liquidated damages in event of failure of the successful bidder to execute the contract within ten days after the award or to give satisfactory surety as required by law.

Project completion date:The General Contractor is to achieve Substantial Completion of the project within four hundred and thirty (430) calendar days from the date of issuance of the Notice To Proceed.

Liquidated Damages: Liquidated Damages will be Five Hundred Dollars ($500.00) per day.

A performance bond and a payment bond will be required for one hundred percent (100%) of the contract price.

Payment will be made based on ninety-five percent (95%) of monthly estimates and final payment made upon completion and acceptance of work.

No bid may be withdrawn after the scheduled closing time for the receipt of bids for a period of 30 days.

Vance-Granville Community College reserves the right to reject any or all bids and to waive informalities.

| Designer: | Owner: |
|---|---|
| Little Diversified Architectural Consulting | Vance-Granville Community College |
| 406 Blackwell Street, Suite 500 | 200 Community College Road |
| Durham, North Carolina 27701 | Henderson, North Carolina 27537 |
| (919) 474-2500 | (252) 738-3446 |

# INSTRUCTIONS TO BIDDERS

# AND

# GENERAL CONDITIONS OF THE CONTRACT

## STANDARD FORM FOR CONSTRUCTION PROJECTS

**STATE CONSTRUCTION OFFICE**

**NORTH CAROLINA**

**DEPARTMENT OF ADMINISTRATION**

**Form OC-15**

**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.**

**Twenty Fourth Edition, Revision 3 - July 2026:**
**Articles: 2.c, 20.a, 32.d, 33.c, 34, 35, 49, 52.b - h**

## INSTRUCTIONS TO BIDDERS

**For a proposal to be considered it must be in accordance with the following instructions:**

### 1. PROPOSALS

Proposals must be made in strict accordance with the Form of Proposal provided therefor, and all blank spaces for bids, alternates, and unit prices applicable to bidder's work shall be properly filled in. When requested alternates are not bid, the proposer shall so indicate by the words "No Bid". Any blanks shall also be interpreted as "No Bid". The bidder agrees that bid on Form of Proposal detached from specifications will be considered and will have the same force and effect as if attached thereto. Photocopied or faxed proposals will not be considered. Numbers shall be stated both in writing and in figures for the base bids and alternates. If figures and writing differ, the written number will supersede the figures.

Any modifications to the Form of Proposal (including alternates and/or unit prices) will disqualify the bid and may cause the bid to be rejected.

The bidder shall fill in the Form of Proposal as follows:

a. 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.

b. 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.

c. If the documents are executed on the part of a corporation, they shall be 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.

d. If the proposal is made by a joint venture, it shall be executed by each member of the joint venture in the above form for sole owner, partnership or corporation, whichever form is applicable.

Proposals should be addressed as indicated in the Advertisement for Bids and be delivered, enclosed in an opaque sealed envelope, marked "Proposal" and bearing the title of the work, name of the bidder, and the contractor's license number of the bidder. Bidders should clearly mark on the outside of the bid envelope which contract(s) they are bidding.

For projects bid in the single-prime alternative, the names and license numbers of major subcontractors shall be listed on the proposal form.

It shall be the specific responsibility of the bidder to deliver his bid to the proper official at the selected place and prior to the announced time for the opening of bids. Later delivery of a bid for any reason, including delivery by any delivery service, shall disqualify the bid.

Unit prices quoted in the proposal shall include overhead and profit and shall be the full compensation for the contractor's cost involved in the work. See General Conditions, Article 19c-1.

### 2. EXAMINATION OF CONDITIONS

It is understood and mutually agreed that by submitting a bid the bidder acknowledges that he has carefully examined all documents pertaining to the work, the location, accessibility and general character of the site of the work and all existing buildings and structures within and

adjacent to the site, and has satisfied himself as to the nature of the work, the condition of existing buildings and structures, the conformation of the ground, the character, quality and quantity of the material to be encountered, the character of the equipment, machinery, plant and any other facilities needed preliminary to and during prosecution of the work, the general and local conditions, the construction hazards, and all other matters, including, but not limited to, the labor situation which can in any way affect the work under the contract, and including all safety measures required by the Occupational Safety and Health Act of 1970 and all rules and regulations issued pursuant thereto. It is further mutually agreed that by submitting a proposal the bidder acknowledges that he has satisfied himself as to the feasibility and meaning of the plans, drawings, specifications and other contract documents for the construction of the work and that he accepts all the terms, conditions and stipulations contained therein; and that he is prepared to work in cooperation with other contractors performing work on the site.

Reference is made to contract documents for the identification of those surveys and investigation reports of subsurface or latent physical conditions at the site or otherwise affecting performance of the work which have been relied upon by the designer in preparing the documents. The owner will make copies of all such surveys and reports available to the bidder upon request.

Each bidder may, at his own expense, make such additional surveys and investigations as he may deem necessary to determine his bid price for the performance of the work. Any on-site investigation shall be done at the convenience of the owner. Any reasonable request for access to the site will be honored by the owner.

## 3. BULLETINS AND ADDENDA

Any addenda to specifications issued during the time of bidding are to be considered covered in the proposal and in closing a contract they will become a part thereof. It shall be the bidder's responsibility to ascertain prior to bid time the addenda issued and to see that his bid includes any changes thereby required.

Should the bidder find discrepancies in, or omission from, the drawings or documents or should he be in doubt as to their meaning, he shall at once notify the designer who will send written instructions in the form of addenda to all bidders. Notification should be no later than seven (7) days prior to the date set for receipt of bids. Neither the owner nor the designer will be responsible for any oral instructions.

All addenda should be acknowledged by the bidder(s) on the Form of Proposal. However, even if not acknowledged, by submitting a bid, the bidder has certified that he has reviewed all issued addenda and has included all costs associated within his bid.

## 4. BID SECURITY

Each proposal shall be accompanied by a cash deposit or a certified check drawn on some bank or trust company insured by the Federal Deposit Insurance Corporation, or a bid bond in an amount equal to not less than five percent (5%) of the proposal, said deposit to be retained by the owner as liquidated damages in event of failure of the successful bidder to execute the contract within ten (10) days after the award or to give satisfactory surety as required by law (G.S. 143-129).

Bid bond shall be conditioned that the surety will, upon demand, forthwith make payment to the obligee upon said bond if the bidder fails to execute the contract. The owner may retain bid securities of any bidder(s) who may have a reasonable chance of award of contract for the full duration of time stated in the Notice to Bidders. Other bid securities may be released sooner, at the discretion of the owner. All bid securities (cash or certified checks) shall be returned to the bidders promptly after award of contracts, and no later then seven (7) days after expiration of the holding period stated in the Notice to Bidders. Standard Form of Bid Bond is included in these specifications and shall be used.

## 5. RECEIPT OF BIDS

Bids shall be received in strict accordance with requirements of the General Statutes of North Carolina. Bid security shall be required as prescribed by statute. Prior to the closing of the bid, the bidder will be permitted to change or withdraw his bid. Guidelines for opening of public construction bids are available from the State Construction Office.

## 6. OPENING OF BIDS

Upon opening, all bids shall be read aloud. Once bidding is closed, there shall not be any withdrawal of bids by any bidder and no bids may be returned by the designer to any bidder. After the opening of bids, no bid may be withdrawn, except under the provisions of General Statute 143-129.1, for a period of thirty days unless otherwise specified. Should the successful bidder default and fail to execute a contract, the contract may be awarded to the next lowest and responsible bidder. The owner reserves the unqualified right to reject any and all bids. Reasons for rejection may include, but shall not be limited to, the following:

a. If the Form of Proposal furnished to the bidder is not used or is altered.

b. If the bidder fails to insert a price for all bid items, alternates, and unit prices requested.

c. If the bidder adds any provisions reserving the right to accept or reject any award.

d. If there are unauthorized additions or conditional bids, or irregularities of any kind which tend to make the proposal incomplete, indefinite or ambiguous as to its meaning.

e. If the bidder fails to complete the proposal form where information is requested so the bid may be properly evaluated by the owner.

f. If the unit prices contained in the bid schedule are unacceptable to the owner and the State Construction Office.

g. If the bidder fails to comply with other instructions stated herein.

## 7. BID EVALUATION

The award of the contract will be made to the lowest responsible bidder as soon as practical. The owner may award on the basis of the base bid and any alternates the owner chooses.

Before awarding a contract, the owner may require the apparent low bidder to qualify himself to be a responsible bidder by furnishing any or all of the following data:

a. The latest financial statement showing assets and liabilities of the company or other information satisfactory to the owner.

b. A listing of completed projects of similar size.

c. Permanent name and address of place of business.

d. The number of regular employees of the organization and length of time the organization has been in business under present name.

e. The name and home office address of the surety proposed and the name and address of the responsible local claim agent.

f. The names of members of the firms who hold appropriate trade licenses, together with

license numbers.

g. If prequalified, contractor info will be reviewed and evaluated comparatively to submitted prequalification package.

Failure or refusal to furnish any of the above information, if requested, shall constitute a basis for disqualification of any bidder.

In determining the lowest responsible, responsive bidder, the owner shall take into consideration the past performance of the bidder on construction contracts for the State with particular concern given to completion times, quality of work, cooperation with other contractors, and cooperation with the designer and owner.

Should the owner adjudge that the apparent low bidder is not the lowest responsible, responsive bidder by virtue of the above information, said apparent low bidder will be so notified and his bid security shall be returned to him.

## 8. PERFORMANCE BOND

The successful bidder, upon award of contract, shall furnish a performance bond in an amount equal to 100 percent of the contract price. See Article 35, General Conditions.

## 9. PAYMENT BOND

The successful bidder, upon award of contract, shall furnish a payment bond in an amount equal to 100 percent of the contract price. See Article 35, General Conditions.

## 10. PAYMENTS

Payments to the successful bidders (contractors) will be made on the basis of monthly estimates. See Article 31, General Conditions.

## 11. PRE-BID CONFERENCE

Prior to the date set for receiving bids, the Designer may arrange and conduct a Pre-Bid Conference for all prospective bidders. The purpose of this conference is to review project requirements and to respond to questions from prospective bidders and their subcontractors or material suppliers related to the intent of bid documents. Attendance by prospective bidders shall be as required by the "Notice to Bidders".

## 12. SUBSTITUTIONS

In accordance with the provisions of G.S. 133-3, material, product, or equipment substitutions proposed by the bidders to those specified herein can only be considered during the bidding phase until ten (10) days prior to the receipt of bids when submitted to the Designer with sufficient data to confirm material, product, or equipment equality. Proposed substitutions submitted after this time will be considered only as potential change order.

Submittals for proposed substitutions shall include the following information:

a. Name, address, and telephone number of manufacturer and supplier as appropriate.

b. Trade name, model or catalog designation.

c. Product data including performance and test data, reference standards, and technical descriptions of material, product, or equipment. Include color samples and samples of available finishes as appropriate.

d. Detailed comparison with specified products including performance capabilities, warranties, and test results.

e. Other pertinent data including data requested by the Designer to confirm product equality.

If a proposed material, product, or equipment substitution is deemed equal by the Designer to those specified, all bidders of record will be notified by Addendum**.**

## 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 Notice to Bidders; Instructions to Bidders; 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 proposal; 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 through the agency named in the contract.

c. The **designer(s)** are those referred to within this contract, or their authorized representatives. The Designer(s), as referred to herein, shall mean architect and/or engineer. They will be referred to hereinafter as if each were of the singular number, masculine gender.

d. The **contractor**, as referred to hereinafter, shall be deemed to be either of the several contracting parties called the "Party of the First Part" in either of the several contracts in connection with the total project. Where, in special instances hereinafter, a particular contractor is intended, an adjective precedes the word "contractor," as "general," "heating," etc. For the purposes of a single prime contract, the term Contractor shall be deemed to be the single contracting entity identified as the "Party of the First Part" in the single Construction Contract. Any references or adjectives that name or infer multiple prime contractors shall be interpreted to mean the single prime Contractor.

e. A **subcontractor**, as the term is used herein, shall be understood to be one who has entered into a direct contract with a contractor, 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.

h. The **project** is the total construction work to be performed under the contract documents by the several contractors.

i. **Project Expediter,** as used herein, is an entity stated in the contract documents, designated to effectively facilitate scheduling and coordination of work activities. See Article 14(f) for responsibilities of a Project Expediter. **For the purposes of a single prime contract, the single prime contractor shall be designated as the Project Expediter.**

j. **Change order**, as used herein, shall mean a written order to the contractor subsequent to the signing of the contract authorizing a change in the contract. The change order shall be signed by the contractor, 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 contractor to proceed with the work requested by owner prior to issuance of a formal Change Order. The field order shall be signed by the contractor, designer, owner, and State Construction Office.

l. **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).

m. **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 contractor(s) 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 contractor, or consequential damages that the Owner identified in the bid documents that may be impacted by any delay caused solely by the Contractor (e.g., if a multi-phased project-subsequent phases, delays in start other projects that are dependent on the completion of this Project, extension of leases and/or maintenance agreements for other facilities).

n. **Surety**, as used herein, shall mean the bonding company or corporate body which is bound with and for the contractor, and which engages to be responsible for the contractor and his acceptable performance of the work.

o. **Routine written communications between the Designer and the Contractor** 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 can not be identified as "request for information".

p. **Clarification or Request for information (RFI)** is a request from the Contractor 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 Contractor's interpretation or understanding of the contract documents requirements in question, along with reasons for such an understanding.

q. **Approval** means written or imprinted acknowledgement that materials, equipment or methods of construction are acceptable for use in the work**.**

r. **Inspection** shall mean examination or observation of work completed or in progress to determine its compliance with contract documents.

s. **"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 Designer and owner.

t. **"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.

u. **Provide** shall mean furnish and install complete in place, new, clean, operational, and ready for use.

v. **Indicated and shown** shall mean provide as detailed, or called for, and reasonably implied in the contract documents.

w. **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.

x. **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.

y. **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.

z. **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.

aa. **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.

bb. 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, and 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 bid for 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 contractor shall execute each copy of the proposal, 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 contractor(s) 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 contractor shall not proceed with the work without such detail drawings and/or written clarifications.

## ARTICLE 4 - COPIES OF DRAWINGS AND SPECIFICATIONS

a. The designer or Owner shall furnish free of charge to the contractors electronic copies of plans and specifications. If requested by the contractor, paper copies of plans and specifications shall be furnished free of charge as follows:

1. General contractor - Up to twelve (12) sets of general contractor drawings and specifications, up to six (6) sets of which shall include drawings and specifications of all other contracts, plus a clean set of black line prints on white paper of all appropriate drawings, upon which the contractor shall clearly and legibly record all work-in-place that is at variance with the contract documents.

2. Each other contractor - Up to six (6) sets of the appropriate drawings and specifications, up to three (3) sets of which shall include drawings and specifications of all other contracts, plus a clean set of black line prints on white paper of all appropriate drawings, upon which the contractor shall clearly and legibly record all work-in-place that is at variance with the contract documents.

3. Additional sets shall be furnished at cost, including mailing, to the contractor upon request by the contractor. This cost shall be stated in the bidding documents.

4. For the purposes of a single-prime contract, the contractor shall receive up to 30 sets

of drawings and specifications, plus a clean set of black line prints on white paper of all appropriate drawings, upon which the contractor shall clearly and legibly record all work- in-place that is at variance with the contract documents.

## ARTICLE 5 - SHOP DRAWINGS, SUBMITTALS, SAMPLES, DATA

a. Within 15 consecutive calendar days after the notice to proceed, each prime contractor shall submit a schedule for submission of all shop drawings, product data, samples, and similar submittals through the Project Expediter 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 Contractor(s) 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 Contractor'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 Contractor. 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 or of separate Contractors.

*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 Contractor not later than twenty (20) days from the date of receipt by the Designer, for the Contractor'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 submittal***s.***

d. Approval of shop drawings/submittals by the Designer shall not be construed as relieving the Contractor 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 lack of compliance or errors first have been called in writing to the attention of the Designer by the Contractor.

## ARTICLE 6 - WORKING DRAWINGS AND SPECIFICATIONS AT THE JOB SITE

a. The contractor 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, his authorized representative, owner or State Construction Office.

b. The contractor 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 contractor and submitted to the designer upon project completion and no later than 30 days after final 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 contractor shall, unless otherwise specified, supply and pay for all labor, transportation, materials, tools, apparatus, lights, power, heat, sanitary facilities, water, scaffolding and incidentals necessary for the completion of his work, and shall 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, and 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 therefrom, 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 contractor shall furnish evidence 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 Contractor may select any product meeting this standard, by any manufacturer. When several products or manufacturers are specified as being equally acceptable, the Contractor has the option of using any product and manufacturer combination listed. However, the 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. Request for substitution of materials, items, or equipment shall be submitted to the 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 the award if it can clearly be demonstrated that it is an added benefit to the owner and the designer and owner approves.

e. The designer is the judge of equality for proposed substitution of products, materials or equipment.

f. If at any time during the construction and completion of the work covered by these contract documents, the language, conduct, or attire 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 contractor 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 contractor shall protect and save harmless the owner against suit on account of

alleged or actual infringement. The contractor 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 contractor 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 contractor observes that the drawings and specifications are at variance therewith, he shall promptly notify the designer in writing. See Instructions to Bidders, Paragraph 3, Bulletins and Addenda. Any necessary changes required after contract award shall be made by change order in accordance with Article 19. If the contractor performs any work 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 therefrom. 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 contractor and included within the bid proposal. All water taps, meter barrels, vaults and impact fees shall be paid by the contractor unless otherwise noted.

d. 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 contractor shall, however, cooperate with the county or municipal authorities by obtaining building permits. Permits shall be obtained at no cost.

e. Projects involving local funding (community colleges) are subject also to county and municipal building codes and inspection by local authorities. The contractor shall pay the cost of these permits and inspections.

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

a. The contractors shall be jointly 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. They 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. They shall be responsible for and pay for any damages caused to the owner. All contractors shall have access to the project at all times.

b. The contractor shall provide 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, whether set by him, or any of the subcontractors. 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 and owner.

d. The contractor shall protect all trees and shrubs designated to remain in the vicinity of the operations by building substantial boxes around same. He shall barricade all walks, roads,

etc., 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 contractor shall provide 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. He shall clearly mark or post signs warning of hazards existing, and shall barricade excavations, elevator shafts, stairwells and similar hazards. He shall protect against damage or injury resulting from falling materials and he shall maintain all protective devices and signs throughout the progress of the work.

f. The contractor 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 General Statutes of North Carolina 95-126 through 155.

g. The contractor 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 emergency affecting the safety of life, the protection of work, or the safety of adjoining properties, the contractor 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 contractor 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 contractor(s) 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 contractor(s) 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 contractor(s) 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 contractor(s) 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 and during any time work is in preparation and progress 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 contractor shall therefore provide safe access to the work at all times for such inspections.

b. All instructions to the contractor 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 contractor.

c. All work shall be inspected by designer, special inspector and/or State Construction Office prior to being covered by the contractor. Contractor shall give a minimum two weeks notice unless otherwise agreed to by all parties. If inspection fails, after the first reinspection all costs associated with additional reinspections shall be borne by the contractor.

d. Where special inspection or testing is required by virtue of any state laws, instructions of the designer, specifications or codes, the contractor shall give adequate notice to the designer of the time set for such inspection or test, if the inspection or test will be conducted by a party other than the designer. Such special tests or inspections will be made in the presence of the designer, or his authorized representative, and it shall be the contractor's responsibility to serve ample notice of such tests.

e. All laboratory tests shall be paid by the owner unless provided otherwise in the contract documents except the general contractor 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.

f. Should any work be covered up or concealed prior to inspection and approval by the designer, special inspector, and/or State Construction Office such work shall be uncovered or exposed for inspection, if so requested by the designer in writing. Inspection of the work will be made upon notice from the contractor. 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 contractor involved.

## ARTICLE 14 - CONSTRUCTION SUPERVISION AND SCHEDULE

a. Throughout the progress of the work, each contractor shall keep at the job site, a competent superintendent and supervisory staff satisfactory to the designer and the owner. The superintendent and supervisory staff shall not be changed without the consent of the designer and owner unless said superintendent ceases to be employed by the

contractor or ceases to be competent as determined by the contractor, designer or owner. The superintendent and other staff designated by the contractor in writing shall have authority to act on behalf of the contractor, and instructions, directions or notices given to him shall be as binding as if given to the contractor. However, directions, instructions, and notices shall be confirmed in writing.

b. The contractor 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. All contractors shall be required to cooperate and consult with each other during the construction of this project. Prior to installation of work, all contractors shall jointly prepare coordination drawings, showing locations of various ductworks, piping, motors, pumps, and other mechanical or electrical equipment, in relation to the structure, walls and ceilings. These drawings shall be submitted to the designer through the Project Expediter for information only. Each contractor shall lay out and execute his work to cause the least delay to other contractors. Each contractor shall be financially responsible for any damage to other contractor's work and for undue delay caused to other contractors on the project.

d. The contractor is required to attend job site progress conferences as called by the designer. The contractor shall be represented at these job progress conferences by both home office and project personnel. These representatives shall have authority to act on behalf of the contractor. These meetings shall be open to subcontractors, material suppliers and any others 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. Each contractor shall be prepared to assess progress of the work as required in his particular contract and to recommend remedial measures for correction of progress as may be appropriate. The designer or his authorized representative shall be the coordinator of the conferences and shall preside as chairman. The contractor 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.

e The contractor(s) 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 in a location where same will not be disturbed and where direct instruments sights may be taken.

f. The designer shall designate a Project Expediter on projects involving two or more prime contracts. The Project Expediter shall be designated in the Supplementary General Conditions. The Project Expediter shall have at a minimum the following responsibilities.

1. Prepare the project construction schedule and shall allow all prime contractors (multi-prime contract) and subcontractors (single-prime contract) performing general, plumbing, HVAC, and electrical work equal input into the preparation of the initial construction schedule.

2. Maintain a project progress schedule for all contractors.

3. Give adequate notice to all contractors to ensure efficient continuity of all phases of the work.

4. Notify the designer of any changes in the project schedule.

5. Recommend to the owner whether payment to a contractor shall be approved.

g. It shall be the responsibility of the Project Expediter to cooperate with and obtain from several prime contractors and subcontractors on the job, their respective work activities and integrate these activities into a project construction schedule in form of a detailed bar chart or Critical Path Method (CPM), schedule. Each prime contractor shall provide work activities within fourteen (14) days of request by the Project Expediter. A "work activity", for scheduling purposes, shall be any component or contractual requirement of the project requiring at least one (1) day, but not more than fourteen (14) days, to complete or fulfill. The project construction schedule shall graphically show all salient features of the work required to construct the project from start to finish and within the allotted time established in the contract. The time (in days) between the contractor's early completion and contractual completion dates is part of the project total float time; and shall be used as such, unless amended by a change order. On a multi-prime project, each prime contractor shall review the proposed construction schedule and approve same in writing. The Project Expediter shall submit the proposed construction schedule to the designer for comments. The complete Project construction schedule shall be of the type set forth in the Supplementary General Condition or subparagraph (1) or (2) below, as appropriate:

1. For a project with total contracts of $500,000 or less, a bar chart schedule will satisfy the above requirement. The schedule shall indicate the estimated starting and completion dates for each major element of the work.

2. For a project with total contracts over $500,000, a Critical Path Method (CPM) schedule shall be utilized to control the planning and scheduling of the Work. The CPM schedule shall be the responsibility of the Project Expediter and shall be paid for by the Project Expediter.

**Bar Chart Schedule**: Where a bar chart schedule is required, it shall be time-scaled in weekly increments, shall indicate the estimated starting and completion dates for each major element of the work by trade and by area, level, or zone, and shall schedule dates for all salient features, including but not limited to the placing of orders for materials, submission of shop drawings and other Submittals for approval, approval of shop drawings by designers, the manufacture and delivery of material, the testing and the installation of materials, supplies and equipment, and all Work activities to be performed by the Contractor. The Contractor shall allow sufficient time in his schedule for all commissioning, required inspections and completion of final punchlist(s). Each Work activity will be assigned a time estimate by the Contractor. One day shall be the smallest time unit used.

**CPM Schedule**: Where a CPM schedule is required, it shall be in time-scaled precedence format using the Project Expediter's logic and time estimates. The CPM schedule shall be drawn or plotted with activities grouped or zoned by Work area or subcontract as opposed to a random (or scattered) format. The CPM schedule shall be time-scaled on a weekly basis and shall be drawn or plotted at a level of detail and logic which will schedule all salient features of the work to be performed by the Contractor. The Contractor shall allow

sufficient time in his schedule for all commissioning, required inspections and completion of final punchlist(s). Each Work activity will be assigned a time estimate by the Contractor. One day shall be the smallest time unit used.

The CPM schedule will identify and describe each activity, state the duration of each activity, the calendar dates for the early and late start and the early and late finish of each activity, and clearly highlight all activities on the critical path. "Total float" and "free float" shall be indicated for all activities. Float time shall not be considered for the exclusive use or benefit of either the Owner or the Contractor, but must be allocated in the best interest of completing the Work within the Contract time. Extensions to the Contract time, when granted by Change Order, will be granted only when equitable time adjustment exceeds the Total Float in the activity or path of activities affected by the change. On contracts with a price over $2,500,000, the CPM schedule shall also show what part of the Contract Price is attributable to each activity on the schedule, the sum of which for all activities shall equal the total Contract Price.

**Early Completion of Project**: The Contractor may attempt to complete the project prior to the Contract Completion Date. However, such planned early completion shall be for the Contractor's convenience only and shall not create any additional rights of the Contractor or obligations of the Owner under this Contract, nor shall it change the Time for Completion or the Contract Completion Date. The Contractor shall not be required to pay liquidated damages to the Owner because of its failure to complete by its planned earlier date. Likewise, the Owner shall not pay the Contractor any additional compensation for early completion nor will the Owner owe the Contractor any compensation should the Owner, its officers, employees, or agents cause the Contractor not to complete earlier than the date required by the Contract Documents.

h. The proposed project construction schedule shall be presented to the designer no later than fifteen (15) days after written notice to proceed. No application for payment will be processed until this schedule is accepted by the designer and owner.

i. The approved project construction schedule shall be distributed to all contractors and displayed at the job site by the Project Expediter.

j. The several contractors shall be responsible for their work activities and shall notify the Project Expediter of any necessary changes or adjustments to their work. The Project Expediter shall maintain the project construction schedule, making biweekly adjustments, updates, corrections, etc., that are necessary to finish the project within the Contract time, keeping all contractors and the designer fully informed. Copy of a bar chart schedule annotated to show the current progress shall be submitted by the Contractor(s) to the designer, along with monthly request for payment. For project requiring CPM schedule, the Contractor shall submit a biweekly report of the status of all activities. The bar chart schedule or status report shall show the actual Work completed to date in comparison with the original Work scheduled for all activities. If any activities of the work of several contractors are behind schedule, the contractor must indicate in writing, what measures will be taken to bring each such activity back on schedule and to ensure that the Contract Completion Date is not exceeded. A plan of action and recovery schedule shall be developed and submitted to the designer by the Project Expediter, when (1) the contractor's report indicates delays, that are in the opinion of the designer or the owner, of sufficient magnitude that the contractor's ability to complete the work by the scheduled completion is brought into question; (2) the updated construction schedule is thirty (30)

days behind the planned or baseline schedule and no legitimate time extensions, as determined by the Designer, are in process; and (3) the contractor desires to make changes in the logic (sequencing of work) or the planned duration of future activities of the CPM schedule which, in the opinion of the designer or the owner, are of a major nature. The plan of action, when required shall be submitted to the Owner for review within two (2) business days of the Contractor receiving the Owner's written demand. The recovery schedule, when required, shall be submitted to the Owner within five (5) calendar days of the Contractor's receiving the Owner's written demand. Failure to provide an updated construction schedule or a recovery schedule may be grounds for rejection of payment applications or withholding of funds as set forth in Article 33.

k. The Project Expediter shall notify each contractor of such events or time frames that are critical to the progress of the job. Such notice shall be timely and reasonable. Should the progress be delayed due to the work of any of the several contractors, it shall be the duty of the Project Expediter to immediately notify the contractor(s) responsible for such delay, the designer, the State Construction Office and other prime contractors. The designer shall determine the contractor(s) who caused the delays and notify the bonding company of the responsible contractor(s) of the delays; and shall make a recommendation to the owner regarding further action.

l. Designation as Project Expediter entails an additional project control responsibility and does not alter in any way the responsibility of the contractor so designated, nor the responsibility of the other contractors involved in the project. The project expeditor's Superintendent(s) shall be in attendance at the Project site at all times when work is in progress unless conditions are beyond the control of the Contractor or until termination of the Contract in accordance with the Contract Documents. It is understood that such Superintendent shall be acceptable to the Owner and Designer and shall be the one who will be continued in that capacity for the duration of the project unless he ceases to be on the Contractor's payroll or the Owner otherwise agrees. The Superintendent shall not be employed on any other project for or by the Contractor or by any other entity during the course of the Work. If the Superintendent is employed by the Contractor on another project without the Owner's approval, then the Owner may deduct from the Contractor's monthly general condition costs and amount representing the Superintendent's cost and shall deduct that amount for each month thereafter until the Contractor has the Superintendent back on the Owner's Project full-time.

## ARTICLE 15 - SEPARATE CONTRACTS AND CONTRACTOR RELATIONSHIPS

a. Effective from January 1, 2002, Chapter 143, Article 8, was amended, to allow public contracts to be delivered by the following delivery methods: single-prime, dual (single-prime and separate-prime), construction manager at risk, and alternative contracting method as approved by the State Building Commission. The owner reserves the right to prepare separate specifications, receive separate bids, and award separate contracts for such other major items of work as may be in the best interest of the State. For the purposes of a single prime contract, refer to Article 1 – Definitions.

b. All contractors shall cooperate with each other in the execution of their work, and shall plan their work in such manner as to avoid conflicting schedules or delay of the work. See Article 14, Construction Supervision.

c. If any part of contractor's work depends upon the work of another contractor, defects which may affect that work shall be reported to the designer in order that prompt inspection may be made and the defects corrected. Commencement of work by a contractor where such condition exists will constitute acceptance of the other contractor's work as being satisfactory in all respects to receive the work commenced, except as to

defects which may later develop. The designer shall be the judge as to the quality of work and shall settle all disputes on the matter between contractors.

d. Any mechanical or electrical work such as sleeves, inserts, chases, openings, penetrations, etc., which is located in the work of the general contractor shall be built in by the general contractor. The respective mechanical and electrical contractors shall set all sleeves, inserts and other devices that are to be incorporated into the structure in cooperation and under the supervision of the general contractor. The responsibility for the exact location of such items shall be that of the mechanical and/or electrical contractor.

e. The designer and the owner shall have access to the work whenever it is in preparation and progress and during normal working hours. The contractor shall provide facilities for such access so the designer may perform his functions under the contract documents.

f. Should a contractor cause damage to the work or property of another contractor, he shall be directly responsible, and upon notice, shall promptly settle the claim or otherwise resolve the dispute.

## ARTICLE 16 - SUBCONTRACTS AND SUBCONTRACTORS

a. Within thirty (30) days after award of the contract, the contractor shall submit to the designer, owner and to the State Construction Office a list giving the names and addresses of subcontractors and equipment and material suppliers he proposes to use, together with the scope of their respective parts of the work. Should any subcontractor be disapproved by the designer or owner, the designer or owner shall submit his reasons for disapproval in writing to the State Construction Office for its consideration with a copy to the contractor. If the State Construction Office concurs with the designer's or owner's recommendation, the contractor shall submit a substitute for approval. The designer and owner shall act promptly in the approval of subcontractors, and when approval of the list is given, no changes of subcontractors will be permitted except for cause or reason considered justifiable by the designer or owner.

b. The designer will furnish to any subcontractor, upon request, evidence regarding amounts of money paid to the contractor on account of the subcontractor's work.

c. The contractor is and remains fully responsible for his own acts or omissions as well as those of any subcontractor or of any employee of either. The contractor agrees that no contractual relationship exists between the subcontractor and the owner in regard to the contract, and that the subcontractor acts on this work as an agent or employee of the contractor.

d. The owner reserves the right to limit the amount of portions of work to be subcontracted as hereinafter specified

## ARTICLE 17 - CONTRACTOR AND SUBCONTRACTOR RELATIONSHIPS

The contractor agrees that the terms of these contract documents shall apply equally to each subcontractor as to the contractor, and the contractor agrees to take such action as may be necessary to bind each subcontractor to these terms. The contractor further agrees to conform to the Code of Ethical Conduct as adopted by the Associated General Contractors of America, Inc., with respect to contractor-subcontractor relationships, and that payments to subcontractors shall be made in accordance with the provisions of 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 G.S. 136-28.1, the balance due prime contractors 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 contractor, 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. No payment shall be delayed because of the failure of another prime contractor on such project to complete his contract. Should final payment to any prime contractor beyond the date such contracts have been certified to be completed by the designer or architect, 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 prime contractor 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 a prime contractor during construction shall be paid in accordance with the payment provisions of the contract documents or said prime contractor 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 prime contractor of each periodic or final payment, the prime contractor shall pay the subcontractor based on work completed or service provided under the subcontract. Should any periodic or final payment to the subcontractor be delayed by more than seven days after receipt of periodic or final payment by the prime contractor, the prime contractor shall pay the subcontractor 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 prime contractor to the subcontractor shall not exceed the percentage of retainage on payments made by the owner to the prime contractor. Any percentage of retainage on payments made by the prime contractor to the subcontractor that exceeds the percentage of retainage on payments made by the owner to the prime contractor shall be subject to interest to be paid by the prime contractor to the subcontractor at the rate of one percent (1%) per month or fraction thereof.

d. Nothing in this section shall prevent the prime contractor at the time of application and certification to the owner from withholding application and certification to the owner for payment to the subcontractor for unsatisfactory job progress; defective construction not remedied; disputed work; third-party claims filed or reasonable evidence that claim will be filed; failure of subcontractor to make timely payments for labor, equipment and materials; damage to prime contractor or another subcontractor; reasonable evidence that subcontract 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 designer shall provide general administration of the performance of construction contracts, including 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 direct work to be performed, to stop work, to order work removed, or to order corrections of faulty work, where any such action by the designer may be necessary to assure successful completion of the work.

b. The 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 contractor, taking sides with neither.

c. Should the 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 designer.

d. The designer and his consultants will make inspections of the project. He will inspect the progress, the quality and the quantity of the work.

e. The designer and the owner shall have access to the work whenever it is in preparation and progress during normal working hours. The contractor shall provide facilities for such access so the designer and owner may perform their functions under the contract documents.

f. Based on the designer's inspections and evaluations of the project, the designer shall issue interpretations, directives and decisions as may be necessary to administer the project. His decisions relating to artistic effect and technical matters shall be final, provided such decisions are within the limitations of the contract.

## 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 contractor 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, electronically, 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.

In the event of emergency endangering life or property, the contractor may be directed to proceed on a time and material basis whereupon the contractor shall proceed and keep accurately on such form as specified by the designer or owner, 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, 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, or subsequently agreed to by the Contractor, Designer, Owner and State Construction Office 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 is 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 shall be as follows: all contractors (the single contracting entity (prime), his subcontractors(1st tier subs), or their sub-subcontractors (2nd tier subs, 3rd tier subs, etc)) shall be allowed a maximum of 10% on work they each self-perform; the prime contractor shall be allowed a maximum of 5% on contracted work of his 1st tier sub; 1st tier, 2nd tier, 3rd tier, etc contractors shall be allowed a maximum of 2.5% on the contracted workof their subs. ; 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 work;

2. The actual costs of labor expended on the project site; labor expended in coordination, change order negotiation, record document maintenance, shop drawing revision or other tasks necessary to the administration of the project are considered overhead whether they take place in an office or 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 work;

5. The actual costs of premiums for bonds, insurance, permit fees, and sales or use taxes related to the work.

6. 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 unit cost breakdown showing method of arriving at net cost as defined above.

g. In all change orders, the procedure will be for the designer to request proposals for the change order work in writing. The contractor will provide such proposal and supporting data in suitable format. The designer shall verify correctness. Delay in the processing of the change order due to lack of proper submittal by the contractor of all required supporting data shall not constitute grounds for a time extension or basis of a claim. Within fourteen (14) days after receipt of the contractor's accepted proposal including all supporting documentation required by the designer**,** the designer shall prepare the change order and forward to the contractor for his signature or otherwise respond, in writing, to the contractor's proposal. Within seven (7) days after receipt of the change order executed by the contractor, the 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. 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 contractor 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 contractor's terms are unacceptable, the owner**,** with the approval of the State Construction Office, may require the contractor to perform such work on a time and material basis whereupon the contractor shall proceed and keep accurately on such form as specified by the Designer or owner, a correct account of cost together with all proper invoices, payrolls and supporting data. Upon completion of the work a change order will be prepared with allowances for overhead and profit per paragraph d. above and "net cost" and "cost" per paragraph e. 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 contractor consider that as a result of instructions given 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 contractor 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 shall 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 contractor shall not act on instructions received by him from persons other than the designer, and any claims for extra compensation or extension of time on account of such instruction will not be honored. The designer shall not be responsible for misunderstandings claimed by the contractor 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 contractor and is denied by the designer or owner, and cannot be resolved by a representative of the State Construction Office, the contractor may request a mediation in connection with GS 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 contractor is unable to resolve its claim as a result of mediation, the contractor may pursue the claim in accordance with the provisions of G.S. 143-135.3, or G.S. 143-135.6 where Community Colleges are the owner, and the following:

1. A contractor who has not completed a contract with a board 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 contractor 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 Chapter 150B of the General Statutes.

2. A contractor who has completed a contract with a board 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 contractor claims is due. The claim shall be submitted within sixty (60) days after the contractor receives a final statement of the board's disposition of his claim and shall state the factual basis for the claim.

   (a) 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 contractor agree. The contractor 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 contractor a written statement of the director's decision on the contractor's claim.

   (b) A contractor 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.

   (c) As to any portion of a claim that is denied by the director, the contractor 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 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 contractor.

## ARTICLE 22 - UNCORRECTED FAULTY WORK

Should the correction of faulty or damaged work be considered inadvisable or inexpedient by the owner and the designer, the owner shall be reimbursed by the contractor. 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 time of completion is stated in the Supplementary General Conditions and in the Form of Construction Contract. The Project Expediter, upon notice of award of contract, shall prepare a construction schedule to complete the project within the time of completion as required by Article 14.

b. The contractors shall commence work to be performed under this agreement on a date to be specified in a written Notice to Proceed from the designer and shall fully complete all work hereunder within the time of completion stated. Time is of the essence and the contractor acknowledges the Owner will likely suffer financial damage for failure to complete the work within the time of completion. For each day in excess of the above number of days, the contractor(s) 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 said contractor(s) 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. In the event of multiple prime contractors, the designer shall be the judge as to the division of responsibility between the contractor(s), based on the construction schedule, weekly reports and job records, and shall apportion the amount of liquidated damages to be paid by each of them, according to delay caused by any or all of them.

d. If the contractor is delayed at any time in the progress of his work solely by any act or negligence of the owner, the designer, or by any employee of either; by any separate contractor employed by the owner; 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 only 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 contractor 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.

e. 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 Contractor shall notify the Designer to the designer, copies to the owner and SCO, of the delay within 20 days of the beginning of the delay and only one claim is necessary.

f. The contractor shall notify his surety in writing of extension of time granted.

g. No claim for time extension shall be allowed on account of failure of the 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 prior to the completion of the project.

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.

2. Contractor will obtain consent of surety.

3. Contractor will obtain endorsement from insurance company permitting beneficial occupancy.

c. The owner shall have the right to exclude the contractor from any part of the project which the designer has so certified to be substantially complete, but the owner will allow the

contractor 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 contractor 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 contractor(s) that the project is complete and ready for inspection, the 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 contractor(s) shall complete all items requiring corrective measures noted at the Designer final inspection**.** The designer shall schedule a SCO final inspection at a time and date acceptable to the owner, contractor(s) and 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 one of the following determinations:

1. That the project is completed and accepted.

2. That the project will be 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.

4. That the project is not complete and another date for a SCO final inspection will be established.

c. Within fourteen (14) days of final acceptance per Paragraph b1 or within fourteen (14) days after completion of punch list per Paragraph b2 above, the 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 b1 or b2 above shall be handled in accordance with Article 42, Guarantee.

f. The final acceptance date will establish the following:

1. The beginning of guarantees and warranties period.

2. The date on which the contractor'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 contractor.

g. 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 contractor, and shall be immediately replaced by new work in accordance with the contract at no additional cost to the owner. Work or property of other contractors or the owner, damaged or destroyed by virtue of such faulty work, shall be made good at the expense of the contractor whose work is faulty.

b. Correction of condemned work described above shall commence within twenty-four (24) hours after receipt of notice from the designer, and shall make satisfactory progress, as determined by the designer, until completed.

c. Should the contractor 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 designer, shall relieve the contractor from responsibility for negligence, or faulty material or workmanship, or failure to comply with the drawings and specifications. Contractor shall correct or make good any defects due thereto and repair any damage resulting there from, 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 contractor and establish a time limit for completion of corrections by the contractor. 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 contractor 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 contractor 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 contractor, such action and cost of same having been first approved by the designer. Should the cost of such action of the owner exceed the amount due or to become due the contractor, then the contractor 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 contractor fails to begin the work under the contract within the time specified, 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 contractor 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 contractor and his surety of such delay, neglect or default, specifying the same, and if the contractor 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 contractor, 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 contractor 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 contractor, then the said contractor 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 contractor and the surety shall be liable and shall pay to the owner the amount of said excess.

## ARTICLE 30 - CONTRACTOR'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 contractor, 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 contractor, 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 contractor for the cost of all materials delivered and work performed on this contract plus 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 contractor 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 contractor 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 contractor'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. The contractor, upon request of the designer, shall substantiate the request with invoices of vouchers or payrolls or other evidence.

c. Prior to submitting the first request, the contractor shall prepare for the designer a schedule showing a breakdown of the contract price into values of the various parts of the work, so arranged as to facilitate payments to subcontractors in accordance with Article 17, Contractor and Subcontractor Relationships. The contractor(s) shall list the value of each subcontractor and supplier, if applicable.

d. When payment is made on account of stored materials and equipment, such materials must be stored on the owner's property, and the requests for payments shall be accompanied by invoices or bills of sale or other evidence to establish the owner's title to such materials and equipment. Such payments will be made only for materials that have been customized or fabricated specifically for this project. Raw materials or commodity products including but not limited to piping, conduit, CMU, metal studs and gypsum board may not be submitted. Responsibility for such stored materials and equipment shall remain with the contractor regardless of ownership title. Such stored materials and equipment shall not be removed from the owner's property. Should the space for storage on-site be limited, the contractor, at his option, shall be permitted to store such materials and/or equipment in a suitable space off-site. Should the contractor desire to include any such materials or equipment in his application for payment, they must be stored in the name of the owner in an independent, licensed, bonded warehouse approved by the designer, owner and the State Construction Office and located as close to the site as possible. The warehouse selected must be approved by the contractor's bonding and insurance companies; the material to be paid for shall be assigned to the owner and shall be inspected by the designer. Upon approval by the designer, owner and SCO of the storage facilities and materials and equipment, payment therefore will be certified. Responsibility for such stored materials and equipment shall remain with the contractor. Such stored materials and equipment shall not be moved except for transportation to the project site. Under certain conditions, the designer may approve storage of materials at the point of manufacture, which conditions shall be approved by the designer, the owner and the State Construction Office prior to approval for the storage and shall include an agreement by the storing party which unconditionally gives the State absolute right to possession of the materials at anytime. Bond, security and insurance protection shall continue to be the responsibility of the contractor(s).

e. In the event of beneficial occupancy, retainage of funds due the contractor(s) 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 contractor's bonding company.

## ARTICLE 32 - CERTIFICATES OF PAYMENT AND FINAL PAYMENT

a. Within five (5) days from receipt of request for payment from the contractor, 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 contractor 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 contractor.

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 contractor 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 contractor 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 Contractor'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 contractor shall forward to the designer, the final application for payment along with the following documents:

1. Affidavit of Release of Liens.

2. Affidavit of contractors of payment to material suppliers and subcontractors. (See Article 36).

3. Consent of Surety to Final Payment.

4. 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 designer, certificates of compliance issued, and the contractor has complied with the closeout requirements. The designer shall forward the contractor'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.

b. The secretary of the Department of Administration may authorize the withholding of payment for the following reasons:

1. Claims filed against the contractor or evidence that a claim will be filed.
2. Evidence that subcontractors have not been paid.

c. The Owner may withhold all or a portion of Contractor's general conditions costs set forth in the approved schedule of values, if Contractor 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 contractor without cause will make owner liable for payment of interest to the contractor 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 by the Contractor 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 contractor shall provide and maintain, until final acceptance, 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 contractor shall provide and maintain, until final acceptance, 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 contractor shall purchase and maintain property insurance until final acceptance, upon the entire work at the site to the full insurable value thereof. This insurance shall include the interests of the owner, the contractor, the subcontractors and sub- subcontractors in the work and shall insure against the perils of fire, wind, rain, flood, extended coverage, and vandalism and malicious mischief. If the owner is damaged by failure of the contractor to purchase or maintain such insurance, then the contractor shall bear all reasonable costs properly attributable thereto; the contractor 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 contractor.

e. **Other Insurance**

The contractor 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 contractor 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

Each contractor 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. Bonds shall be executed in the form bound with these specifications.

## ARTICLE 36 - CONTRACTOR'S AFFIDAVIT

The final payment of retained amount due the contractor on account of the contract shall not become due until the contractor 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 in connection with his contract have been satisfied, and that no claims or liens exist against the contractor in connection with this contract. In the event that the contractor cannot obtain similar affidavits from subcontractors to protect the contractor and the owner from possible liens or claims against the subcontractor, the contractor shall state in his affidavit that no claims or liens exist against any subcontractor to the best of his (the contractor's) knowledge, and if any appear afterward, the contractor shall save the owner harmless.

## ARTICLE 37 - ASSIGNMENTS

The contractor 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 contractor under the contract may be assigned.

## ARTICLE 38 - USE OF PREMISES

a. The contractor(s) 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 owner and shall not exceed those established limits in his operations.

b. The contractor(s) shall not load or permit any part of the structure to be loaded with a weight that will endanger its safety.

c. The contractor(s) 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 contractor shall do all cutting, fitting or patching of his work that may be required to make its several parts 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 contractor shall endanger any work of another contractor by cutting, digging or other means. No contractor shall cut or alter the work of any other contractor without the consent of the designer and the affected contractor(s).

## ARTICLE 40 - UTILITIES, STRUCTURES, SIGNS

a. The contractor shall provide necessary and adequate facilities for water, electricity, gas, oil, sewer and other utility services which maybe necessary and required for completion of the project including all utilities required for testing, cleaning, balancing, and sterilization of designated plumbing, mechanical and electrical systems. Any permanent meters installed shall be listed in the contractor's name until work has a final acceptance. The contractor will be solely responsible for all utility costs prior to final acceptance. Contractor shall contact all affected utility companies prior to bid to determine their requirements to provide temporary and permanent service and include all costs associated with providing those services in their bid. Coordination of the work of the utility companies during construction is the sole responsibility of the contractor.

b. Meters shall be relisted in the owner's name on the day following final acceptance of the Project Expediter's work, and the owner shall pay for services used after that date.

c. The owner shall be reimbursed for all metered utility charges after the meter is relisted in the owner's name and prior to completion and acceptance of the work of all contractors. Reimbursement shall be made by the contractor whose work has not been completed and accepted. If the work of two or more contractors has not been completed and accepted, reimbursement to the owner shall be paid by the contractors involved on the basis of assessments by the designer.

d Prior to the operation of permanent systems, the Project Expediter will provide temporary power, lighting, water, and heat to maintain space temperature above freezing, as required for construction operations.

e. All contractors shall have the permanent building systems 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 contractor(s), the designer and owner. Use of the equipment in this manner shall be subject to the approval of the Designer and owner and shall in no way affect the warranty requirements of the contractor(s).

f. The electrical contractor shall have the building's permanent power wiring distribution system in sufficient readiness to provide power as required by the HVAC contractor for temporary climatic control.

g. The electrical contractor shall have the building's permanent lighting system ready at the time the general contractor begins interior painting and shall provide adequate lighting in those areas where interior painting and finishing is being performed.

h. Each prime contractor 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 final acceptance of work by the State Construction Office, each contractor shall remove and replace 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 electrical contractor shall have all lamps in proper working condition at the time of final project acceptance.

i. The Project Expediter 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.

j. The Project Expediter 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.

k. On multi-story construction projects, the Project Expediter shall provide temporary elevators, lifts, or other special equipment for the general use of all contractors. The cost for such elevators, lifts or other special equipment and the operation thereof shall be included in the Project Expediter's bid.

l. The Project Expediter 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 names of prime contractors on the project, 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 contractors shall keep the building and surrounding area 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 or Project Expediter. The Project Expediter shall provide an on site refuse container(s) for the use of all contractors. Each contractor shall remove their rubbish and debris from the building on a daily basis. The Project Expediter shall broom clean the building as required to minimize dust and dirt accumulation.

b. The Project Expediter shall provide and maintain suitable all-weather access to the building.

c. Before final inspection and acceptance of the building, each contractor shall clean his portion of the work, 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 contractor 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 contractor 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 contractor 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 contractor 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 there from, and (2) is caused in whole or in part by any negligent act or omission of the contractor, the contractor's subcontractor, or the agents of either the contractor or the contractor'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 and contract sum.

e. Accounting Procedures for Refund of County Sales & Use Tax

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

Contractors performing contracts for state agencies shall give the state agency for whose project the property was purchased a signed statement containing the information listed in 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 as of April 1, 1991 from the contractor 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 contractor.

Similar certified statements by his subcontractors must be obtained by the general contractor and furnished to the claimant.

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 contractor(s) agree not to discriminate against any employee or applicant for employment because of physical or mental disabilities in regard to any position for which the employee or applicant is qualified. The contractor agrees to take affirmative action to employ, advance in employment and otherwise treat qualified individuals with such disabilities without discrimination based upon their physical or mental disability 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. Contractors are reminded of the requirements of instructions under Instructions to Bidders and 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 - RESERVED

## ARTICLE 50 – CONTRACTOR EVALUATION

The contractor'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 bid on future State capital improvement projects. In addition to final evaluation, interim evaluation may be prepared during the progress of project. The document, Contractor Evaluation Procedures, is hereby incorporated and made a part of this contract. The owner may request the contractor'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, passthrough 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:

6. 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 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

Owner may at any time and for any reason terminate Contractor's services and work at Owner's convenience. Upon receipt of such notice, Contractor 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.

Upon such termination, Contractor 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 Contractor 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 Contractor prior to the date of the termination of this

Agreement. Contractor 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.

# F O R M  O F  P R O P O S A L

VGCC Center for Advanced Manufacturing and Applied Technology — Contract: Single Prime Contract

Vance-Granville Community College — Bidder: _____

SCO 24-28444-02A — Date: _____

The undersigned, as bidder, hereby declares that the only person or persons interested in this proposal as principal or principals is or are named herein and that no other person than herein mentioned has any interest in this proposal or in the contract to be entered into; that this proposal is made without connection with any other person, company or parties making a bid or proposal; and that it is in all respects fair and in good faith without collusion or fraud. The bidder further declares that he has examined the site of the work and the contract documents relative thereto, and has read all special provisions furnished prior to the opening of bids; that he has satisfied himself relative to the work to be performed. The bidder further declares that he and his subcontractors have fully complied with NCGS 64, Article 2 in regards to E-Verification as required by Section 2.(c) of Session Law 2013-418, codified as N.C. Gen. Stat. § 143-129(j).

.

The Bidder proposes and agrees if this proposal is accepted to contract with the

State of North Carolina through Vance-Granville Community College

in the form of contract specified below, to furnish all necessary materials, equipment, machinery, tools, apparatus, means of transportation and labor necessary to complete the construction of

VGCC CENTER FOR ADVANCED MANUFACTURING AND APPLIED TECHNOLOGY
SCO ID # 24-28444-02A

Project Description: A new 35,380 square foot educational facility on a greenfield site with instructional laboratories, classrooms, and related support spaces. The building will be one-story, with masonry and metal panel exterior cladding.

in full in complete accordance with the plans, specifications and contract documents, to the full and entire satisfaction of the State of North Carolina, and the

Designer:
Little Diversified Architectural Consulting

406 Blackwell Street, Suite 500
Durham, North Carolina 27701

(919) 474-2500

Owner:
Vance-Granville Community College

200 Community College Road
Henderson, North Carolina 27537

(252) 738-3446

with a definite understanding that no money will be allowed for extra work except as set forth in the General Conditions and the contract documents, for the sum of:

**SINGLE PRIME CONTRACT**: _____

Base Bid:

_____ Dollars($) _____

General Subcontractor:

_____ Lic _____

Plumbing Subcontractor:

_____ Lic _____

Mechanical Subcontractor: Electrical Subcontractor:

_____Lic_____ _____Lic_____

GS143-128(d) requires all single prime bidders to identify their subcontractors for the above subdivisions of work. A contractor whose bid is accepted shall not substitute any person as subcontractor in the place of the subcontractor listed in the original bid, except (i) if the listed subcontractor's bid is later determined by the contractor to be non-responsible or non-responsive or the listed subcontractor refuses to enter into a contract for the complete performance of the bid work, or (ii) with the approval of the awarding authority for good cause shown by the contractor.

## ALTERNATES:

Should any of the alternates as described in the contract documents be accepted, the amount written below shall be the amount to be "added to" the base bid.

## GENERAL CONTRACT:

Alternate No. 1: PVC Roof Membrane.

Base Bid: Provide TPO roofing as specified in Section 07 54 23 Thermoplastic-Polyolefin (TPO) Roofing

Alternate: Provide PVC roofing as specified in Section 07 54 19 Polyvinyl-Chloride (PVC) Roofing in lieu of TPO roofing.

(Add) _____ Dollars($) _____

Alternate No. 2: MCM Panels.

Base Bid: Provide metal wall panels as specified in Section 07 42 13.13 Formed Metal Wall Panels in lieu of ACM.

Alternate: Provide ACM wall panels as specified in Section 07 42 13.23 Metal Composite Material Wall Panels.

(Add) _____ Dollars($) _____

Alternate No. 3: Expanded Metal Ceiling Assembly.

Base Bid: Metal ceiling assembly not in the Project Scope.

Alternate: Provide metal ceiling assembly as specified in Section 09 51 30 Suspended Metal Ceilings where indicated on the Drawings.

(Add) _____ Dollars($) _____

Alternate No. 4: Asphalt Paving.

Base Bid: Additional parking lot not in Project scope.

Alternate: Provide additional parking area as indicated on the Drawings.

(Add) _____ Dollars($) _____

Alternate No. 5: Sound-Absorbing Ceiling Panels.

Base Bid: No sound-absorbing Ceiling Panels in the Project scope.

Alternate: Provide sound-absorbing ceiling panels as specified in Section 09 84 36 Sound Absorbing Ceiling Units where indicated on the Drawings

(Add) _____ Dollars($) _____

Alternate No. 6: Lightning Protection.

Base Bid: No lightning protection in the Project scope.

Alternate: Provide lightning protection as specified in Section 26 41 00 Facility Lightning Protection.

(Add) _____ Dollars($) _____

Alternate No. 7: Pole Lights and Fixtures.

Base Bid: Duke Energy will provide all pole light fixtures and make them operational, including all conduit and wiring between poles.

Alternate: Provide underground conduit for Duke Energy lighting. Provide 2-inch Schedule 40, 90 deg C, PVC conduit buried at least 30 inches below grade. Provide pull strings and cap conduit at the light fixture locations and provide a stake to identify the locations.

(Add) _____ Dollars($) _____

The bidder further proposes and agrees hereby to commence work under this contract on a date to be specified in a written order of the designer and shall fully complete all work thereunder within the time specified in the Supplementary General Conditions Article 23. Applicable liquidated damages amount is also stated in the Supplementary General Conditions Article 23.

**PROJECT COMPLETION DATE:**

Project completion date: The General Contractor is to achieve Substantial Completion of the project within four hundred and thirty (430) calendar days from the date of issuance of the Notice To Proceed.

**LIQUIDATED DAMAGES:**

Liquidated Damages: Liquidated Damages will be Five Hundred Dollars ($500.00) per day.

## Proposal Signature Page

The undersigned further agrees that in the case of failure on his part to execute the said contract and the bonds within ten (10) consecutive calendar days after being given written notice of the award of contract, the certified check, cash or bid bond accompanying this bid shall be paid into the funds of the owner's account set aside for the project, as liquidated damages for such failure; otherwise the certified check, cash or bid bond accompanying this proposal shall be returned to the undersigned.

Respectfully submitted this day of _____

_____

(Name of firm or corporation making bid)

By:_____

Signature

Name: _____

Print or type

Title_____

(Owner/Partner/Pres./V.Pres)

Address_____

_____

License No._____

Federal I.D. No. _____

Email Address: _____

Addendum received and used in computing bid:

Addendum No. 1 _____ Addendum No. 3 _____ Addendum No. 5_____ Addendum No. 6_____

Addendum No. 2 _____ Addendum No. 4 _____ Addendum No. 6 _____ Addendum No. 7 _____

**FORM OF BID BOND**

KNOW ALL MEN BY THESE PRESENTS THAT _____ _____ as principal, and _____, as surety, who is duly licensed to act as surety in North Carolina, are held and firmly bound unto the State of North Carolina* through _____ as obligee, in the penal sum of _____ DOLLARS, lawful money of the United States of America, for the payment of which, well and truly to be made, we bind ourselves, our heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

Signed, sealed and dated this ____ day of _____ 20__

WHEREAS, the said principal is herewith submitting proposal for and the principal desires to file this bid bond in lieu of making the cash deposit as required by G.S. 143-129.

NOW, THEREFORE, THE CONDITION OF THE ABOVE OBLIGATION is such, that if the principal shall be awarded the contract for which the bid is submitted and shall execute the contract and give bond for the faithful performance thereof within ten days after the award of same to the principal, then this obligation shall be null and void; but if the principal fails to so execute such contract and give performance bond as required by G.S. 143-129, the surety shall, upon demand, forthwith pay to the obligee the amount set forth in the first paragraph hereof. Provided further, that the bid may be withdrawn as provided by G.S. 143-129.1.

| | |
|---|---|
| _____ | _____ |
| Contractor: (Trade or Corporate Name) | (Surety Company) |
| By: _____ | By: _____ |
| Name: _____ | Name: _____ |
| Title: _____ | Title: _____ |
| (Owner, Partner, or Corp. Pres. or Vice Pres. only) | (Attorney in Fact) |
| (Corporate Seal) | (Surety Corporate Seal) |

***(**Community college projects:  Delete State of North Carolina as owner and replace with community college name.)

# 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

_____
Print or Type Name of Above

My Commission Expires: _____

Seal

NOTE:
This certified statement may be subject to audit.

STATE OF NORTH CAROLINA
SALES AND USE TAX REPORT DETAIL

CONTRACTOR: _____ 

SUBCONTRACTOR _____ FOR PERIOD: _____

PROJECT: _____

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

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

# FORM OF PERFORMANCE BOND

Date of Contract: Click or tap here to enter text.

Date of Execution: _____

Name of Principal (Contractor) Click or tap here to enter text.

Name and Address of Surety: _____

Name of Contracting Body: Click or tap here to enter text.

Amount of Bond: Click or tap here to enter text.

Project: Click or tap here to enter text.

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 Click or tap here to enter text. counterpart(s).

Click or tap here to enter text.

Contractor: (Trade or Corporate Name)

By: _____

Name: _____

Title: _____

(Owner, Partner, or Corp. Pres. or Vice Pres. only)

(Corporate Seal)

_____

(Surety Company)

By: _____

Name: _____

Title: _____

(Attorney in Fact)

(Surety Corporate Seal)

_____

_____

Name and Address-Surety Agency

_____

_____

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

# FORM OF PAYMENT BOND

Date of Contract: Click or tap here to enter text.

Date of Execution: _____

Name of Principal (Contractor) Click or tap here to enter text.

Name and Address of Surety: _____

Name of Contracting Body: Click or tap here to enter text.

Amount of Bond: Click or tap here to enter text.

Project: Click or tap here to enter text.

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 Click or tap here to enter text. counterpart(s).

Click or tap here to enter text.

Contractor: (Trade or Corporate Name)

By: _____

Name: _____

Title: _____

(Owner, Partner, or Corp. Pres. or Vice Pres. only)

(Corporate Seal)

_____

(Surety Company)

By: _____

Name: _____

Title: _____

(Attorney in Fact)

(Surety Corporate Seal)

_____

_____

Name and Address-Surety Agency

_____

_____

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

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: VGCC Center for Advanced Manufacturing and Applied Technology.
1. Project Location: 5612 Tabbs Creek Road, Oxford, North Carolina 27565.

B Owner: Vance-Granville Community College.
1. Owner's Representative: Steven Graham.

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: IMEG.
a. Representative: Bowen Shen.
2. Mechanical, Electrical, Plumbing: Little Diversified Architectural Consulting.
a. Mechanical Representative: Blaine Byers.
b. Plumbing Representative: Fred Josey.
c. Electrical Representative: Herbert Bendillo.
3. Fire Suppression: Summit Consulting.
a. Representative: David Stacy.
4. Civil and Landscape: CLH design, p.a.
a. Civil Representative: Steve Miller.
b. Landscape Representative: Rachel Watson.

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 Architect's Newforma 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 Community College Center for teaching advanced manufacturing and technology skills.

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: PVC Roof Membrane.
1. Base Bid: Provide TPO roofing as specified in Section 07 54 23 Thermoplastic-Polyolefin (TPO) Roofing
2. Alternate: Provide PVC roofing as specified in Section 07 54 19 Polyvinyl-Chloride (PVC) Roofing in lieu of TPO roofing.
B. Alternate No. 2: MCM Panels.
1. Base Bid: Provide metal wall panels as specified in Section 07 42 13.13 Formed Metal Wall Panels in lieu of ACM.
2. Alternate: Provide ACM wall panels as specified in Section 07 42 13.23 Metal Composite Material Wall Panels.
C. Alternate No. 3: Expanded Metal Ceiling Assembly.
1. Base Bid: Metal ceiling assembly not in the Project Scope.
2. Alternate: Provide metal ceiling assembly as specified in Section 09 51 30 Suspended Metal Ceilings where indicated on the Drawings.
D. Alternate No. 4: Asphalt Paving.
1. Base Bid: Additional parking lot not in Project Scope

2. Alternate: Provide additional parking area as indicated on the Drawings.

E. Alternate No. 5: Sound-Absorbing Ceiling Panels.
   1. Base Bid: No sound-absorbing Ceiling Panels in the Project scope.
   2. Alternate: Provide sound-absorbing ceiling panels as specified in Section 09 84 36 Sound-Absorbing Ceiling Units where indicated on the Drawings.

F. Alternate No. 6: Lightning Protection.
   1. Base Bid: No lightning protection in the Project scope.
   2. Alternate: Provide lightning protection as specified in Section 26 41 00 Facility Lightning Protection.

G. Alternate No. 7: Pole Lights and Fixtures.
   1. Base Bid: Duke Energy will provide all pole light fixtures and make them operational, including all conduit and wiring between poles.
   2. Alternate: Provide underground conduit for Duke Energy lighting. Provide 2-inch Schedule 40, 90 deg C, PVC conduit buried at least 30 inches below grade. Provide pull strings and cap conduit at the light fixture locations and provide a stake to identify the locations.

END OF SECTION 01 23 00

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.

l. 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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Form Version: September 2013
CSI Form 13.1A

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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.

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 41 00 - SPECIAL INSPECTION SERVICES

## PART 1 GENERAL

### 1.1 RELATED DOCUMENTS

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

### 1.2 SUMMARY

A This Section includes administrative and procedural requirements for Special Inspection services.

B Certain structural components of the Project will be subject to the requirements for Special Inspections. Special Inspections will be applicable to the following specification sections:

1. Section 03 30 00 Cast-In-Place Concrete.
2. Section 04 20 00 Unit Masonry.
3. Section 05 12 00 Structural Steel Framing.
4. Section 05 21 00 Steel Joist Framing.
5. Section 05 31 00 Steel Decking.
6. Section 05 40 00 Cold-Formed Metal Framing.

C The Owner will procure and bear all costs of the Special Inspector and the Independent Testing Laboratory, except as otherwise noted. The Special Inspector will be the manager of the Special Inspection process. The Special Inspector checks the certification of all other inspecting agents required by Special Inspections and coordinates their activities. The Special Inspector carries the exclusive responsibility for assuring that the inspections indicated are performed. The Statement of Special Inspections will be required by the Building Official as a condition for building permit issuance.

D Requirements for Special Inspections are outlined in the Statement and Schedule of Special Inspections included at the end of this section.

1. Specific quality-assurance and control requirements for individual construction activities are specified in the Sections that specify those activities. Requirements in those Sections may also cover production of standard products.
2. Specified tests, inspections, and related actions do not limit Contractor's other quality-assurance and -control procedures that facilitate compliance with the Contract Document requirements.
3. Requirements for Contractor to provide quality-assurance and -control services required by Architect, Owner, Construction Manager, or authorities having jurisdiction are not limited by provisions of this Section.

E Special 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 -control requirements for individual construction activities are specified in the Sections that specify those activities. Requirements in those Sectiosn may also cover production of standard products.
2. Specified tests, inspections, and related actions do not limit Contractor’s other quality-assurance and -control procedures that facilitate compliance with the Contract Document requirements.
3. Requirements for Contractor to provide quality-assurance and -control services required by Architect, Owner, Construction Manager, or authorities having jurisdiction are not limited by provisions of this Section.
4. Specific test and inspection requirements are not specified in this Section.

F Related Sections: The following Sections contain requirements that relate to this Section:

1. Section 01 40 00 “Quality Requirements" specifies requirements for inspection and test requirements.

1.3 RESPONSIBILITIES

A Contractor Responsibilities: Contractor shall provide and include in the Contract Sum, inspections, tests, and other similar quality-control services specified elsewhere in the Contract Documents and required by authorities having jurisdiction except where they are specifically indicated to be the Owner's responsibility, or are provided by another identified entity:

1. Retesting: The Contractor is responsible for retesting where results of inspections, tests, or other quality-control services prove unsatisfactory and indicate noncompliance with Contract Document requirements, regardless of whether the original test was Contractor's responsibility.
   a. The Contractor shall correct deficiencies in work that inspections and laboratory test reports have indicated to be not in compliance with requirements.
   b. The cost of retesting construction, revised or replaced by the Contractor, is the Contractor's responsibility where required tests performed on original construction indicated noncompliance with Contract Document requirements.
2. Testing and inspecting 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.
   a. Specified tests, inspections, and related actions do not limit Contractor's other quality-assurance and -control procedures that facilitate compliance with the Contract Document requirements.
3. Associated Services: The Contractor shall cooperate with agencies performing required inspections, tests, and similar services, and provide reasonable auxiliary services as requested. Notify the agency sufficiently in advance of operations to permit assignment of personnel. Auxiliary services required include, but are not limited to, the following:
   a. Provide access to the Work.
   b. Furnish incidental labor and facilities necessary to facilitate inspections and tests.
   c. Take adequate quantities of representative samples of materials that require testing or assist the agency in taking samples.
   d. Provide and maintain for the sole use of the Special Inspector or Special Inspectors adequate facilities for safe storage and proper curing of test samples on the Project Site.
   e. Provide the agency with a preliminary design mix proposed for use for materials mixes that require control by the testing agency.
   f. Provide security and protection of samples and test equipment at the Project Site.
   g. The Contractor shall designate a representative (the superintendent or an assistant to the superintendent) who shall be the direct point-of-contact with the Special Inspector during each phase of the work. Discrepancies noted during the progress of the work will be reported to the Contractor's representative for corrective action. Communications given by the Special Inspector to the Contractor's representative shall be as binding as if given to the Contractor.

B Special Inspector Responsibilities:

1. The Special Inspector shall conduct and interpret tests, state in each report whether test specimens comply with requirements, specifically state any deviations therefrom, and record work required and performed to correct deficiencies.
2. The Special Inspector will keep records of all inspection and tests which will be furnished to the Building Official, the Architect, and the Structural Engineer of Record.
3. The Special Inspector shall notify the Architect, Construction Manager, and Contractor promptly of irregularities and deficiencies observed in the Work during performance of its services. All discrepancies will be brought to the immediate attention of the Contractor for correction. If discrepancies are not corrected, the discrepancies will be brought to the attention of the Building Official and the Structural Engineer of Record.
4. A final report documenting completion of all required special inspections and corrections of any discrepancies noted will be submitted to the Building Official by the Special Inspector prior to, and as a condition of, issuance of the Certificate of Use and Occupancy.
5. The Special Inspector shall not perform any duties of the Contractor.

6. The Special Inspector shall not release, revoke, alter, decrease, or increase the Contract Document requirements.

C Independent Testing Laboratory Responsibilities: The Independent Testing Laboratory engaged to perform inspections, sampling, and testing of materials and construction specified in individual Sections shall cooperate with the Architect and the Contractor in performance of the Laboratory's duties. The Laboratory shall provide qualified personnel to perform required inspections and tests.

1. Notify Architect, Construction Manager, and Contractor promptly of irregularities or deficiencies observed in the Work during performance of its services.
2. Determine the location 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. Shall not release, revoke, alter, or increase the Contract Document requirements or approve or accept any portion of the Work.

D Coordination: The Contractor and each agency engaged to perform inspection, tests and similar services shall coordinate the sequence of activities to accommodate required services with a minimum of delay. In addition, the Contractor and each agency shall coordinate activities to avoid the necessity of removing and replacing construction to accommodate inspections and tests.

1. The Contractor is responsible for scheduling times for inspections, tests, taking samples, and similar activities.

1.4 SUBMITTALS

A The Special Inspector and the Independent Testing Laboratory shall submit a certified written report, in duplicate, of each inspection, test, or similar service to the Architect.

1. Submit additional copies of each written report directly to the governing authority, when the authority so directs.
2. Report Data: Written reports of each inspection, test, or similar service include, but are not limited to, the following:
   a. Date of issue.
   b. Project title and number.
   c. Name, address, and telephone number of testing agency.
   d. Dates and locations of samples and tests or inspections.
   e. Names of individuals making the inspection or test.
   f. Designation of the Work and test method.
   g. Identification of product and Specification Section.
   h. Complete inspection or test data.
   i. Test results and an interpretation of test results.
   j. Ambient conditions at the time of sample taking and testing.
   k. Comments or professional opinion on whether inspected or tested Work complies with Contract Document requirements.
   l. Name and signature of laboratory inspector.
   m. Recommendations on retesting.

1.5 QUALITY ASSURANCE

A Qualification for Special Inspector: The Special Inspector shall be a Registered Professional Engineer, licensed in the State of North Carolina, experienced in performing special inspections and shall be approved by the Building Official and the Architect. The credentials of all Inspectors and testing technicians shall be provided if requested.

B Qualifications for Independent Testing Laboratory: Engage independent inspection and testing laboratories, that are prequalified as complying with the American Council of Independent Laboratories' "Recommended Requirements for Independent Laboratory Qualification" and that specialize in the types of inspections and tests to be performed.

1. Each independent inspection and testing agency engaged on the Project shall be authorized by authorities having jurisdiction to operate in the state where the Project is located.
2. Each independent inspection and testing agency engaged on the Project shall demonstrate that it has the experience and capability to conduct the required field and laboratory testing without delaying the progress of the work. The minimum requirements shall be as follows:
   a. Reinforced Concrete Testing –
      (1) ACI-CFTT *Concrete Field Testing Technician – Grade 1*
      (2) ACI-LTT *Laboratory Testing Technician – Grade 1 or 2* and *Strength Testing Technician*
      (3) NICET-CT *Concrete Technician – Level III*
   b. Reinforced Concrete Inspection –
      (1) ACI-CCI *Concrete Construction Inspector*
      (2) ICC-RCSI *Reinforced Concrete Special Inspector*
   c. Structural Steel
      (1) AWS-CWI *Certified Welding Inspector*
      (2) AWS/AISC-CSI *Certified Steel Inspector*
      (3) ICC-SWSI *Structural Steel and Welding Inspector*
   d. Structural Masonry
      (1) ICC-SMSI *Structural Masonry Special Inspector*
   e. Soils Testing –
      (1) NICET-ST *Soils Technician Level III*
      (2) NICET-GET *Geotechnical Engineering Technician Level III*
   f. Exterior Insulation and Finish Systems (EIFS)
      (1) EDI *EIFS Third Party Inspector*

C Pre-Construction Conference – Prior to the start of project construction, the Special Inspector shall conduct a Pre-Construction Conference to discuss the requirements for Special Inspections as well as the Administrative Procedures to be followed during the course of the project. Protocols for notification, documentation, and individual responsibilities shall be reviewed. Attendees shall include, but are not limited to:

1. Owner.
2. Owner’s Project Manager.
3. Owner’s Project Inspector.
4. Owner’s Independent Testing Agency.
5. Architect.
6. Structural Engineer.
7. Contractor’s Project Manager.
8. Contractor's Superintendent

PART 2 PRODUCTS NOT APPLICABLE

PART 3 EXECUTION

3.1 REPAIR AND PROTECTION

A General: On completion of testing, inspecting, sample taking, and similar services, repair damaged construction and restore substrates and finishes.

1. Provide materials and comply with installation requirements specified in other Specification Sections 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 017300 “Execution”.

B Protect construction exposed by or for quality-control service activities.

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

END OF SECTION 01 41 00

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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.

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-inchmonitor 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 30 00 - CAST-IN-PLACE CONCRETE

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. Cast-in-place concrete, including concrete materials, mixture design, placement procedures, and finishes.

B Related Requirements:

1. Section 031000 “Concrete Forming and Accessories” for form-facing materials, form liners, insulating concrete forms, and waterstops.
2. Section 032000 “Concrete Reinforcing” for steel reinforcing bars and welded-wire reinforcement.
3. Section 033300 “Architectural Concrete” for general building applications of specially finished formed concrete.
4. Section 312000 “Earth Moving” for drainage fill under slabs-on-ground.

1.3 DEFINITIONS

A Cementitious Materials: Portland cement alone or in combination with one or more of the following: blended hydraulic cement, fly ash, slag cement, other pozzolans, and silica fume; materials subject to compliance with requirements.

B Water/Cement Ratio (w/cm): The ratio by weight of water to cementitious materials.

1.4 PREINSTALLATION MEETINGS

A Preinstallation Conference: Conduct conference at Project site.

1. Require representatives of each entity directly concerned with cast-in-place concrete to attend, including the following:
   a. Contractor’s superintendent.
   b. Independent testing agency responsible for concrete design mixtures.
   c. Ready-mix concrete manufacturer.
   d. Concrete Subcontractor.
   e. Special concrete finish Subcontractor.
2. Review the following:
   a. Special inspection and testing and inspecting agency procedures for field quality control.
   b. Construction joints, control joints, isolation joints, and joint-filler strips.
   c. Vapor-retarder installation.
   d. Anchor rod and anchorage device installation tolerances.
   e. Cold and hot weather concreting procedures.
   f. Concrete finishes and finishing.
   g. Curing procedures.
   h. Forms and form-removal limitations.
   i. Methods for achieving specified floor and slab flatness and levelness.
   j. Floor and slab flatness and levelness measurements.
   k. Concrete repair procedures.
   l. Concrete protection.
   m. Initial curing of test cylinders (ASTM C31/C31M.)
   n. Protection of test cylinders.

1.5 ACTION SUBMITTALS

A Product Data: For each of the following.
1. Portland cement.
2. Fly ash.
3. Aggregates.
4. Admixtures:
   a. Include limitations of use, including restrictions on cementitious materials, supplementary cementitious materials, air entrainment, aggregates, temperature at time of concrete placement, relative humidity at time of concrete placement, curing conditions, and use of other admixtures.
5. Vapor retarders.
6. Curing materials.
7. Joint fillers.
8. Repair materials.

B Design Mixtures: For each concrete mixture. Submit alternate design mixtures when characteristics of materials, Project conditions, weather, test results, or other circumstances warrant adjustments.
1. Indicate amounts of mixing water to be withheld for later addition at Project site.

C Steel Reinforcement Shop Drawings: Prepare shop drawings in accordance with ACI 315. Placing drawings that detail fabrication, bending, and placement. Include bar sizes, lengths, material, grade, bar schedules, stirrup spacing, bent bar diagrams, bar arrangement, splices and laps, mechanical connections, tie spacing, hoop spacing, and supports for concrete reinforcement.
1. Include special reinforcement required for openings through concrete structures and dimensioned opening locations. Include applicable dimensions, sections, elevations, and details required to complete installation and coordination of the details, and typical details. Plan shall be drawn at a scale of no less than 1/8” per foot.

D Construction and Control Joint Layout: Indicate proposed construction joints required to construct the structure as well as wall and slab control joint locations.
1. Location of construction and control joints is subject to approval of the Architect.

1.6 INFORMATIONAL SUBMITTALS

A Qualification Data: For Installer and Ready Mix Manufacturer.

B Welding Certificates.

C Material Certificates: For each of the following, signed by manufacturers:
1. Cementitious materials.
2. Coarse and Fine Aggregates.
3. Admixtures.
4. Form materials and form-release agents.
5. Steel reinforcement and accessories.
6. Waterstops.
7. Curing compounds.
8. Floor and slab treatments.
9. Bonding agents.
10. Adhesives.
11. Vapor retarders.
12. Semirigid joint filler.
13. Joint-filler strips.
14. Repair materials.

D Material Test Reports: For the following, from a qualified testing agency indicating conformance with the material specification:
1. Aggregates: Include service record data indicating absence of deleterious expansion of concrete due to alkali aggregate reactivity.
2. Cementitious materials.
3. Steel Reinforcement.

E Floor surface flatness and levelness measurements indicating compliance with specified tolerances.
F Minutes of preinstallation conference.

1.7 QUALITY ASSURANCE
A Installer Qualifications: A qualified installer who employs on Project personnel qualified as ACI-certified Flatwork Technician and Finisher and a supervisor who is an ACI-certified Concrete Flatwork Technician.
B Manufacturer Qualifications: A firm experienced in manufacturing ready-mixed concrete products and that complies with ASTM C 94/C 94M requirements for production facilities and equipment.
1. Manufacturer certified according to NRMCA's "Certification of Ready Mixed Concrete Production Facilities."
C Testing Agency Qualifications: An independent agency, acceptable to authorities having jurisdiction, qualified according to ASTM C 1077 and ASTM E 329 for testing indicated.
1. Personnel conducting field tests shall be qualified as ACI Concrete Field Testing Technician, Grade 1, according to ACI CP-1 or an equivalent certification program.
2. Personnel performing laboratory tests shall be ACI-certified Concrete Strength Testing Technician and Concrete Laboratory Testing Technician, Grade I. Testing agency laboratory supervisor shall be an ACI-certified Concrete Laboratory Testing Technician, Grade II.
D Welding Qualifications: Qualify procedures and personnel according to AWS D1.4.

1.8 DELIVERY, STORAGE, AND HANDLING
A Steel Reinforcement: Deliver, store, and handle steel reinforcement to prevent bending and damage.
B Waterstops: Store waterstops under cover to protect from moisture, sunlight, dirt, oil, and other contaminants.

1.9 FIELD CONDITIONS
A Cold-Weather Placement: Comply with ACI 306.1 and as follows. Protect concrete work from physical damage or reduced strength that could be caused by frost, freezing actions, or low temperatures.
1. When average high and low temperature is expected to fall below 40 deg F for three successive days, maintain delivered concrete mixture temperature within the temperature range required by ACI 306.1.
2. Do not use frozen materials or materials containing ice or snow. Do not place concrete on frozen subgrade or on subgrade containing frozen materials.
3. Do not use calcium chloride, salt, or other materials containing antifreeze agents or chemical accelerators unless otherwise specified and approved in mixture designs.
B Hot-Weather Placement: Comply with ACI 305.1 and as follows:
1. Maintain concrete temperature below 95 deg F at time of placement. Chilled mixing water or chopped ice may be used to control temperature, provided water equivalent of ice is calculated to total amount of mixing water. Using liquid nitrogen to cool concrete is Contractor's option.
2. Fog-spray forms, steel reinforcement, and subgrade just before placing concrete. Keep subgrade uniformly moist without standing water, soft spots, or dry areas.
a. Maximum temperature of forms, reinforcement, anchor bolts, and other embedded items shall not exceed 120 deg F.

PART 2 PRODUCTS

2.1 CONCRETE, GENERAL
A ACI Publications: Comply with the following unless modified by requirements in the Contract Documents:
1. ACI 301.

2. ACI 117.
3. ACI 315.
4. CRSI “Manual of Standard Practice.”
5. ACI 318.

2.2 FORM-FACING MATERIALS

A Smooth-Formed Finished Concrete: Form-facing panels that will provide continuous, true, and smooth concrete surfaces. Furnish in largest practicable sizes to minimize number of joints.
1. Plywood, metal, or other approved panel materials.

B Rough-Formed Finished Concrete: Plywood, lumber, metal, or another approved material. Provide lumber dressed on at least two edges and one side for tight fit.

C Chamfer Strips: Wood, metal, PVC, or rubber strips, 3/4 by 3/4 inch, minimum.

D Form-Release Agent: Commercially formulated form-release agent that will not bond with, stain, or adversely affect concrete surfaces and does not impair subsequent treatments of concrete surfaces.
1. Formulate form-release agent with rust inhibitor for steel form-facing materials.

E Form Ties: Factory-fabricated, removable, or snap-off metal or glass-fiber-reinforced plastic form ties designed to resist lateral pressure of fresh concrete on forms and to prevent spalling of concrete on removal.
1. Furnish units that will leave no corrodible metal closer than 1 inch to the plane of exposed concrete surface.
2. Furnish ties that, when removed, will leave holes no larger than 1 inch in diameter in concrete surface.
3. Furnish ties with integral water-barrier plates to walls indicated to receive dampproofing or waterproofing.

2.3 STEEL REINFORCEMENT

A Reinforcing Bars: ASTM A 615/A 615M, Grade 60, deformed.

B Low-Alloy-Steel Reinforcing Bars: ASTM A 706, deformed.

C Deformed-Steel Welded-Wire Reinforcement: ASTM A 1064/A 1064M, flat sheet.

D Deformed-Steel Wire: ASTM A 1064 / A 1064M.

E Deformed Bar Anchors (DBAs): ASTM A1064, plain, Type C, 70,000 psi yield strength.

2.4 REINFORCEMENT ACCESSORIE

A Bar Supports: Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars and welded wire reinforcement in place. Manufacture bar supports from steel wire, plastic, or precast concrete according to CRSI's "Manual of Standard Practice," of greater compressive strength than concrete and as follows:
1. For concrete surfaces exposed to view where legs of wire bar supports contact forms, use CRSI Class 1 plastic-protected steel wire or CRSI Class 2 stainless-steel bar supports.

2.5 CONCRETE MATERIALS

A Source Limitations: Obtain each type or class of cementitious material of the same brand from the same manufacturer’s plant, obtain aggregate from single source, and obtain admixtures from single source from single manufacturer.

B Cementitious Material: Use the following cementitious materials, of the same type, brand, and source, throughout Project:
1. Portland Cement: ASTM C 150, Type I/II, gray.
2. Fly Ash: ASTM C 618, Class F.

C Normal-Weight Aggregates: ASTM C 33, Class 3M coarse aggregate or better, graded. Provide aggregates from a single source with documented service record data of at least 10 years' satisfactory service in similar applications and service conditions using similar aggregates and cementitious materials.
1. Maximum Coarse-Aggregate Size: 1-1/2 inches nominal.
2. Fine Aggregate: Free of materials with deleterious reactivity to alkali in cement.

D Water: ASTM C 94/C 94M and potable.
E Air-Entraining Admixture: ASTM C 260.
F Chemical Admixtures: Certified by manufacturer to be compatible with other admixtures and that will not contribute water-soluble chloride ions exceeding those permitted in hardened concrete. Do not use calcium chloride or admixtures containing calcium chloride.
1. Water-Reducing Admixture: 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. High-Range, Water-Reducing Admixture: ASTM C 494/C 494M, Type F.
5. High-Range, Water-Reducing and Retarding Admixture: ASTM C 494/C 494M, Type G.
6. Plasticizing and Retarding Admixture: ASTM C 1017/C 1017M, Type II.

2.6 WATERSTOPS
A Self-Expanding Butyl Strip Waterstops: Manufactured rectangular or trapezoidal strip, butyl rubber with sodium bentonite or other hydrophilic polymers, for adhesive bonding to concrete, 3/4 by 1 inch.
1. Waterstops applied where only 1 curtain of vertical reinforcing exists shall be certified by the manufacturer as acceptable for such applications.

2.7 VAPOR RETARDERS
A Sheet Vapor Retarder: ASTM E 1745, Class A, except with maximum water-vapor permeance of 0.01 and minimum 15 mils thickness. Include manufacturer’s recommended adhesive or pressure-sensitive tape.

2.8 LIQUID FLOOR TREATMENTS
A Penetrating Liquid Floor Treatment: Clear, chemically reactive, waterborne solution of inorganic silicate or siliconate materials and proprietary components; odorless; that penetrates, hardens, and densifies concrete surfaces.
1. Apply to concrete surfaces to receive polished concrete finish.

2.9 CURING MATERIALS
A Absorptive Cover: AASHTO M 182, Class 2, burlap cloth made from jute or kenaf, weighing approximately 9 oz./sq. yd. when dry.
B Moisture-Retaining Cover: ASTM C 171, polyethylene film or white burlap-polyethylene sheet.
C Water: Potable.
D Clear, Waterborne, Membrane-Forming Curing Compound: ASTM C 309, Type 1, Class B, dissipating.
E Clear, Waterborne, Membrane-Forming Curing and Sealing Compound: ASTM C 1315, Type 1, Class A.

2.10 RELATED MATERIALS
A Expansion- and Isolation-Joint-Filler Strips: ASTM D 1751, asphalt-saturated cellulosic fiber.
B Bonding Agent: ASTM C 1059/C 1059M, Type II, nonredispersible, acrylic emulsion or styrene butadiene.
C Epoxy Bonding Adhesive: ASTM C 881, two-component epoxy resin, capable of humid curing and bonding to damp surfaces, of class suitable for application temperature and of grade to suit requirements, and as follows:
1. Types IV and V, load bearing, for bonding hardened or freshly mixed concrete to hardened concrete.

2.11 REPAIR MATERIALS
A Repair Underlayment: Cement-based, polymer-modified, self-leveling product that can be applied in thicknesses from 1/8 inch and that can be feathered at edges to match adjacent floor elevations.

1. Cement Binder: ASTM C 150, portland cement or hydraulic or blended hydraulic cement as defined in ASTM C 219.
2. Primer: Product of underlayment manufacturer recommended for substrate, conditions, and application.
3. Aggregate: Well-graded, washed gravel, 1/8 to 1/4 inch or coarse sand as recommended by underlayment manufacturer.
4. Compressive Strength: Not less than 5000 psi at 28 days when tested according to ASTM C 109/C 109M.

B Repair Overlayment: Cement-based, polymer-modified, self-leveling product that can be applied in thicknesses from 1/4 inch and that can be filled in over a scarified surface to match adjacent floor elevations.

1. Cement Binder: ASTM C 150, portland cement or hydraulic or blended hydraulic cement as defined in ASTM C 219.
2. Primer: Product of topping manufacturer recommended for substrate, conditions, and application.
3. Aggregate: Well-graded, washed gravel, 1/8 to 1/4 inch or coarse sand as recommended by topping manufacturer.
4. Compressive Strength: Not less than 5000 psi at 28 days when tested according to ASTM C 109/C 109M.

## 2.12 CONCRETE MIXTURES, GENERAL

A Prepare design mixtures for each type and strength of concrete, proportioned on the basis of laboratory trial mixture or field test data, or both, according to ACI 301.

1. Use a qualified independent testing agency for preparing and reporting proposed mixture designs based on laboratory trial mixtures.

B Cementitious Materials: Limit percentage, by weight, of cementitious materials other than portland cement in concrete as follows:

1. Fly Ash: 25 percent.

C Limit water-soluble, chloride-ion content in hardened concrete as follows:

1. 0.30 percentage by weight of cement.

D Admixtures: Use admixtures according to manufacturer's written instructions.

1. Use water-reducing, high-range water-reducing or plasticizing admixture in concrete, as required, for placement and workability.
2. Use water-reducing and -retarding admixture when required by high temperatures, low humidity, or other adverse placement conditions.
3. Use water-reducing admixture in pumped concrete and concrete with a w/c ratio below 0.50.

## 2.13 CONCRETE MIXTURES FOR BUILDING ELEMENTS

A Footing: Normal-weight concrete.

1. Minimum Compressive Strength: 3,000 psi at 28 days.
2. Maximum W/C Ratio: 0.50.
3. Slump Limit: 4 inches, plus or minus 1 inch or 8 inches (maximum) for concrete with verified slump of 2 to 4 inches before adding high-range water-reducing admixture or plasticizing admixture at Project site.
4. Air Content: 1.5 percent, plus or minus 1.5 percent.
5. Maximum Aggregate Size : 3/4 inch.

B Interior Slabs-on-Grade: Normal-weight concrete.

1. Minimum Compressive Strength: 3,500 psi at 28 days.
2. Maximum W/C Ratio: 0.45.
3. Slump Limit: 4 inches, plus or minus 1 inch or 8 inches (maximum) for concrete with verified slump of 2 to 4 inches before adding high-range water-reducing admixture or plasticizing admixture at Project site.
4. Air Content: 1.5 percent, plus or minus 1.5 percent at point of final placement. Do not allow air content of trowel-finished floors to exceed 3 percent.
5. Maximum Aggregate Size : 3/4 inch.

C Pier: Normal-weight concrete.
1. Minimum Compressive Strength: 4,000 psi at 28 days.
2. Maximum W/C Ratio: 0.45.
3. Slump Limit: 4 inches, plus or minus 1 inch or 8 inches (maximum) for concrete with verified slump of 2 to 4 inches before adding high-range water-reducing admixture or plasticizing admixture at Project site.
4. Air Content: 1.5 percent, plus or minus 1.5 percent.
5. Maximum Aggregate Size : 3/4 inch.

2.14 FABRICATING REINFORCEMENT

A Fabricate steel reinforcement according to CRSI's "Manual of Standard Practice."

2.15 CONCRETE MIXING

A Ready-Mixed Concrete: Measure, batch, mix, and deliver concrete according to ASTM C 94/C 94M, and furnish batch ticket information.
1. Limit concrete mixing and delivery time to 90 minutes.
2. Concrete Temperature: 50 deg F minimum, 95 deg F maximum, at point of placement.

PART 3 EXECUTION

3.1 FORMWORK INSTALLATION

A Design, erect, shore, brace, and maintain formwork, according to ACI 301, to support vertical, lateral, static, and dynamic loads, and construction loads that might be applied, until structure can support such loads.

B Construct formwork so concrete members and structures are of size, shape, alignment, elevation, and position indicated, within tolerance limits of ACI 117.

C Limit concrete surface irregularities, designated by ACI 347 as abrupt or gradual, as follows:
1. Class A, 1/8 inch for smooth-formed finished exposed surfaces.
2. Class B, 1/4 inch for rough-formed finished non-exposed surfaces.

D Construct forms tight enough to prevent loss of concrete mortar.

E Construct forms for easy removal without hammering or prying against concrete surfaces. Provide crush or wrecking plates where stripping may damage cast concrete surfaces. Provide top forms for inclined surfaces steeper than 1.5 horizontal to 1 vertical.
1. Install keyways and the like for easy removal.
2. Do not use rust-stained steel form-facing material.

F Set edge forms, bulkheads, and intermediate screed strips for slabs to achieve required elevations and slopes in finished concrete surfaces. Provide and secure units to support screed strips; use strike-off templates or compacting-type screeds.

G Provide temporary openings for cleanouts and inspection ports where interior area of formwork is inaccessible. Close openings with panels tightly fitted to forms and securely braced to prevent loss of concrete mortar. Locate temporary openings in forms at inconspicuous locations.

H Chamfer exterior corners and edges of permanently exposed concrete.

I Form openings, chases, offsets, keyways, blocking, screeds, and bulkheads required in the Work. Determine sizes and locations from trades providing such items.

J Retighten forms and bracing before placing concrete, as required, to prevent mortar leaks and maintain proper alignment.

K Coat contact surfaces of forms with form-release agent, according to manufacturer's written instructions, before placing reinforcement.

L Clean forms and adjacent surfaces to receive concrete. Remove chips, wood, sawdust, dirt, and other debris just before placing concrete.

3.2 FORMWORK INSTALLATION

A Place and secure anchorage devices and other embedded items required for adjoining work that is attached to or supported by cast-in-place concrete. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.

1. Install anchor rods, accurately located, to elevations required and complying with tolerances in Section 7.5 of AISC 303.

3.3 REMOVING AND REUSING FORMS

A General: Formwork for sides of grade beams, walls, columns, and similar parts of the Work that does not support weight of concrete may be removed after cumulatively curing at not less than 50 deg F for 48 hours after placing concrete. Concrete must be hard enough to not be damaged by form-removal operations, and curing and protection operations need to be maintained.

B Clean and repair surfaces of forms to be reused in the Work. Split, frayed, delaminated, or otherwise damaged form-facing material are not acceptable for exposed surfaces. Apply new form-release agent.

C When forms are reused, clean surfaces, remove fins and laitance, and tighten to close joints. Align and secure joints to avoid offsets. Do not use patched forms for exposed concrete surfaces unless approved by Architect.

3.4 REMOVING AND REUSING FORMS

A Sheet Vapor Retarders: Place, protect, and repair sheet vapor retarder according to ASTM E 1643 and manufacturer's written instructions.

1. Lap joints 6 inches and seal with manufacturer's recommended tape.
2. Extend vapor retarder 2 feet beyond core and shell slab-on-grade extents for future connection with vapor barrier from tenant upfit.
3. Protect exposed portions of vapor retarder until adjacent vapor retarder and slab from tenant upfit have been installed.

3.5 STEEL REINFORCEMENT INSTALLATION

A General: Comply with CRSI's "Manual of Standard Practice" for fabricating, placing, and supporting reinforcement.

1. Do not cut or puncture vapor retarder. Repair damage and reseal vapor retarder before placing concrete.

B Clean reinforcement of loose rust and mill scale, earth, ice, and other foreign materials that reduce bond to concrete.

C Accurately position, support, and secure reinforcement against displacement. Locate and support reinforcement with bar supports to maintain minimum concrete cover. Do not tack weld crossing reinforcing bars.

D Set wire ties with ends directed into concrete, not toward exposed concrete surfaces.

E Install welded-wire reinforcement in longest practicable lengths on bar supports spaced to minimize sagging. Lap edges and ends of adjoining sheets at least one mesh spacing. Offset laps of adjoining sheet widths to prevent continuous laps in either direction. Lace overlaps with wire.

3.6 JOINTS

A General: Construct joints true to line with faces perpendicular to surface plane of concrete.

B Construction Joints: Install so strength and appearance of concrete are not impaired, at locations indicated or as approved by Architect.

1. Place joints perpendicular to main reinforcement. Continue reinforcement across construction joints unless otherwise indicated.
2. Form keyed joints as indicated. Embed keys at least 1-1/2 inches into concrete.
3. Locate joints for grade beams and slabs, as indicated.
4. Space vertical joints in walls as indicated. Locate joints beside piers integral with walls, near corners, and in concealed locations where possible.

5. Use a bonding agent at locations where fresh concrete is placed against hardened or partially hardened concrete surfaces.

C Contraction Joints in Slabs-on-Grade: Form weakened-plane contraction joints, sectioning concrete into areas as indicated. Construct contraction joints for a depth equal to at least one-fourth of concrete thickness as follows:

1. Sawed Joints: Form contraction joints with power saws equipped with shatterproof abrasive or diamond-rimmed blades. Cut 1/8-inch- wide joints into concrete when cutting action does not tear, abrade, or otherwise damage surface and before concrete develops random contraction cracks. Cut joints the same day as concrete placement and within 12 hours.

D Isolation Joints in Slabs-on-Grade: After removing formwork, install joint-filler strips at slab junctions with vertical surfaces, such as column pedestals, foundation walls, grade beams, and other locations, as indicated.

1. Extend joint-filler strips full width and depth of joint, terminating flush with finished concrete surface unless otherwise indicated.
2. Install joint-filler strips in lengths as long as practicable. Where more than one length is required, lace or clip sections together.

E Doweled Joints: Install dowel bars and support assemblies at joints where indicated. Lubricate or asphalt coat one-half of dowel length to prevent concrete bonding to one side of joint.

## 3.7 WATERSTOPS

A Self-Expanding Strip Waterstops: Install in construction joints and at other locations indicated, according to manufacturer's written instructions, adhesive bonding, mechanically fastening, and firmly pressing into place. Install in longest lengths practicable.

## 3.8 CONCRETE PLACEMENT

A Before placing concrete, verify that installation of formwork, reinforcement, and embedded items is complete and that required inspections are completed.

B Before test sampling and placing concrete, water may be added at Project site, subject to limitations of ACI 301.

1. Do not add water to concrete after adding high-range water-reducing admixtures to mixture.

C Deposit concrete continuously in one layer or in horizontal layers of such thickness that no new concrete will be placed on concrete that has hardened enough to cause seams or planes of weakness. If a section cannot be placed continuously, provide construction joints as indicated. Deposit concrete to avoid segregation.

1. Deposit concrete in horizontal layers of depth to not exceed formwork design pressures and in a manner to avoid inclined construction joints.
2. Consolidate placed concrete with mechanical vibrating equipment according to ACI 301.
3. Do not use vibrators to transport concrete inside forms. Insert and withdraw vibrators vertically at uniformly spaced locations to rapidly penetrate placed layer and at least 6 inches into preceding layer. Do not insert vibrators into lower layers of concrete that have begun to lose plasticity. At each insertion, limit duration of vibration to time necessary to consolidate concrete and complete embedment of reinforcement and other embedded items without causing mixture constituents to segregate.

D Deposit and consolidate concrete for floors and slabs in a continuous operation, within limits of construction joints, until placement of a panel or section is complete.

1. Consolidate concrete during placement operations, so concrete is thoroughly worked around reinforcement and other embedded items and into corners.
2. Maintain reinforcement in position on chairs during concrete placement.
3. Screed slab surfaces with a straightedge and strike off to correct elevations.
4. Slope surfaces uniformly to drains where required.
5. Begin initial floating using bull floats or darbies to form a uniform and open-textured surface plane, before excess bleedwater appears on the surface. Do not further disturb slab surfaces before starting finishing operations.

3.9 FINISHING FORMED SURFACES

A Rough-Formed Finish: As-cast concrete texture imparted by form-facing material with tie holes and defects repaired and patched. Remove fins and other projections that exceed specified limits on formed-surface irregularities.
1. Apply to concrete surfaces not exposed to public view.

B Smooth-Formed Finish: As-cast concrete texture imparted by form-facing material, arranged in an orderly and symmetrical manner with a minimum of seams. Repair and patch tie holes and defects. Remove fins and other projections that exceed specified limits on formed-surface irregularities.
1. Apply to concrete surfaces exposed to public view.

C Related Unformed Surfaces: At tops of walls, horizontal offsets, and similar unformed surfaces adjacent to formed surfaces, strike off smooth and finish with a texture matching adjacent formed surfaces. Continue final surface treatment of formed surfaces uniformly across adjacent unformed surfaces unless otherwise indicated.

D Rubbed Finish: Apply the following to smooth-formed-finished as-cast concrete:
1. Grout-Cleaned Finish: Wet concrete surfaces and apply grout of a consistency of thick paint to coat surfaces and fill small holes. Mix 1 part Portland cement to 1-1/2 parts fine sand with a 1:1 mixture of bonding admixture and water. Add white Portland cement in amounts determined by trial patches, so color of dry grout matches adjacent surfaces. Scrub grout into voids and remove excess grout. When grout whitens, rub surface with clean burlap and keep surface damp by fog spray for at least 36 hours.

3.10 FINISHING FLOORS AND SLABS

A General: Comply with ACI 302.1R recommendations for screeding, restraightening, and finishing operations for concrete surfaces. Do not wet concrete surfaces.

B Scratch Finish: While still plastic, texture concrete surface that has been screeded and bull-floated or darbied. Use stiff brushes, brooms, or rakes to produce a profile amplitude of 1/4 inch in one direction.
1. Apply scratch finish to surfaces to receive mortar setting beds for bonded cementitious floor finishes.

C Float Finish: Consolidate surface with power-driven floats or by hand floating if area is small or inaccessible to power driven floats. Restraighten, cut down high spots, and fill low spots. Repeat float passes and restraightening until surface is left with a uniform, smooth, granular texture.
1. Apply float finish to surfaces to receive trowel finish.
2. Apply to slabs-on-grade.
3. Apply to suspended concrete slabs.

D Trowel Finish: After applying float finish, apply first troweling and consolidate concrete by hand or power-driven trowel. Continue troweling passes and restraighten until surface is free of trowel marks and uniform in texture and appearance. Grind smooth any surface defects that would telegraph through applied coatings or floor coverings.
1. Apply a trowel finish to non-air entrained surfaces exposed to view or to be covered with resilient flooring, carpet, ceramic or quarry tile.
2. Finish surfaces to the following tolerances, according to ASTM E 1155, for a randomly trafficked floor surface:
   a. Specified overall values of flatness, F(F) 25; and of levelness, F(L) 20; with minimum local values of flatness, F(F) 17; and of levelness, F(L) 15, unless otherwise noted.
   b. Specified overall values of flatness, F(F) 40; and of levelness, F(L) 25; with minimum local values of flatness, F(F) 24; and of levelness, F(L) 17; for slab-on-grade.
   c. Specified overall values of flatness, F(F) 30; and of levelness, F(L) 20; with minimum local values of flatness, F(F) 24; and of levelness, F(L) 15; for suspended slabs.

E Fine-Broom Finish: Apply a first trowel or float finish to surfaces where ceramic or quarry tile is to be installed by either thickset or thin-set method. While concrete is still plastic, slightly scarify surface with a fine broom.
1. Comply with flatness and levelness tolerances for trowel-finished floor surfaces.

F Broom Finish: Apply a broom finish to exterior concrete platforms, steps, ramps, and elsewhere as indicated.
1. Immediately after float finishing, slightly roughen trafficked surface by brooming with fiber-bristle broom perpendicular to main traffic route. Coordinate required final finish with Architect before application.

3.11 MISCELLANEOUS CONCRETE ITEMS
A Filling In: Fill in holes and openings left in concrete structures after work of other trades is in place unless otherwise indicated. Mix, place, and cure concrete, as specified, to blend with in-place construction. Provide other miscellaneous concrete filling indicated or required to complete the Work.
B Equipment Bases and Foundations:
1. Coordinate sizes and locations of concrete bases with actual equipment provided.
2. Construct concrete bases to height indicated, and extend base not less than 6 inches in each direction beyond the maximum dimensions of supported equipment unless otherwise indicated or required by equipment manufacturer.
3. Minimum Compressive Strength: 3000 psi at 28 days (Normal Weight).
4. Install dowel rods to connect concrete base to concrete floor. Unless otherwise indicated, install dowel rods on 12-inch centers around the full perimeter of concrete base.
5. Prior to pouring concrete, place, and secure anchorage devices. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
6. Cast anchor-bolt insert into bases. Install anchor bolts to elevations required for proper attachment to supported equipment.
C Steel Pan Stairs: Provide concrete fill for steel pan stair treads, landings, and associated items. Cast-in inserts and accessories as shown on Drawings. Screed, tamp, and trowel finish concrete surfaces. Provide 3000 psi compressive strength normal-weight concrete.

3.12 CONCRETE PROTECTING AND CURING
A General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures. Comply with ACI 306.1 for cold-weather protection and ACI 305.1 for hot-weather protection during curing. For concrete specified to be receive polished finish the outdoor air temperature during the curing period must be limited to 80 deg F.
B Evaporation Retarder: Apply evaporation retarder to unformed concrete surfaces if hot, dry, or windy conditions cause moisture loss approaching 0.2 lb/sq. ft. x h before and during finishing operations. Apply according to manufacturer's written instructions after placing, screeding, and bull floating or darbying concrete, but before float finishing.
C Formed Surfaces: Cure formed concrete surfaces, including underside of beams, supported slabs and other similar surfaces. If forms remain during curing period, moist cure after loosening forms. If removing forms before end of curing period, continue curing for the remainder of the curing period.
D Unformed Surfaces: Begin curing immediately after finishing concrete. Cure unformed surfaces, including floors and slabs, concrete floor toppings, and other surfaces.
E Cure concrete according to ACI 308.1, by one or a combination of the following methods.
1. Moisture Curing: Keep surfaces continuously moist for not less than seven days with the following materials:
a. Water.
b. Continuous water-fog spray.
c. Absorptive cover, water saturated, and kept continuously wet. Cover concrete surfaces and edges with 12-inch lap over adjacent absorptive covers.
2. Moisture-Retaining-Cover Curing: Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in widest practicable width, with sides and ends lapped at least 12 inches, and sealed by waterproof tape or adhesive. Cure for not less than seven days. Immediately repair any holes or tears during curing period, using cover material and waterproof tape.

a. Moisture cure or use moisture-retaining covers to cure concrete surfaces to receive floor coverings.
b. Moisture cure or use moisture-retaining covers to cure concrete surfaces to receive penetrating liquid floor treatments or polished finish.
c. Cure concrete surfaces to receive floor coverings with either a moisture-retaining cover or a curing compound that the manufacturer certifies does not interfere with bonding of floor covering used on Project.
d. and edges with 12-inch lap over adjacent absorptive covers.

3. Curing Compound: Apply uniformly in continuous operation by power spray or roller according to manufacturer's written instructions. Recoat areas subjected to heavy rainfall within three hours after initial application. Maintain continuity of coating and repair damage during curing period.
   a. Removal: After curing period has elapsed, remove curing compound without damaging concrete surfaces by method recommended by curing compound manufacturer unless manufacturer certifies curing compound does not interfere with bonding of floor covering used on Project.
   b. Use of curing compounds to cure concrete surfaces to receive penetrating liquid floor treatments or polished finished is not permitted.
4. Curing and Sealing Compound: Apply uniformly to floors and slabs indicated in a continuous operation by power spray or roller according to manufacturer's written instructions. Recoat areas subjected to heavy rainfall within three hours after initial application. Repeat process 24 hours later and apply a second coat. Maintain continuity of coating and repair damage during curing period.

3.13 LIQUID FLOOR TREATMENT APPLICATION

A Penetrating Liquid Floor Treatment: Prepare, apply and finish penetrating liquid floor treatment according to manufacturer’s written instructions.
1. Remove curing compounds, sealers, oil, dirt, laitance, and other contaminants and complete surface repairs.
2. Do not apply to concrete until cured for minimum amount of time stipulated in manufacturer’s written instructions.
3. Apply liquid until surface is saturated, scrubbing into surface until a gel forms; rewet; and repeat brooming or scrubbing. Rinse with water; remove excess material until surface is dry. Apply a second coat in a similar manner if surface is rough or porous.

3.14 CONCRETE SURFACE REPAIRS

A Defective Concrete: Repair and patch defective areas when approved by Architect. Remove and replace concrete that cannot be repaired and patched to Architect's approval.

B Repair technique for surfaces exposed to view in the final condition shall be tested on a mockup or surface to be concealed later, before repairing surfaces.
1. Repair test shall be approved by the Architect prior to repairing surfaces.

C Repairing Formed Surfaces: Surface defects include color and texture irregularities, cracks, spalls, air bubbles, honeycombs, rock pockets, fins and other projections on the surface, and stains and other discolorations that cannot be removed by cleaning.
1. Immediately after form removal, cut out honeycombs, rock pockets, and voids more than 1/2 inch in any dimension to solid concrete. Limit cut depth to 3/4 inch. Make edges of cuts perpendicular to concrete surface. Clean, dampen with water, and brush-coat holes and voids with bonding agent. Fill and compact with patching mortar before bonding agent has dried. Fill form-tie voids with patching mortar or cone plugs secured in place with bonding agent.
2. Repair defects on surfaces exposed to view by blending white portland cement and standard portland cement so that, when dry, patching mortar will match surrounding color. Patch a test area at inconspicuous locations to verify mixture and color match before proceeding with patching. Compact mortar in place and strike off slightly higher than surrounding surface.

3. Repair defects on concealed formed surfaces that affect concrete's durability and structural performance as determined by Architect.

D Repairing Unformed Surfaces: Test unformed surfaces, such as floors and slabs, for finish and verify surface tolerances specified for each surface. Correct low and high areas. Test surfaces sloped to drain for trueness of slope and smoothness; use a sloped template.

1. Repair finished surfaces containing defects. Surface defects include spalls, popouts, honeycombs, rock pockets, crazing and cracks in excess of 0.01 inch wide or that penetrate to reinforcement or completely through unreinforced sections regardless of width, and other objectionable conditions.
2. After concrete has cured at least 14 days, correct high areas by grinding.
3. Correct localized low areas during or immediately after completing surface finishing operations by cutting out low areas and replacing with patching mortar. Finish repaired areas to blend into adjacent concrete.
4. Correct other low areas scheduled to receive floor coverings with a repair underlayment. Prepare, mix, and apply repair underlayment and primer according to manufacturer's written instructions to produce a smooth, uniform, plane, and level surface. Feather edges to match adjacent floor elevations.
5. Correct other low areas scheduled to remain exposed with a repair topping. Cut out low areas to ensure a minimum repair topping depth of 1/4 inch to match adjacent floor elevations. Prepare, mix, and apply repair topping and primer according to manufacturer's written instructions to produce a smooth, uniform, plane, and level surface.
6. Repair defective areas, except random cracks and single holes 1 inch or less in diameter, by cutting out and replacing with fresh concrete. Remove defective areas with clean, square cuts and expose steel reinforcement with at least a 3/4-inch clearance all around. Dampen concrete surfaces in contact with patching concrete and apply bonding agent. Mix patching concrete of same materials and mixture as original concrete except without coarse aggregate. Place, compact, and finish to blend with adjacent finished concrete. Cure in same manner as adjacent concrete.
7. Repair random cracks and single holes 1 inch or less in diameter with patching mortar. Groove top of cracks and cut out holes to sound concrete and clean off dust, dirt, and loose particles. Dampen cleaned concrete surfaces and apply bonding agent. Place patching mortar before bonding agent has dried. Compact patching mortar and finish to match adjacent concrete. Keep patched area continuously moist for at least 72 hours.

E Perform structural repairs of concrete, subject to Architect's approval, using epoxy adhesive and patching mortar.

F Repair materials and installation not specified above may be used, subject to Architect's approval.

3.15 SPECIAL INSPECTIONS

A Special Inspections and tests shall be performed by the Special Inspector or Special Inspection Agency.

B Verification and inspection of concrete construction shall be in accordance with the Statement of Special Inspections, Section 1705.3 of the 2018 North Carolina State Building Code and as follows:

1. Concrete Tests: Testing of composite samples of fresh concrete obtained according to ASTM C 172 shall be performed according to the following requirements.
   a. Testing Frequency: Obtain at least one composite sample for each 100 cu. yd. or fraction thereof of each concrete mixture placed each day.
      (1) When frequency of testing will provide fewer than five compressive-strength tests for each concrete mixture, testing shall be conducted from at least five randomly selected batches or from each batch if fewer than five are used.
   b. Slump: ASTM C 143/C 143M; one test at point of placement for each composite sample, but not less than one test for each day's pour of each concrete mixture. Perform additional tests when concrete consistency appears to change.
   c. Air Content: ASTM C 231, pressure method, for normal-weight concrete; ASTM C 173/C 173M, volumetric method, for structural lightweight concrete; one test

for each composite sample, but not less than one test for each day's pour of each concrete mixture.

d. Concrete Temperature: ASTM C 1064/C 1064M; one test at point of delivery for each truck and one test at point of placement for each 25 cu. yd. placed.
e. Unit Weight: ASTM C 567, fresh unit weight of structural normal-weight concrete; one test for each composite sample, but not less than one test for each day's pour of each concrete mixture.
f. Compression Test Specimens: ASTM C 31/C 31M.
   (1) Cast and laboratory cure five 4x8 standard cylinder specimens for each composite sample.
g. Compressive-Strength Tests: ASTM C 39/C 39M; test one laboratory-cured specimen at 7 days and three laboratory-cured specimens at 28 days. Maintain one specimen in reserve for later testing, if required.
   (1) A compressive-strength test shall be the average compressive strength from a set of three specimens obtained from same composite sample and tested at age indicated.
   (2) Strength of each concrete mixture will be satisfactory if every average of any three consecutive compressive-strength tests equals or exceeds specified compressive strength and no compressive-strength test value falls below specified compressive strength by more than 500 psi.
h. Measure floor and slab flatness and levelness according to ASTM E 1155 within 48 hours of finishing.
i. Test results shall be reported in writing to Architect, concrete manufacturer, and Contractor within 48 hours of testing. Reports of compressive-strength tests shall contain Project identification name and number, date of concrete placement, name of concrete testing and inspecting agency, location of concrete batch in Work, design compressive strength at 28 days, concrete mixture proportions and materials, compressive breaking strength, and type of break for both 7- and 28-day tests.
j. Nondestructive Testing: Impact hammer, sonoscope, or other nondestructive device may be permitted by Architect but will not be used as sole basis for approval or rejection of concrete.
k. Additional Tests: Testing and inspecting agency shall make additional tests of concrete when test results indicate that slump, air entrainment, compressive strength, or other requirements have not been met, as directed by Architect. Testing and inspecting agency may conduct tests to determine adequacy of concrete by cored cylinders complying with ASTM C 42 or by other methods as directed by Architect.

2. Inspections: Perform inspections of the work to verify compliance with the requirements of the contract documents, including the following:
   a. Steel reinforcement placement.
   b. Steel reinforcement welding.
   c. Headed bolts and studs.
   d. Verification of use of required design mixture.
   e. Concrete placement, including conveying and depositing.
   f. Curing procedures and maintenance of curing temperature.
   g. Verification of concrete strength.
   h. Concrete batch plant and review procedures for maintaining proper mix proportions and proper mix techniques.
   i. Concrete delivery tickets at time of delivery to assure conformance to ACI 318.

C Correct deficiencies in the Work that test reports and inspections indicate do not comply with the Contract Documents.

D Additional testing and inspecting, at Contractor’s expense, will be performed to determine compliance of replaced or additional work with specified requirements.

3.16 PROTECTION OF LIQUID FLOOR TREATMENTS

A Protect liquid floor treatment from damage and wear during the remainder of constriction period. Use protective methods and materials, including temporary covering, recommended in writing by liquid floor treatments installer.

END OF SECTION 03 30 00

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SECTION 03 35 43 - POLISHED CONCRETE FINISHING

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. Polished concrete finishing.
2. Supplementary components and accessories normally furnished or otherwise necessary for a complete application.

1.3 REFERENCES

A Acronyms and Abbreviations:

1. ACI: American Concrete Institute.
2. ASCC: American Society of Concrete Contractors.
3. CPC: Concrete Polishing Council.
4. DOI: Distinctness-of-Image.
5. NSFI: National Floor Safety Institute.
6. SCAQMD: South Coast Air Quality Management District.
7. VOC: Volatile Organic Compounds.

B Manufacturer: Means the polished concrete floor finish products manufacturer unless otherwise indicated.

1.4 COORDINATION

A The concrete slab is the finished floor. Do not allow marking of the floor in finished areas other than with chalk. Do not apply chemical products other than those approved by polishing system manufacturer.

1. Petroleum Based Stains and Residue: Prevent the spill of petroleum based chemicals and compounds. No chemical process or cleaning system is known that will remove petroleum stains, hydraulic fluid and other similar penetrating chemicals from concrete surfaces. The prevention of spills is essential.
   a. Parking of vehicles or equipment on the slab without protection, such as plastic or nonabsorbent drop clothes under the vehicles, is not permitted.
   b. Diaper hydraulic equipment used on concrete floor during the work.
   c. Do not fit or cut pipe on the concrete slab.
   d. Do not place steel on the concrete slab without protection beneath.
   e. Prevent acids from coming in contact with slab.
   f. Use drop cloths on concrete. If paint gets on concrete, immediately remove it.
   g. Check tires on equipment for screws and nails that cause chips or mar the surface.
   h. Do not install bolts, expansion anchors, pins, nails, or fasteners penetrating the floor slab unless part of a permanent structure or concealed from view in the final layout of the space.

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.
   a. Include data for grinding machine, including all types of grinding heads, dust extraction system, joint filler, and penetrating sealer.

2. Polishing Schedule: Submit plan showing polished concrete surfaces and schedule of polishing operations for each area of polished concrete before start of polishing operations. Include locations of all joints, including construction joints.

B Informational Submittals:
1. Qualification Data: For installer.
2. Material Certificates: For each of the following, signed by manufacturers:
   a. Repair Materials: Manufacturer’s certification that proposed repair materials are compatible with polishing operations.
   b. Liquid floor treatments.
   c. Grinding and polishing equipment.
   d. Grinding heads.

C Closeout Submittals:
1. Maintenance Data: For polished concrete floor finish. Submit manufacturer's recommended cleaning and maintenance instructions.

1.6 QUALITY ASSURANCE

A Applicator Qualifications: Installer having at least 5 years’ documented experience who is trained and certified as an ASCC CPC Concrete Polishing Craftsman, or who can demonstrate compliance with its requirements, and who is regularly engaged in the finishing of polished concrete.

B Mockups: Before polishing concrete, build mockups to verify selections and to demonstrate typical joints, surface finish, and standard of workmanship. Build mockups to comply with the following requirements, using materials indicated for the completed work:
1. Build 10 feet by 10 feet mockups including edge treatments (adjacent to walls and other fixed objects) in locations as directed by Architect.
2. Provide mockup area lighting similar in illumination, lumen output, color temperature, and both height and distance from surface as that of final areas to receive polished concrete finishing.
3. Use the same personnel, equipment including hand grinders, tools and methods as will be used for the remaining interior floor slab.
4. Mockup shall demonstrate joint treatments, inside wall edge treatments, and any protective sealers.
5. Demonstrate curing, finishing, and protecting of polished concrete.
6. Do not begin full scale product applications, floor polishing operations, or deliver major materials until Architect has approved mockup
7. Subject to compliance with requirements, approved mockups may become part of the completed work if undisturbed at time of Final Acceptance.

1.7 FIELD CONDITIONS

A Traffic Control: Maintain access for vehicular and pedestrian traffic as required for other construction activities.

B Limitations: Comply with manufacturer’s written instructions for substrate temperature and moisture content, ambient temperature and humidity, ventilation, and conditions affecting polishing application and performance.

PART 2 PRODUCTS

2.1 LIQUID FLOOR TREATMENTS

A Penetrating Liquid Floor Treatments for Polished Concrete Finish System (CON-2): Clear, waterborne solution of inorganic silicate or siliconate materials and other proprietary components; odorless; that penetrates, hardens, and is suitable for polished concrete surfaces.
1. Basis-of-Design System: Subject to compliance with the Contract Documents, design is based on the following.
   a. “RetroPlate System” as manufacturd by Curecrete Distribution, Inc.

2. Acceptable Manufacturers: Subject to compliance with the Contract Documents, acceptable sources of polished concrete finish systems include the following.
   a. Citadel; Rust-Oleum Corporation.
   b. Sika Corporation (SCOFIELD).
   c. Tennant Coatings.
3. Architectural Coatings, Allowable VOC Content: Architectural coatings intended to be field applied must comply with SCAQMD Rule 1113 VOC limits.

B Joint Filler: Epoxy filler and polyurea sealant, nonstaining and compatible with floor finish and as recommended by the manufacturer.
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).

2.2 EQUIPMENT

A Grinder: Counter rotating-head floor grinding machine with dust extraction system.
B Grinding Heads: As required to meet specified polish level.
1. Metal Bonded 40, 80, 150, and/or 300 grit diamonds.
2. Resin Bonded 100, 200, 400, 800 grit diamonds.
C Grinding pads for edges.
D Hand grinder with dust extraction attachment and pads.

PART 3 EXECUTION

3.1 POLISHING

A General: Perform polishing operations in compliance with applicable requirements of ACI 310.1 and manufacturer’s written instructions.
B Design Intent: Provide the following or as otherwise necessary to match approved mockup.
1. Aggregate Exposure: As selected by the Architect and matching approved mockup.
2. Polish Level: Level 3 (semi-polished) and matching approved mockup.
C Apply polished concrete finish system to cured and prepared slabs to match approved mockup.
1. Machine grind floor surfaces to receive polished finishes level and smooth and to depth required to reveal aggregate to match approved mockup.
2. Apply penetrating liquid floor treatment for polished concrete in polishing sequence and according to manufacturer's written instructions, allowing recommended drying time between successive coats.
3. Continue polishing with progressively finer-grit diamond polishing pads to gloss level, to match approved mockup.
4. Control and dispose of waste products produced by grinding and polishing operations.
5. Neutralize and clean polished floor surfaces.
D Joint Filling:
1. Prepare, clean, and install joint filler in accordance with manufacturer's written instructions.
   a. Do not fill joints until construction traffic has permanently ceased.
2. Remove dirt, debris, saw cuttings, curing compounds, and sealers from joints; leave contact faces of joints clean and dry.
3. Install semirigid joint filler full depth in saw-cut joints and at least 2 inches deep in formed joints.
4. Overfill joint, and trim joint filler flush with top of joint after hardening.

3.2 PROTECTION

A Protection: Provide final protection and maintain conditions, in a manner acceptable to installer, that ensure that polished concrete is without damage or deterioration at time of Final Acceptance.

END OF SECTION 03 35 43

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 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. ACI: American Concrete Institute.
2. BIA: Brick Industry Association.
3. SMACNA: Sheet Metal and Air Conditioning Contractors Association.
4. 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 feet vertically and horizontally of a walking surface.

C Fire-Resistance Ratings: Comply with requirements for fire-resistance-rated assembly designs indicated.
1. Where fire-resistance-rated construction is indicated, use the equivalent thickness method for masonry units in accordance with ACI 216.1.

### 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. Interior Exposed-to-View CMU Corners: Provide bullnose units.
   a. Provide square-edge CMU for starter course to accept resilient wall base.

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: Normal weight unless otherwise indicated.
4. Size (Width): Manufactured to the following dimensions, unless otherwise indicated:
   a. 8 inches nominal; 7-5/8 inches actual.

5. 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. Products: Subject to compliance with the Contract Documents provide the following.
a. BR-1: As selected by the Architect.
b. BR-2: As selected by the Architect.
2. Grade: SW.
3. Type: FBS.
4. Initial Rate of Absorption: Less than 30 g/30 sq. in. per minute when tested per ASTM C 67.
5. Efflorescence: Provide brick that has been tested according to ASTM C 67 and is rated "not effloresced."
6. Size (Actual Dimensions): 3-5/8 inches wide by 2-1/4 inches high by 7-5/8 inches long, unless otherwise indicated.

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 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 Adjustable Masonry-Veneer Anchors, Double-Pintle Plate: Rib-stiffened, sheet metal anchor section with screw holes at top and bottom, projecting horizontal leg with slots for vertical legs of double pintle wire tie.

1. General: Provide anchors that allow vertical adjustment but resist a 200 lbf load in both tension and compression perpendicular to plane of wall without deforming or developing play in excess of 1/16 inch.
2. Fabricate sheet metal anchor sections and other sheet metal parts from at least 0.1084-inch thick steel sheet, galvanized after fabrication.
3. Fabricate wire ties from at least 0.187-inch-diameter, hot-dip galvanized-steel wire.
4. Products: Subject to compliance with the Contract Documents provide one of the following.
   a. “No. 213 Double Pintle Plate Veneer Anchors” as manufactured by Heckmann Building Products.
   b. “HB-213-2X” Adjustable Veneer Anchor with “2X-Hook” as manufactured by HB (Hohmann & Barnard, Inc.)
   c. “RJ-711 Adjustable Veneer Anchor” as manufactured by Wire-Bond.

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 MATERIALS

A General: Fabricate sheet metal flashing and trim to comply with recommendations in the SMACNA publication Architectural Sheet Metal Manual that apply to design, dimensions, metal, and other characteristics of the item.

B Material Flashing: Stainless steel at least 0.0156 inch thick.
1. 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.
2. Fabricate metal expansion-joint strips from sheet metal indicated above, formed to shape indicated.
3. Fabricate metal drip edges from sheet metal indicated above. Do not expose edge of flashing. Edge of flashing to remain behind face of joint.

C Stainless Steel Fabric Flashing: Composite, flashing product consisting of 2-mil of Type 304 stainless steel sheet, bonded to a layer of polymeric fabric, to produce an overall thickness of 40-mil.
1. Manufacturers: Subject to compliance with the Contract Documents provide products by one of the following:
a. HB (Hohmann & Barnard, Inc.)
b. STS Coatings, Inc.
c. Wire-Bond.
d. York Manufacturing, Inc

D Drainage Plane Flashing: Fabricate from stainless steel and drainage membrane to shapes indicated, including weep tabs, termination bar, and drip edge. Provide flashing materials as follows:
1. Stainless Steel: ASTM A 240/A 240M or ASTM A 666/A 666M, Type 304, 0.016 inch thick.
2. Elastomeric Membrane: EPDM complying with ASTM D 4637/D 4637M, 40 mil.
3. Fabricate continuous flashings in sections at least 60 inches long.
4. Accessories: Provide preformed corners, end dams, other special shapes, and seaming materials produced by flashing manufacturer.

E Solder and Sealants for Sheet Metal Flashings:
1. Solder for Stainless Steel: ASTM B 32, Grade Sn60, with acid flux of type recommended by stainless steel sheet manufacturer.
2. Elastomeric Sealant: ASTM C 920, chemically curing urethane sealant; of type, grade, class, and use classifications required to seal joints in sheet metal flashing and remain watertight.

F Adhesives, Primers, and Seam Tapes for Flashings: Flashing manufacturer's standard products or products recommended by flashing manufacturer for bonding flashing sheets to each other and to substrates.

G Termination Bars for Flexible Flashing, Flanged: Stainless steel sheet 0.019 inch by 1-1/2 inches with a 3/8-inch flange at top and bottom.

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.
2. At fire-rated partitions, treat joint between top of partition and underside of structure above to comply with Section 07 84 43 Joint Firestopping.

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 that cannot be used as fill and other masonry waste, and legally dispose of off Owner's property.

END OF SECTION 04 20 00

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SECTION 05 12 00 – STRUCTURAL STEEL FRAMING

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. Structural steel.
2. Field-installed shear connectors and deformed bar anchors.
3. Grout for column base plates.

B Related Requirements:

1. Section 014100 “Special Inspection Services” for administrative and procedural requirements for special inspection services.
2. Section 053100 “Steel Decking” for field installation of shear connectors through deck.
3. Section 099600 “High-performance Coatings” for surface-preparation and priming requirements of members to receive high performance coatings.

1.3 DEFINITIONS

A Structural Steel: Elements of structural-steel frame indicated on Drawings and as described in AISC 303, "Code of Standard Practice for Steel Buildings and Bridges.”

1.4 COORDINATION

A Coordinate selection of shop primers with topcoats to be applied over them. Comply with paint and coating manufacturers' recommendations to ensure that shop primers and topcoats are compatible with one another.

B Coordinate installation of anchorage items to be embedded in or attached to other construction without delaying the Work. Provide setting diagrams, sheet metal templates, instructions, and directions for installation.

1.5 PREINSTALLATION MEETINGS

A Preinstallation Conference: Conduct conference at Project site.

1.6 ACTION SUBMITTALS

A Shop Drawings: Show fabrication of structural-steel components.

1. Include details of cuts, connections, splices, camber, holes, and other pertinent data.
2. Provide setting drawings, templates, and directions for installation of anchor bolts and other anchorages to be installed as work of other sections.
3. Include embedment drawings.
4. Indicate welds by standard AWS symbols, distinguishing between shop and field welds, and show size, length, and type of each weld. Show backing bars that are to be removed and supplemental fillet welds where backing bars are to remain.
5. Indicate type, size, and length of bolts, distinguishing between shop and field bolts. Identify pretensioned and slip-critical high-strength bolted connections.
6. Delegated design submittals must be submitted with or prior to shop drawings. Shop drawings will not be reviewed until delegated design submittals have been submitted.

B Delegated-Design Submittal: For structural-steel connections indicated as “delegated design”, include structural calculations signed and sealed by the qualified professional engineer responsible for their preparation. In addition, the professional engineer responsible for connection design shall review the shop drawings prior to submittal for review to verify that the connections as detailed on the shop drawings comply with the connection design requirements of the final calculations. A review letter, signed and sealed by the professional engineer responsible for connection design shall be provided with the shop drawing and calculation submittal stating that this review and verification has been completed.

1.7 INFORMATION SUBMITTALS

A Qualification Data: For qualified fabricator.

B Welding certificates. Welder certificates signed by Contractor certifying that welders comply with requirements specified under the “Quality Assurance” Article.

C Paint Compatibility Certificates: From manufacturers of topcoats applied over shop primers, certifying that shop primers are compatible with topcoats.

D Mill test reports for structural steel, including chemical and physical properties.

E Product Test Reports: For the following:

1. Bolts, nuts, and washers including mechanical properties and chemical analysis.
2. Direct-tension indicators.
3. Tension-control, high-strength, bolt-nut-washer assemblies.
4. Shear stud connectors.
5. Deformed Bar Anchors.
6. Shop primers.
7. Nonshrink grout.

1.8 QUALITY ASSURANCE

A Fabricator Qualifications: A qualified fabricator that participates in the AISC Quality Certification Program and is designated an AISC-Certified Plant, Category STD.

1. Exception: The fabricator maintains detailed fabrication and quality control procedures which provide a basis for inspection control of the workmanship and the fabricator’s ability to conform to approved drawings, project specifications and referenced standards.
   a. The Owner’s Special Inspection Agency shall review the procedures to the completeness and adequacy relative to the Code requirements including Special Inspection requirements for the fabricators scope of work.

B Installer Qualifications: A qualified installer who participates in the AISC Quality Certification Program and is designated an AISC-Certified Erector, Category CSE.

C Welding Qualifications: Qualify procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code – Steel.”

D Comply with applicable provisions of the following specifications and documents:

1. AISC 303.
2. AISC 360.
3. RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts.”

1.9 DELIVERY, STORAGE, AND HANDLING

A Store materials to permit easy access for inspection and identification. Keep steel members off ground and spaced by using pallets, dunnage, or other supports and spacers. Protect steel members and packaged materials from corrosion and deterioration.

1. Do not store materials on structure in a manner that might cause distortion, damage, or overload to members or supporting structures. Repair or replace damaged materials or structures as directed.

B Store fasteners in a protected place in sealed containers with manufacturer's labels intact.

1. Fasteners may be repackaged provided Owner's testing and inspecting agency observes repackaging and seals containers.
2. Clean and relubricate bolts and nuts that become dry or rusty before use.

3. Comply with manufacturers' written recommendations for cleaning and lubricating ASTM F 1852 fasteners and for retesting fasteners after lubrication.

1.10 PERFORMANCE REQUIREMENTS

A Connections: Provide details of simple shear, braced frame, moment frame and lintel/girt connections required by the Contract Documents to be selected or completed by structural-steel fabricator, including comprehensive engineering design by a qualified professional engineer, to withstand loads indicated and comply with other information and restrictions indicated.
   1. Select and complete connections using schematic details indicated and AISC 360.
   2. Use LRFD; data are given at strength-load level.

PART 2 PRODUCTS

2.1 STRUCTURAL-STEEL MATERIALS

A W-Shapes: ASTM A 992, Grade 50.
B Channels, Angles: ASTM A 36, Grade 36.
C Plate and Bar: ASTM A 36, Grade 36.
D Cold-Formed Hollow Structural Sections: ASTM A 500, Grade C, structural tubing, square, and rectangular.
E Cold-Formed Hollow Structural Sections: ASTM A 500, Grade B, structural round shape.
F Welding Electrodes: Comply with AWS requirements.

2.2 BOLTS, CONNECTORS, AND ANCHORS

A High-Strength Bolts, Nuts, and Washers: ASTM A 325, Type 1, heavy-hex steel structural bolts; ASTM A 563, Grade C, heavy-hex carbon-steel nuts; and ASTM F 436, Type 1, hardened carbon-steel washers; all with plain finish.
B Tension-Control, High-Strength Bolt-Nut-Washer Assemblies: ASTM F 1852, Type 1, heavy-hex round head assemblies consisting of steel structural bolts with splined ends, heavy-hex carbon-steel nuts, and hardened carbon-steel washers.
   1. Finish: Plain, unless otherwise noted.
C Shear Connectors: ASTM A 108, Grades 1015 through 1020, headed-stud type, cold-finished carbon steel; AWS D1.1/D1.1M, Type B.
D Deformed Bar Anchors: ASTM A 1064; AWS D1.1, Type C.
E Headed Anchor Rods: ASTM F 1554, Grade 36, weldable, straight.
   1. Nuts: ASTM A 563 heavy-hex carbon steel.
   2. Plate Washers: ASTM A 36/A 36M carbon steel.
   3. Washers: ASTM F 436, Type 1, hardened carbon steel.
   4. Finish: Plain.

2.3 PRIMER

A Primer: Fabricator's standard lead- and chromate-free, nonasphaltic, rust-inhibiting primer complying with MPI#79 and requirements for low-emitting materials, compatible with topcoat where members are exposed on interior.
B At all structural steel and miscellaneous steel framing in natatorium and associated pool equipment and storage rooms, provide the following:
   1. SSPC-SP6 Commercial Blast Cleaning.
   2. One coat of Tnemec Series 90-97 Tneme-Zinc at 2.5 – 3.5 dry mils.
   3. One coat of Tnemec Series 161 Tneme-Fascure at 4.0 – 5.0 dry mils.
   4. Refer to High Performance Coatings specification section for field painting.
C For all steel to receive field-applied insulating coating, refer to High Performance Coatings specification section for primer and coating system.
D For all steel to receive field-applied intumescent or spray-applied fireproofing, refer to Division 7 fireproofing specification sections for primer and coating systems.
E Galvanizing Repair Paint: ASTM A 780.

2.4 BLACK ASPHALTUM PAINT

A Ultra high bond, single-component coal tar mastic for protecting steel below grade.

2.5 GROUT

A Nonmetallic, Shrinkage-Resistant Grout: ASTM C 1107, factory-packaged, nonmetallic aggregate grout, noncorrosive and nonstaining, mixed with water to consistency suitable for application and a 30-minute working time.
1. 5,500 psi minimum compressive strength.

2.6 FABRICATION

A Structural Steel: Fabricate and assemble in shop to greatest extent possible. Fabricate according to AISC's "Code of Standard Practice for Steel Buildings and Bridges" and AISC 360.
1. Camber structural-steel members where indicated.
2. Fabricate beams with rolling camber up.
3. Identify high-strength structural steel according to ASTM A 6/A 6M and maintain markings until structural steel has been erected.
4. Mark and match-mark materials for field assembly.
5. Complete structural-steel assemblies, including welding of units, before starting shop-priming operations.

B Thermal Cutting: Perform thermal cutting by machine to greatest extent possible.
1. Plane thermally cut edges to be welded to comply with requirements in AWS D1.1/D1.1M.

C Bolt Holes: Cut, drill or punch standard bolt holes perpendicular to metal surfaces.

D Finishing: Accurately finish ends of columns and other members transmitting bearing loads.

E Cleaning: Clean and prepare steel surfaces that are to remain unpainted according to SSPC SP 2, “Hand Tool Cleaning.” Clean and prepare steel surfaces that are to receive hot-dip galvanization according to SSPC-SP 2, “Hand Tool Cleaning” prior to galvanizing.

F Shear Connectors: Prepare steel surfaces as recommended by manufacturer of shear connectors. Use automatic end welding of headed-stud shear connectors according to AWS D1.1/D1.1M and manufacturer's written instructions.

G Holes: Provide holes required for securing other work to structural steel and for other work to pass through steel framing members.
1. Cut, drill, or punch holes perpendicular to steel surfaces. Do not thermally cut bolt holes or enlarge holes by burning.
2. Baseplate Holes: Cut, drill, mechanically thermal cut, or punch holes perpendicular to steel surfaces.
3. Weld threaded nuts to framing and other specialty items indicated to receive other work.

2.7 SHOP CONNECTIONS

A High-Strength Bolts: Shop install high-strength bolts according to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts" for type of bolt and type of joint specified.
1. Joint Type: Snug tightened, unless otherwise indicated.

B Weld Connections: Comply with AWS D1.1/D1.1M for tolerances, appearances, welding procedure specifications, weld quality, and methods used in correcting welding work.
1. Assemble and weld built-up sections by methods that will maintain true alignment of axes without exceeding tolerances in AISC 303 for mill material.

2.8 SHOP PRIMING

A Shop prime steel surfaces except the following:
1. Surfaces embedded in concrete or mortar. Extend priming of partially embedded members to a depth of 2 inches.
2. Surfaces to be field welded.
3. Surfaces of high-strength bolted, slip-critical connections.
4. Surfaces to receive sprayed fire-resistive materials (applied fireproofing).
5. Galvanized surfaces.
6. Surfaces enclosed in interior construction.

B Surface Preparation: Clean surfaces to be painted. Remove loose rust and mill scale and spatter, slag, or flux deposits. Prepare surfaces according to the following specifications and standards:
1. SSPC-SP 2, "Hand Tool Cleaning."
2. SSPC-SP 3, "Power Tool Cleaning."
3. SSPC-SP 6, "Commercial Blast Cleaning" as noted for Tnemec shop primer and field painted areas.

C Priming: Immediately after surface preparation, apply primer according to manufacturer's written instructions and at rate recommended by SSPC to provide a minimum dry film thickness of 1.5 mils. Use priming methods that result in full coverage of joints, corners, edges, and exposed surface.
1. Stripe paint corners, crevices, bolts, welds, and sharp edges.
2. Apply two coats of shop paint to surfaces that are inaccessible after assembly or erection. Change color of second coat to distinguish it from first.

2.9 GALVANIZING

A Hot-Dip Galvanized Finish: Clean per requirements provided in specification. Apply zinc coating by the hot-dip process to structural steel according to ASTM A 123/A 123M.
1. Fill vent and drain holes that will be exposed in the finished Work unless they function as weep holes, by plugging with zinc solder and filing off smooth.
2. Galvanize lintels, lintel assemblies and shelf angles located in exterior walls.

2.10 SPECIAL INSPECTIONS

A Special Inspections and tests will be performed by the Owner's Special Inspection Agency.
1. Provide access to places where structural-steel work is being fabricated or produced to perform tests and inspections.
2. Verify that the fabricator maintains detailed fabrication and quality control procedures that provide a basis for inspection control of the workmanship and that those procedures are being implemented. This inspection will provide a basis for determination of fabricator's ability to conform to approved drawings, project specifications, and referenced standards.
   a. Exception: Special Inspections will not be required where the work is done on the premises of a qualified fabricator that participates in the AISC Quality Certification Program and is designated an AISC-Certified Plant, Category STD.
3. Approval shall be based upon review of the fabricator's written procedural and quality control manuals and periodic auditing of fabrication practices.
4. At completion of fabrication, the fabricator shall submit a certificate of compliance stating that the work was performed in accordance with the approved construction documents.

PART 3 EXECUTION

3.1 EXAMINATION

A Verify, with steel Erector present, elevations of concrete- and masonry-bearing surfaces and locations of anchor rods, bearing plates, and other embedments for compliance with requirements.
1. Prepare a certified survey of bearing surfaces, anchor rods, bearing plates, and other embedments showing dimensions, locations, angles, and elevations.

B Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A Provide temporary shores, guys, braces, and other supports during erection to keep structural steel secure, plumb, and in alignment against temporary construction loads and loads equal in intensity to design loads. Remove temporary supports when permanent structural steel, connections, and bracing are in place unless otherwise indicated.
1. Do not remove temporary shoring supporting composite deck construction until cast-in-place concrete has attained its design compressive strength.

3.3 ERECTION

A Set structural steel accurately in locations and to elevations indicated and according to AISC 303 and AISC 360.

B Baseplates: Clean concrete- and masonry-bearing surfaces of bond-reducing materials, and roughen surfaces prior to setting plates. Clean bottom surface of plates.

1. Set plates for structural members on wedges, shims, or setting nuts as required.
2. Weld plate washers to top of baseplate.
3. Snug-tighten anchor rods after supported members have been positioned and plumbed. Do not remove wedges or shims but, if protruding, cut off flush with edge of plate before packing with grout.
4. Promptly pack grout solidly between bearing surfaces and plates so no voids remain. Neatly finish exposed surfaces; protect grout and allow to cure. Comply with manufacturer's written installation instructions for shrinkage-resistant grouts.

C Apply two heavy coats of black asphaltum paint to all steel below grade.

D Maintain erection tolerances of structural steel within AISC 303 "Code of Standard Practice for Steel Buildings and Bridges."

E Align and adjust various members that form part of complete frame or structure before permanently fastening. Before assembly, clean bearing surfaces and other surfaces that will be in permanent contact with members. Perform necessary adjustments to compensate for discrepancies in elevations and alignment.

1. Level and plumb individual members of structure.
2. Make allowances for difference between temperature at time of erection and mean temperature when structure is completed and in service.

F Splice members only where indicated.

G Do not use thermal cutting during erection unless approved by Architect. Finish thermally cut sections within smoothness limits in AWS D1.1/D1.1M.

H Do not enlarge unfair holes in members by burning or using drift pins. Ream holes that must be enlarged to admit bolts.

I Shear Connectors: Prepare steel surfaces as recommended by manufacturer of shear connectors. Use automatic end welding of headed-stud shear connectors according to AWS D1.1/D1.1M and manufacturer's written instructions.

J Deformed Bar Anchors: Prepare steel surfaces as recommended by manufacturer of Deformed Bar Anchors. Use automatic end welding of Deformed Bar Anchors according to AWS D1.1 and manufacturer's written instructions.

3.4 FIELD CONNECTIONS

A High-Strength Bolts: Install high-strength bolts according to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts" for type of bolt and type of joint specified.

1. Joint Type: Snug tightened or fully pretensioned, as indicated.

B Weld Connections: Comply with AWS D1.1/D1.1M for tolerances, appearances, welding procedure specifications, weld quality, and methods used in correcting welding work.

1. Comply with AISC 303 and AISC 360 for bearing, alignment, adequacy of temporary connections, and removal of paint on surfaces adjacent to field welds.
2. Remove backing bars or runoff tabs where exposed to view in the final condition, back gouge, and grind steel smooth.
3. Assemble and weld built-up sections by methods that will maintain true alignment of axes without exceeding tolerances in AISC 303 "Code of Standard Practice for Steel Buildings and Bridges" for mill material.

3.5 SPECIAL INSPECTIONS

A Special Inspections and tests shall be performed by the Special Inspector or Special Inspection Agency.

B Where fabrication of structural load-bearing members and assemblies is being performed on the premises of the fabricators shop, special inspection of the fabricated item shall be performed.

1. Verify that the fabricator maintains detailed fabrication and quality control procedures that provide a basis for inspection control of the workmanship and that those procedures are being implemented. This inspection will provide a basis for determination of the fabricator's ability to conform to approved drawings, project specifications, and referenced standards.
2. Exception: Special Inspections will not be required where the work is done on the premises of a fabricator registered and approved to perform such work without special inspection. Approval shall be based upon review of the fabricator's written procedural and quality control manuals and periodic auditing of fabrication practices. At completion of fabrication, the fabricator shall submit a certificate of compliance stating that the work was performed in accordance with the approved construction documents.

C Verification and inspection of steel construction shall be in accordance with the requirements of the Statement of Special Inspections, Section 1705.2 of the 2018 North Carolina State Building Code, and as follows:

1. Welding: Welding inspection shall be in compliance with AWS D1.1. In addition to visual inspection, welds may be tested and inspected according to AWS D1.1 and the following inspection procedures, at Special Inspector's option.
   a. Liquid Penetrant Inspection: ASTM E 165.
   b. Magnetic Particle Inspection: ASTM E 709; performed on root pass and on finished weld. Cracks or zones of incomplete fusion or penetration will not be accepted.
   c. Ultrasonic Inspection: ASTM E 164.
   d. Radiographic Inspection: ASTM E 94.
2. Details: Perform periodic inspections of the erected structural steel framing to verify compliance with the details shown on the construction documents and approved shop drawings such as member locations, size and spacing, connection details, bracing and bolted and welded connections.
3. High Strength Bolts: Bolted connections will be tested and inspected according to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts."
   a. General: While work is in progress, determine that the requirements for installation of bolts, nuts, washers and bolted parts are met. For bolts requiring pretensioning, observe the preinstallation testing and calibration procedures when such procedures are required by the installation method or by project plans or specifications; determine that all plies of connected materials have been drawn together and properly snugged and monitor the installation of bolts to verify that the selected procedure for installation is properly used to tighten bolts. For joints required to be tightened only to snug-tight condition, verify that the connected materials have been drawn together and properly snugged.
   b. Periodic monitoring: Monitoring of bolt installation for pretensioning is permitted to be performed on a periodic basis when using the turn-of-nut method with matchmarking techniques, the direct tension indicator method or the alternate design fastener (twist-off bolt) method. Joints designated as sung tight shall be inspected on a periodic basis.
   c. Continuous monitoring: Monitoring of bolt installation for pretensioning using the calibrated wrench method or the turn-of-nut method without matchmarking shall be performed on a continuous basis.
4. Shear Studs and Deformed Bar Anchors: Test and inspect welded shear connectors and Deformed Bar Anchors according to requirements in AWS D1.1/D1.1M, Type B and C, respectively, for stud welding and as follows:
   a. Perform bend tests if visual inspections reveal either a less-than-continuous 360-degree flash or welding repairs to any shear connector.
   b. Conduct tests on additional shear connectors if weld fracture occurs on shear connectors already tested, according to requirements in AWS D1.1/D1/1M.

D Correct deficiencies in Work that test reports and inspections indicate does not comply with the Contract Documents.

E Additional testing performed to determine compliance of corrected work with specified requirements shall be at Contractor's expense.

3.6 REPAIRS AND PROTECTION

A Galvanized Surfaces: Clean areas where galvanizing is damaged or missing and repair galvanizing to comply with ASTM A 780.

B Touchup Painting: Immediately after erection, clean exposed areas where primer is damaged or missing and paint with the same material as used for shop priming to comply with SSPC-PA 1 for touching up shop-painted surfaces.

1. Clean and prepare surfaces by SSPC-SP 2 hand-tool cleaning or SSPC-SP 3 power-tool cleaning.

END OF SECTION 05 12 00

# SECTION 05 21 00 – STEEL JOIST FRAMING

## 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. KCS-series steel joists.
2. LH-series long-span steel joists.
3. Joist accessories.

### 1.3 DEFINITIONS

A SJI "Specifications": Steel Joist Institute's "Standard Specifications, Load Tables and Weight Tables for Steel Joists and Joist Girders."

### 1.4 ACTION SUBMITTALS

A Product Data: For each type of joist, accessory, and product.

B Shop Drawings:

1. Include layout, designation, number, type, location, and spacings of joists.
2. Include joining and anchorage details, bracing, bridging, joist accessories; splice and connection locations and details; and attachments to other construction.
3. Indicate locations and details of bearing plates to be embedded in other construction.

### 1.5 INFORMATION SUBMITTALS

A Qualification Data: For manufacturer.

B Welding certificates.

C Manufacturer certificates.

D Mill Certificates: For each type of bolt.

E Comprehensive engineering analysis of special joists signed and sealed by the qualified professional engineer responsible for its preparation.

### 1.6 QUALITY ASSURANCE

A Manufacturer Qualifications: A manufacturer certified by SJI to manufacture joists complying with applicable standard specifications and load tables of SJI "Specifications."

1. Manufacturer's responsibilities include providing professional engineering services for designing special joists to comply with performance requirements.

B SJI Specifications: Comply with standard specifications in SJI's "Specifications" that are applicable to types of joists indicated.

C Welding Qualifications: Qualify field-welding procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code – Steel."

### 1.7 DELIVERY, STORAGE, AND HANDLING

A Deliver, store, and handle joists as recommended in SJI's "Specifications."

B Protect joists from corrosion, deformation, and other damage during delivery, storage, and handling.

### 1.8 SEQUENCING

A Deliver steel bearing plates to be built into cast-in-place concrete and masonry construction to ensure continuity of construction.

PART 2 PRODUCTS

2.1 KCS-SERIES STEEL JOISTS

A Manufacture steel joists of type indicated according to "Standard Specifications for Open Web Steel Joists, K-Series" in SJI's "Specifications," with steel-angle top- and bottom-chord members, underslung ends, and parallel top chord.
   1. Joist Type: KCS-series steel joists.

B Comply with AWS requirements and procedures for shop welding, appearance, quality of welds, and methods used in correcting welding work.

C Top-Chord Extensions: Extend top chords of joists with SJI's top-chord extensions as indicated, complying with SJI's "Specifications." Design top chord extensions to resist the uniformly distributed loads indicated on the construction documents.

D Camber joists according to SJI's "Specifications."

E Equip bearing ends of joists with manufacturer's standard beveled ends or sloped shoes if joist slope exceeds 1/4 inch per 12 inches.

2.2 LONG-SPAN STEEL JOISTS

A Manufacture steel joists according to "Standard Specifications for Longspan Steel Joists, LH-Series and Deep Longspan Steel Joists, DLH-Series" in SJI's "Specifications," with steel-angle top- and bottom-chord members; of joist type and end and top-chord arrangements as indicated.
   1. Joist Type: LH-series and DLH-series steel joists, as noted on drawings.
   2. End arrangement: As noted on drawings.
   3. Top-chord Arrangement: As noted on drawings.

B Top-Chord Extensions: Extend top chords of joists with SJI's Type S top-chord extensions where indicated, complying with SJI's "Specifications." Design top chord extensions to resist the uniformly distributed loads indicated on the construction documents.

C Camber long-span steel joists according to SJI's "Specifications."

D Equip bearing ends of joists with manufacturer's standard beveled ends or sloped shoes if joist slope exceeds 1/4 inch per 12 inches.

2.3 PRIMERS

A Primer: SSPC-Paint 15, or manufacturer's standard shop primer complying with performance requirements in SSPC-Paint 15.

B Provide shop primer that complies with Section 099123 “Interior Painting.”

2.4 JOIST ACCESSORIES

A Bridging:
   1. Provide bridging anchors and number of rows of horizontal or diagonal bridging of material, size, and type required by SJI's "Specifications" for type of joist, chord size, spacing, and span. Furnish additional erection bridging if required for stability.
   2. Schematically indicated. Detail and fabricate according to SJI’s “Specifications.” Furnish additional erection bridging if required for stability.
   3. Farbicate as indicated on Drawings and according to SJI’s “Specifications.” Furnish additional erection bridging if required for stability.

B Fabricate steel bearing plates from ASTM A36/A36 M steel with integral anchorage of sizes and thicknesses indicated on Drawings. Shop prime paint.

C Steel bearing plates with integral anchorages are specified in Section 055000 Section "Metal Fabrications."

D Furnish ceiling extensions, either extended bottom-chord elements or a separate extension unit of enough strength to support ceiling construction. Extend ends to within 1/2 inch of finished wall surface, unless otherwise indicated.

E High-Strength Bolts, Nuts, and Washers: ASTM A 325, Type 1, heavy hex steel structural bolts; ASTM A 563 heavy hex carbon-steel nuts; and ASTM F 436 hardened carbon-steel washers.
   1. Finish: Plain.

F Welding Electrodes: Comply with AWS standards.

G Supply miscellaneous accessories, including splice plates and bolts required by joist manufacturer to complete joist assembly.

2.5 CLEANING AND SHOP PAINTING

A Clean and remove loose scale, heavy rust, and other foreign materials from fabricated joists and accessories by hand-tool cleaning, SSPC-SP 2 or power-tool cleaning, SSPC-SP 3.

B Apply one coat of shop primer to joists and joist accessories to be primed to provide a continuous, dry paint film not less than 1 mil thick.

C Shop priming of joists and joist accessories complies with Section 099123 “Interior Painting.”

PART 3 EXECUTION

3.1 EXAMINATION

A Examine supporting substrates, embedded bearing plates, and abutting structural framing for compliance with requirements for installation tolerances and other conditions affecting performance of the work.

B Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A Do not install joists until supporting construction is in place and secured.

B Install joists and accessories plumb, square, and true to line; securely fasten to supporting construction according to SJI's "Specifications," joist manufacturer's written recommendations, and requirements in this Section.

1. Before installation, splice joists delivered to Project site in more than one piece.
2. Space, adjust, and align joists accurately in location before permanently fastening.
3. Install temporary bracing and erection bridging, connections, and anchors to ensure that joists are stabilized during construction.
4. Do not rigidly connect bottom-chord extensions to columns or supports until dead loads are applied.

C Field weld joists to supporting steel bearing plates and framework. Coordinate welding sequence and procedure with placement of joists. Comply with AWS requirements and procedures for welding, appearance and quality of welds, and methods used in correcting welding work.

D Bolt joists to support steel framework using carbon-steel bolts.

E Bolt joists to supporting steel framework using high-strength structural bolts. Comply with RCSC’s “Specification for Structural Joints Using ASTM A325 or ASTM A490 Bolts” for high-strength structural bolt installation and tightening requirements.

F Install and connect bridging concurrently with joist erection before construction loads are applied. Anchor ends of bridging lines at top and bottom chords if terminating at walls or beams.

3.3 SPECIAL INSPECTIONS

A Owner will engage a qualified Special Inspector or Special Inspections Agency to perform tests and inspections.

B Where fabrication of structural load-bearing members and assemblies is being performed on the premises of the fabricators shop, special inspection of the fabricated item shall be performed.

1. Verify that the fabricator maintains detailed fabrication and quality control procedures that provide a basis for inspection control of the workmanship and that those procedures are being implemented. This inspection will provide a basis for determination of the fabricator’s ability to conform to approved drawings, project specifications, and referenced standards.
2. Exception: Special Inspections will not be required where the work is done on the premises of a fabricator registered and approved to perform such work without special inspection. Approval shall be based upon review of the fabricator’s written procedural and quality control manuals and periodic auditing of fabrication practices. At completion of fabrication, the fabricator shall submit a certificate of compliance stating that the work was performed in accordance with the approved construction documents.

C Visually inspect bolted connections.

D Verification and inspection of steel construction shall be in accordance with Chapter 17 of the 2018 North Carolina State Building Code, and as follows:
1. Welding: Welding inspection shall be in compliance with AWS D1.1. In addition to visual inspection, welds may be tested and inspected according to AWS D1.1 and the following inspection procedures, at Special Inspector's option:
   a. Liquid Penetrant Inspection: ASTM E 165.
   b. Magnetic Particle Inspection: ASTM E 709; performed on root pass and on finished weld. Cracks or zones of incomplete fusion or penetration will not be accepted.
   c. Ultrasonic Inspection: ASTM E 164.
   d. Radiographic Inspection: ASTM E 94.
2. Details: Perform periodic inspections of the erected steel joist framing to verify compliance with the details shown on the construction documents and approved shop drawings such as joist size and spacing, bearing, welds at seats and installation of bridging.

E Correct deficiencies in Work that test and inspection reports have indicated are not comply with special requirements.

F Prepare test and inspection reports.

G Additional testing performed to determine compliance of corrected work with specified requirements shall be at Contractor's expense.

3.4 REPAIRS AND PROTECTION

A Repair damaged galvanized coatings on galvanized items with galvanized repair paint according to ASTM A780/A780M and manufacturer's written instructions.

B Touchup Painting:
1. Immediately after installation, clean prepare, and prime or reprime field connections, rust spots, and abraded surfaces of prime-painted joists abutting structural steel, and accessories.
   a. Clean and prepare surfaces by SSPC-SP 2 hand-tool cleaning or SSPC-SP 3 power-tool cleaning.
   b. Apply a compatible primer of same type as primer used on adjacent surfaces.
2. Cleaning and touchup painting are specified in Section 099113 "Exterior Painting" and Section 099123 "Interior Painting".

C Provide final protection and maintain conditions, in a manner acceptable to manufacturer and Installer, that ensure that joists and accessories are without damage or deterioration at time of Substantial Completion.

END OF SECTION 05 21 00

SECTION 05 31 00 – STEEL DECKING

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. Roof deck.
- B Related Requirements:
  1. Section “Special Inspection Services” for administrative and procedural requirements for special inspection services.
  2. Section 051200 “Structural Steel Framing” for shop- and field-weld shear connectors.
  3. Section 099123 “Interior Painting” for repair painting of primed deck and finish painting of deck.

1.3 ACTION SUBMITTALS
- A Product Data: For each type of deck, accessory, and product indicated.
- B Shop Drawings:
  1. Include layout and types of deck panels, anchorage details, reinforcing channels, pans, cut deck openings, special jointing, accessories, and attachments to other construction.

1.4 INFORMATIONAL SUBMITTALS
- A Welding certificates.
- B Product Certificates: For each type of steel deck.

1.5 QUALITY ASSURANCE
- A Welding Qualifications: Qualify procedures and personnel according to AWS D1.3, "Structural Welding Code - Sheet Steel.”
- B AISI Specifications: Comply with calculated structural characteristics of steel deck in accordance with AISI S100.
- C FM Global Listing: Provide steel roof deck evaluated by FM Global and listed in its “Approval Guide, Building Materials” for Class 1 fire rating and Class 1-90 windstorm ratings.

1.6 DELIVERY, STORAGE, AND HANDLING
- A Protect steel deck from corrosion, deformation, and other damage during delivery, storage, and handling.
- B Store products in accordance with SDI MOC3. Stack steel deck on platforms or pallets and slope to provide drainage. Protect with a waterproof covering and ventilate to avoid condensation.
  1. Protect and ventilate acoustical cellular roof deck with factory-installed insulation to maintain insulation free of moisture.

1.7 PERFORMANCE REQUIREMENTS
- A AISI Specifications: Comply with calculated structural characteristics of steel deck according to AISI’s “North American Specification for the Design of Cold-Formed Steel Structural Members.”
- B Steel roof deck shall be capable of resisting the following loads:
  1. Allowable total load: 80 PSF, minimum with 5’-6” span for 1-1/2” deck and 65 PSF minimum with 10’-0” span for 3” deck.
- C Fire-Resistance Ratings: Comply with ASTM E 119; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
  1. Indicate design designations from UL's "Fire Resistance Directory" or from the listings of another qualified testing agency.

PART 2 PRODUCTS

2.1 TYPE B ROOF DECK

A Steel Roof Deck: Fabricate panels, without top-flange stiffening grooves, to comply with “SDI Specifications and Commentary for Steel Roof Deck,” in SDI Publication No. 31, and with the following:

1. Prime-Painted Steel Sheet: ASTM A1008/ASTM A 1008M, Structural Steel (SS), Grade 50 minimum, shop primed with manufacturer’s standard baked-on, rust inhibitive primer.
2. Deck Profile: Type B.
3. Profile Depth: 1-1/2 inches.
4. Design Uncoated-Steel Thickness: As indicated on Drawings.
5. Span Condition: Triple span or more.
6. Side Laps: Overlapped.

2.2 TYPE N ROOF DECK

A Steel Roof Deck: Fabricate panels, without top-flange stiffening grooves, to comply with “SDI Specifications and Commentary for Steel Roof Deck,” in SDI Publication No. 31, and with the following:

1. Prime-Painted Steel Sheet: ASTM A1008/ASTM A 1008M, Structural Steel (SS), Grade 50 minimum, shop primed with manufacturer’s standard baked-on, rust inhibitive primer.
2. Deck Profile: Type N.
3. Profile Depth: 3 inches.
4. Design Uncoated-Steel Thickness: As indicated on Drawings.
5. Span Condition: Triple span or more.
6. Side Laps: Overlapped.

2.3 ACCESSORIES

A General: Provide manufacturer's standard accessory materials for deck that comply with requirements indicated.

B Mechanical Fasteners: Corrosion-resistant, low-velocity, power-actuated or pneumatically driven carbon-steel fasteners; or self-drilling, self-threading screws.

C Side-Lap Fasteners: Corrosion-resistant, hexagonal washer head; self-drilling, carbon-steel screws, No. 10 minimum diameter.

D Miscellaneous Sheet Metal Deck Accessories: Steel sheet, minimum yield strength of 33,000 psi, not less than 0.0359-inch design uncoated thickness, of same material and finish as deck; of profile indicated or required for application.

E Pour Stops and Girder Fillers: Steel sheet, minimum yield strength of 33,000 psi, of same material and finish as deck, and of thickness and profile indicated.

F Column Closures, End Closures, Z-Closures, and Cover Plates: Steel sheet, of same material, finish, and thickness as deck, unless otherwise indicated.

G Flat Sump Plate: Single-piece steel sheet, 0.0747 inch thick, of same material and finish as deck. For drains, cut holes in the field.

H Galvanizing Repair Paint: ASTM A 780.

PART 3 EXECUTION

3.1 EXAMINATION

A Examine supporting frame and field conditions for compliance with requirements for installation tolerances and other conditions affecting performance.

B Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION, GENERAL

A Install deck panels and accessories according to applicable specifications and commentary in SDI Publication No. 31, manufacturer's written instructions, and requirements in this Section.

B Install temporary shoring before placing deck panels, if required to meet deflection limitations.

C Locate deck bundles to prevent overloading of supporting members.
D Place deck panels on supporting frame and adjust to final position with ends accurately aligned and bearing on supporting frame before being permanently fastened. Do not stretch or contract side-lap interlocks.
E Align cellular deck panels over full length of cell runs and align cells at ends of abutting panels.
F Place deck panels flat and square and fasten to supporting frame without warp or deflection.
G Cut and neatly fit deck panels and accessories around openings and other work projecting through or adjacent to deck.
H Provide additional reinforcement and closure pieces at openings as required for strength, continuity of deck, and support of other work.
I Comply with AWS requirements and procedures for manual shielded metal arc welding, appearance and quality of welds, and methods used for correcting welding work.
J Shear Stud Connectors: Prepare steel surfaces as recommended by manufacturer of shear connectors. Weld using end welding of headed-stud shear connectors in accordance with AWS D1.1 and manufacturer's written instructions.

3.3 ROOF-DECK INSTALLATION

A Fasten roof-deck panels to steel supporting members by arc spot (puddle) welds of the surface diameter indicated or arc seam welds with an equal perimeter that is not less than 1-1/2 inches long, and as follows:
1. Weld Diameter: 5/8 inch, nominal.
2. Weld Spacing: As indicated on drawings.

B Side-Lap and Perimeter Edge Fastening: Fasten side laps and perimeter edges of panels between supports, at intervals indicated, and as follows:
1. Mechanically fasten side laps with self-drilling, No. 10 diameter or larger, carbon-steel screws.
2. Spacing: As indicated on Drawings.

C End Bearing: Install deck ends over supporting frame with a minimum end bearing of 1-1/2 inches, with end joints as follows:
1. End Joints: Lapped 2 inches minimum.

D Roof Sump Pans and Sump Plates: Install over openings provided in roof deck and weld flanges to top of deck. Space welds not more than 12 inches apart with at least one weld at each corner.
1. Install reinforcing channels or zees in ribs to span between supports and weld.

E Miscellaneous Roof-Deck Accessories: Install ridge and valley plates, finish strips, end closures, and reinforcing channels according to deck manufacturer's written instructions. Weld to substrate to provide a complete deck installation.
1. Weld cover plates at changes in direction of roof-deck panels, unless otherwise indicated.

3.4 SPECIAL INSPECTIONS

A Special Inspections and tests shall be performed by the Special Inspector or Special Inspection Agency.

B Verification and inspection of metal deck construction shall be in accordance with the Schedule of Special Inspections, Section 1705.2 of the 2018 North Carolina State Building Code, and as follows:
1. Welding: Welding inspection shall be in compliance with AWS D1.3.
2. Details: Perform periodic inspections of the installed steel decking to verify compliance with the details shown on the construction documents and approved shop drawings such as deck layout, gage, bearing, side laps, end laps and quantity and spacing of welds and screws.

C Correct deficiencies in Work that test reports and inspections indicate does not comply with the Contract Documents.
D Remove and replace work that does not comply with specified requirements.
E Additional inspecting, at Contractor's expense, will be performed to determine compliance of corrected work with specified requirements.

3.5 REPAIRS AND PROTECTION

A Galvanizing Repairs: Prepare and repair damaged galvanized coatings on both surfaces of deck with galvanized repair paint according to ASTM A 780 and manufacturer's written instructions.

B Provide final protection and maintain conditions to ensure that steel deck is without damage or deterioration at time of Substantial Completion.

END OF SECTION 05 31 00

SECTION 05 40 00 - COLD-FORMED METAL FRAMING

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. All exterior non-load-bearing wall framing that receives lateral wind loading and gravity and lateral wind loading from windows, louvers, doors and other openings; including roof parapet wall stud.
2. Exterior soffit and ceiling framing receiving wind load.

B Related Requirements:

1. Section 092116.23 "Gypsum Board Shaft Wall Assemblies" for interior non-load-bearing, metal-stud-framed, shaft-wall assemblies.
2. Section 092216 "Non-Structural Metal Framing" for interior non-load-bearing, metal-stud framing and ceiling-suspension assemblies.

C The Owner will engage an independent testing and inspection agency to perform tests and inspections, and verify the adequacy of the Contractor's quality control; refer to Section 01 40 00 "Quality Requirements." Before concealing the cold-formed metal framing work, obtain the required inspections from a representative of the Owner's independent testing and inspection agency.

1.3 ACTION SUBMITTALS

A Product Data: For each type of cold-formed steel framing product and accessory.

B Shop Drawings:

1. Include layout, spacings, sizes, thicknesses, and types of cold-formed steel framing; fabrication; and fastening and anchorage details, including mechanical fasteners.
2. Indicate reinforcing channels, opening framing, supplemental framing, strapping, bracing, bridging, splices, accessories, connection details, and attachment to adjoining work.

C Delegated Design:

1. For cold-formed metal framing indicated to comply with design loads, include shop drawings and structural analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

1.4 INFORMATIONAL SUBMITTALS

A Welding certificates.

B Product Certificates: For each type of code-compliance certification for studs and tracks.

C Product Test Reports: For each listed product, for tests performed by manufacturer and witnessed by a qualified testing agency.

1. Steel sheet.
2. Expansion anchors.
3. Power-actuated anchors.
4. Mechanical fasteners.
5. Vertical deflection clips.
6. Horizontal drift deflection clips.
7. Miscellaneous structural clips and accessories.

1.5 QUALITY ASSURANCE

A Engineering Responsibility: Preparation of Shop Drawings, design calculations, and other structural data by a qualified professional engineer.

B 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 cold-formed metal framing that are similar to those indicated for this Project in material, design, and extent.

C Installer Qualifications: Engage an experienced installer who has completed cold-formed metal framing on a minimum of three projects similar in material, design, and extent to that indicated for this Project in the last 10 years that have a record of successful in-service performance.

D Product Tests: Mill certificates, signed by manufacturer, or data from a qualified independent testing agency, or in-house testing with calibrated test equipment, indicating steel sheet complies with requirements, including base-metal thickness, yield strength, tensile strength, total elongation, chemical requirements, and metallic-coating thickness.

E Welding Qualifications: Qualify procedures and personnel according to the following:
1. AWS D1.1/D1.1M, "Structural Welding Code - Steel."
2. AWS D1.3/D1.3M, "Structural Welding Code - Sheet Steel."

F AISI Specifications and Standards: Comply with AISI's "North American Specification for the Design of Cold-Formed Steel Structural Members" and its "Standard for Cold-Formed Steel Framing - General Provisions."
1. Comply with AISI's "Standard for Cold-Formed Steel Framing - Header Design."

1.6 DELIVERY, STORAGE, AND HANDLING

A Protect cold-formed steel framing from corrosion, moisture staining, deformation, and other damage during delivery, storage, and handling.

1.7 PERFORMANCE REQUIREMENTS

A Delegated Design: Engage a qualified professional engineer, as defined in Section 014000 “Quality Requirements,” to design cold-formed steel framing.

B Structural Performance: Provide cold-formed metal framing capable of withstanding design loads within limits and under conditions indicated.
1. Design Loads: As indicated on Drawings.
2. Deflection Limits: Design framing systems to withstand design loads without deflections greater than the following:
   a. Exterior Non-Load-Bearing Framing, unless otherwise noted: Horizontal deflection of 1/360 of the wall height.
   b. Exterior Non-Load-Bearing Framing, supporting masonry veneer: Horizontal deflection of 1/600 of the wall height.
3. Design framing systems to provide for movement of framing members without damage or overstressing, sheathing failure, connection failure, undue strain on fasteners and anchors, or other detrimental effects when subject to a maximum ambient temperature change of 120 deg F.
4. Design framing system to maintain clearances at openings, to allow for construction tolerances, and to accommodate live load deflection of primary building structure as follows:
   a. Upward and downward movement of 3/4 inch.
5. Design exterior non-load-bearing wall framing to accommodate horizontal deflection without regard for contribution of sheathing materials.
6. Building Frame Movement: Design, fabricate and install cold formed metal framing to withstand building movements including thermal movements, loading deflections, shrinkage, creep and similar movements. Thermal movements shall be as specified above. Building frame deflections, shrinkage, creep and other movements are available from the structural engineer.

C Cold-Formed Steel Framing, General: Design according to AISI's "Standard for Cold-Formed Steel Framing - General Provisions."
1. Wall Studs: AISI S211.
2. Headers: AISI S212.
3. Lateral Design: AISI S213.

D AISI Specifications and Standards: Unless more stringent requirements are indicated, comply with AISI S100 and AISI S200.

PART 2 PRODUCTS

2.1 COLD-FORMED STEEL FRAMING, GENERAL

A Steel Sheet: ASTM A 1003/A 1003M, Structural Grade, Type H, metallic coated, of grade and coating weight as follows:
1. Grade: As required by structural performance.
2. Coating: G60.
   a. Use G90 as indicated for exterior exposed studs.

B Steel Sheet for Vertical Deflection Clips: ASTM A 653/A 653M, structural steel, zinc coated, of grade and coating as follows:
1. Grade: 50, Class 1 or 2.
2. Coating: G90,

2.2 EXTERIOR NON-LOAD-BEARING WALL FRAMING

A Steel Studs: Manufacturer's standard C-shaped steel studs, of web depths indicated, punched, with stiffened flanges, and as follows:
1. Minimum Base-Metal Thickness: 0.0428 inch.
2. Flange Width: 1-5/8 inches.

B Steel Track: Manufacturer's standard U-shaped steel track, of web depths indicated, unpunched, with unstiffened flanges, and as follows:
1. Minimum Base-Metal Thickness: 0.0428 inch, but not less than stud thickness.
2. Flange Width: 1-1/4 inches.

C Vertical Deflection Clips: Manufacturer's standard bypass clips, capable of accommodating upward and downward vertical displacement of primary structure through positive mechanical attachment to stud web.

D Single Deflection Track: Manufacturer's single, deep-leg, U-shaped steel track; unpunched, with unstiffened flanges, of web depth to contain studs while allowing free vertical movement, with flanges designed to support horizontal loads and transfer them to the primary structure, and as follows:
1. Minimum Base-Metal Thickness: 0.0428 inch.
2. Flange Width: 1 inch plus the design gap for one-story structures and 1 inch plus twice the design gap for other applications.

2.3 SOFFIT FRAMING

A Exterior Soffit Frame: Manufacturer's standard C-shaped steel sections, of web depths indicated, with stiffened flanges, and as follows:
1. Minimum Base-Metal Thickness: 0.0428 inch.
2. Flange Width: 1-5/8 inches, minimum.

B Steel Track: Manufacturer's standard U-shaped steel track, of web depths indicated, unpunched, with unstiffened flanges, and as follows:
1. Minimum Base-Metal Thickness: 0.0428 inch , but not less than stud thickness.
2. Flange Width: 1-1/4 inches, minimum.

2.4 INTERIOR SUSPENDED OVERHEAD FRAMING

A Members: Manufacturer's standard C-shaped steel sections, of web depths indicated, with stiffened flanges, and as follows:
1. Minimum Base-Metal Thickness: 0.0329 inch.
2. Flange Width: 1-5/8 inches, minimum.

2.5 FRAMING ACCESSORIES

A Fabricate steel-framing accessories from steel sheet, ASTM A 1003/A 1003M, Structural Grade, Type H, metallic coated, of same grade and coating weight used for framing members.

B Provide accessories of manufacturer's standard thickness and configuration, unless otherwise indicated, as follows:
1. Supplementary framing.
2. Bracing, bridging, and solid blocking.
3. Web stiffeners.
4. Anchor clips.
5. End clips.
6. Foundation clips.
7. Stud kickers, knee braces, and girts.
8. Hole reinforcing plates.
9. Backer plates.

2.6 ANCHORS, CLIPS, AND FASTENERS

A Steel Shapes and Clips: ASTM A 36/A 36M, zinc coated by hot-dip process according to ASTM A 123/A 123M.

B Anchor Bolts: ASTM F 1554, Grade 36 threaded carbon-steel hex-headed bolts, and carbon-steel nuts; and flat, hardened-steel washers; zinc coated by hot-dip process according to ASTM A 153, Class C.

C Expansion Anchors: Fabricated from corrosion-resistant materials, with capability to sustain, without failure, a load equal to 5 times design load, as determined by testing per ASTM E 488 conducted by a qualified independent testing agency.

D Power-Actuated Anchors: Fastener system of type suitable for application indicated, fabricated from corrosion-resistant materials, with capability to sustain, without failure, a load equal to 10 times design load, as determined by testing per ASTM E 1190 conducted by a qualified independent testing agency.

E Mechanical Fasteners: ASTM C 1513, corrosion-resistant-coated, self-drilling, self-tapping steel drill screws.
1. Head Type: Low-profile head beneath sheathing, manufacturer's standard elsewhere.

F Welding Electrodes: Comply with AWS standards.

2.7 MISCELLANEOUS MATERIALS

A Galvanizing Repair Paint: ASTM A 780.

2.8 FABRICATION

A Fabricate cold-formed metal framing and accessories plumb, square, and true to line, and with connections securely fastened, according to referenced AISI's specifications and standards, manufacturer's written instructions, and requirements in this Section.
1. Fabricate framing assemblies using jigs or templates.
2. Cut framing members by sawing or shearing; do not torch cut.
3. Fasten cold-formed metal framing members by screw fastening. Wire tying of framing members is not permitted.
   a. Comply with AWS D1.3/D1.3M requirements and procedures for welding, appearance and quality of welds, and methods used in correcting welding work.
   b. Locate mechanical fasteners and install according to Shop Drawings, with screw penetrating joined members by no fewer than three exposed screw threads.
4. Fasten other materials to cold-formed metal framing by screw fastening, according to Shop Drawings.

B Reinforce, stiffen, and brace framing assemblies to withstand handling, delivery, and erection stresses. Lift fabricated assemblies to prevent damage or permanent distortion.

C Fabrication Tolerances: Fabricate assemblies level, plumb, and true to line to a maximum allowable tolerance variation of 1/8 inch in 10 feet and as follows:
1. Spacing: Space individual framing members no more than plus or minus 1/8 inch from plan location. Cumulative error shall not exceed minimum fastening requirements of sheathing or other finishing materials.

2. Squareness: Fabricate each cold-formed metal framing assembly to a maximum out-of-square tolerance of 1/8 inch.

PART 3 EXECUTION

3.1 EXAMINATION

A Examine supporting substrates and abutting structural framing for compliance with requirements for installation tolerances and other conditions affecting performance.
1. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A Before sprayed fire-resistive materials are applied, attach continuous angles, supplementary framing, or tracks to structural members indicated to receive sprayed fire-resistive materials.

B After applying sprayed fire-resistive materials, remove only as much of these materials as needed to complete installation of cold-formed framing without reducing thickness of fire-resistive materials below that required to obtain fire-resistance rating indicated. Protect remaining fire-resistive materials from damage.

3.3 INSTALLATION, GENERAL

A Cold-formed metal framing may be shop or field fabricated for installation, or it may be field assembled.

B Install cold-formed steel framing according to AISI S200 and to manufacturer's written instructions unless more stringent requirements are indicated.

C Install shop- or field-fabricated, cold-formed framing and securely anchor to supporting structure.
1. Screw wall panels at horizontal and vertical junctures to produce flush, even, true-to-line joints with maximum variation in plane and true position between fabricated panels not exceeding 1/16 inch.

D Install cold-formed metal framing and accessories plumb, square, and true to line, and with connections securely fastened.
1. Cut framing members by sawing or shearing; do not torch cut.
2. Fasten cold-formed metal framing members by screw fastening. Wire tying of framing members is not permitted.
a. Locate mechanical fasteners and install according to Shop Drawings, and complying with requirements for spacing, edge distances, and screw penetration.
b. Comply with AWS D1.3/D1.3M requirements and procedures for welding, appearance and quality of welds, and methods used in correcting welding work.

E Install framing members in one-piece lengths unless splice connections are indicated for track or tension members.

F Install temporary bracing and supports to secure framing and support loads comparable in intensity to those for which structure was designed. Maintain braces and supports in place, undisturbed, until entire integrated supporting structure has been completed and permanent connections to framing are secured.

G Do not bridge building expansion and control joints with cold-formed metal framing. Independently frame both sides of joints.

H Install insulation, specified in Division 07 Section "Thermal Insulation," in built-up exterior framing members, such as headers, sills, boxed joists, and multiple studs at openings, that are inaccessible on completion of framing work.

I Fasten hole reinforcing plate over web penetrations that exceed size of manufacturer's standard punched openings.

J Erection Tolerances: Install cold-formed metal framing level, plumb, and true to line to a maximum allowable tolerance variation of 1/8 inch in 10 feet and as follows:
1. Space individual framing members no more than plus or minus 1/8 inch from plan location. Cumulative error shall not exceed minimum fastening requirements of sheathing or other finishing materials.

3.4 EXTERIOR NON-LOAD-BEARING WALL INSTALLATION

A Install continuous tracks sized to match studs. Align tracks accurately and securely anchor to supporting structure as indicated.

B Fasten both flanges of studs to bottom track, unless otherwise indicated. Space studs as follows:

1. Stud Spacing: 16 inches, maximum. Stud Spacing: 16 inches, maximum. Smaller spacings may be used to meet loading requirements.

C Set studs plumb, except as needed for diagonal bracing or required for nonplumb walls or warped surfaces and similar requirements.

D Isolate non-load-bearing steel framing from building structure to prevent transfer of vertical loads while providing lateral support.

1. Connect vertical deflection clips to bypassing studs and anchor to building structure.

E Install horizontal bridging in wall studs, spaced in rows indicated on Shop Drawings but not more than 48 inches apart. Fasten at each stud intersection.

1. Bridging: Cold-rolled steel channel, welded or mechanically fastened to webs of punched studs.
2. Bridging: Proprietary bridging bars installed according to manufacturer's written instructions.

F Install miscellaneous framing and connections, including stud kickers, web stiffeners, clip angles, continuous angles, anchors, fasteners, and stud girts, to provide a complete and stable wall-framing system.

3.5 FIELD QUALLY CONTROL

A The Owner will engage an independent testing and inspection agency to verify the adequacy of the Contractor's quality control; refer to Section 01 40 00 "Quality Requirements." Before concealing the cold-formed metal framing work, obtain the required inspections of same from a representative of the Owner's independent testing and inspection agency.

B Field and shop welds will be subject to testing and inspecting.

C Special Inspector will report test results promptly and in writing to Contractor and Architect.

D Cold-formed steel framing will be considered defective if it does not pass tests and inspections.

E Remove and replace work that does not comply with specified requirements.

F Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.

3.6 REPAIRS AND PROTECTION

A Galvanizing Repairs: Prepare and repair damaged galvanized coatings on fabricated and installed cold-formed metal framing with galvanized repair paint according to ASTM A 780 and manufacturer's written instructions.

B Provide final protection and maintain conditions, in a manner acceptable to manufacturer and Installer, that ensure that cold-formed metal framing is without damage or deterioration at time of Substantial Completion.

END OF SECTION 05 40 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. Including the following:
   a. Bollards.
2. Steel framing and supports for applications where framing and supports are not specified in other Specification Sections.
3. Supplementary components and accessories normally furnished or otherwise necessary for a complete installation.

B Related Requirements:

1. Section 05 51 33 Metal Ladders.

### 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, including personal ladder fall-arrest system if ladders are fabricated in lieu of providing manufactured ladders.
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.
3. Delegated Design Submittals: For fabricated ladders and their attachments to the building, 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: Certification that welders to be employed for the Project have satisfactorily passed AWS qualification tests. Certifications shall be current within last 12 months.
3. Paint Compatibility Certificates: From manufacturers of topcoats applied over shop primers, certifying that shop primers are compatible with topcoats.
4. 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 Delegated Design: Engage a qualified professional engineer licensed in the state of North Carolina to design fabricated steel ladders and their attachments to the building.
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 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 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.

2.6 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.

2.7 BOLLARDS

A Fabricate metal bollards from Schedule 80 steel pipe.

1. Prime steel bollards with primer specified in Section 09 91 13 Exterior Painting.

2.8 FABRICATED STEEL LADDERS

A General:

1. At Contractor’s option, delegated-design ladders and their attachments to the structure may be provided in lieu of manufactured ladders as specified in Section 05 51 33 Metal Ladders.
2. Comply with ANSI A14.3.

B Fixed Steel Wall Ladders:

1. Space siderails 16 inches apart unless otherwise indicated.
2. Siderails: Continuous, 3/8-by-2-1/2-inch steel flat bars, with eased edges.
3. Rungs: At least 3/4-inch-diameter, steel bars.
4. Fit rungs in centerline of siderails; plug-weld and grind smooth on outer rail faces.
5. Provide nonslip surfaces on top of each rung, either by coating rung with aluminum-oxide granules set in epoxy-resin adhesive, or by using a type of manufactured rung filled with aluminum-oxide grout or with abrasive material metallically bonded to the rung.
   a. Source Limitations: Obtain nonslip surfaces from single source from the same manufacturer.
6. Support each ladder at top and bottom and not more than 60 inches on center with welded or bolted steel brackets.
7. Galvanize and prime ladders, including brackets.

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 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.

3.3 INSTALLATION OF METAL BOLLARDS

A Provide one of the following as selected by the Architect:

1. Bollards with Metal Caps: Fill bollards solidly with concrete and allow concrete to cure 7 days before installing.
2. Bollards without Metal Caps: Fill bolalrds solidly with concrete, mounding top surface to shed water.

B Install bollards by one of the following methods as indicated on the Drawings.

1. Anchor bollards to existing construction with anchor or through bolts. Provide four, 3/4-inch bolts at each bollard unless otherwise indicated.
   a. Embed anchor bolts at least 4 inches in concrete.
2. Anchor bollards in concrete with pipe sleeves preset and anchored into concrete. Fill annular space around bollard solidly with shrinkage-resistant grout; mixed and placed to comply with grout manufacturer's written instructions. Slope grout up approximately 1/8 inch toward bollard.
3. Anchor bollards in concrete in formed or core-drilled holes not less than 42 inches deep and 3/4 inch larger than outside diameter of bollard. Fill annular space around bollard solidly with shrinkage-resistant grout; mixed and placed to comply with grout manufacturer's written instructions. Slope grout up approximately 1/8 inch toward bollard.

3.4 INSTALLATION OF FABRICATED METAL LADDERS

A Secure ladders to adjacent construction with the clip angles attached to the stringer.

B Install brackets as required for securing of ladders welded or bolted to structural steel or built into masonry or concrete.

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

# 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.
2. Supplementary components and accessories normally furnished or otherwise necessary for a complete installation.

### 1.3 REFERENCES

A Definitions:

1. Manufacturer: Means the metal 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 ROOF ACCESS LADDERS

A Manufacturers: Subject to compliance with the Contract Documents, provide products by one of the following.

1. Kattsafe (formerly FIXFAST USA).
2. O'Keefe's, Inc.
3. Precision Ladders.

B Aluminum Ladders:

1. Configuration: Fixed wall-mounted ladders as indicated on the Drawings.
2. Siderails: Continuous extruded-aluminum channels or tubes, not less than 2-1/2 inches deep, 3/4 inch wide, and 1/8 inch thick.
   a. Space siderails at least 18 inches apart unless otherwise indicated.

3. Rungs: Extruded-aluminum tubes, not less than 3/4 inch deep and not less than 1/8 inch thick, with ribbed tread surfaces.
   a. Fit rungs in centerline of siderails; fasten by welding or with stainless steel fasteners or brackets and aluminum rivets.
4. Support each ladder at top and bottom and not more than 60 inches on center with welded or bolted aluminum brackets, unless otherwise indicated in accordance with manufacturer’s written installation instructions.
5. Finish: Mill finish.

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.

2.4 FABRICATED LADDERS, ALTERNATE

A Fabricated Ladders: Galvanized steel ladders designed and fabricated in conformance with the requirements of Section 05 50 00 Metal Fabrications may be provided in lieu of the specified manufactured metal ladders.

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 metal ladders indicates acceptance of surfaces and conditions.

3.2 INSTALLATION

A Install in accordance with manufacturer's instructions, cited standards, and in proper relationship with adjacent construction.

3.3 REPAIR

A Touch-up, repair, or replace damaged products before Substantial Completion.

END OF SECTION 05 51 33

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: AWPA 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. Supplementary components and accessories normally furnished or otherwise necessary for a complete installation.

1.3 REFERENCES
A Acronyms and Abbreviations:
1. GA: Gypsum Association.
B Definitions:
1. Manufacturer: Means the sheathing manufacturer unless otherwise indicated.

1.4 SUBMITTALS
A Action Submittals:
1. Product Data: For each type of product. Include the following.
a. Indicate component materials and dimensions and include construction and application details.
b. Current Health Product Declaration.
c. Current Environmental Product Declaration.

1.5 DELIVERY, STORAGE, AND HANDLING
A Stack panels flat with spacers 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 WALL SHEATHING
A Glass-Mat Gypsum Sheathing, Walls: ASTM C 1177/C 1177M.
1. Products: Subject to compliance with the Contract Documents, provide one of the following.
a. “GlasRoc Sheathing Type X” manufactured by CertainTeed.
b. “Gold Bond eXP Fire-Shield Sheathing” manufactured by National Gypsum Company.
c. “Securock Glass-Mat Sheathing” manufactured by USG Corporation.
2. Type and Thickness: Type X, 5/8 inch thick.
3. Size: At least 48 by 96 inches.

2.2 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 A 153/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 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 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

# 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. Reception desk.
2. Vanity aprons.
3. 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 the following:
   a. Composite wood products.
   b. 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 RECEPTION DESK

A Reception Desk:

1. Core: Fabricator's option for material that complies with referenced quality standard or as indicated on the Drawings.
2. 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 Corporation.
   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) Panolam Industries International, Inc. (Nevamar)
      2) Wilsonart LLC.
3. Countertops: As indicated in the Finish Material Schedule on the Drawings.
4. Furring, Blocking, Shims, and Nailers: As specified in Section 06 10 53 Miscellaneous Rough Carpentry.
5. 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 Corporation.
   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) Panolam Industries International, Inc. (Nevamar)
      2) Wilsonart LLC.
4. Thickness and Dimensions: As indicated on the Drawings.

2.4 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.

1. Wood Moisture Content: 5 to 10 percent.

B Composite Wood Products: Provide materials that comply with requirements of referenced quality standard for each type of architectural woodwork fabrication and quality grade specified unless otherwise indicated.

2.5 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.

2.6 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

# 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 Product: 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. Formica Corporation.
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. Panolam Industries International, Inc. (Nevamar)
b. Wilsonart LLC.
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 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, a Carlisle 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 Protection Course: ASTM D 6506, semirigid sheets of fiberglass or mineral-reinforced-asphaltic core, pressure laminated between 2 asphalt-saturated fibrous liners.

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

2.5 MOLDED-SHEET DRAINAGE PANELS

A Nonwoven-Geotextile-Faced, Molded-Sheet Drainage Panel: Composite subsurface drainage panel acceptable to dampproofing manufacturer and consisting of a studded, nonbiodegradable, molded-plastic-sheet drainage core; with a nonwoven, needle-punched geotextile facing with an apparent opening size not exceeding No. 70 sieve laminated to one side of the core, with or without a polymeric film bonded to the other side; and with a vertical flow rate through the core of 9 to 21 gpm per ft.

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 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.

3.5 INSTALLATION OF PROTECTION COURSE

A Install protection course over completed-and-cured dampproofing. Comply with dampproofing-material and protection-course manufacturers' written instructions for attaching protection course.

1. Install protection course on same day or within 24 hours of dampproofing installation (while coating is tacky) in accordance with the manufacturer’s installation instructions to ensure adhesion.

3.6 INSTALLATION OF DRAINAGE PANELS

A Molded-Sheet Drainage Panels: Install panels, with geotextile facing away from wall substrate, according to manufacturer's written instructions. Use adhesive or another method that does not penetrate dampproofing. Lap edges and ends of geotextile to maintain continuity. Protect installed molded-sheet drainage panels during subsequent construction.

3.7 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. Mineral-wool board insulation.
  2. Glass-fiber blanket insulation.
  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. SCAQMD: South Coast Air Quality Management District.
  3. VOC: Volatile Organic Compound.
- B Definitions:
  1. Manufacturer: Means the applicable 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. Indicate VOC content for adhesive.
- 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 Mineral Wool and Glass-Fiber 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 unless installer is providing certification specified in “Informational Submittals” Article.
- C Thermal-Resistance Value (R-Value): R-value as indicated on Drawings in accordance with ASTM C 518.

2.2 MINERAL-WOOL INSULATION
- A Mineral Wool Board Insulation: ASTM C 612, Type IVB; unfaced.
  1. Basis-of-Design Product: Subject to compliance with the Contract Documents, the design is based on the following:

a. "Cavityrock" as manufactured by ROCKWOOL.
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. Johns Manville.
b. Owens Corning.

B Nominal Density: Greater than 4.3 lb/cu. ft; density will vary based on thickness.
C Thickness: As indicated on the Drawings and as necessary to achieve required R-value.

2.3 GLASS-FIBER BLANKET INSULATION
A Manufacturers: Subject to compliance with the Contract Documents, provide basis-of-design product, or comparable products by one of the following:
1. Johns Manville.
2. Knauf
3. Owens Corning.
B Glass-Fiber Blanket Insulation, Unfaced: ASTM C 665, Type I; passing ASTM E 136 for combustion characteristics.

2.4 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 CAVITY-WALL INSULATION
A Mineral-Wool Board Insulation: Install insulation fasteners 4 inches from each corner of board insulation, at center of board, and as recommended by manufacturer.
1. Fit courses of insulation between masonry wall ties and other obstructions, with edges butted tightly in both directions, and with faces flush.
2. Press units firmly against inside substrates.
B Miscellaneous Voids: Install insulation in miscellaneous voids and cavity spaces where required to prevent gaps in insulation.

3.4 INSTALLATION OF INSULATION IN FRAMED CONSTRUCTION
A Blanket 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 using the following materials:

1. Glass-Fiber Insulation: Compact to approximately 40 percent of normal maximum volume equaling a density of approximately 2.5 lb/cu. ft.

3.5 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

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SECTION 07 27 26 - FLUID-APPLIED MEMBRANE AIR BARRIERS

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. Vapor permeable air barrier.
2. Supplementary components and accessories normally furnished or otherwise necessary for a complete installation.

1.3 REFERENCES

A Acronyms and Abbreviations:

1. ABAA: Air Barrier Association of America.

B Definitions:

1. Air-Barrier Accessory: A transitional component of the air barrier that provides continuity.
2. Air-Barrier Assembly: The collection of air-barrier materials and accessories applied to an opaque wall, including joints and junctions to abutting construction, to control air movement through the wall.
3. Air-Barrier Material: A primary element that provides a continuous barrier to the movement of air.
4. Manufacturer: Means the air barrier material assembly manufacturer unless otherwise indicated.

1.4 SUBMITTALS

A Action Submittals:

1. Product Data: Include manufacturer's written instructions for evaluating, preparing, and treating each substrate; technical data; dry film thickness; and tested physical and performance properties of products. Include Health Product Declaration and Environmental Product Declaration.
2. Shop Drawings: For air-barrier assemblies.
   a. Show locations and extent of air-barrier materials, accessories, and assemblies specific to Project conditions.
   b. Include details for substrate joints and cracks, counterflashing strips, penetrations, inside and outside corners, terminations, and tie-ins with adjoining construction.
   c. Include details of interfaces with other materials that form part of air barrier.

B Informational Submittals:

1. Qualification Data: For installer. Include list of ABAA-certified installers and supervisors employed by Installer, who work on Project.
2. Product Certificates: From air-barrier manufacturer, certifying compatibility of air barriers and accessory materials with Project materials that connect to or that come in contact with the barrier.
3. Product Test Reports: For each air-barrier assembly, for tests performed by a qualified testing agency.
4. Field quality-control reports.

1.5 QUALITY ASSURANCE

A Installer Qualifications: An entity that employs experienced installers and supervisors who are acceptable to the manufacturer.

1. Installer to be licensed by ABAA in accordance with ABAA's Quality Assurance Program and to employ ABAA-certified installers and supervisors on Project.

1.6 DELIVERY, STORAGE, AND HANDLING

A Remove and replace liquid materials that cannot be applied within their stated shelf life.

B Protect stored materials from direct sunlight.

1.7 FIELD CONDITIONS

A Environmental Limitations: Apply air barrier within the range of ambient and substrate temperatures recommended in writing by the manufacturer.

1. Protect substrates from environmental conditions that affect air-barrier performance.
2. Do not apply air barrier to a damp or wet substrate or during snow, rain, fog, or mist.

PART 2 PRODUCTS

2.1 SOURCE LIMITATIONS

A Obtain primary air-barrier materials and air-barrier accessories from single manufacturer.

2.2 PERFORMANCE REQUIREMENTS

A Air-Barrier Performance: Air-barrier assembly and seals with adjacent construction to be capable of performing as a continuous air barrier. Air-barrier assemblies to be capable of accommodating substrate movement and of sealing substrate expansion and control joints, construction material changes, penetrations, tie-ins to installed waterproofing, and transitions at perimeter conditions without deterioration and air leakage exceeding specified limits.

B Air-Barrier Assembly Air Leakage: No more than 0.04 cfm/sq. ft. of surface area at 1.57 lbf/sq. ft., when tested in accordance with ASTM E 2357.

C Air Permeance: No more than 0.004 cfm/sq. ft. of surface area at 1.57 lbf/sq. ft. pressure difference; ASTM E 2178.

D Ultimate Elongation: At least 250 percent; ASTM D 412, Die C.

E UV Resistance: Can be exposed to sunlight for up to 12 months in accordance with manufacturer's written instructions.

2.3 VAPOR PERMEABLE AIR BARRIERS

A Vapor-Permeable Air Barrier: Liquid-applied elastomeric membrane with an installed dry film thickness, according to manufacturer's written instructions, of 20 mils or thicker over smooth, void-free substrates.

1. Products: Subject to compliance with the Contract Documents, provide one of the following.
   a. “Air-Bloc All Weather STPE” manufactured by Henry Company.
   b. “ExoAir 230” manufactured by Tremco CPG Inc.
   c. “Air-Shield LMP” manufactured by W.R. Meadows, Inc.
2. Vapor Permeance: At least 12 perms; ASTM E 96/E 96M, Procedure B, Water Method.

2.4 ACCESSORY MATERIALS

A Provide primers, transition strips, termination strips, joint reinforcing fabric and strips, joint sealants, counterflashing strips, flashing sheets and metal termination bars, termination mastic, substrate patching materials, adhesives, tapes, foam sealants, lap sealants, and other accessory materials that are recommended in writing by the manufacturer to produce a complete air-barrier assembly and that are compatible with primary air-barrier material and adjacent construction to which they may seal.

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 substrates are sound and free of oil, grease, dirt, excess mortar, or other contaminants.

2. Verify that substrates have cured and aged for minimum time recommended in writing by the manufacturer.
3. Verify that substrates are visibly dry and free of moisture. Test concrete substrates for capillary moisture by plastic sheet method in accordance with ASTM D 4263.
4. Verify that masonry joints are flush and completely filled with mortar.

B Do not proceed with installation until unsatisfactory conditions have been corrected.
1. Installation of fluid-applied membrane air barrier indicates acceptance of surfaces and conditions.

3.2 SURFACE PREPARATION

A Clean, prepare, treat, fill, and seal substrate and joints and cracks in substrate in accordance with manufacturer's written instructions and details. Provide clean, dust-free, and dry substrate for air-barrier application.

B Mask off adjoining surfaces not covered by air barrier to prevent spillage and overspray affecting other construction.

C Remove grease, oil, bitumen, form-release agents, paints, curing compounds, and other penetrating contaminants or film-forming coatings from concrete.

D Remove fins, ridges, mortar, and other projections and fill honeycomb, aggregate pockets, holes, and other voids in concrete with substrate-patching material.

E Remove excess mortar from masonry ties, shelf angles, and other obstructions.

F At changes in substrate plane, apply sealant or termination mastic beads at sharp corners and edges to form a smooth transition from one plane to another.

G Cover gaps in substrate plane and form a smooth transition from one substrate plane to another with stainless steel sheet mechanically fastened to structural framing to provide continuous support for air barrier.

H Bridge isolation joints, expansion joints, and discontinuous wall-to-wall, deck-to-wall, and deck-to-deck joints with air-barrier accessory material that accommodates joint movement in accordance with manufacturer's written instructions and details.

3.3 INSTALLATION OF ACCESSORIES

A Install accessory materials in accordance with air-barrier manufacturer's written instructions and details to form a seal with adjacent construction and ensure continuity of air and water barrier.
1. Coordinate the installation of air barrier with installation of roofing membrane and base flashing to ensure continuity of air barrier with roofing membrane.
2. Install transition strip on roofing membrane or base flashing so that at least 3 inches of coverage is achieved over each substrate.
3. Unless manufacturer recommends in writing against priming, apply primer to substrates at required rate and allow it to dry.
4. Apply primer to substrates at required rate and allow it to dry. Limit priming to areas that will be covered by air-barrier material on same day. Reprime areas exposed for more than 24 hours.

B Connect and seal exterior wall air-barrier material continuously to roofing-membrane air barrier, concrete below-grade structures, floor-to-floor construction, exterior glazing and window systems, glazed curtain-wall systems, storefront systems, exterior louvers, exterior door framing, and other construction used in exterior wall openings, using accessory materials.

C At end of each working day, seal top edge of strips and transition strips to substrate with termination mastic.

D Apply joint sealants forming part of air-barrier assembly within manufacturer's recommended application temperature ranges. Consult manufacturer when sealant cannot be applied within these temperature ranges.

E Wall Openings: Prime concealed, perimeter frame surfaces of windows, storefronts, and doors. Apply transition strip or preformed silicone extrusion, in accordance with manufacturer's written instructions, so that at least 3 inches of coverage is achieved over each substrate. Maintain 3 inches of full contact over firm bearing to perimeter frames, with not less than 1 inch of full contact.
1. Transition Strip: Roll firmly to enhance adhesion.
2. Preformed Silicone Extrusion: Set in full bed of silicone sealant applied to walls, frame, and air-barrier material.

F Fill gaps in perimeter frame surfaces of windows, storefronts, and doors, and miscellaneous penetrations of air-barrier material with foam sealant.

G Seal strips and transition strips around masonry reinforcing or ties and penetrations with termination mastic.

H Seal top of through-wall flashings to air barrier with an additional 6-inch-wide, transition strip.

I Seal exposed edges of strips at seams, cuts, penetrations, and terminations not concealed by metal counterflashings or ending in reglets with termination mastic.

J Repair punctures, voids, and deficient lapped seams in strips and transition strips. Slit and flatten fishmouths and blisters. Patch with transition strips extending 6 inches beyond repaired areas in strip direction.

## 3.4 INSTALLATION OF PRIMARY AIR-BARRIER MATERIAL

A Apply air-barrier material to form a seal with strips and transition strips and to achieve a continuous air barrier in accordance with air-barrier manufacturer's written instructions and details. Apply air-barrier material within manufacturer's recommended application temperature ranges.
1. Unless manufacturer recommends in writing against priming, apply primer to substrates at required rate and allow it to dry.
2. Limit priming to areas that will be covered by air-barrier material on same day. Reprime areas exposed for more than 24 hours.
3. Where multiple prime coats are needed to achieve required bond, allow adequate drying time between coats.

B Air Barriers: Apply continuous unbroken air-barrier material to substrates according to the following thickness. Apply air-barrier material in full contact around protrusions such as masonry ties.
1. Vapor-Permeable Air Barrier: Total dry film thickness as recommended in writing by manufacturer to comply with performance requirements, but not less than 20 mils, applied in number of coats as recommended in writing by the manufacturer.

C Do not cover air barrier until it has been tested and inspected by testing agency.

D Correct deficiencies in or remove air barrier that does not comply with requirements; repair substrates and reapply air-barrier components.

## 3.5 FIELD QUALITY CONTROL

A ABAA Quality Assurance Program: Perform examinations, preparation, installation, testing, and inspections under ABAA's Quality Assurance Program.

B Testing Agency: Engage a qualified testing agency to perform tests and inspections.

C Inspections: Air-barrier materials, accessories, and installation are subject to inspection for compliance with requirements. Inspections may include the following:
1. Continuity of air-barrier system has been achieved throughout the building envelope with no gaps or holes.
2. Air-barrier dry film thickness.
3. Continuous structural support of air-barrier system has been provided.
4. Masonry and concrete surfaces are smooth, clean, and free of cavities, protrusions, and mortar droppings.
5. Site conditions for application temperature and dryness of substrates have been maintained.
6. Maximum exposure time of materials to UV deterioration has not been exceeded.
7. Surfaces have been primed, if applicable.

8. Laps in strips and transition strips have complied with minimum requirements and have been shingled in the correct direction (or mastic has been applied on exposed edges), with no fishmouths.
9. Termination mastic has been applied on cut edges.
10. Strips and transition strips have been firmly adhered to substrate.
11. Compatible materials have been used.
12. Transitions at changes in direction and structural support at gaps have been provided.
13. Connections between assemblies (air-barrier and sealants) have complied with requirements for cleanliness, surface preparation and priming, structural support, integrity, and continuity of seal.
14. All penetrations have been sealed.

D Tests: As determined by testing agency from among the following tests:
1. Air-Leakage-Location Testing: Air-barrier assemblies will be tested for evidence of air leakage in accordance with ASTM E 1186, chamber pressurization or depressurization with smoke tracers or ASTM E 1186, chamber depressurization using detection liquids Insert requirement.
2. Air-Leakage-Volume Testing: Air-barrier assemblies will be tested for air-leakage rate in accordance with ASTM E 783.
3. Adhesion Testing: Air-barrier assemblies will be tested for required adhesion to substrate in accordance with ASTM D 4541 for each 600 sq. ft. of installed air barrier or part thereof.

E Air barriers will be considered defective if they do not pass tests and inspections.
1. Apply additional air-barrier material, in accordance with manufacturer's written instructions, where inspection results indicate insufficient thickness.
2. Remove and replace deficient air-barrier components for retesting as specified above.

F Repair damage to air barriers caused by testing; follow manufacturer's written instructions.

G Prepare test and inspection reports.

3.6 CLEANING AND PROTECTION

A Protect air-barrier system from damage during application and remainder of construction period, in accordance with manufacturer's written instructions.
1. Protect air barrier from exposure to UV light and harmful weather exposure as recommended in writing by manufacturer. If exposed to these conditions for longer than recommended, remove and replace air barrier or install additional, full-thickness, air-barrier application after repairing and preparing the overexposed materials in accordance with the manufacturer's written instructions.
2. Protect air barrier from contact with incompatible materials and sealants not approved by the manufacturer.

B Clean spills, stains, and soiling from construction that would be exposed in the completed work using cleaning agents and procedures recommended in writing by manufacturer of affected construction.

C Remove masking materials after installation.

END OF SECTION 07 27 26

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SECTION 07 42 13.13 - FORMED METAL WALL 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. Metal wall panels.
2. Supplementary components and accessories normally furnished or otherwise necessary for a complete installation.

1.3 REFERENCES

A Acronyms and Abbreviations:

1. AAMA: American Aluminum Manufacturers Association.
2. PVDF: Polyvinylidene Fluoride.
3. SCAQMD: South Coast Air Quality Management District.
4. SMACNA: Sheet Metal and Air Conditioning Contractors' National Association.
5. VOC: Volatile Organic Compounds.

B Definitions:

1. Manufacturer: Means the formed metal wall panel manufacturer unless otherwise indicated.
2. (Metal) Wall Panel: Means the exposed-fastener, lap-seam metal wall panel.

1.4 SUBMITTALS

A Action Submittals:

1. Product Data: For exposed-fastener, lap-seam metal wall panels. Include the following:
   a. Construction details, material descriptions, dimensions of individual components and profiles, and finishes for each type of panel and accessory.
   b. Current Environmental Product Declaration.
2. Shop Drawings:
   a. Include fabrication and installation layouts of metal panels; details of edge conditions, joints, panel profiles, corners, anchorages, attachment system, trim, flashings, closures, and accessories; and special details.
   b. Accessories: Include details of the flashing, trim, and anchorage systems, at a scale of not less than 1-1/2 inches per 12 inches.
3. Samples: For each type of exposed finish, prepared on Samples of size indicated below:
   a. Metal Panels: 12 inches long by actual panel width. Include fasteners, closures, and other metal panel accessories.
   b. Include Samples of trim and accessoires involving color selection.

B Informational Submittals:

1. Qualification Data: For installer.
2. Product Test Reports: For exposed-fastener, lap-seam metal wall panels, for tests performed by a qualified testing agency.
3. Field quality-control reports.
4. Sample Warranties: For special warranties.

C Closeout Submittals:

1. Maintenance Data: For metal panels to include in maintenance manuals.

1.5 QUALITY ASSURANCE

A Installer Qualifications: An entity experienced in installing 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.

1.6 DELIVERY, STORAGE, AND HANDLING

A Deliver components, metal panels, and other manufactured items so as not to be damaged or deformed. Package metal panels for protection during transportation and handling.

B Unload, store, and erect metal panels in a manner to prevent bending, warping, twisting, and surface damage.

C Stack metal panels horizontally on platforms or pallets, covered with suitable weathertight and ventilated covering. Store metal panels to ensure dryness, with positive slope for drainage of water. Do not store metal panels in contact with other materials that might cause staining, denting, or other surface damage.

D Retain strippable protective covering on metal panels during installation.

1.7 FIELD CONDITIONS

A Weather Limitations: Do not proceed with installation until existing and forecasted weather conditions permit assembly of metal panels to be performed according to manufacturers' written instructions and warranty requirements.

1.8 COORDINATION

A Coordinate metal panel installation with rain drainage work, flashing, trim, construction of soffits, and other adjoining work to provide a leakproof, secure, and noncorrosive installation.

1.9 WARRANTY

A Special Warranty on Panel Finishes: Manufacturer's standard form in which manufacturer agrees to repair finish or replace metal panels that show evidence of deterioration of factory-applied finishes within specified warranty period.

1. Exposed Panel Finish: Deterioration includes the following:
   a. Color fading more than 5 Delta E units when tested according to ASTM D 2244.
   b. Chalking in excess of a No. 8 rating when tested according to ASTM D 4214.
   c. Cracking, checking, peeling, or failure of paint to adhere to bare metal.
2. Finish Warranty Period: 20 years from date of Final Acceptance.

PART 2 PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A Structural Performance: Provide metal panel systems capable of withstanding the effects of the following loads, based on testing according to ASTM E 1592:

1. Wind Loads: As indicated on Drawings.
2. Other Design Loads: As indicated on Drawings.
3. Deflection Limits: For wind loads, no greater than 1/180 of the span.

B Air Infiltration: Air leakage of not more than 0.06 cfm/sq. ft. when tested according to ASTM E 283 at the following test-pressure difference:

1. Test-Pressure Difference: 6.24 lbf/sq. ft..

C Water Penetration under Static Pressure: No water penetration when tested according to ASTM E331 at the following test-pressure difference:

1. Test-Pressure Difference: 6.24 lbf/sq. ft..

D Thermal Movements: Allow for thermal movements from ambient and surface temperature changes by preventing 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 (Range): 120 deg F, ambient; 180 deg F, material surfaces.

2.2 CONCEALED-FASTENER, LAP-SEAM METAL WALL PANELS

A Provide factory-formed metal panels designed to be field assembled by lapping and interconnecting side edges of adjacent panels and mechanically attaching through panel to supports using concealed fasteners in side laps. Include accessories required for weathertight installation.

B Reveal-Joint, Concealed-Fastener Metal Wall Panels: Formed with vertical panel edges and a flat pan between panel edges; with narrow reveal joint between panels.

1. Product:
   a. Basis-of-Design Product: Subject to compliance with the Contract Documents, design is based on the following.
      1) "VERSA-SEAM with 1/2-Inch Reveal" as manufactured by ATAS International, Inc.
   b. Acceptable Products: Subject to compliance with the Contract Documents, provide the basis-of-design product or one of the following.
      1) "Latitude Pan Rib B with 1-Inch Reveal" as manufactured by Innovative Metals Company, Inc. (IMTECO)
      2) "Reveal Wall Panels with 1-1/2 Inch Reveal" as manufactured by Petersen (PAC-CLAD); a Carlisle Company.
2. Aluminum Sheet: Coil-coated sheet, ASTM B209, alloy as standard with manufacturer, with temper as required to suit forming operations and structural performance required.
   a. Thickness: 0.40 inch.
   b. Surface: Smooth, flat finish.
   c. Exterior Finish: 3-coat fluoropolymer.
      1) Color: Custom color; match Architect's sample.
3. Panel Coverage: 12 inches.
4. Panel Height: 1 inch.

2.3 MISCELLANEOUS MATERIALS

A Miscellaneous Metal Subframing and Furring: ASTM C 645, cold-formed, metallic-coated steel sheet, ASTM A 653/A 653M, G90 hot-dip galvanized coating designation or ASTM A 792/A 792M, Class AZ50 aluminum-zinc-alloy coating designation unless otherwise indicated. Provide manufacturer's standard sections as required for support and alignment of metal panel system.

B Panel Accessories: Provide components required for a complete, weathertight panel system including trim, copings, fasciae, mullions, sills, corner units, clips, flashings, sealants, gaskets, fillers, closure strips, and similar items. Match material and finish of metal panels unless otherwise indicated.

1. Closures: Provide closures at eaves and rakes, fabricated of same metal as metal panels.
2. Backing Plates: Provide metal backing plates at panel end splices, fabricated from material recommended by manufacturer.
3. Closure Strips: Closed-cell, expanded, cellular, rubber or crosslinked, polyolefin-foam or closed-cell laminated polyethylene; minimum 1-inch-thick, flexible closure strips; cut or premolded to match metal panel profile. Provide closure strips where indicated or necessary to ensure weathertight construction.

C Flashing and Trim: Provide flashing and trim formed from same material as metal panels as required to seal against weather and to provide finished appearance. Locations include, but are not limited to, bases, drips, sills, jambs, corners, endwalls, framed openings, rakes, fasciae, parapet caps, soffits, reveals, and fillers. Finish flashing and trim with same finish system as adjacent metal panels.

D Panel Fasteners: Self-tapping screws designed to withstand design loads. Provide exposed fasteners with heads matching color of metal panels by means of plastic caps or factory-applied coating. Provide EPDM or PVC sealing washers for exposed fasteners.

E Panel Sealants: Provide sealant type recommended by manufacturer that is compatible with panel materials, is nonstaining, and will not damage panel finish.

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).
2. Sealant Tape: Pressure-sensitive, 100 percent solids, gray polyisobutylene compound sealant tape with release-paper backing. Provide permanently elastic, nonsag, nontoxic, nonstaining tape 1/2 inch wide and 1/8 inch thick.
3. Joint Sealant: ASTM C 920; elastomeric polyurethane or silicone sealant; of type, grade, class, and use classifications required to seal joints in metal panels and remain weathertight; and as recommended in writing by the manufacturer.
4. Butyl-Rubber-Based, Solvent-Release Sealant: ASTM C 1311.

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

2.4 FABRICATION

A Fabricate and finish metal panels and accessories at the factory, by manufacturer's standard procedures and processes, as necessary to fulfill indicated performance requirements demonstrated by laboratory testing. Comply with indicated profiles and with dimensional and structural requirements.

B Provide panel profile, including major ribs and intermediate stiffening ribs, if any, for full length of panel.

C Sheet Metal Flashing and Trim: Fabricate flashing and trim to comply with manufacturer's recommendations and recommendations in the SMACNA publication *Architectural Sheet Metal Manual* that apply to design, dimensions, metal, and other characteristics of item indicated.

1. Form exposed sheet metal accessories that are without excessive oil canning, buckling, and tool marks and that are true to line and levels indicated, with exposed edges folded back to form hems.
2. Seams for Aluminum: Fabricate nonmoving seams with flat-lock seams. Form seams and seal with epoxy seam sealer. Rivet joints for additional strength.
3. Sealed Joints: Form nonexpansion, but movable, joints in metal to accommodate sealant and to comply with SMACNA standards.
4. Conceal fasteners and expansion provisions where possible. Exposed fasteners are not allowed on faces of accessories exposed to view.
5. Fabricate cleats and attachment devices from same material as accessory being anchored or from compatible, noncorrosive metal recommended in writing by metal panel manufacturer.
   a. Size: As recommended in the SMACNA publication *Architectural Sheet Metal Manual* or the manufacturer for application but not less than thickness of metal being secured.

2.5 FINISHES

A Protect mechanical and painted finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

B Appearance of Finished Work: Variations in appearance of abutting or adjacent pieces are acceptable if they are within one-half of the range of approved Samples. Noticeable variations in same piece are not acceptable. Variations in appearance of other components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

C Aluminum Panels and Accessories: Provide one of the following as selected by the Architect.

1. 3-Coat Fluoropolymer: AAMA 2605. Fluoropolymer finish containing not less than 70 percent polyvinylidene fluoride (PVDF) resin by weight in both color coat and clear topcoat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.

PART 3 EXECUTION

3.1 EXAMINATION

A Examine substrates, areas, and conditions, with installer present, for compliance with requirements for installation tolerances, metal panel supports, and other conditions affecting performance of the work.

1. Examine wall framing to verify that girts, angles, channels, studs, and other structural panel support members and anchorage have been installed within alignment tolerances required by metal wall panel manufacturer.

B Examine roughing-in for components and systems penetrating metal panels to verify actual locations of penetrations relative to seam locations of metal panels before installation.

C Do not proceed with installation until unsatisfactory conditions have been corrected.

1. Installation of metal wall panels indicates acceptance of surfaces and conditions.

3.2 PREPARATION

A Miscellaneous Supports: Install subframing, furring, and other miscellaneous panel support members and anchorages according to ASTM C 754 and the manufacturer's written recommendations.

3.3 INSTALLATION OF METAL PANELS

A Install metal panels according to manufacturer's written instructions in orientation, sizes, and locations indicated. Install panels perpendicular to supports unless otherwise indicated. Anchor metal panels and other components of the work securely in place, with provisions for thermal and structural movement.

1. Shim or otherwise plumb substrates receiving metal panels.
2. Flash and seal metal panels at perimeter of all openings. Fasten with self-tapping screws. Do not begin installation until air- or water-resistive barriers and flashings that will be concealed by metal panels are installed.
3. Install screw fasteners in predrilled holes.
4. Locate and space fastenings in uniform vertical and horizontal alignment.
5. Install flashing and trim as metal panel work proceeds.
6. Locate panel splices over, but not attached to, structural supports. Stagger panel splices and end laps to avoid a four-panel lap splice condition.
7. Align bottoms of metal panels and fasten with blind rivets, bolts, or self-tapping screws. Fasten flashings and trim around openings and similar elements with self-tapping screws.
8. Provide weathertight escutcheons for pipe- and conduit-penetrating panels.

B Fasteners: Use aluminum or stainless steel fasteners for surfaces exposed to the exterior; use aluminum or galvanized-steel fasteners for surfaces exposed to the interior.

C Metal Protection: Where dissimilar metals contact each other or corrosive substrates, protect against galvanic action as recommended in writing by metal panel manufacturer.

D Lap-Seam Metal Panels: Fasten metal panels to supports with fasteners at each lapped joint at location and spacing recommended by manufacturer.

1. Lap ribbed or fluted sheets one full rib. Apply panels and associated items true to line for neat and weathertight enclosure.
2. Provide metal-backed washers under heads of exposed fasteners bearing on weather side of metal panels.
3. Locate and space exposed fasteners in uniform vertical and horizontal alignment. Use proper tools to obtain controlled uniform compression for positive seal without rupture of washer.
4. Install screw fasteners with power tools having controlled torque adjusted to compress washer tightly without damage to washer, screw threads, or panels. Install screws in predrilled holes.
5. Flash and seal panels with weather closures at perimeter of all openings.

E Accessory Installation: Install accessories with positive anchorage to building and weathertight mounting, and provide for thermal expansion. Coordinate installation with flashings and other components.
1. Install components required for a complete metal panel system including trim, copings, corners, seam covers, flashings, sealants, gaskets, fillers, closure strips, and similar items. Provide types indicated by metal wall panel manufacturer; or, if not indicated, provide types recommended by metal panel manufacturer.

F Flashing and Trim: Comply with performance requirements, manufacturer's written installation instructions, and the SMACNA publication *Architectural Sheet Metal Manual*. Provide concealed fasteners where possible, and set units true to line and level as indicated. Install work with laps, joints, and seams that are permanently watertight.
1. Install exposed flashing and trim that is without buckling and tool marks, and that is true to line and levels indicated, with exposed edges folded back to form hems. Install sheet metal flashing and trim to fit substrates and achieve waterproof performance.
2. 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 expansion provisions cannot be used or would not be sufficiently waterproof, form expansion joints of intermeshing hooked flanges, not less than 1 inch deep, filled with mastic sealant (concealed within joints).

## 3.4 CLEANING AND PROTECTION

A Remove temporary protective coverings and strippable films, if any, as metal panels are installed, unless otherwise indicated in manufacturer's written installation instructions. On completion of metal panel installation, clean finished surfaces as recommended by metal panel manufacturer. Maintain in a clean condition during construction.

B After metal panel installation, clear weep holes and drainage channels of obstructions, dirt, and sealant.

C Replace metal panels that have been damaged or have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.

END OF SECTION 07 42 13.13

SECTION 07 42 13.23 - METAL COMPOSITE MATERIAL PANELS (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. Metal composite material (MCM) panels.
2. Supplementary components and accessories normally furnished or otherwise necessary for a complete installation.

1.3 REFERENCES

A Acronyms and Abbreviations:

1. DBVC: Drained and Back Ventilated Cavity.
2. MCA: Metal Construction Association.
3. MCM: Metal Composite Material.
4. SMACNA: Sheet Metal and Air Conditioning Contractors' National Association.

B Definitions:

1. DBVC: Rainscreen system designed to drain and dry water entering cavity through drainage channels, weeps, and air ventilation.
2. Manufacturer: Means the MCM panel or system manufacturer unless otherwise indicated.
3. MCM: Means cladding material formed by joining 2 thin metal skins to core and bonded under precise temperature, pressure, and tension.

1.4 SUBMITTALS

A Action Submittals:

1. Product Data: Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for each type of panel, system, and accessory. Include Health Product Declaration and Environmental Product Declaration.
2. Shop Drawings:
   a. Include fabrication and installation layouts of MCM assemblies, details of edge conditions, joints, panel profiles, corners, anchorages, attachment assembly, trim, flashings, closures, accessories, and special details.
   b. Accessories: Include details of flashing, trim, and anchorage, at a scale of not less than 1-1/2 inches per 12 inches.
3. Samples: For each type of exposed finish, prepared on Samples of size indicated below:
   a. MCM Panels: 12 inches long by actual panel width. Include fasteners, closures, and other metal panel accessories.

B Informational Submittals:

1. Product Test Reports: For each MCM panel, for tests performed by a qualified testing agency, or by the manufacturer and witnessed by a qualified testing agency.
2. Sample warranties.

C Closeout Submittals:

1. Maintenance Data: For MCM panels.
2. Manufacturers' special warranties.

1.5 DELIVERY, STORAGE, AND HANDLING

A Deliver components, MCM panels, and other manufactured items so as not to be damaged or deformed. Package MCM panels for protection during transportation and handling.

B Unload, store, and erect MCM panels in a manner to prevent bending, warping, twisting, and surface damage.

C Stack MCM panels horizontally on platforms or pallets, covered with suitable weathertight and ventilated covering. Store MCM panels to ensure dryness, with positive slope for drainage of water. Do not store MCM panels in contact with other materials that might cause staining, denting, or other surface damage.

D Retain strippable protective covering on MCM panels during installation.

1.6 FIELD CONDITIONS

A Weather Limitations: Do not proceed with installation until existing and forecasted weather conditions permit assembly of MCM panels to be performed in accordance with manufacturers' written instructions and warranty requirements.

1.7 COORDINATION

A Coordinate MCM panel installation with rain drainage work, flashing, trim, construction of soffits, and other adjoining work to provide a leakproof, secure, and noncorrosive installation.

1.8 WARRANTY

A Panel Integrity Warranty: Manufacturer agrees to repair or replace components of MCM panels that fail in materials or workmanship within specified warranty period.
1. Failures include the following:
a. Structural failures including rupturing, cracking, or puncturing.
b. Deterioration of metals and other materials beyond normal weathering.
2. Warranty Period: 10 years from date of Final Acceptance.

B Panel Finish Warranty: Manufacturer agrees to repair finish or replace MCM panels that show evidence of deterioration of factory-applied finishes within specified warranty period.
1. Exposed Panel Finish: Deterioration includes the following:
a. Color fading more than 5 Hunter units when tested in accordance with ASTM D 2244.
b. Chalking in excess of a No. 8 rating when tested in accordance with ASTM D 4214.
c. Cracking, checking, peeling, or failure of paint to adhere to bare metal.
2. Finish Warranty Period: 20 years from date of Final Acceptance.

PART 2 PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A Structural Performance: MCM systems to withstand the effects of the following loads, based on testing in accordance with ASTM E 330/E 330M:
1. Wind Loads: As indicated on Drawings.
2. Other Design Loads: As indicated on Drawings.
3. Deflection Limits: For wind loads, no greater than 1/240 of the span.

B Air Infiltration: Air leakage of not more than 0.06 cfm/sq. ft. when tested in accordance with ASTM E 283/E 283M at the following test-pressure difference:
1. Test-Pressure Difference: 6.24 lbf/sq. ft.

C Water Penetration under Static Pressure: No water penetration when tested in accordance with ASTM E331 at the following test-pressure difference:
1. Test-Pressure Difference: 6.24 lbf/sq. ft.

D Water Penetration under Dynamic Pressure: No water penetration when tested in accordance with AAMA 501.1 at the following test pressure:
1. Test Pressure: 12 psf.

E Provide DBVC system with V-axis classification number greater than or equal to W-axis classification number.

F 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 METAL COMPOSITE MATERIAL (MCM) WALL PANELS

A Metal Composite Material (MCM) Wall Panels: Provide MCM panels fabricated from 2 metal facings bonded to a solid, extruded thermoplastic core.

1. Manufacturers:
   a. Basis-of-Design Manufacturer: Subject to compliance with the Contract Documents, design is based on product by the following.
      1) 3A Composites USA (ALUCOBOND PLUS).
   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) Arconic (Reynobond FR).
      2) Mitsubishi (ALPOLIC/fr).
2. Core: FR (fire-resistant).
3. Panel Thickness: As selected by the Architect.
4. Bond Strength: 22.5 inch-lb/in. when tested for bond integrity in accordance with ASTM D 1781.
5. Fire Performance: Flame-spread index less than 25 and smoke-developed index less than 450, in accordance with ASTM E 84 or UL 723.

B MCM Panel Materials:

1. Aluminum-Faced Panels: ASTM B 209/B 209M alloy as standard with manufacturer, temper as required to suit finish and forming operations with thick, aluminum sheet facings.
   a. Finish: As selected by the Architect.

2.3 METAL COMPOSITE MATERIAL (MCM) SYSTEM

A DBVC MCM System: Provide factory-formed and -assembled, MCM panels formed into profile for DBVC system installation, drained at horizontal joints and at base of wall. Include attachment assembly components and accessories required for weathertight system.

2.4 ACCESSORIES

A Metal Subframing and Furring: ASTM C 955 cold-formed, metallic-coated steel sheet ASTM A 653/A 653M, G90 hot-dip galvanized coating designation or ASTM A 792/A 792M, Class AZ50 aluminum-zinc-alloy coating designation unless otherwise indicated. Provide sections as required for support and alignment of MCM system. Provide thermally broken attachment system.

1. Thermally-Broken Clips: Subject to compliance with the Contract Documents provide one of the following.
   a. “ACS Thermal Clips” as manufactured by ACS Composite Systems Inc.
   b. “Isoclip” as manufactured by Northern Facades Ltd.
   c. “Thermal Isolation Clip” as manufactured by Technoform.

B System Accessories: Provide components required for a complete assembly including trim, corner units, clips, flashings, sealants, gaskets, fillers, closure strips, and similar items. Match material and finish of MCM panels unless otherwise indicated.

C Flashing and Trim: Provide flashing and trim formed from same material as MCM panels as required to seal against weather and to provide finished appearance. Finish flashing and trim with same finish system as adjacent MCM panels.

D Panel Fasteners: Self-tapping screws designed to withstand design loads. Use gasketed or approved coated fasteners between dissimilar metals.

1. Aluminum Panels: Use aluminum or stainless steel fasteners for surfaces exposed to the exterior; use aluminum or galvanized-steel fasteners for surfaces exposed to the interior.

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

2.5 FABRICATION

A Fabricate and finish MCM panels at the factory, by the manufacturer's standard procedures and processes, as necessary to fulfill indicated panel performance requirements demonstrated by laboratory testing.

B Shop-fabricate MCM systems and accessories by fabricator's standard procedures and processes, as necessary to fulfill indicated performance requirements demonstrated by laboratory testing. Comply with requirements of MCM panel manufacturer, of indicated system profiles, and with dimensional and structural requirements.

1. Fabricate panels to dimensions indicated on Drawings based on an assumed design temperature of 70 deg F. Allow for ambient temperature range at time of fabrication.
2. Formed MCM panel lines, breaks, and angles to be sharp and straight, with surfaces free from warp or buckle.
3. Fabricate panels with sharply cut edges and no displacement of face sheet or protrusion of core.
4. Fabricated Panel Tolerances: Shop-fabricate panels to sizes and joint configurations indicated on Drawings.
    a. Width: Plus or minus 0.079 inch at 70 deg F.
    b. Length: Plus or minus 0.079 inch at 70 deg F.
    c. Squareness: Plus or minus 0.079 inch at 70 deg F.

C Sheet Metal Flashing and Trim: Fabricate flashing and trim to comply with manufacturer's written instructions and recommendations in the SMACNA publication Architectural Sheet Metal Manual that apply to design, dimensions, metal, and other characteristics of item indicated.

1. Form exposed sheet metal accessories that are without excessive oil-canning, buckling, and tool marks and that are true to line and levels indicated, with exposed edges folded back to form hems.
2. Seams for Aluminum: Fabricate nonmoving seams with flat-lock seams. Form seams and seal with epoxy seam sealer. Rivet joints for additional strength.
3. Conceal fasteners and expansion provisions where possible. Exposed fasteners are not allowed on faces of accessories exposed to view.
4. Fabricate thermally-broken cleats and attachment devices.

2.6 FINISHES

A Protect mechanical and painted finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

B 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 substrates, areas, and conditions, with installer present, for compliance with requirements for installation tolerances, MCM supports, and other conditions affecting performance of the work.

B Do not proceed with installation until unsatisfactory conditions have been corrected.

1. Installation of MCM wall panels indicates acceptance of surfaces and conditions.

3.2 INSTALLATION OF MCM SYSTEM

A General: Install MCM system in accordance with system manufacturer's written instructions in orientation, sizes, and locations indicated on Drawings. Install panels perpendicular to supports unless otherwise indicated. Anchor MCM system securely in place, with provisions for thermal and structural movement.

1. Shim or otherwise plumb substrates receiving MCM system.
2. Flash and seal MCM system at perimeter of all openings. Fasten with self-tapping screws.

3. Install screw fasteners in predrilled holes.
4. Locate and space fastenings in uniform vertical and horizontal alignment.
5. Install flashing and trim as MCM system work proceeds.
6. Align bottoms of MCM panels and fasten with blind rivets, bolts, or self-tapping screws. Fasten flashings and trim around openings and similar elements with self-tapping screws.
7. Provide weathertight escutcheons for all items penetrating system.
8. Where dissimilar metals contact each other or corrosive substrates, protect against galvanic action with gaskets.
9. Attach MCM panels to supports at locations, spacings, and with fasteners recommended by manufacturer to meet listed performance requirements.

B Attachment Assembly, General: Install attachment assembly required to support MCM panels and to provide a complete weathertight wall system, including tracks, drainage channels, anchor channels, perimeter extrusions, and panel clips.
1. Install subframing, furring, and other panel support members and anchorages in accordance with ASTM C955.
2. Install support system at locations, at spacings, and with fasteners recommended by the manufacturer to meet listed performance requirements.

C DBVC MCM System: Install vertical tracks and horizontal tracks at locations, at spacings, and with fasteners recommended by system manufacturer.
1. Attach MCM panels by interlocking panel clips into tracks.
2. Insert matching MCM spline into tracks at joint reveal locations.

D Install panels to allow individual panels to "free float" and be installed and removed without disturbing adjacent panels.

E Install accessories with positive anchorage to building and weathertight mounting, and provide for thermal expansion. Coordinate installation with flashings and other components.
1. Install accessory components required for a complete MCM system assembly including trim, copings, corners, seam covers, flashings, sealants, gaskets, fillers, closure strips, and similar items. Provide types indicated by the manufacturer.

F Flashing and Trim: Comply with performance requirements, manufacturer's written installation instructions, and the SMACNA publication Architectural Sheet Metal Manual. Provide concealed fasteners where possible, and set units true to line and level as indicated. Install work with laps, joints, and seams that are permanently watertight.
1. Install exposed flashing and trim that is without buckling and tool marks and that is true to line and levels indicated, with exposed edges folded back to form hems. Install trim to fit substrates and to result in waterproof performance.
2. 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 expansion provisions cannot be used or would not be sufficiently waterproof, form expansion joints of intermeshing hooked flanges, not less than 1 inch deep, filled with mastic sealant (concealed within joints).

## 3.3 INSTALLATION TOLERANCES

A Shim and align MCM panels within installed tolerance of 1/4 inch in 20 feet, non-accumulative, on level, plumb, and location lines as indicated, and within 1/8-inch offset of adjoining faces and of alignment of matching profiles.

## 3.4 CLEANING

A Remove temporary protective coverings and strippable films as MCM panels are installed unless otherwise indicated in manufacturer's written installation instructions. On completion of installation, clean finished surfaces as recommended by the manufacturer. Maintain in a clean condition during construction.

B After installation, clear weep holes and drainage channels of obstructions, dirt, and sealant.

3.5 PROTECTION

A Replace MCM material that has been damaged or have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.

END OF SECTION 07 42 13.23

# SECTION 07 54 19 - POLYVINYL-CHLORIDE (PVC) ROOFING (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 Section.

### 1.2 SUMMARY

A Section Includes:

1. Polyvinyl chloride (PVC) roofing system.
2. Roof insulation.
3. Insulation accessories and cover board.
4. Supplementary components and accessories normally furnished or otherwise necessary for a complete installation.

### 1.3 REFERENCES

A Acronyms and Abbreviations:

1. NRCA: National Roofing Contractors Association.
2. PVC: Polyvinyl-Chloride.
3. SCAQMD: South Coast Air Quality Management District.
4. SPRI: Single Ply Roofing Industry.
5. VOC: Volatile Organic Compound.

B Definitions:

1. Manufacturer: Means the PVC membrane roofing system 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, testing and inspecting agency representative, roofing installer, manufacturer's 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 the following:
   a. Current Environmental Product Declaration.
   b. Current Health Product Declaration.
   c. Adhesive, sealant, and primer VOC content disclosure data.

d. For insulation and roof system component fasteners, include copy of SPRI’s Directory of Roof Assemblies listing.

2. Shop Drawings: For roofing system. Include plans, sections, details, and attachments to other work, including the following:
   a. Layout and thickness of insulation.
   b. Base flashings and membrane terminations.
   c. Flashing details at penetrations.
   d. Tapered insulation thickness and slopes.
   e. Roof plan showing orientation of steel roof deck and orientation of roof membrane, fastening spacings, and patterns for mechanically fastened roofing system.
   f. Insulation fastening patterns for corner, perimeter, and field-of-roof locations.
   g. Tie-in with air barrier.
3. Samples: For the following products:
   a. Roof membrane and flashing, of color required.

B Informational Submittals:
1. Qualification Data: For installer and manufacturer.
2. Manufacturer Certificates:
   a. Performance Requirement Certificate: Signed by manufacturer, certifying that roofing system complies with requirements specified in "Performance Requirements" Article.
      1) Submit evidence of compliance with performance requirements.
   b. Special Warranty Certificate: Signed by manufacturer, certifying that all materials supplied under this Specification Section are acceptable for special warranty.
3. Product Test Reports: For roof membrane and insulation, tests performed by independent qualified test agency indicating compliance with specified requirements.
4. 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 Qualifications:
1. Manufacturers: A qualified manufacturer that is UL listed and listed in SPRI’s Directory of Roof Assemblies for roofing system identical to that used for this Project.
2. Installers: 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 the 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 physical 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 roof membrane, base flashings, roof insulation, fasteners, cover boards, substrate boards, and other components of roofing system.
2. Warranty Period: 20 years from date of Final Acceptance.

PART 2 PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A General Performance: Installed roofing and base flashings to withstand specified uplift pressures, thermally induced movement, and exposure to weather without failure due to defective manufacture, fabrication, installation, or other defects in construction. Roof system and flashings to remain watertight.
1. Accelerated Weathering: Roof membrane 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/D 4272M.

B Material Compatibility: Roofing materials to 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.
3. Zone 3 (Roof Area Corners): As indicated on the Drawings.

D Fire-Resistance Ratings: Comply with fire-resistance-rated assembly designs indicated. Identify products with appropriate markings of applicable testing agency.

2.2 MANUFACTURERS

A Manufacturers:
1. Basis of Design Manufacturer: Subject to compliance with the Contract Documents, design is based on products by the following.
a. Sika Sarnafil.
2. Acceptable Manufacturers: Subject to compliance with the Contract Documents, provide roofing system by the basis-of-design manufacturer or comparable products by one of the following.
a. Carlisle SynTec Systems.
b. GAF Materials LLC.
c. Johns Manville.

B Source Limitations: Obtain components for roofing system from roof membrane manufacturer or by manufacturers approved by the roof membrane manufacturer.

2.3 POLYVINYL CHLORIDE (PVC) ROOFING MEMBRANE

A PVC Sheet Type III: ASTM D 4434/D 4434M, polyester reinforced membrane.
1. Product: “Sarnafil G 410-60” membrane.
2. Thickness: 60 mils, nominal.
3. Exposed Face Color: White.

2.4 ACCESSORY ROOFING MATERIALS

A General: Auxiliary materials recommended by the manufacturer for intended use and compatible with other roofing components.
1. Allowable VOC Content: Adhesives, adhesive bonding primers, adhesive primers, sealants, and sealant 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 Sheet Flashing: Manufacturer's standard sheet flashing of same material, type, reinforcement, thickness, and color as PVC sheet.

C Prefabricated Pipe Flashings: As recommended by the manufacturer.

D Roof Vents: As recommended by the manufacturer.
1. Size: Not less than 4-inch diameter.

E Adhesive: Manufacturer’s standard spray-applied adhesive formulated for compatibility and use with membrane roofing.

F Metal Termination Bars: Manufacturer's standard, predrilled stainless steel or aluminum bars, approximately 1 by 1/8 inch thick; with anchors.

G Metal Battens: Manufacturer's standard, aluminum-zinc-alloy-coated or zinc-coated steel sheet, approximately 1 inch wide by 0.05 inch thick, prepunched.

H 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 the manufacturer.

I 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 as supplied, recommended, or required by the manufacturer and as necessary for a complete installation.

2.5 ROOF INSULATION

A General: Preformed roof insulation boards manufactured by, or approved by, the manufacturer.

B Polyisocyanurate Board Insulation: ASTM C 1289, Type II, Class 1, Grade 2 or 3, felt or glass-fiber mat facer on both major surfaces.
1. Size: 48 inches by 48 inches.
2. Compressive Strength: At least 20 psi unless otherwise recommended or required by the manufacturer for the roofing system assembly.
3. Thickness: As indicated on the Drawings.

C Tapered Insulation: Provide factory-tapered insulation boards.
1. Material: Match roof insulation.
2. Thickness: At least 1/4 inch.
3. Slope:
a. Roof Field: 1/4 inch per foot unless otherwise indicated.
b. Saddles and Crickets: 1/2 inch per foot unless otherwise indicated.

2.6 INSULATION ACCESSORIES

A General: Roof insulation accessories recommended by insulation manufacturer for intended use and compatibility with other roofing components.
1. Allowable VOC Content: Adhesives, adhesive bonding primers, adhesive primers, sealants, and sealant 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 Fasteners: Factory-coated steel fasteners and metal or plastic plates complying with corrosion-resistance provisions in FM Global 4470, designed for fastening roof insulation 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 as follows:
1. Bead-applied, low-rise, one-component or multicomponent urethane adhesive.

D Glass-Mat Gypsum Cover Board: ASTM C 1177/C 1177M, water-resistant gypsum board.
1. Products: Subject to compliance with requirements, provide one of the following as acceptable to manufacturer:
a. “Dens Deck Prime” as manufactured by Georgia-Pacific Corporation.
b. “DEXcell Glass Mat Roof Board” as manufactured by National Gypsum Company (Gold Bond Building Products, LLC.)
c. “Securock Brand Roof Cover Board” as manufactured by USG.
2. Thickness: At least 1/2 inch.

E Miscellaneous Accessories: Provide accessories supplied, recommended, or required by the manufacturer and as necessary for a complete installation.

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 supplied by or acceptable to roofing system 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 steel roof deck complies with requirements in Section 05 31 00 Steel Decking.
4. Verify that minimum concrete drying period recommended by the manufacturer has passed.
5. Verify that concrete substrate is visibly dry and free of moisture, and that minimum concrete internal relative humidity is not more than 75 percent, or as recommended by the manufacturer, when tested according to ASTM F 2170.
a. Test Frequency: One test probe per each 1000 sq. ft., or portion thereof, of roof deck, with no fewer than three test probes.
b. Submit test reports within 24 hours of performing tests.
6. Verify that concrete-curing compounds that will impair adhesion of roofing components to roof deck have been removed.

B Do not proceed with installation until unsatisfactory conditions have been corrected.
1. Installation of PVC roofing indicates acceptance of surfaces and conditions.

3.2 PREPARATION

A Clean substrate of dust, debris, moisture, and other substances detrimental to roofing system installation according to the 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 Start installation of roofing in presence of roofing system manufacturer's technical personnel.

B Install roofing system according to the manufacturer's written instructions and SPRI's Directory of Roof Assemblies listed roof assembly requirements.

C 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. Locate end joints over crests of decking.
    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. Mechanically attach base layer of insulation 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.
    e. Trim insulation so that water flow is unrestricted.
    f. Fill gaps exceeding 1/4 inch with insulation.
    g. Cut and fit insulation within 1/4 inch of nailers, projections, and penetrations.
    h. 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.
        1) Set each layer of insulation in ribbons of bead-applied insulation adhesive, firmly pressing and maintaining insulation in place, unless otherwise required by the manufacturer.

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. Loosely butt cover boards together and adhere per manufacturer’s instructions.

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 as follows:
    a. Set each layer of insulation in ribbons of bead-applied insulation adhesive, firmly pressing and maintaining insulation in place unless otherwise required by the manufacturer.

3.6 INSTALLATION OF ADHERED ROOF MEMBRANE

A Adhere membrane roofing over area to receive roofing according to manufacturer's written instructions.

B Unroll roof membrane and allow to relax before installing.

C Start installation of roofing in presence of manufacturer's technical personnel.

D Accurately align roof membrane, and maintain uniform side and end laps of minimum dimensions required by manufacturer. Stagger end laps.

E Roof Membrane Adhesive: Apply to substrate at rate required by manufacturer, and install fabric-backed roof membrane.

F In addition to adhering, mechanically fasten roof membrane securely at terminations, penetrations, and perimeter of roofing.

G Apply roof membrane with side laps shingled with slope of roof deck where possible.

H Seams: Clean seam areas, overlap roofing, and hot-air weld side and end laps of roof membrane and sheet flashings 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 roof membrane and sheet flashings.
2. Verify field strength of seams at least twice daily, and repair seam sample areas.
3. Repair tears, voids, and lapped seams in roof membrane that do not comply with requirements.

I Spread sealant bed over deck drain flange at roof drains and securely seal roof membrane 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 the 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 according to manufacturer's written instructions.
1. Install flexible walkways at locations indicated on the Drawings and as required by roofing system manufacturer's warranty requirements.
2. Provide 6-inch clearance between adjoining pads.
3. 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 manufacturer's technical personnel to inspect roofing installation on completion, in presence of the Architect, and to prepare inspection report.

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 system 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 19

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. Roof insulation.
4. Insulation accessories and cover board.
5. 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.

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 Final Acceptance.

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) Elevate (Holcim).
   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) Carlisle SynTec Incorporated.
      2) Flex Roofing Systems.
      3) 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 ROOF INSULATION
A General: Preformed roof insulation boards manufactured or approved by the 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.

2.5 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. Product:
a. Basis-of-Design Product: Subject to compliance with the Contract Documents, the design is based on the following:
1) “Dens Deck Prime” as manufactured by Georgia-Pacific Gypsum LLC.
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) Johns Manville.
2) National Gypsum.
2. Thicknesses: Provide the following unless otherwise indicated or recommended or required by the manufacturer.
a. Roof: 1/2 inch thick.
b. Parapet: 5/8-inch.

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 Arrange for roofing system manufacturer's technical representative to be present at start of installation of roofing.

B Install roofing system according to the manufacturer's written instructions.

C 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.

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 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.

3.9 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

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# 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. 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.
3. Samples: Include Samples of each type of roof specialty to verify finish and color selection, in manufacturer's standard sizes.

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 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:

1. Basis-of-Design Manufacturer: Subject to compliance with the Contract Documents, design is based on product by the following.
   a. ATAS International, Inc.
2. Acceptable Manufacturers: Subject to compliance with the Contract Documents provide product as manufactured by the basis-of-design manufacturer or comparable approved product by one of the following.
   a. Innovative Metals Company, Inc. (IMTECO)
   b. Petersen (PAC-CLAD); a Carlisle Company.

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. Product: "Continuous Cleat".
2. Formed Aluminum Sheet Coping Caps: Aluminum sheet, 0.040 inch thick.
   a. Surface: Smooth, flat finish.
   b. Finish: 3-coat fluoropolymer.
      1) Color: Custom color; match Architect's Sample.

C Aluminum Sheet: ASTM B 209, alloy as standard with manufacturer for finish required, with temper to suit forming operations and performance required.

1. Exposed Coil-Coated Finish: Prepainted by the coil-coating process to comply with ASTM A755/A755M. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.

a. 3-Coat Fluoropolymer: AAMA 2605. Fluoropolymer finish containing not less than 70 percent polyvinylidene fluoride (PVDF) resin by weight in both color coat and clear topcoat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions

2.4 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.

2.5 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 Elastomeric Sealant: ASTM C 920, elastomeric polymer sealant of type, grade, class, and use classifications required by the manufacturer for each application.

C Butyl Sealant: ASTM C 1311, single-component, solvent-release butyl rubber sealant; polyisobutylene plasticized; heavy bodied for hooked-type joints with limited movement.

D Bituminous Coating: Cold-applied asphalt emulsion complying with ASTM D 1187/D 1187M.

E Asphalt Roofing Cement: ASTM D 4586, asbestos free, of consistency required for application.

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

2.6 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 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 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 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 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

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# SECTION 07 72 00 - ROOF HATCHES

## 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. Roof hatches.
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. MSG: Manufacturers Standard Gage.
3. NAAMM: National Association of Architectural Metal Manufacturers.

B Definitions:
1. Manufacturer: Means the roof hatch manufacturer unless otherwise indicated.

### 1.4 COORDINATION

A Coordinate layout and installation of roof hatches with roofing and base flashing and interfacing and adjoining construction to provide a leakproof, weathertight, secure, and noncorrosive installation.

### 1.5 SUBMITTALS

A Action Submittals:
1. Product Data: For roof hatches; 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 hatches.
   a. Include plans, elevations, keyed details, and attachments to other work. Indicate dimensions, loadings, and special conditions. Distinguish between plant- and field-assembled work.

B Closeout Submittals:
1. Operation and Maintenance Data: For roof hatches to include in operation and maintenance manuals.

## PART 2 PRODUCTS

### 2.1 PERFORMANCE REQUIREMENTS

A General Performance: Roof hatches 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.

### 2.2 ROOF HATCHES

A Roof Hatches: Metal roof-hatch units with lids and insulated curbs, welded and sealed corner joints, continuous lid-to-curb counterflashing and weathertight perimeter gasketing, straight sides, and integrally formed deck-mounting flange at perimeter bottom.
1. Basis-of-Design Product: Subject to compliance with the Contract Documents, design is based on the following.

a. "Model E-20" ladder-access roof hatch as manufactured by The Bilco 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. Babcock-Davis.
   b. J.L. Industries, Activar Construction Products Group.

B Type and Size: Single-leaf lid, 36 by 36 inches.

C Loads: At least 40-lbf/sq. ft. external live load and 20-lbf/sq. ft. internal uplift load.

D Hatch Material, Steel: G-90 paint-bond zinc-coated (galvanized) steel sheet.
1. Thickness: 0.0785 inch.
2. Finish: Factory prime coating.

E Construction:
1. Insulation: Manufacturer’s standard, 1-inch thick.
2. Hatch Lid: Opaque, insulated, and double walled, with manufacturer's standard metal liner of same material and finish as outer metal lid.
3. Curb Liner: Manufacturer's standard, of same material and finish as metal curb.
4. Fabricate curbs to height of at least 12 inches above roofing surface unless otherwise indicated.

F Hardware: Spring operators, hold-open arm, galvanized steel spring latch with turn handles, steel butt- or pintle-type hinge system, and padlock hasps inside and outside.

G Safety Railing System: Manufacturer's standard system including rails, clamps, fasteners, safety barrier at railing opening, and accessories required for a complete installation; attached to roof hatch and complying with 29 CFR 1910.23 requirements and the AHJ.
1. Height: 42 inches above finished roof deck.
2. Posts and Rails: 1-1/4 inches in diameter 6061 T6 aluminum alloy (Schedule 40).
3. Maximum Opening Size: System constructed to prevent passage of a sphere 21 inches in diameter.
4. Self-Latching Gate: Fabricated of same materials and rail spacing as safety railing system. Provide manufacturer's standard hinges and self-latching mechanism.
5. Post and Rail Tops and Ends: Weather resistant, closed or plugged with prefabricated end fittings.
6. Provide weep holes or another means to drain entrapped water in hollow sections of handrail and railing members.
7. Fabricate joints exposed to weather to be watertight.
8. Fasteners: Manufacturer's standard, finished to match railing system.
9. Finish: Manufacturer's standard.
   a. Color: Manufacturer’s “Safety Yellow”.

H Ladder-Assist Post: Manufacturer's standard device for attachment to fixed roof-access ladder.
1. Operation: Post locks in place on full extension; release mechanism returns post to closed position.
2. Height: 42 inches above finished roof deck.
3. Material: Steel tube or aluminum; provide same material as fixed roof-access ladder..
4. Post: At least 1-5/8-inch-diameter pipe.
5. Finish: Manufacturer's standard baked enamel or powder coat for steel; mill-finish for aluminum.

## 2.3 MISCELLANEOUS MATERIALS

A Provide materials and types of fasteners, protective coatings, sealants, and other miscellaneous items required by manufacturer for a complete installation.

B Felt Underlayment: ASTM D 226/D 226M, Type II (No. 30), asphalt-saturated organic felt, nonperforated.

C Fasteners: Manufacturer's recommended fasteners suitable for application and metals being fastened. Match finish of exposed fasteners with finish of material being fastened. Provide nonremovable fastener heads to exterior exposed fasteners. Furnish the following unless otherwise indicated:

1. Fasteners for Zinc-Coated Steel: Series 300 stainless steel or hot-dip zinc-coated steel according to ASTM A1 53/A1 53M or ASTM F 2329.

D Gaskets: Manufacturer's standard tubular or fingered design of EPDM.

E Elastomeric Sealant: ASTM C 920, elastomeric polymer sealant as recommended by the manufacturer for installation indicated; low modulus; of type, grade, class, and use classifications required to seal joints and remain watertight.

F Asphalt Roofing Cement: ASTM D 4586/D 4586M, asbestos free, of consistency required for application.

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

2.4 GENERAL FINISH REQUIREMENTS

A Comply with the NAAMM publication Metal Finishes Manual for Architectural and Metal Products for recommendations for applying and designating finishes.

B Appearance of Finished Work: Noticeable variations in same piece are not acceptable. 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 substrates, areas, and conditions, with installer present, to verify actual locations, dimensions, and other conditions affecting performance of the work.

B Verify that substrate is sound, dry, smooth, clean, sloped for drainage, and securely anchored.

C Verify dimensions of roof openings for roof accessories.

D Do not proceed with installation until unsatisfactory conditions have been corrected.

1. Installation of roof hatches indicates acceptance of surfaces and conditions.

3.2 INSTALLATION

A Install roof hatches according to manufacturer's written instructions.

1. Install roof hatches level; plumb; true to line and elevation; and without warping, jogs in alignment, buckling, or tool marks.
2. Anchor roof hatches securely in place so they are capable of resisting indicated loads.
3. Use fasteners, separators, sealants, and other miscellaneous items as required to complete installation of roof hatches and fit them to substrates.
4. Install roof hatches to resist exposure to weather without failing, rattling, leaking, or loosening of fasteners and seals.

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 accessories with bituminous coating where in contact with wood, ferrous metal, or cementitious construction.
2. Underlayment: Where installing roof accessories directly on cementitious or wood substrates, install a course of underlayment and cover with manufacturer's recommended slip sheet.
3. Bed flanges in thick coat of asphalt roofing cement where required by manufacturers of roof accessories for waterproof performance.

C Roof-Hatch Installation:

1. Verify that roof hatch operates properly. Clean, lubricate, and adjust operating mechanism and hardware.
2. Attach safety railing system to roof-hatch curb.
3. Attach ladder-assist post according to manufacturer's written instructions.

D Seal joints with sealant as required by roof accessory manufacturer.

3.3 REPAIR AND CLEANING

A Galvanized Surfaces: Clean field welds, bolted connections, and abraded areas and repair galvanizing according to ASTM A 780/A 780M.

B Touch up factory-primed surfaces with compatible primer ready for field painting according to Section 09 91 13 Exterior Painting.

C Clean exposed surfaces according to manufacturer's written instructions.

D Clean off excess sealants.

E Replace roof hatches that have been damaged or that cannot be successfully repaired by finish touchup or similar minor repair procedures.

END OF SECTION 07 72 00

# 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

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**PENETRATION FIRESTOPPING SCHEDULE**

THIS SCHEDULE INDICATES WHICH SERIES OF UL CLASSIFIED PENETRATIING 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 | | | PENETRANT TYPE | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **TYPE** | **BASIS OF CONSTRUCTION** | **FIRE STOPPING REQUIREMENTS** | **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 WALLBOARD** | UL CLASSIFIED SYSTEM — SINGLE PENETRANT | 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 8 | NOTE 8 |
| UL DESIGN NO. - U300 SERIE | | UL CLASSIFIED SYSTEM — 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 WALLBOARD** | UL CLASSIFIED SYSTEM — SINGLE PENETRANT | 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 8 | NOTE 8 |
| UL DESIGN NO. - U400 SERIE | | UL CLASSIFIED SYSTEM — 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** | UL CLASSIFIED SYSTEM — SINGLE PENETRANT | 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 | ?? | NOTE 8 |
| UL DESIGN NO. FOR CONCRETE BLOCK WALL - U900 SERIES (ANY THICKNESS) | | UL CLASSIFIED SYSTEM — 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 CONRETE BLOCK OR MASONRY** | UL CLASSIFIED SYSTEM — SINGLE PENETRANT | 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 | | UL CLASSIFIED SYSTEM — MULTIPLE PENETRANTS | | N/A | | | | | | N/A | | | |
| | | F RATING | EQUAL TO BARRIER RATING | | | | | | | | | | |
| | | T RATING | EQUAL TO F RATING (NOTE 9) | | | | | | | | | | |
| | | ADDITIONAL REQUIREMENTS | NONE | | | | | | | | | | |
| **FLOOR** | **FRAMED** | UL CLASSIFIED SYSTEM — SINGLE PENETRANT | 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 |
| | | UL CLASSIFIED SYSTEM — 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** MAXIMUM THICKNESS OF FIVE INCHES OR LESS | UL CLASSIFIED SYSTEM | SINGLE PENETRANT | 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 |
| | | MULTIPLE PENETRANTS | | 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 | |
| | 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** MINIMUM THICKNESS GREATER THAN FIVE INCHES | UL CLASSIFIED SYSTEM | SINGLE PENETRANT | 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 |
| | | MULTIPLE PENETRANTS | | 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 | |
| | 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**

1. EXAMPLES OF SYSTEMS THAT OPERATE BETWEEN 32 DEGF (0DEGC) AND 122 DEGF (50 DEGC):
   - CHILLED WATER SUPPLY & RETURN
   - HEAT PUMP WATER SUPPLY & RETURN
   - DOMESTIC COLD WATER
   - DOMESTIC HOT WATER LESS THAN 122 DEGF (50 DEGC)
   - DOMESTIC HOT WATER RECIRCULATION LESS THAN 122 DEGF (50
2. EXAMPLES OF SYSTEMS OPERATING BELOW 32 DEGF (0DEGC) OR ABOVE 122 DEGF (50 DEGC):
   - STEAM SUPPLY & RETURN
   - STEAM VENT
   - CONDENSATE PUMP DISCHARGE
   - BOILER BLOW DOWN
   - CRYOGENIC VENT
   - HEATING HOT WATER SUPPLY & RETURN
   - HOT-CHILLDED WATER SUPPLY & RETURN
   - GLYCOL HEATING HOT WATER SUPPLY & RETURN
   - DOMESTIC HOT WATER SUPPLY 140 DEGF (60 DEGC)
   - DOMESTIC HOT WATER RECIRCULATION 140 DEGF (60 DEGC)
3. EXAMPLES OF OTHER RECESSED DEVICES:
   - MEDICAL GAS ZONE VALVES
   - MEDICAL GAS OUTLETS
   - FIRE VALVE CABINETS
   - FIRE HOSE CABINETS
   - UNIT HEATERS
   - FIRE FIGHTERS' PHONE
   - FIRE EXTINGUISHER CABINET
4. SEAL OPENING USING BARRIER'S ORIGINAL CONSTRUCTION.
5. WHERE APPROPRIATE MULTI-PENETRATION CLASSIFICATION IS NOT AVAILABLE; INSTALL PENETRANTS SINGLY, AND PROVIDE SINGLE-PENETRANT SYSTEMS.
6. FOR SYSTEMS THAT OPERATE BELOW 32 DEGF (0DEGC) OR ABOVE 122 DEGF (50 DEGC), COMPLY WITH THE FOLLOWING ADDITIONAL REQUIREMENTS:
   A. PROVIDE TPFS SYSTEM USING INTUMESCENT ELASTOMERIC WRAP STRIP AS ITS FILL, VOID, OR CAVITY MATERIAL.
   B. DO NOT USE SERIES 8000 PENETRATIONS. PROVIDE ONLY SINGLE PENETRATIONS.
7. FOR PENETRATIONS PROTECTED WITH DAMPERS, PROVIDE TPFS SYSTEM APPROVED BY DAMPER MANUFACTURER.
8. WHERE UL CLASSIFIED SYSTEMS ARE NOT AVAILABLE FOR OTHER RECESSED DEVICES, MAINTAIN CONTINUITY OF RATED BARRIER CONSTRUCTION AROUND RECESS.
9. WHERE PENETRANT EXITS PENETRATION ENTIRELY WITHIN THE CAVITY OF A WALL A T-RATING IS NOT REQUIRED.
10. 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 Final Acceptance. 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 Specification 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 MANUFACTURERS

A Manufacturers: Subject to compliance with the Contract Documents, acceptable manufacturers of joint sealants includes but is not limited to the following.
1. BASF.
2. Dow Chemical Company.
3. Pecora Corporation.
4. Sika Corporation.
5. Tremco CPG Inc.

## 2.3 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, or comparable acceptable product:
   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 or comparable approved product:
   a. Pecora Corporation; 898
   b. Tremco CPG Inc., Tremsil 600.
   c. Dow Chemical Company; DOWSIL 786.
2. Type: Single-component (S)
3. Grade: Nonsag (NS)
4. Class: 25.
5. Use: Nontraffic (NT)

## 2.4 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 CPG Inc.; 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. Dow Chemical Company.

b. Pecora Corporation.
c. Sika.
3. Type: Multicomponent (M).
4. Grade: Nonsag (NS).
5. Class: 50.
6. Uses: T, NT.
7. Color: "Baptist Brick"; verify with Architect.

2.5 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 CPG Inc.; Tremflex 834.
c. BASF Corporation; Sonolac.

2.6 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.

2.7 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.

2.8 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 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. If acceptable to AHJ, in lieu of documentation indicated above, submit copy of DHI Fire and Egress Door Assembly Inspector (FDAI) certificate.

2. Product Test Reports: For each type of fire-rated 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.

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.

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-inchheight adjustment. Terminate bottom of frames at top of underlayment.
D Material: ASTM A 879/A 879M, Commercial Steel (CS), 04Zdesignation; 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.

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

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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 glosss 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 23 - OVERHEAD COILING 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. Insulated service doors.
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. MSG: Manufacturer’s Standard Gauge.
3. NAAMM: National Association of Architectural Metal Manufacturers.
4. NOMMA: National Ornamental and Miscellaneous Metals Association.
5. USDOJ: United States Department of Justice.

B Definitions:
1. Manufacturer: Means the overhead coiling door manufacturer unless otherwise indicated.

### 1.4 SUBMITTALS

A Action Submittals:
1. Product Data: For each type and size of overhead coiling door and accessory.
   a. Include construction details, material descriptions, dimensions of individual components, profiles for slats, and finishes.
2. Shop Drawings: For each installation and for special components not dimensioned or detailed in manufacturer's product data.
   a. Include plans, elevations, sections, and mounting details.
   b. Include details of equipment assemblies, and indicate dimensions, required clearances, method of field assembly, components, and location and size of each field connection.
   c. Include points of attachment and their corresponding static and dynamic loads imposed on structure.
   d. For exterior components, include details of provisions for assembly expansion and contraction and for excluding and draining moisture to the exterior.
3. Samples: For each type of exposed finish on the following components, in manufacturer's standard sizes:
   a. Curtain slats.
   b. Include similar Samples of accessories involving color selection.

B Informational Submittals:
1. Qualification Data: For installer.
2. Sample Warranty: For special warranty.

C Closeout Submittals:
1. Special warranty.
2. Maintenance Data: For overhead coiling doors to include in maintenance manuals.

### 1.5 QUALITY ASSURANCE

A Installer Qualifications: An entity that employs installers and supervisors who are approved by manufacturer for installation of units required for this Project.

1.6 WARRANTY

A Special Warranty: Manufacturer agrees to repair or replace components of doors that fail in materials or workmanship within specified warranty period.

1. Warranty Period: 2 years from date of Substantial Completion.

PART 2 PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A Accessibility Standard: Comply with applicable provisions in the USDOJ publication 2010 ADA Standards for Accessible Design and ICC A117.1.

B Structural Performance, Exterior Doors: Capable of withstanding the following design wind loads:

1. Design Wind Load: As indicated on the Drawings.
2. Deflection Limits: Design overhead coiling doors to withstand design wind load without evidencing permanent deformation or disengagement of door components.

2.2 DOOR ASSEMBLIES

A Insulated Service Door: Overhead coiling door formed with curtain of interlocking metal slats.

1. Basis-of-Design Product: Subject to compliance with the Contract Documents, design is based on the following.
   a. “Model 625/627 Insulated Door” as manufactured by Overhead Door Corporation.
2. Acceptable Manufacturers: Subject to compliance with the Contract Documents, provide basis-of-design product or comparable product by one of the following.
   a. CornellCookson, LLC.
   b. Wayne-Dalton.

B Air Infiltration: Maximum rate of 1.0 cfm/sq. ft.at 15 and 25 mph when tested according to ASTM E 283.

C Insulated Door Curtain R-Value: 8 deg F x h x sq. ft./Btu

D Door Curtain Material: Galvanized steel.

E Door Curtain Slats: Flat profile slats of 3-1/4-inchcenter-to-center height.

1. Insulated-Slat Interior Facing: Metal.
2. Gasket Seal. Manufacturer's standard continuous gaskets between slats.

F Bottom Bar: Two angles, each not less than 1-1/2 by 1-1/2 by 1/8 inchthick; fabricated from hot-dip galvanized steel and finished to match door.

G Curtain Jamb Guides: Galvanized steel with exposed finish matching curtain slats.

H Hood: Match curtain material and finish.

1. Shape: Round.
2. Mounting: As indicated on Drawings.

I Manual Door Operator: Chain-hoist operator.

J Curtain Accessories: Equip door with weatherseals.

K Door Finish:

1. Powder-Coated Finish: As selected by Architect from the manufacturer’s full range of colors.
2. Interior Curtain-Slat Facing: Manufacturer’s standard color.

2.3 DOOR CURTAIN MATERIALS AND CONSTRUCTION

A Door Curtains: Fabricate overhead coiling-door curtain of interlocking metal slats, designed to withstand wind loading indicated, in a continuous length for width of door without splices. Unless otherwise indicated, provide slats of thickness and mechanical properties recommended by door manufacturer for performance, size, and type of door indicated, and as follows:

1. Steel Door Curtain Slats: Zinc-coated (galvanized), cold-rolled structural-steel sheet; complying with ASTM A 653/A 653M, with G90zinc coating; nominal sheet thickness (coated) of 0.0276 inch; and as required.

2. Insulation: Fill slats for insulated doors with manufacturer's standard thermal insulation complying with flame-spread and smoke-developed indexes of no more than 75 and 450, respectively, according to ASTM E 84 or UL 723. Enclose insulation completely within slat faces.
3. Metal Interior Curtain-Slat Facing: Match metal of exterior curtain-slat face, with steel thickness of at least 0.010 inch

B Curtain Jamb Guides: Manufacturer's standard angles or channels and angles of same material and finish as curtain slats unless otherwise indicated, with sufficient depth and strength to retain curtain, to allow curtain to operate smoothly, and to withstand loading. Slot bolt holes for guide adjustment. Provide removable stops on guides to prevent overtravel of curtain, and a continuous bar for holding windlocks.

2.4 HOODS

A General: Form sheet metal hood to entirely enclose coiled curtain and operating mechanism at opening head. Contour to fit end brackets to which hood is attached. Roll and reinforce top and bottom edges for stiffness. Form closed ends for surface-mounted hoods and fascia for any portion of between-jamb mounting that projects beyond wall face. Equip hood with intermediate support brackets as required to prevent sagging.
1. Galvanized Steel: Nominal 0.028-inch-thick, hot-dip galvanized-steel sheet with G90zinc coating, complying with ASTM A 653/A 653M.

2.5 LOCKING DEVICES

A Locking Device Assembly: Fabricate with cylinder lock, spring-loaded dead bolt, operating handle, cam plate, and adjustable locking bars to engage through slots in tracks.
1. Lock Cylinders: As specified in Section 08 71 00 Door Hardware and keyed to building keying system.
2. Keys: 3 for each cylinder.

2.6 CURTAIN ACCESSORIES

A Weatherseals for Exterior Doors: Equip each exterior door with weather-stripping gaskets fitted to entire exterior perimeter of door for a weather-resistant installation unless otherwise indicated.
1. At door head, use 1/8-inch-thick, replaceable, continuous-sheet baffle secured to inside of hood or field-installed on the header.
2. At door jambs, use replaceable, adjustable, continuous, flexible, 1/8-inch-thick seals of flexible vinyl, rubber, or neoprene.

2.7 COUNTERBALANCE MECHANISM

A General: Counterbalance doors by means of manufacturer's standard mechanism with an adjustable-tension, steel helical torsion spring mounted around a steel shaft and contained in a spring barrel connected to top of curtain with barrel rings. Use grease-sealed bearings or self-lubricating graphite bearings for rotating members.

B Counterbalance Barrel: Fabricate spring barrel of manufacturer's standard hot-formed, structural-quality, seamless carbon-steel pipe, of sufficient diameter and wall thickness to support rolled-up curtain without distortion of slats and to limit barrel deflection to not more than 0.03 inch./ft.of span under full load.

C Counterbalance Spring: One or more oil-tempered, heat-treated steel helical torsion springs. Size springs to counterbalance weight of curtain, with uniform adjustment accessible from outside barrel. Secure ends of springs to barrel and shaft with cast-steel barrel plugs.

D Torsion Rod for Counterbalance Shaft: Fabricate of manufacturer's standard cold-rolled steel, sized to hold fixed spring ends and carry torsional load.

E Brackets: Manufacturer's standard mounting brackets of either cast iron or cold-rolled steel plate.

2.8 GENERAL FINISH REQUIREMENTS

A Comply with NAAMM/NOMMA 500 for recommendations for applying and designating finishes.

B Appearance of Finished Work: Noticeable variations in same piece are not acceptable. 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.

2.9 STEEL AND GALVANIZED-STEEL FINISHES

A Powder-Coat Finish: Manufacturer's standard baked-on finish consisting of prime coat and thermosetting topcoat. Comply with coating manufacturer's written instructions for cleaning, pretreatment, application, and minimum dry film thickness.

1. Color: As selected by the Architect from the manufacturer’s full range of custom colors.

PART 3 EXECUTION

3.1 EXAMINATION

A Examine substrates areas and conditions, with installer present, for compliance with requirements for substrate construction and other conditions affecting performance of the work.

B Do not proceed with installation until unsatisfactory conditions have been corrected.

1. Installation of overhead coiling doors indicates acceptance of surfaces and conditions.

3.2 INSTALLATION, GENERAL

A Install overhead coiling doors and operating equipment complete with necessary hardware, anchors, inserts, hangers, and equipment supports; according to manufacturer's written instructions and as specified.

B Install overhead coiling doors, hoods, controls, and operators at the mounting locations indicated for each door.

C Accessibility: Install overhead coiling doors along accessible routes in compliance with the accessibility standard.

3.3 ADJUSTING

A Adjust hardware and moving parts to function smoothly so that doors operate easily, free of warp, twist, or distortion.

1. Adjust exterior doors and components to be weather resistant.

B Lubricate bearings and sliding parts as recommended by manufacturer.

C Adjust seals to provide tight fit around entire perimeter.

3.4 DEMONSTRATION

A If requested by Owner, engage a factory-authorized service representative to train Owner's designated personnel to adjust, operate, and maintain overhead coiling doors.

END OF SECTION 08 33 23

# 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. SSPC: Society for Protective Coatings.

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. "EFCO 406 Storefront", an Apogee Architectural Metals brand.
2. Acceptable Manufacturers: Subject to compliance with the Contract Documents provide the basis-of-design assemblies or comparable approved assemblies by one of the following.
   a. Kawneer.
   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: 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: Front.
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. "EFCO 401 Storefront", 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. Kawneer.
   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-thermal.
2. Framing Dimensions: 2 inches by 4-1/2 inches.
3. Glazing System: Retained mechanically with gaskets on 4 sides.
4. Glazing Plane: Front.
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 General: Provide entrance doors manufactured by the provided storefront manufacturers.

B Entrance Doors:
1. Basis-of-Design Entrance Doors:
   a. Exterior Doors: "EFCO D302 ThermaStile Entrance System", an Apogee Architectural Metals brand.
   b. Interior Doors: "EFCO D300 Entrance", an Apogee Architectural Metals brand.
2. Acceptable Manufacturers: Subject to compliance with the Contract Documents provide the basis-of-design doors or comparable approved doors by one of the following.
   a. Kawneer.

b. Oldcastle BuildingEnvelope.

C Accessories: Glazing stops and gaskets.

D Entrance Door Hardware: As indicated in Section 08 71 00 Door Hardware.

E 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 Clear Anodic Finish: AAMA 611, AA-M12C22A41, Class I, at least 0.018 mm thick.

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 Final Acceptance.

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.
1. Repair or replace nonconforming work and retest until work complies with specified requirements.
2. Arrange for manufacturer's technical personnel to observe repair or replacement and retesting.
3. The Architect reserves the right to require testing on an additional 2 untested areas.

D Prepare test and inspection reports.

END OF SECTION 08 41 13

# SECTION 08 71 00 - DOOR HARDWARE

## PART 1 - GENERAL

### 1.1 RELATED DOCUMENTS

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

### 1.2 SUMMARY

A. This Section includes commercial door hardware for the following:

1. Swinging doors.

B. Door hardware includes, but is not necessarily limited to, the following:

1. Mechanical door hardware.
2. Electromechanical door hardware.
3. Automatic operators.
4. Cylinders specified for doors in other sections.

C. Codes and References: Comply with the version adopted by the Authority Having Jurisdiction.

1. ANSI A117.1 - Accessible and Usable Buildings and Facilities.
2. ICC/IBC - International Building Code.
3. NFPA 70 - National Electrical Code.
4. NFPA 80 - Fire Doors and Windows.
5. NFPA 105 - Installation of Smoke Door Assemblies.
6. UL/ULC and CSA C22.2 - Standards for Automatic Door Operators Used on Fire and Smoke Barrier Doors and Systems of Doors.
7. State Building Codes, Local Amendments.

D. Standards: All hardware specified herein shall comply with the following industry standards as applicable. Any undated reference to a standard shall be interpreted as referring to the latest edition of that standard:

1. ANSI/BHMA Certified Product Standards - A156 Series.
2. UL10C - Positive Pressure Fire Tests of Door Assemblies.
3. ANSI/UL 294 - Access Control System Units.
4. UL 305 - Panic Hardware.

### 1.3 SUBMITTALS

A. Product Data: Manufacturer's product data sheets including installation details, material descriptions, dimensions of individual components and profiles, operational descriptions and finishes.

B. Door Hardware Schedule: Prepared by or under the supervision of supplier, detailing, fabrication and assembly of door hardware, as well as procedures and diagrams. Coordinate the final Door Hardware Schedule with doors, frames, and related work to ensure proper size, thickness, hand, function, and finish of door hardware.

1. Format: Comply with scheduling sequence and vertical format in DHI's "Sequence and Format for the Hardware Schedule."
2. Organization: Organize the Door Hardware Schedule into door hardware sets indicating complete designations of every item required for each door or opening. Organize door hardware sets in same order as in the Door Hardware Sets at the end of Part 3. Submittals that do not follow the same format and order as the Door Hardware Sets will be rejected and subject to resubmission.
3. Content: Include the following information:

    a. Type, style, function, size, label, hand, and finish of each door hardware item.
    b. Manufacturer of each item.
    c. Fastenings and other pertinent information.
    d. Location of door hardware set, cross-referenced to Drawings, both on floor plans and in door and frame schedule.
    e. Explanation of abbreviations, symbols, and codes contained in schedule.
    f. Mounting locations for door hardware.
    g. Door and frame sizes and materials.
    h. Warranty information for each product.

4. Submittal Sequence: Submit the final Door Hardware Schedule at earliest possible date, particularly where approval of the Door Hardware Schedule must precede fabrication of other work that is critical in the Project construction schedule. Include Product Data, Samples, Shop Drawings of other work affected by door hardware, and other information essential to the coordinated review of the Door Hardware Schedule.

C. Shop Drawings: Details of electrified access control hardware indicating the following:

1. Wiring Diagrams: Upon receipt of approved schedules, submit detailed system wiring diagrams for power, signaling, monitoring, communication, and control of the access control system electrified hardware. Differentiate between manufacturer-installed and field-installed wiring. Include the following:

    a. Elevation diagram of each unique access controlled opening showing location and interconnection of major system components with respect to their placement in the respective door openings.
    b. Complete (risers, point-to-point) access control system block wiring diagrams.
    c. Wiring instructions for each electronic component scheduled herein.

2. Electrical Coordination: Coordinate with related sections the voltages and wiring details required at electrically controlled and operated hardware openings.

D. Keying Schedule: After a keying meeting with the owner has taken place prepare a separate keying schedule detailing final instructions. Submit the keying schedule in electronic format. Include keying system explanation, door numbers, key set symbols, hardware set numbers and special instructions. Owner must approve submitted keying schedule prior to the ordering of permanent cylinders/cores.

## 1.4 CLOSEOUT SUBMITTALS

A. Operating and Maintenance Manuals: Provide manufacturers operating and maintenance manuals for each item comprising the complete door hardware installation in quantity as required in Division 01, Closeout Procedures.

1.5 QUALITY ASSURANCE

A. Manufacturers Qualifications: Engage qualified manufacturers with a minimum 5 years of documented experience in producing hardware and equipment similar to that indicated for this Project and that have a proven record of successful in-service performance.

B. Certified Products: Where specified, products must maintain a current listing in the Builders Hardware Manufacturers Association (BHMA) Certified Products Directory (CPD).

C. Installer Qualifications: A minimum 3 years documented experience installing both standard and electrified door hardware 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.

D. Door Hardware Supplier Qualifications: Experienced commercial door hardware distributors with a minimum 5 years documented experience supplying both mechanical and electromechanical hardware installations comparable in material, design, and extent to that indicated for this Project. Supplier recognized as a factory direct distributor by the manufacturers of the primary materials with a warehousing facility in Project's vicinity. Supplier to have on staff a certified Architectural Hardware Consultant (AHC) available during the course of the Work to consult with Contractor, Architect, and Owner concerning both standard and electromechanical door hardware and keying.

E. Source Limitations: Obtain each type and variety of door hardware specified in this section from a single source unless otherwise indicated.

1. Electrified modifications or enhancements made to a source manufacturer's product line by a secondary or third party source will not be accepted.
2. Provide electromechanical door hardware from the same manufacturer as mechanical door hardware, unless otherwise indicated.

F. Each unit to bear third party permanent label indicating compliance with the referenced testing standards.

G. Pre-Submittal Conference: Conduct coordination conference in compliance with requirements in Division 01 Section "Project Meetings" with attendance by representatives of Supplier(s), Installer(s), and Contractor(s) to review proper methods and the procedures for receiving, handling, and installing door hardware.

1. Prior to installation of door hardware, conduct a project specific training meeting to instruct the installing contractors' personnel on the proper installation and adjustment of their respective products. Product training to be attended by installers of door hardware (including electromechanical hardware) for aluminum, hollow metal and wood doors. Training will include the use of installation manuals, hardware schedules, templates and physical product samples as required.
2. Inspect and discuss electrical roughing-in, power supply connections, and other preparatory work performed by other trades.
3. Review sequence of operation narratives for each unique access controlled opening.
4. Review and finalize construction schedule and verify availability of materials.
5. Review the required inspecting, testing, commissioning, and demonstration procedures

H. At completion of installation, provide written documentation that components were applied according to manufacturer's instructions and recommendations and according to approved schedule.

1.6 DELIVERY, STORAGE AND HANDLING

A. Inventory door hardware on receipt and provide secure lock-up and shelving for door hardware delivered to Project site. Do not store electronic access control hardware, software or accessories at Project site without prior authorization.

B. Tag each item or package separately with identification related to the final Door Hardware Schedule, and include basic installation instructions with each item or package.

C. Deliver, as applicable, permanent keys, cylinders, cores, access control credentials, software and related accessories directly to Owner via registered mail or overnight package service. Instructions for delivery to the Owner shall be established at the "Keying Conference".

1.7 COORDINATION

A. Templates: Obtain and distribute to the parties involved templates for doors, frames, and other work specified to be factory prepared for installing standard and electrified hardware. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing hardware to comply with indicated requirements.

B. Door Hardware and Electrical Connections: Coordinate the layout and installation of scheduled electrified door hardware and related access control equipment with required connections to source power junction boxes, low voltage power supplies, detection and monitoring hardware, and fire and detection alarm systems.

C. Door and Frame Preparation: Doors and corresponding frames are to be prepared, reinforced and pre-wired (if applicable) to receive the installation of the specified electrified, monitoring, signaling and access control system hardware without additional in-field modifications.

1.8 WARRANTY

A. General Warranty: Reference Division 01, General Requirements. Special warranties specified in this Article shall not deprive Owner of other rights Owner may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by Contractor under requirements of the Contract Documents.

B. Warranty Period: Written warranty, executed by manufacturer(s), agreeing to repair or replace components of standard and electrified door hardware that fails in materials or workmanship within specified warranty period after final acceptance by the Owner. Failures include, but are not limited to, the following:

1. Structural failures including excessive deflection, cracking, or breakage.
2. Faulty operation of the hardware.
3. Deterioration of metals, metal finishes, and other materials beyond normal weathering.
4. Electrical component defects and failures within the systems operation.

C. Warranty Period: Unless otherwise indicated, warranty shall be one year from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Hardware shall not have any visible manufacturer names on exposed materials, except cylinders, when the door is in a closed position.

2.2 BUTT HINGES

A. Hinges: ANSI/BHMA A156.1 butt hinges with number of hinge knuckles and other options as specified in the Door Hardware Sets.

1. Quantity: Provide the following hinge quantity:

a. Two Hinges: For doors with heights up to 60 inches.
b. Three Hinges: For doors with heights 61 to 90 inches.
c. Four Hinges: For doors with heights 91 to 120 inches.
d. For doors with heights more than 120 inches, provide 4 hinges, plus 1 hinge for every 30 inches of door height greater than 120 inches.

2. Hinge Size: Provide the following, unless otherwise indicated, with hinge widths sized for door thickness and clearances required:

a. Widths up to 3’0”: 4-1/2” standard or heavy weight as specified.
b. Sizes from 3’1” to 4’0”: 5” standard or heavy weight as specified.

3. Hinge Weight and Base Material: Unless otherwise indicated, provide the following:

a. Exterior Doors: Heavy weight, non-ferrous, ball bearing or oil impregnated bearing hinges unless Hardware Sets indicate standard weight.
b. Interior Doors: Standard weight, steel, ball bearing or oil impregnated bearing hinges unless Hardware Sets indicate heavy weight.

4. Hinge Options: Comply with the following:

a. Non-removable Pins: With the exception of electric through wire hinges, provide set screw in hinge barrel that, when tightened into a groove in hinge pin, prevents removal of pin while door is closed; for all out-swinging lockable doors.

5. Manufacturers:

a. Hager Companies (HA) - BB Series, 5-knuckle.
b. Ives (IV) - 5BB Series, 5-knuckle.
c. McKinney (MK) - TA/T4A Series, 5-knuckle.

2.3 CONTINUOUS HINGES

A. Continuous Geared Hinges: ANSI/BHMA A156.26 Grade 1-600 continuous geared hinge. with minimum 0.120-inch thick extruded 6063-T6 aluminum alloy hinge leaves and a minimum overall width of 4 inches. Hinges are non-handed, reversible and fabricated to template screw locations. Factory trim hinges to suit door height and prepare for electrical cut-outs.

1. Where specified, provide modular continuous geared hinges that ship in two or three pieces and form a single continuous hinge upon installation.
2. Manufacturers:.

    a. Hager Companies (HA).
    b. Ives (IV).
    c. Pemko (PE).

## 2.4 POWER TRANSFER DEVICES

A. Concealed Quick Connect Electric Power Transfers: Provide concealed wiring pathway housing mortised into the door and frame for low voltage electrified door hardware. Furnish with Molex™ standardized plug connectors and sufficient number of concealed wires (up to 12) to accommodate the electrified functions specified in the Door Hardware Sets. Connectors plug directly to through-door wiring harnesses for connection to electric locking devices and power supplies. Wire nut connections are not acceptable.

    1. Manufacturers:

        a. Architectural Builders Hardware (AH) - PT1000-EZ Series.
        b. Pemko (PE) - EL-CEPT Series.
        c. Securitron (SU) - EL-CEPT Series.

B. Electric Door Wire Harnesses: Provide electric/data transfer wiring harnesses with standardized plug connectors to accommodate up to twelve (12) wires. Connectors plug directly to through-door wiring harnesses for connection to electric locking devices and power supplies. Provide sufficient number and type of concealed wires to accommodate electric function of specified hardware. Provide a connector for through-door electronic locking devices and from hinge to junction box above the opening. Wire nut connections are not acceptable. Determine the length required for each electrified hardware component for the door type, size and construction, minimum of two per electrified opening.

    1. Provide one each of the following tools as part of the base bid contract:

        a. McKinney (MK) - Electrical Connecting Kit: QC-R001.
        b. McKinney (MK) - Connector Hand Tool: QC-R003.

## 2.5 DOOR OPERATING TRIM

A. Flush Bolts and Surface Bolts: Provide products conforming to ANSI/BHMA A156.3 and A156.16, Grade 1.

    1. Flush bolts to be furnished with top rod of sufficient length to allow bolt retraction device location approximately six feet from the floor.
    2. Furnish dust proof strikes for bottom bolts.
    3. Surface bolts to be minimum 8” in length and U.L. listed for labeled fire doors and U.L. listed for windstorm components where applicable.
    4. Provide related accessories (mounting brackets, strikes, coordinators, etc.) as required for appropriate installation and operation.
    5. Manufacturers:

        a. Burns Manufacturing (BU).

b. Door Controls International (DC).
c. Rockwood (RO).

B. Coordinators: ANSI/BHMA A156.3 door coordinators consisting of active-leaf, hold-open lever and inactive-leaf release trigger. Model as indicated in hardware sets.

1. Manufacturers:

a. Burns Manufacturing (BU).
b. Door Controls International (DC).
c. Rockwood (RO).

C. Door Push Plates and Pulls: ANSI/BHMA A156.6 door pushes and pull units of type and design specified in the Hardware Sets. Coordinate and provide proper width and height as required where conflicting hardware dictates.

1. Push/Pull Plates: Minimum .050 inch thick, size as indicated in hardware sets, with beveled edges, secured with exposed screws unless otherwise indicated.
2. Door Pull and Push Bar Design: Size, shape, and material as indicated in the hardware sets. Minimum clearance of 2 1/2-inches from face of door unless otherwise indicated.
3. Offset Pull Design: Size, shape, and material as indicated in the hardware sets. Minimum clearance of 2 1/2-inches from face of door and offset of 90 degrees unless otherwise indicated.
4. Pulls shall be provided with a 10” clearance from the finished floor on the push side to accommodate wheelchair accessibility.
5. Fasteners: Provide manufacturer's designated fastener type as indicated in Hardware Sets. When through-bolt fasteners are in the same location as a push plate, countersink the fasteners flush with the door face allowing the push plate to sit flat against the door.
6. Manufacturers:

a. Burns Manufacturing (BU).
b. Ives (IV).
c. Rockwood (RO).

## 2.6 CYLINDERS AND KEYING

A. General: Cylinder manufacturer to have minimum (10) years’ experience designing secured master key systems and have on record a published security keying system policy.

B. Cylinder Types: Original manufacturer cylinders able to supply the following cylinder formats and types:

1. Threaded mortise cylinders with rings and cams to suit hardware application.
2. Rim cylinders with back plate, flat-type vertical or horizontal tailpiece, and raised trim ring.
3. Tubular deadlocks and other auxiliary locks.
4. Mortise and rim cylinder collars to be solid and recessed to allow the cylinder face to be flush and be free spinning with matching finishes.
5. Keyway: Manufacturer’s Standard.

C. Keying System: Each type of lock and cylinders to be factory keyed alike.

D. Key Quantity: Provide the following minimum number of keys:

1. Construction Keys: Ten (10).

E. Construction Keying: Provide construction master keyed cylinders keyed alike (KA) for use during construction phase to be replaced with digital cylinders after substantial construction is complete.

2.7 DIGITAL CYLINDERS AND KEYS

A. Digital Cylinders: Provide original manufacturer cylinders to meet the following minimal requirements:

1. Cylinders operate as key-based product.
2. Cylinders combine both electronic technology and mechanical pinning for two independent forms of security protection.

a. Mechanical protection includes:
   1) Three locking elements consisting of a slider mechanism, a sidebar mechanism with tumbler rotation and pin tumbler elevation.
   2) Lock tumblers with dual-axis action, with one axis utilized for pin tumbler rotation and the other axis utilized for positioning key cuts.
   3) Automatic mechanical relock upon removal of the key without the aid of battery power.

b. Electronic protection includes:
   1) Unique security code for every system.
   2) Electronic communication protected by minimum of 64-bit DES encryption.

c. Cylinders automatically relock upon removal of the key without the aid of battery power.

3. Cylinders shall install without requiring any wiring or electricity and are capable of retrofitting existing hardware without any special door or door frame modifications.

a. Cylinders to provide time-stamped electronic audit with no less than 750 operations or attempted operations and stored in non-volatile memory within the cylinder and accessible with an administrative key that holds no less than 2000 records.
b. Provide scheduling with no less than 1000 user groups per cylinder and 1000 individual users per user group.
c. Retrofit into rim, mortise, or key-in-lever cylinder types, and auxiliary locks (deadbolts, padlocks).

B. Digital Keys: Provide original manufacturer keys to meet the following minimum requirements:

1. Keys to combine both electronic technology and mechanical pinning for two independent forms of security protection.

a. Mechanical Security Features:
   1) Keys to be protected by U.S. Utility patent to ensure against unlawful key duplication.
   2) Key must have no fewer than 6 mechanical cuts with varying depths and angles to each cut.
   3) Key must be no less than .125” thick for strength.
   4) Capable of providing a single master key with over 1,000,000 (1 million) usable, not interchangeable change keys in a single keyway.

b. Electronic Security Features:
   1) Key electronic security codes are to be unique to any system with electronic communication a minimum 64-bit DES encryption.
   2) Keys to provide access control functions with non-volatile system programming allowing loss of battery life to retain key access rights, and/or audit records.

2. Keys to allow different schedules for up to 30 different cylinder groups.
3. Keys to operate cylinder type products with a minimum capacity of 1000 user groups per key and 1000 individual users per user group.
4. Keys to provide a time-stamped audit for up to the most recent 1000 operations or attempted operations.
5. Keys are powered by a watch-style battery, model CR2025.
6. Keys to provide multiple level battery indicator via flashing LED and audible tone.
7. Keys to be compact in design and operate in a similar manner as mechanical key.
8. Keys shall not be limited by a timeframe to unlock the cylinder once inserted, if key is properly authorized.
9. Keys to require no additional maintenance other than regular battery replacement.
10. Key Quantities: Provide the following:

    a. E3 Dynamic User Key: Two per each cylinder keyset.
    b. Control Key: Two.

C. Programming Devices: Provide stations for the programming of keys. Provide the necessary cables and system dongles for full operation.

1. Provide one local programming device.
2. Provide one mobile programming device.

D. Digital Electronic Cylinder System Software: Provide digital cylinder manufacturer's original management software supporting the following features:

1. Provide web hosted Basic version of the software.
2. Auditing capability of the digital cylinder and the key.
3. Product management by the system software with the following provisions:

    a. Lost or stolen keys to be deactivated from the system.
    b. User schedules set uniquely for each key holder.
    c. Software access protected by password and unique system authorization key.
    d. System capacity to operate up to 65,535 keys.

E. Manufacturers:

1. Medeco High Security Locks (MC) - CLIQ Digital Cylinders and Keys. [OWNER PREFERRED]
2. Mul-T-Lock (MTL) - CLIQ Digital Cylinders and Keys.
3. ASSA Lock (ASSA) - CLIQ Digital Cylinders and Keys.

## 2.8 MORTISE LOCKS AND LATCHING DEVICES

A. Mortise Locksets, Grade 1 (Heavy Duty): Provide ANSI/BHMA A156.13, Series 1000, Operational and Security Grade 1 Certified Products Directory (CPD) listed mortise locksets. Listed manufacturers shall meet all functions and features as specified herein.

1. Manufacturers:

    a. ASSA ABLOY ACCENTRA (YA) - 8800FL Series.
    b. Corbin Russwin Hardware (RU) - ML2000 Series.
    c. Sargent Manufacturing (SA) - 8200 Series.

2.9 DEADLOCKS AND LATCHES

A. Mortise Deadlocks, Small Case: ANSI/BHMA A156.36, Grade 1, small case mortise type deadlocks constructed of heavy gauge wrought corrosion resistant steel. Steel or stainless steel bolts with a 1" throw and hardened steel roller pins. Deadlocks to be products of the same source manufacturer and keyway as other specified locksets.

1. Manufacturers:

    a. ASSA ABLOY ACCENTRA (YA) - 350 Series.
    b. Corbin Russwin Hardware (RU) - DL4000 Series.
    c. Sargent Manufacturing (SA) - 4870 Series.

2.10 LOCK AND LATCH STRIKES

A. Strikes: Provide manufacturer's standard strike with strike box for each latch or lock bolt, with curved lip extended to protect frame, finished to match door hardware set, unless otherwise indicated, and as follows:

1. Flat-Lip 7/8” LTC Strikes: For locks on door pairs equipped with overlapping astragal.
2. Extra-Long-Lip Strikes: For locks used on frames with applied wood casing trim.
3. Aluminum-Frame Strike Box: Provide manufacturer's special strike box fabricated for aluminum framing.

B. Standards: Comply with the following:

1. Strikes for Mortise Locks and Latches: BHMA A156.13.
2. Strikes for Auxiliary Deadlocks: BHMA A156.36.
3. Dustproof Strikes: BHMA A156.16.

2.11 CONVENTIONAL EXIT DEVICES

A. General Requirements: All exit devices specified herein shall meet or exceed the following criteria:

1. Exit devices shall have a five-year warranty.
2. At doors not requiring a fire rating, provide devices complying with NFPA 101 and listed and labeled for "Panic Hardware" according to UL305. Provide proper fasteners as required by manufacturer including sex nuts and bolts at openings specified in the Hardware Sets.
3. Where exit devices are required on fire rated doors, provide devices complying with NFPA 80 and with UL labeling indicating "Fire Exit Hardware". Provide devices with the proper fasteners for installation as tested and listed by UL. Consult manufacturer’s catalog and template book for specific requirements.

4. Except on fire rated doors, provide exit devices with hex key dogging device to hold the pushbar and latch in a retracted position. Provide optional keyed cylinder dogging on devices where specified in Hardware Sets.
5. Devices must fit flat against the door face with no gap that permits unauthorized dogging of the push bar. The addition of filler strips is required in any case where the door light extends behind the device as in a full glass configuration.
6. Lever Operating Trim: Where exit devices require lever trim, furnish manufacturer's heavy duty escutcheon trim with threaded studs for thru-bolts.

    a. Lock Trim Design: As indicated in Hardware Sets, provide finishes and designs to match that of the specified locksets.
    b. Where function of exit device requires a cylinder, provide a cylinder (Rim or Mortise) as specified in Hardware Sets.

7. Vertical Rod Exit Devices: Where surface or concealed vertical rod exit devices are used at interior openings, provide as less bottom rod (LBR) unless otherwise indicated. Provide dust proof strikes where thermal pins are required to project into the floor.
8. Narrow Stile Applications: At doors constructed with narrow stiles, or as specified in Hardware Sets, provide devices designed for maximum 2” wide stiles.
9. Dummy Push Bar: Nonfunctioning push bar matching functional push bar.
10. Rail Sizing: Provide exit device rails factory sized for proper door width application.
11. Through Bolt Installation: For exit devices and trim as indicated in Door Hardware Sets.

B. Conventional Push Rail Exit Devices (Heavy Duty): ANSI/BHMA A156.3, Grade 1 Certified Products Directory (CPD) listed exit devices. Listed manufacturers shall meet all functions and features as specified herein.

1. Provide exit devices with functions and features as follows:

    a. Where required by code, provide knurling or abrasive coating on all levers leading to hazardous areas.
    b. Meets UL and CUL Standard 10C Positive Pressure, Fire Test of Door Assemblies with levers that meet A117.1 Accessibility Code.
    c. No catch points: addition of applied deflectors or other added components are not allowed.
    d. No visible plastic.
    e. Heavy duty end caps with flush and overlapping options made of stainless steel, brass, or bronze with architectural finishes.
    f. Constructed of all stainless steel.
    g. Stainless steel pullman type latch with deadlock feature.
    h. Narrow or wide style exterior trim as specified in the hardware sets.
    i. Center case adjustability on concealed vertical rod exit devices; single operation with hex key individually adjusts top or bottom latches. No retainer screws or clips required to maintain adjustment.
    j. Ten-year limited warranty for mechanical features.

2. Electromechanical exit devices shall have the following functions and features:

    a. Universal Molex plug-in connectors that have standardized color-coded wiring and are field configurable in fail safe or fail secure and operate from 12vdc to 24vdc regulated.
    b. Wire routing for all non-access control electromechanical functions and EcoFlex trim to be contained within the carrier of the device eliminating the need for cavities in

doors to be drilled. Include a protective film so that wires don't get damaged if the rail needs to be removed.

c. EcoFlex or equivalent technology that reduces energy consumption up to 92% as certified by GreenCircle.
d. Options to be available for request-to-exit or enter signaling, latchbolt and touchbar monitoring.
e. Field configurable electrified trim to fail-safe or fail-secure that operates from 12-24VDC.

3. Manufacturers:

a. Corbin Russwin Hardware (RU) - PED4000 / PED5000 Series.
b. Sargent Manufacturing (SA) - PE80 Series.
c. Von Duprin (VD) - 35A/98 XP Series.

## 2.12 SURFACE DOOR CLOSERS

A. All door closers specified herein shall meet or exceed the following criteria:

1. General: Door closers to be from one manufacturer, matching in design and style, with the same type door preparations and templates regardless of application or spring size. Closers to be non-handed with full sized covers.
2. Standards: Closers to comply with UL-10C for Positive Pressure Fire Test and be U.L. listed for use of fire rated doors.
3. Cycle Testing: Provide closers which have surpassed 15 million cycles.
4. Size of Units: Comply with manufacturer's written recommendations for sizing of door closers depending on size of door, exposure to weather, and anticipated frequency of use. Where closers are indicated for doors required to be accessible to the Americans with Disabilities Act, provide units complying with ANSI ICC/A117.1.
5. Closer Arms: Provide heavy duty, forged steel closer arms unless otherwise indicated in Hardware Sets.
6. Closers shall not be installed on exterior or corridor side of doors; where possible install closers on door for optimum aesthetics.
7. Closer Accessories: Provide door closer accessories including custom templates, special mounting brackets, spacers and drop plates as required for proper installation. Provide through-bolt and security type fasteners as specified in the hardware sets.

B. Door Closers, Surface Mounted (Heavy Duty): ANSI/BHMA A156.4, Grade 1 Certified Products Directory (CPD) listed surface mounted, heavy duty door closers with complete spring power adjustment, sizes 1 thru 6; and fully operational adjustable according to door size, frequency of use, and opening force. Closers to be rack and pinion type, one piece cast iron or aluminum alloy body construction, with adjustable backcheck and separate non-critical valves for closing sweep and latch speed control. Provide non-handed units standard.

1. Heavy duty surface mounted door closers shall have a 30-year warranty.

2. Manufacturers:

a. ASSA ABLOY ACCENTRA (YA) - 4400 Series.
b. Corbin Russwin Hardware (RU) - DC6000 Series.
c. Norton Rixson (NO) - 7500 Series.

C. Door Closers, Surface Mounted (Unitrol): ANSI/BHMA A156.4, Grade 1 Certified Products Directory (CPD) listed surface mounted closers with door stop mechanism to absorb dead stop shock on arm and top hinge. Hold-open arms to have a spring loaded mechanism in addition to shock absorber assembly. Arms to be provided with rigid steel main arm and secondary arm lengths proportional to the door width.

1. Manufacturers:

a. ASSA ABLOY ACCENTRA (YA) - Unitrol Series.
b. Corbin Russwin Hardware (RU) - Unitrol Series.
c. Norton Rixson (NO) - Unitrol Series.

## 2.13 ELECTROHYDRAULIC DOOR OPERATORS

A. Electrohydraulic Door Operators (High Traffic): Provide ANSI/BHMA A156.19 Certified Products Directory (CPD) listed low energy operators that meet ANSI/BHMA A156.4 requirements and are UL listed for use on fire rated doors and UL10C certified that comply with requirements for the Americans with Disabilities Act (ADA). Operators shall be verified by GreenCircle to offer energy savings of 19% when compared to similar products to accommodate openings up 250 pounds and 48” wide. Provide accessories such as custom templates, special mounting brackets, spacers and drop plates as needed for proper installation. Operators shall accommodate openings up to 200 pounds and 48” wide. Listed manufacturers shall meet all functions and features as specified herein.

1. Provide operators with features as follows:

a. Non-handed with push and pull side mounting.
b. Operates as mechanical surface closer during close cycles, when door is opened manually or if power is off.
c. Activation by push button, hands-free or radio frequency devices.
d. On board electronics to collect usage and cycle count data to facilitate preventative maintenance/diagnostics.
e. Two-year limited warranty.
f. Wi-Fi interface where the operator is a secure, password protected WiFi hot spot with no connection to building’s IT required.
   1) Simple setup with no app required.
   2) View status and make adjustments without removing the cover.
   3) Built-in logic to support single use restroom applications with no external relay boards, logic modules, position switches required.
g. Mounting backplate to simplify and speed up installation.

2. Operators shall have the following functionality:

a. Adjustable Hold Open: Amount of time a door will stay in the full open position after an activation.
b. Blow Open for Smoke Ventilation: Door opens when signal is received from alarm system allowing air or smoke to flow through opening. Door will stay open until signal from alarm system is stopped.
c. Infinite Hold Open: Door will hold open at set position until power is turned off.
d. Obstruction Detection: Door closes if it hits an obstruction while opening; door will reverse to open position if it hits an obstruction while closing. Door will stop once it hits an obstruction and will rest against the obstruction until removed.
e. Open Delay: Delays operator opening for locking hardware.

f. Overload Safety Shut-Off: After two minutes of receiving a door activation signal, inverter times out and door closes to prevent motor/inverter damage.
g. Presence Detector Input: Input for external sensor to detect presence at door open or close position only.
h. Push & Go: As the door is manually opened, the operator "senses" movement and opens door to the full-open position.
i. Selector Mode Switch: Off disables the signal inputs unless Blow Open is activated, on activates the signal inputs, hold open activates the unit (unless Blow Closed is activated) to the hold open position.
j. Vestibule Delay: When the wall switch is pressed, first door in vestibule will open. Second door will open once vestibule door delay has expired. Delay is adjustable.

3. Manufacturers:

a. Gyrotech Nabco - GT500 Series.
b. LCN (LC) - 4630/4640 Series.
c. Norton Rixson (NO) - 6000 Series.

## 2.14 ARCHITECTURAL TRIM AND ACCESSORIES

A. Door, Frame and Wall Protective Trim: ANSI/BHMA A156.6, protective products as specified in the hardware sets. Door protection plates shall be not more than 2" less than door width on stop side and 1” less door width on the pull side or on stop side of pairs of doors. Listed manufacturers shall meet all functions and features as specified herein.

1. Provide protective trim with functions and features as follows:

a. Meets ADA requirements for smooth bottom door surfaces.
b. UL Classified options for use on fire-rated doors up to 3 hours.
c. Fabricated from stainless steel, brass, bronze, aluminum, or high-impact plastic.
d. Available in a variety of sizes, finishes, and profiles to suit aesthetic and functional requirements.
e. Designed to protect doors, frames, and adjacent walls from damage due to impact, abrasion, or traffic.
f. Fasteners included; adhesive-backed options available for select models.
g. Ten-year limited warranty.

2. Manufacturers:

a. Burns Manufacturing (BU).
b. Hiawatha, Inc. (HI).
c. Rockwood (RO).

## 2.15 DOOR STOPS AND HOLDERS

A. Door Stops and Bumpers: ANSI/BHMA A156.16, Grade 1 door stops and wall bumpers. Provide wall bumpers, either convex or concave types with anchorage as indicated, unless floor or other types of door stops are specified in Hardware Sets. Do not mount floor stops where they will impede traffic. Where floor or wall bumpers are not appropriate, provide overhead type stops and holders.

1. Manufacturers:

a. Burns Manufacturing (BU).
b. Hiawatha, Inc. (HI).
c. Rockwood (RO).

B. Overhead Door Stops and Holders: ANSI/BHMA A156.8, Grade 1 Certified Products Directory (CPD) listed overhead stops and holders to be surface or concealed types as indicated in Hardware Sets. Track, slide, arm and jamb bracket to be constructed of extruded bronze and shock absorber spring of heavy tempered steel. Provide non-handed design with mounting brackets as required for proper operation and function.

1. Manufacturers:

a. Norton Rixson (NO).
b. Rockwood (RO).
c. Sargent Manufacturing (SA).

2.16 ARCHITECTURAL SEALS

A. General: Thresholds, weatherstripping, and gasket seals to be of type and design as specified below or in the Hardware Sets. Provide continuous weatherstrip gasketing on exterior doors and provide smoke, light, or sound gasketing on interior doors where indicated. At exterior applications provide non-corrosive fasteners and elsewhere where indicated.

B. Smoke Labeled Gasketing: Assemblies complying with NFPA 105 that are 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.

1. Provide smoke labeled perimeter gasketing at all smoke labeled openings.

C. Fire Labeled Gasketing: Assemblies complying with NFPA 80 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire ratings indicated, based on testing according to UL-10C.

1. Provide intumescent seals as indicated to meet UL10C Standard for Positive Pressure Fire Tests of Door Assemblies, and NFPA 252, Standard Methods of Fire Tests of Door Assemblies.

D. Sound-Rated Gasketing: Assemblies that are listed and labeled by a testing and inspecting agency, for sound ratings indicated.

E. Replaceable Seal Strips: Provide only those units where resilient or flexible seal strips are easily replaceable and readily available from stocks maintained by manufacturer.

F. Manufacturers:

1. Pemko (PE).
2. Reese Enterprises, Inc. (RE).
3. Zero (ZE).

2.17 BOLLARDS AND PEDESTALS

A. Bollards, pedestals, housings, and accessories used to contain access control devices. Listed manufacturers shall meet all functions and features as specified herein.

1. Provide products with functions and features as follows:

a. Compliant with the Americans with Disabilities Act (ADA) and all local building codes and standards.
b. All seams and edges continuously welded and closed to prevent water intrusion.
c. Removable panels for access to areas that require mounting, wire pass, and otherwise inaccessible areas.
d. Tapered weather shroud on housings.
e. Removable access door gasketed using EPDM rubber seals or equivalent.
f. Stainless steel hinges.
g. Powder coat or hot dipped galvanized with stainless steel or polycarbonate finish as specified.

2. Manufacturers:

a. Pedestal PRO (PP).
b. BEA, Inc. (BEA)
c. Wick’s Manufacturing, Inc. (WMI)
d. Or equal.

2.18 ELECTRONIC ACCESSORIES

A. Push-Button Switches: Industrial grade momentary or alternate contact, back-lighted push buttons with stainless-steel switch enclosures. 12/24 VDC bi-color illumination suitable for either flush or surface mounting.

1. Manufacturers:

a. Alarm Controls (AK) - TS Series.
b. Security Door Controls (SD) - 400 Series.
c. Securitron (SU) - PB Series.

B. Door Position Switches: Door position magnetic reed contact switches specifically designed for use in commercial door applications. On recessed models the contact and magnetic housing snap-lock into a 1" diameter hole. Surface mounted models include wide gap distance design complete with armored flex cabling. Provide SPDT, N/O switches with optional Rare Earth Magnet installation on steel doors with flush top channels.

1. Manufacturers:

a. Alarm Controls (AK) - CP1-1026 Series.
b. Sargent Manufacturing (SA) - 3280 Series.
c. Securitron (SU) - DPS Series.

C. Linear Power Supplies: Filtered and regulated power for electrified hardware. Listed manufacturers shall meet all functions and features as specified herein.

1. Provide power supplies with functions and features as follows:

    a. 120VAC input with selectable output at 12VDC (6 amp) or 24VDC (3 amp).
    b. Internal back-up battery (batteries not included) charging circuit.
    c. Regulated and filtered, fuse protected outputs.
    d. Each output can be individually turned on and off via a jumper.
    e. Power status of each output is shown by an LED.
    f. Fire alarm interface; dry contacts NO/NC, 9-33VDC, 3-15mA.

2. Manufacturers:

    a. Sargent (SA).
    b. Life Safety Power (LP).
    c. Securitron (SU).

## 2.19 SYSTEM APPLICATION SOFTWARE

A. Stand Alone Computer Managed Software: Provide software and handheld programmable transmitter, capable of working with Microsoft Windows operating systems, required to program time zone periods, holidays, automatic unlock with first entry, and listing 2,000 event transaction history - unlock, egress activation, entry into programming mode, date, time, user number, and door number.

1. Manufacturers:

    a. Provide manufacturer's standard management software compatible with the specified digital cylinders and keys.

## 2.20 FABRICATION

A. Fasteners: Provide door hardware manufactured to comply with published templates generally prepared for machine, wood, and sheet metal screws. Provide screws according to manufacturers recognized installation standards for application intended.

## 2.21 FINISHES

A. Standard: Designations used in the Hardware Sets and elsewhere indicate hardware finishes complying with ANSI/BHMA A156.18, including coordination with traditional U.S. finishes indicated by certain manufacturers for their products.

B. Provide quality of finish, including thickness of plating or coating (if any), composition, hardness, and other qualities complying with manufacturer's standards, but in no case less than specified by referenced standards for the applicable units of hardware

C. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine scheduled openings, with Installer present, for compliance with requirements for installation tolerances, labeled fire door assembly construction, wall and floor construction, and other conditions affecting performance.

B. Notify architect of any discrepancies or conflicts between the door schedule, door types, drawings and scheduled hardware. Proceed only after such discrepancies or conflicts have been resolved in writing.

3.2 PREPARATION

A. Hollow Metal Doors and Frames: Comply with ANSI/DHI A115 series.

B. Wood Doors: Comply with ANSI/DHI A115-W series.

3.3 INSTALLATION

A. Install each item of mechanical and electromechanical hardware and access control equipment to comply with manufacturer's written instructions and according to specifications.

1. Installers are to be trained and certified by the manufacturer on the proper installation and adjustment of fire, life safety, and security products including: hanging devices; locking devices; closing devices; and seals.

B. Paint prime coated mullions to match frames.

C. Mounting Heights: Mount door hardware units at heights indicated in following applicable publications, unless specifically indicated or required to comply with governing regulations:

1. Standard Steel Doors and Frames: DHI's "Recommended Locations for Architectural Hardware for Standard Steel Doors and Frames."
2. DHI TDH-007-20: Installation Guide for Doors and Hardware.
3. Where indicated to comply with accessibility requirements, comply with ANSI A117.1 "Accessibility Guidelines for Buildings and Facilities."
4. Provide blocking in drywall partitions where wall stops or other wall mounted hardware is located.

D. Retrofitting: Install door hardware to comply with manufacturer's published templates and written instructions. Where cutting and fitting are required to install door hardware onto or into surfaces that are later to be painted or finished in another way, coordinate removal, storage, and reinstallation of surface protective trim units with finishing work specified in Division 9 Sections. Do not install surface-mounted items until finishes have been completed on substrates involved.

E. Push Plates and Door Pulls: When through-bolt fasteners are in the same location as a push plate, countersink the fasteners flush with the door face allowing the push plate to sit flat against the door.

F. Thresholds: Set thresholds for exterior and acoustical doors in full bed of sealant complying with requirements specified in Division 7 Section "Joint Sealants."

G. Storage: Provide a secure lock up for hardware delivered to the project but not yet installed. Control the handling and installation of hardware items so that the completion of the work will not be delayed by hardware losses before and after installation.

## 3.4 FIELD QUALITY CONTROL

A. Field Inspection (Punch Report): Reference Division 01 Sections “Closeout Procedures”. Produce project punch report for each installed door opening indicating compliance with approved submittals and verification hardware is properly installed, operating and adjusted. Include list of items to be completed and corrected, indicating the reasons or deficiencies causing the Work to be incomplete or rejected.

1. Organization of List: Include separate Door Opening and Deficiencies and Corrective Action Lists organized by Mark, Opening Remarks and Comments, and related Opening Images and Video Recordings.

## 3.5 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.

## 3.6 CLEANING AND PROTECTION

A. Protect all hardware stored on construction site in a covered and dry place. Protect exposed hardware installed on doors during the construction phase. Install any and all hardware at the latest possible time frame.

B. Clean adjacent surfaces soiled by door hardware installation.

C. Clean operating items as necessary to restore proper finish. Provide final protection and maintain conditions that ensure door hardware is without damage or deterioration at time of owner occupancy.

## 3.7 DEMONSTRATION

A. Instruct Owner's maintenance personnel to adjust, operate, and maintain mechanical and electromechanical door hardware.

## 3.8 DOOR HARDWARE SETS

A. The hardware sets represent the design intent and direction of the owner and architect. They are a guideline only and should not be considered a detailed hardware schedule. Discrepancies, conflicting hardware and missing items should 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 and functionality.

1. Quantities listed are for each pair of doors, or for each single door.
2. The supplier is responsible for handing and sizing all products.

3. Where multiple options for a piece of hardware are given in a single line item, the supplier shall provide the appropriate application for the opening.

## Hardware Sets

### Set: 1.0

Doors: 100A, 144A

Description: Exterior SF Alum Exit Pair - Auto Operator, Card Reader (PH)

| | | | | | |
|---|---|---|---|---|---|
| 2 | Continuous Hinge | CFM_SLF-HD1 PT x Length Required | | PE | |
| 2 | Electric Power Transfer | EL-CEPT | 630 | SU | ⚡ |
| 1 | CVR MELR Exit, Exit Only | PED4801 MELR EO AD M92 | 630 | RU | |
| 1 | CVR MELR Exit, Key Trim | PED4850T MELR M48 PED159 AD M92 KA | 630 | RU | |
| 1 | CLIQ Mortise Cylinder | 100500C | 26 | MC | ⚡ |
| 2 | Offset Door Pull | RM7330-24 Mtg-Type 12HD | US32D | RO | |
| 1 | Automatic Opener W HD Arm Stop | D6061-36 (dual-pair) 120V | 689 | NO | ⚡ |
| 1 | Pedestal | ADA-SS-TWR-47x4x6-2 CR Prep | | PP | |
| 2 | ADO Door Switch | 671 | | NO | ⚡ |
| 2 | Sweep | 3452CNB | | PE | |
| 1 | Threshold (vreify per sill detail) | 25_x_AFG MSES25SS-2 | | PE | |
| 2 | ElectroLynx Harness - Frame | QC-C1500P | | MK | ⚡ |
| 2 | ElectroLynx Harness - Door | QC-CXXX (Size as required) | | MK | ⚡ |
| 2 | Positition Switch | CP1-1026 DPDT | WT | AK | ⚡ |
| 1 | Power Supply | LSP-12-24 (Coordinate w/ Security Contractor) | | RU | ⚡ |
| 1 | HID Card Reader | Furnished by Security Contractor | | | |
| 1 | Wiring Diagram | Elevation and Point to Point as Specified | | | |
| 1 | Gasket | Furnished with Aluminum Door/Frame | | | |

Notes: Operator to utilize Vestibule Delay function
Operational Narrative:
1. Doors normally closed and secure.
2. Authorized access by card reader retracting exit device latches for predetermined time limit. Exit device latches can be electrically held retracted for open access.
3. ADO access by actuator switch. In locked condition, actuator energized only upon valid card reader presentation.
4. Egress free for immediate exit. ADO egress by actuator switch.
5. REX switch in push rail allows authorized exit without alarm condition.
6. Door position switches monitor open/closed status.
7. Exit device latches release (fail secure, doors remain latched) in event of power loss. Keyed cylinder override for emergency access.

**Set: 2.0**

Doors: 123
Description: Exterior SF Aluminum Exit Pair - (PH)

| | | | | | |
|---|---|---|---|---|---|
| 2 | Continuous Hinge | CFM_SLF-HD1-M x Length Required | | PE | |
| 1 | CVR Exit, Exit Only | PED4801 M48 EO AD | 630 | RU | |
| 1 | CVR Exit, Key Trim | PED4850T M48 PED159 AD KA | 630 | RU | |
| 1 | CLIQ Mortise Cylinder | 100500C | 26 | MC | ⚡ |
| 2 | Offset Door Pull | RM7330-24 Mtg-Type 12HD | US32D | RO | |
| 2 | Surface Closer | DC6210 A11 (597F58 drop plate if req) | 689 | RU | |
| 2 | Sweep | 3452CNB | | PE | |
| 1 | Threshold (verify per sill detail) | 25_x_AFG MSES25SS-2 | | PE | |
| 2 | position Switch | CP1-1026 DPDT | WT | AK | ⚡ |
| 1 | Gasket | Furnished with Aluminum Door/Frame | | | |

**Set: 3.0**

Doors: 132
Description: Exterior Elec Room Exit Pair - Storeroom Function (PH)

| | | | | | |
|---|---|---|---|---|---|
| 2 | Continuous Hinge | CFM_HD1-M x Length Required | | PE | |
| 1 | Mullion | CR908KMSM | | RU | |
| 1 | Rim Exit Device, Exit Only | PED5201 M48 EO | 630 | RU | |
| 1 | Rim Exit Device | PED5259 L959PT KA | 630 | RU | |
| 1 | Mullion Cylinder | CR1000-118 KA x 447F42 | 626 | RU | |
| 2 | CLIQ Mortise Cylinder | 100500C | 26 | MC | ⚡ |
| 2 | Surface Closer | DC6210 A11 (597F58 drop plate if req) | 689 | RU | |
| 2 | Kick Plate | K1050 10" high CSK BEV | US32D | RO | |
| 2 | Astragal | 29324CNB | | PE | |
| 1 | Gasketing | 290APK x 2891APK | | PE | |
| 1 | Rain Guard | 346C | | PE | |
| 2 | Sweep | 3452CNB | | PE | |
| 1 | Threshold (verify per sill detail) | 25_x_AFG MSES25SS-2 | | PE | |
| 2 | Position Switch | CP1-1026 DPDT | WT | AK | ⚡ |

**Set: 4.0**

Doors: 134E
Description: Exterior Pair Exit - (PH)

| | | | | | |
|---|---|---|---|---|---|
| 2 | Continuous Hinge | CFM_HD1-M x Length Required | | PE | |
| 1 | Mullion | CR908KMSM | | RU | |
| 1 | Rim Exit Device, Exit Only | PED5201 M48 EO | 630 | RU | |
| 1 | Rim Exit Device | PED5255 M48 L955PT KA | 630 | RU | |
| 1 | Mullion Cylinder | CR1000-118 KA x 447F42 | 626 | RU | |
| 2 | CLIQ Mortise Cylinder | 100500C | 26 | MC | |
| 2 | Surface Closer | DC6210 A11 (597F58 drop plate if req) | 689 | RU | |
| 2 | Kick Plate | K1050 10" high CSK BEV | US32D | RO | |
| 2 | Astragal | 29324CNB | | PE | |
| 1 | Gasketing | 290APK x 2891APK | | PE | |
| 1 | Rain Guard | 346C | | PE | |
| 2 | Sweep | 3452CNB | | PE | |
| 1 | Threshold (verify per sill detail) | 25_x_AFG MSES25SS-2 | | PE | |
| 2 | position Switch | CP1-1026 DPDT | WT | AK | |

**Set: 5.0**

Doors: 102D, 106C, 108D, 130E, 134F, 143F
Description: Exterior Single Exit - Classroom Function (PH)

| | | | | | |
|---|---|---|---|---|---|
| 1 | Continuous Hinge | CFM_HD1-M x Length Required | | PE | |
| 1 | Rim Exit Device | PED5255 M48 L955PT KA | 630 | RU | |
| 1 | CLIQ Mortise Cylinder | 100500C | 26 | MC | |
| 1 | Surface Closer | DC6210 A11 (597F58 drop plate if req) | 689 | RU | |
| 1 | Kick Plate | K1050 10" high CSK BEV | US32D | RO | |
| 1 | Gasketing | 290APK x 2891APK | | PE | |
| 1 | Rain Guard | 346C | | PE | |
| 1 | Sweep | 3452CNB | | PE | |
| 1 | Threshold (verify per sill detail) | 25_x_AFG MSES25SS-2 | | PE | |
| 1 | position Switch | CP1-1026 DPDT | WT | AK | |

**Set: 6.0**

Doors: 104, 136A, 136B, 143E

Description: Exterior Pair Storeroom Lock

| | | | | |
|---|---|---|---|---|
| 2 | Continuous Hinge | CFM_HD1-M x Length Required | | PE |
| 1 | Self Latch Flush Bolt Set | 2845 / 2945 (as required) | US26D | RO |
| 1 | Storeroom Lock | ML2057 LWA SS078 KA | 630 | RU |
| 1 | CLIQ Mortise Cylinder | 100500C | 26 | MC |
| 1 | Coordinator | 2600 Series x Mtng Brackets as required | Black | RO |
| 2 | Surface Closer | DC6210 A4 | 689 | RU |
| 2 | Kick Plate | K1050 10" high CSK BEV | US32D | RO |
| 1 | Astragal | 357SP | | PE |
| 1 | Gasketing | 290APK x 2891APK | | PE |
| 1 | Rain Guard | 346C | | PE |
| 2 | Sweep | 3452CNB | | PE |
| 1 | Threshold (verify per sill detail) | 25_x_AFG MSES25SS-2 | | PE |

**Set: 7.0**

Doors: 100B, 144B

Description: Vest SF Alum Pair - Auto Operator, RLD (PH)

| | | | | | |
|---|---|---|---|---|---|
| 2 | Continuous Hinge | CFM_SLF-HD1 PT x Length Required | | PE | |
| 2 | Electric Power Transfer | EL-CEPT | 630 | SU | ⚡ |
| 1 | CVR MELR Exit, Exit Only | PED4801 MELR EO AD M55 | 630 | RU | |
| 1 | CVR MELR Exit, Key Trim | PED4850T MELR PED159 AD M55 KA | 630 | RU | |
| 1 | CLIQ Mortise Cylinder | 100500C | 26 | MC | ⚡ |
| 1 | Pedestal | ADA-SS-TWR-47x4x6 | | PP | |
| 1 | ADO Door Switch | 671 | | NO | ⚡ |
| 2 | Sweep | 18062CNB | | PE | |
| 2 | ElectroLynx Harness - Frame | QC-C1500P | | MK | ⚡ |
| 2 | ElectroLynx Harness - Door | QC-CXXX (Size as required) | | MK | ⚡ |
| 1 | Remote Lock Down | Furnished by Security Contractor | | AK | ⚡ |
| 1 | Power Supply | LSP-12-24 (Coordinate w/ Security Contractor) | | RU | ⚡ |
| 1 | Wiring Diagram | Elevation and Point to Point as Specified | | | |

Notes: Operator to utilize Vestibule Delay function
Operational Narrative:
1. Doors normally closed and secure.
2. Authorized access when exit device latches are retracted for entry. Exit device latches can be electrically held retracted for open access.
3. Egress free for immediate exit. ADO egress by actuator switch.
4. Exit latches and operator power shunted when remote lock-down button is utilized to prevent entry
5. Exit device latches release (fail secure, doors remain latched) in event of power loss or lock-down. Keyed cylinder override for emergency access.

**Set: 8.0**

Doors: 132A

Description: Interior Single Elec Room Exit - Storeroom Function (PH) - Rated

| | | | | | |
|---|---|---|---|---|---|
| 4 | Hinge, Full Mortise, Hvy Wt | T4A3786 [NRP] | US26D | MK | |
| 1 | Rim Exit Device | PED5259 A L959PT KA | 630 | RU | |
| 1 | CLIQ Mortise Cylinder | 100500C | 26 | MC | ⚡ |
| 1 | Surface Closer | DC6210 A4 | 689 | RU | |
| 1 | Kick Plate | K1050 10" high CSK BEV | US32D | RO | |
| 1 | Gasketing | S88D (Head & Jambs) | | PE | |
| 1 | Door Bottom | 420APKL | | PE | |
| 1 | Threshold | 270A MSES25SS | | PE | |

**Set: 9.0**

Doors: 101, 101B, 102, 106, 108, 130, 134, 143
Description: Interior Single - Exit Classroom (PH)

| | | | | | |
|---|---|---|---|---|---|
| 4 | Hinge, Full Mortise, Hvy Wt | T4A3786 [NRP] | US26D | MK | |
| 1 | Rim Exit Device | PED5255 M48 L955PT KA | 630 | RU | |
| 1 | CLIQ Mortise Cylinder | 100500C | 26 | MC | ⚡ |
| 1 | Surface Closer | DC6210 A3 | 689 | RU | |
| 1 | Kick Plate | K1050 10" high CSK BEV | US32D | RO | |
| 1 | Door Stop | 430-RKW / 441H @ no wall | US26D | RO | |
| 1 | Gasketing | S773BL | | PE | |
| 1 | Sweep | 315CN | | PE | |
| 1 | Threshold | 270A MSES25SS | | PE | |

**Set: 10.0**

Doors: 101A
Description: Interior Pair - Storeroom Lock

| | | | | | |
|---|---|---|---|---|---|
| 8 | Hinge, Full Mortise | TA2714 [NRP] | US26D | MK | |
| 2 | Flush Bolt Set | 555 / 557 (As Required) 18" ext top rod | US26D | RO | |
| 1 | Dust Proof Strike | 570 | US26D | RO | |
| 1 | Storeroom Lock | ML2057 LWA SS078 KA | 630 | RU | |
| 1 | CLIQ Mortise Cylinder | 100500C | 26 | MC | ⚡ |
| 1 | Surface Closer | DC6210 A2 | 689 | RU | |
| 2 | Kick Plate | K1050 10" high CSK BEV | US32D | RO | |
| 2 | Door Stop | 430-RKW / 441H @ no wall | US26D | RO | |
| 1 | Astragal | 357SP | | PE | |
| 2 | Silencer | 608-RKW | | RO | |

Notes: Furnish closer @ active leaf

**Set: 11.0**

Doors: 102C, 106A, 108C, 130C, 134C, 143D
Description: Interior Pair - Storeroom Lock

| | | | | | |
|---|---|---|---|---|---|
| 8 | Hinge, Full Mortise, Hvy Wt | T4A3786 [NRP] | US26D | MK | |
| 1 | Flush Bolt Set | 555 / 557 (As Required) 18" ext top rod | US26D | RO | |
| 1 | Dust Proof Strike | 570 | US26D | RO | |
| 1 | Storeroom Lock | ML2057 LWA SS078 KA | 630 | RU | |
| 1 | CLIQ Mortise Cylinder | 100500C | 26 | MC | ⚡ |
| 1 | Surface Overhead Holder/Stop | 10-326 | 689 | NO | |
| 1 | Surface Closer | DC6210 A2 | 689 | RU | |
| 2 | Kick Plate | K1050 10" high CSK BEV | US32D | RO | |
| 1 | Door Stop | 430-RKW / 441H @ no wall | US26D | RO | |
| 1 | Astragal | 357SP | | PE | |
| 2 | Silencer | 608-RKW | | RO | |

Notes: Furnish closer @ active leaf

**Set: 12.0**

Doors: 125A, 143C
Description: Interior Single - Storeroom Lock, No Closer

| | | | | | |
|---|---|---|---|---|---|
| 4 | Hinge, Full Mortise | TA2714 [NRP] | US26D | MK | |
| 1 | Storeroom Lock | ML2057 LWA KA | 630 | RU | |
| 1 | CLIQ Mortise Cylinder | 100500C | 26 | MC | ⚡ |
| 1 | Door Stop | 430-RKW / 441H @ no wall | US26D | RO | |
| 3 | Silencer | 608-RKW | | RO | |

**Set: 13.0**

Doors: 112, 135
Description: Interior Single - Storeroom Lock , Closer

| | | | | | |
|---|---|---|---|---|---|
| 4 | Hinge, Full Mortise | TA2714 [NRP] | US26D | MK | |
| 1 | Storeroom Lock | ML2057 LWA KA | 630 | RU | |
| 1 | CLIQ Mortise Cylinder | 100500C | 26 | MC | ⚡ |
| 1 | Surface Closer | DC6200 /10 | 689 | RU | |
| 1 | Kick Plate | K1050 10" high CSK BEV | US32D | RO | |
| 1 | Door Stop | 430-RKW / 441H @ no wall | US26D | RO | |
| 3 | Silencer | 608-RKW | | RO | |

**Set: 14.0**

Doors: 106B, 134D
Description: Interior Single - Storeroom Lock, Closer, Rated

| | | | | | |
|---|---|---|---|---|---|
| 4 | Hinge, Full Mortise, Hvy Wt | T4A3786 [NRP] | US26D | MK | |
| 1 | Storeroom Lock | ML2057 LWA KA | 630 | RU | |
| 1 | CLIQ Mortise Cylinder | 100500C | 26 | MC | |
| 1 | Surface Closer | DC6210 A4 | 689 | RU | |
| 1 | Kick Plate | K1050 10" high CSK BEV | US32D | RO | |
| 1 | Gasketing | S88D (Head & Jambs) | | PE | |
| 1 | Door Bottom | 420APKL | | PE | |
| 1 | Threshold | 270A MSES25SS | | PE | |

**Set: 15.0**

Doors: 102A, 102B, 107, 108A, 108B, 109, 113, 115, 117, 119, 130A, 130B, 134A, 134B, 143A, 143B
Description: Interior Single - Office Lock

| | | | | | |
|---|---|---|---|---|---|
| 4 | Hinge, Full Mortise | TA2714 [NRP] | US26D | MK | |
| 1 | Entrance Lock | ML2053 LWA KA | 630 | RU | |
| 1 | CLIQ Mortise Cylinder | 100500C | 26 | MC | |
| 1 | Door Stop | 430-RKW / 441H @ no wall | US26D | RO | |
| 1 | Gasketing | S88D (Head & Jambs) | | PE | |

**Set: 16.0**

Doors: 111
Description: Interior Single - Office Lock, Closer

| | | | | | |
|---|---|---|---|---|---|
| 3 | Hinge, Full Mortise | TA2714 [NRP] | US26D | MK | |
| 1 | Office Lock | ML2051 LWA KA | 630 | RU | |
| 1 | CLIQ Mortise Cylinder | 100500C | 26 | MC | |
| 1 | Surface Closer | DC6200 /10 | 689 | RU | |
| 1 | Kick Plate | K1050 10" high CSK BEV | US32D | RO | |
| 1 | Door Stop | 430-RKW / 441H @ no wall | US26D | RO | |
| 1 | Gasketing | S88D (Head & Jambs) | | PE | |

**Set: 17.0**

Doors: 125
Description: Interior Single - Classroom Lockset, Closer

| | | | | | |
|---|---|---|---|---|---|
| 4 | Hinge, Full Mortise | TA2714 [NRP] | US26D | MK | |
| 1 | Classroom Lock | ML2055 LWA KA | 630 | RU | |
| 1 | CLIQ Mortise Cylinder | 100500C | 26 | MC | ⚡ |
| 1 | Surface Closer | DC6200 A1 /6210 A2 | 689 | RU | |
| 1 | Kick Plate | K1050 10" high CSK BEV | US32D | RO | |
| 1 | Door Stop | 430-RKW / 441H @ no wall | US26D | RO | |
| 1 | Gasketing | S88D (Head & Jambs) | | PE | |

**Set: 18.0**

Doors: 105
Description: Interior Single - Classroom Lock , Closer

| | | | | | |
|---|---|---|---|---|---|
| 4 | Hinge, Full Mortise | TA2714 [NRP] | US26D | MK | |
| 1 | Classroom Lock | ML2055 LWA KA | 630 | RU | |
| 1 | CLIQ Mortise Cylinder | 100500C | 26 | MC | ⚡ |
| 1 | Surface Closer | DC6200 A1 /6210 A2 | 689 | RU | |
| 1 | Gasketing | S88D (Head & Jambs) | | PE | |

**Set: 19.0**

Doors: 131, 133
Description: Interior Single - Classroom Lock, Closer

| | | | | | |
|---|---|---|---|---|---|
| 4 | Hinge, Full Mortise | TA2714 [NRP] | US26D | MK | |
| 1 | Classroom Lock | ML2055 LWA KA | 630 | RU | |
| 1 | CLIQ Mortise Cylinder | 100500C | 26 | MC | ⚡ |
| 1 | Surface Closer | DC6200 A1 /6210 A2 | 689 | RU | |
| 1 | Kick Plate | K1050 10" high CSK BEV | US32D | RO | |
| 1 | Door Stop | 430-RKW / 441H @ no wall | US26D | RO | |
| 1 | Gasketing | S88D (Head & Jambs) | | PE | |

**Set: 20.0**

Doors: 141
Description: Interior Single Wellness - Privacy Latch, No Closer

| | | | | |
|---|---|---|---|---|
| 3 | Hinge, Full Mortise | TA2714 [NRP] | US26D | MK |
| 1 | Privacy Lock | ML2060 LWA V54 | 630 | RU |
| 2 | Kick Plate | K1050 10" high CSK BEV | US32D | RO |
| 1 | Door Stop | 430-RKW / 441H @ no wall | US26D | RO |
| 1 | Gasketing | S88D (Head & Jambs) | | PE |
| 1 | Coat Hook | RM801 | US32D | RO |

**Set: 21.0**

Doors: 137, 139
Description: Interior Single - Privacy Latch, Closer

| | | | | |
|---|---|---|---|---|
| 4 | Hinge, Full Mortise | TA2714 [NRP] | US26D | MK |
| 1 | Privacy Lock | ML2030 LWA V54 | 630 | RU |
| 1 | Surface Closer | DC6200 M71 | 689 | RU |
| 1 | Kick Plate | K1050 10" high CSK BEV | US32D | RO |
| 1 | Mop Plate (@ pull side) | K1050 4" high CSK BEV | US32D | RO |
| 1 | Door Stop | 430-RKW / 441H @ no wall | US26D | RO |
| 1 | Gasketing | S88D (Head & Jambs) | | PE |
| 1 | Coat Hook | RM801 | US32D | RO |

**Set: 22.0**

Doors: 121
Description: Interior Single Vending - Passage Latch

| | | | | |
|---|---|---|---|---|
| 3 | Hinge, Full Mortise | TA2714 [NRP] | US26D | MK |
| 1 | Passage Latch | ML2010 LWA | 630 | RU |
| 1 | Surface Closer | DC6200 A1 /6210 A2 | 689 | RU |
| 1 | Door Stop | 430-RKW / 441H @ no wall | US26D | RO |
| 3 | Silencer | 608-RKW | | RO |

**Set: 23.0**

Doors: 130D
Description: Interior DE Pair - Push Plates, Closer, Lock

| | | | | |
|---|---|---|---|---|
| 6 | Hinge, Full Mortise, Hvy Wt | T4A3786 [NRP] | US26D | MK |
| 1 | Flush Bolt Set | 555 / 557 (As Required) 18" ext top rod | US26D | RO |
| 1 | Dust Proof Strike | 570 | US26D | RO |
| 1 | Deadbolt | DL4112 KA | 626 | RU |
| 2 | CLIQ Mortise Cylinder | 100500C | 26 | MC |
| 2 | Push Plate | 70C-RKW CFC | US32D | RO |
| 2 | Surface Closer | DC6210 A11 (597F58 drop plate if req) | 689 | RU |
| 4 | Kick Plate | K1050 10" high CSK BEV | US32D | RO |
| 1 | Astragal | S771C | | PE |
| 1 | Gasketing | S88D (Head & Jambs) | | PE |

**Set: 24.0**

Doors: 127, 129
Description: Interior Men-Women Single - Push/Pull

| | | | | |
|---|---|---|---|---|
| 4 | Hinge, Full Mortise, Hvy Wt | T4A3786 [NRP] | US26D | MK |
| 1 | Push Pull | 111x73C/73CL | US32D | RO |
| 1 | Surface Closer | DC6200 M71 | 689 | RU |
| 1 | Kick Plate | K1050 10" high CSK BEV | US32D | RO |
| 1 | Mop Plate (@ pull side) | K1050 4" high CSK BEV | US32D | RO |
| 1 | Wall Stop | 406 | US32D | RO |
| 3 | Silencer | 608-RKW | | RO |

**Set: 25.0**

Doors: 102E, 106D, 130F, 134G
Description: OH Coiling Roll-Up Door

| | | |
|---|---|---|
| | Hardware | Hardware Supplied by Vendor |

**Set: 26.0**

Doors: 143I, 143J, ES-2, ES-3
Description: Enclosure Gates

| | | | | |
|---|---|---|---|---|
| 2 | Drop Bolt | QB124 x (2) LBBPGB | | DD |
| 2 | Padlock | 5005711S | 26 | MC |
| 2 | CLIQ Padlock Cylinder | 510600H | 26 | MC |
| 2 | Grip Pull | D133-RKW | BSP | RO |

Notes: Hinges to be furnished by Gates Fabricator

**Set: 27.0**

Doors: MISC
Description: Misc to furnish

| | | | |
|---|---|---|---|
| 154 | CLIQ User Key | KEC42602/3B (verify) | MC |
| 2 | CLIQ C-Key | KEC4260CR | MC |
| 2 | CLIQ E2 Key | KEC426P2B | MC |
| 2 | CLIQ E3 Key | KEC426P3B | MC |
| 1 | Programming Device | EA-100167 | MC |
| 1 | Programming Device | EA-100297 | MC |
| 1 | Programming Device | EA-100145 | MC |
| 1 | Software | SW-500101-1 | MC |

END OF SECTION 08 71 00

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# 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. FGIA: 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. FGIA 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 and as indicated in the Schedule in Part 3.
   a. Vitro Architectural 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. Guardian Glass. ("SNX 51/23")
   b. Viracon. ("VNE1-53")

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 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 and to prevent sealant from extruding into glass channel and blocking weep systems until sealants cure. 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.

3.7 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.

3.8 INSULATING GLASS SCHEDULE

A Low-E-Coated, Insulating Glass Type:

1. Product: "Solarban 70" clear + clear.
2. Overall Unit Thickness: 1-inch (25mm).
3. Minimum Thickness of Each Glass Lite: At least 6mm.
4. Outdoor Lite: Heat strengthened (Kind HS) or fully tempered (Kind FT) float glass as indicated on the Drawings and as necessary to meet applicable codes and performance requirements.
5. Interspace Content: Argon.
6. Indoor Lite: Heat strengthened (Kind HS) or 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 0.24.
9. Visible Light Transmittance: At least 64 percent.
10. LSG: 2.37.
11. SGHC: No more than 0.27.
12. Safety glazing required.

END OF SECTION 08 80 00

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# SECTION 08 92 00 - FABRICATED EQUIPMENT ENCLOSURES

## 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. Fabricated equipment screening enclosures.
2. Supplementary components and accessories normally furnished or otherwise necessary for a complete installation.

### 1.3 DEFINITIONS

A Louver Terminology: Definitions of terms for metal louvers contained in AMCA 501 apply to this Specification Section unless otherwise defined in this Specification Section or in referenced standards.

### 1.4 SUBMITTALS

A Action Submittals:

1. Product Data: For each type of product.
2. Shop Drawings: For equipment enclosures and accessories. Include plans, elevations, sections, details, and attachments to other work. Show frame profiles and blade profiles, angles, and spacing.
3. Delegated Design Submittal: For equipment enclosures indicated to comply with structural performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.
4. Samples: For each type of metal finish required.

B Informational Submittals:

1. Qualifications Data: For professional engineer.

### 1.5 QUALITY ASSURANCE

A 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.

B Welding Qualifications: Qualify procedures and personnel according to the following:

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

## PART 2 PRODUCTS

### 2.1 PERFORMANCE REQUIREMENTS

A Delegated Design: Engage a qualified professional engineer to design exterior is legally qualified to practice in the jurisdiction where the Project is located and who is experienced in providing engineering services of the kind indicated.

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: Screening enclosures withstand the effects of gravity loads and the following loads and stresses within limits and under conditions indicated without permanent deformation of louver components, noise or metal fatigue caused by louver-blade rattle or flutter, or permanent damage to fasteners and anchors. Wind pressures are considered to act normal to the face of the building.

1. Wind Loads: Determine loads based on pressures indicated on the Drawings.

C Thermal Movements: Allow for thermal movements from ambient and surface temperature changes.
1. Temperature Change (Range): 120 deg F, ambient; 180 deg F, material surfaces.

2.2 FABRICATED EQUIPMENT ENCLOSURES
A Fabricated Equipment Screening Enclosures: Equipment screening enclosure complete with frame, screen panels, and attachments.
1. Louver Panels: Subject to compliance with the Contract Documents provide one of the following.
a. "RSV-5700" as manufactured by Construction Specialties, Inc.
b. "Model 486" as manufactured by Industrial Louvers, Inc.
c. "EV538" as manufactured by Ruskin.

2.3 MATERIALS
A Aluminum Extrusions: ASTM B 221, Alloy 6063-T5, T-52, or T6.
B Aluminum Sheet: ASTM B 209, Alloy 3003 or 5005 with temper as required for forming, or as otherwise recommended by metal producer for required finish.
C Fasteners: Use types and sizes to suit unit installation conditions.
1. Use tamper-resistant screws for exposed fasteners unless otherwise indicated.
2. For fastening aluminum, use aluminum or 300 series stainless-steel fasteners.
3. For color-finished louvers, use fasteners with heads that match color of louvers.
D Bituminous Paint: Cold-applied asphalt emulsion complying with ASTM D 1187.

2.4 FABRICATION
A Factory assemble equipment enclosures to minimize field splicing and assembly. Disassemble units as necessary for shipping and handling limitations. Clearly mark units for reassembly and coordinated installation.
B Include supports, anchorages, and accessories required for complete assembly.

2.5 ALUMINUM FINISHES
A Finish:
1. 3-Coat Fluoropolymer: AAMA 2605. Fluoropolymer finish containing not less than 70 percent polyvinylidene fluoride (PVDF) resin by weight in both color coat and clear topcoat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.
a. Color: Custom color; match Architect's Sample.

PART 3 EXECUTION

3.1 EXAMINATION
A Examine substrates and openings, 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 louvered equipment enclosures indicates acceptance of surfaces and conditions.

3.2 PREPARATION
A Coordinate setting drawings, diagrams, templates, instructions, and directions for installation of anchorages. Coordinate delivery of such items to Project site.

3.3 INSTALLATION
A General: Install in accordance with manufacturers written installation instructions.
B Form closely fitted joints with exposed connections accurately located and secured.

C Protect unpainted galvanized- and nonferrous-metal surfaces that are in contact with concrete, masonry, or dissimilar metals from corrosion and galvanic action by applying a heavy coating of bituminous paint or by separating surfaces with waterproof gaskets or nonmetallic flashing.

3.4 ADJUSTING AND CLEANING

A Clean exposed surfaces that are not protected by temporary covering, to remove fingerprints and soil during construction period. Do not let soil accumulate during construction period.

B Before final inspection, clean exposed surfaces with water and a mild soap or detergent not harmful to finishes. Thoroughly rinse surfaces and dry.

C Restore surfaces damaged during installation and construction so no evidence remains of corrective work. If results of restoration are unsuccessful, as determined by Architect, remove damaged units and replace with new units.

END OF SECTION 08 92 00

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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: No more than 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 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 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.

B Design framing systems in accordance with the AISI publication AISI S220, *North American Standard for Cold-Formed Steel Framing - Nonstructural Members*, unless otherwise indicated.
C Design Loads: As indicated on the Drawings, or at least 5 lbf/sq. ft.as required by the IBC.
D 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 coatingwith 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 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.
D 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.
E Hat-Shaped, Rigid Furring Channels: ASTM C 645.
1. Minimum Base Metal Thickness: As indicated on the Drawings.
2. Depth: As indicated on Drawings.
F Resilient Furring Channels: 1/2-inch-deep, steel sheet members designed to reduce sound transmission.
1. Configuration: Asymmetrical or hat shaped.
G 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.

H 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. 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.

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

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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.

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 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.

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.

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.
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 where indicated.

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 and minimize end joints.
   a. Stagger abutting end joints not less than one framing member in alternate courses of panels.
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.
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. 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 4: At panel surfaces that will be exposed to view.
   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.
2. Indications that panels are mold damaged include fuzzy or splotchy surface contamination and discoloration.

END OF SECTION 09 29 00

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. Supplementary components and accessories normally furnished or otherwise necessary for a complete installation.

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: None required for basis-of-design product.
    a. Submit samples, 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 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.

2.2 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 Wall Tile:
1. CWT-1:
a. 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 or distributed by the following.
1) Trinity Surfaces.
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) Best Tile.
2) Stone Source LLC.
2. CWT-2:
a. Basis-of-Design Product: Subject to compliance with the Contract Documents design is based on the products indicated in the Finish Material Schedule on the Drawings as manufactured or distributed by the following.
1) TileBar.
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) Best Tile.
2) Stone Source LLC.

2.4 SETTING MATERIALS

A Improved Modified Dry-Set Mortar (Thinset): ANSI A118.15.

1. Basis-of-Design Product: Subject to compliance with the Contract Documents, the design is based on the following:
   a. “Ultraflex 3” manufactured by MAPEI Corporation.
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. Custom Building Products.
   b. H.B. Fuller Construction Products, Inc.
   c. LATICRETE International, Inc.
3. Provide prepackaged, dry-mortar mix containing dry, redispersible, vinyl acetate or acrylic additive to which only water must be added at Project site.
4. 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. Basis-of-Design Product: Subject to compliance with the Contract Documents, the design is based on the following:
   a. “Ultraflex LFT” manufactured by MAPEI Corporation.
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. Custom Building Products.
   b. H.B. Fuller Construction Products, Inc.
   c. LATICRETE International, Inc.
3. Provide where individual tile size has a dimensional length greater than 15 inches on any side of the tile.
4. Provide premium, prepackaged, polymer-enriched, dry-mortar mix combined with water at Project site.

## 2.5 GROUT MATERIALS

A Water-Cleanable Epoxy Grout: ANSI A118.3.
1. Basis-of-Design Product: Subject to compliance with the Contract Documents, the design is based on the following:
   a. “Kerapoxy” manufactured by MAPEI Corporation.
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. Custom Building Products.
   b. H.B. Fuller Construction Products, Inc.
   c. LATICRETE International, Inc.

B Grout Color: As indicated in the Finish Material Schedule on the Drawings.

## 2.6 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 Metal Base Trim:
1. Basis-of-Design Manufacturer: Subject to compliance with the Contract Documents provide products indicated on the Drawings as manufactured by the following.
   a. Schulter Systems
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. Elite Xpressions.
   b. Fry Reglet.

C 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.

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

2.7 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 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 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.

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 base and walls 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 base or walls, align joints unless otherwise indicated.

F Joint Widths: Install tile with the joint widths as indicated in the Finish Material Schedfule 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 tilework abuts restraining surfaces such as perimeter walls, curbs, columns, and ceilings.
2. Where there is a change in substrate material.
3. Interior Tilework: 20 to 25 feet in each direction.
4. Interior Tilework Exposed to Direct Sunlight: 8 to 12 feet in each direction.
5. Interior Tilework Exposed to Moisture: 8 to 12 feet in each direction.

## 3.4 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.

## 3.5 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.

## 3.6 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. Tyle Type: CWT-1, CWT-2.
   b. Thinset Mortar: Improved modified dry-set mortar.
   c. Grout: Water-cleanable epoxy grout.

END OF SECTION 09 30 00

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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.
2. Samples: None required for basis-of-design product.
   a. Provide samples, in manufacturer's standard size, if other than the basis-of-design product will be provided for the Project.

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 Product (APC): 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. Armstrong World Industries.
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. CertainTeed.
   b. USG Corporation.

2.4 METAL SUSPENSION SYSTEMS

A Metal Suspension Systems:

1. Basis-of-Design Products (APC-1): Subject to compliance with the Contract Documents the design is based on product 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 product 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.

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 51 30 - SUSPENDED METAL CEILINGS (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. Metal ceiling with associated suspension system.
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 metal ceiling manufacturer unless otherwise indicated.

### 1.4 SUBMITTALS

A Action Submittals:
1. Product Data: For each type of product.

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. Suspended ceiling components.
   b. Structural members to which suspension systems will be attached.
   c. Items penetrating finished ceiling.

C Closeout Submittals:
1. Maintenance Data: For finishes to include in maintenance manuals.

### 1.5 DELIVERY, STORAGE, AND HANDLING

A Deliver ceiling components, and accessories to Project site in original, unopened packages and store them in a fully enclosed, conditioned space where they are protected against damage from moisture, humidity, temperature extremes, direct sunlight, surface contamination, and other causes.

## PART 2 PRODUCTS

### 2.1 METAL, GENERAL

A Sheet Metal Characteristics: For metal components exposed to view in the completed work, provide materials with smooth, flat surfaces without blemishes. Do not use materials with exposed pitting, seam marks, roller marks, roughness, stains, or discolorations.

### 2.2 METAL CEILING SYSTEM

A Metal Ceiling System (EM):
1. Basis-of-Design: 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. durlum GmbH.

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. Armstrong World Industries, Inc.
   b. McNICHOLS CO.

2.3 METAL SUSPENSION SYSTEMS, GENERAL

A Suspension System: Provide system complete with carriers, runners, splice sections, connector clips, alignment clips, leveling clips, hangers, molding, trim, retention clips, load-resisting struts, and other suspension components required to support ceiling units and other ceiling-supported construction.

B Attachment Devices: Size for 5 times the design load indicated in ASTM C 635/C 635M, Table 1, Direct Hung, unless otherwise indicated. Comply with seismic design requirements.

C Wire Hangers, Braces, and Ties: Provide wires complying with the following requirements:
1. Zinc-Coated, Carbon-Steel Wire: ASTM A 641/A 641M, Class 1 zinc coating, soft temper.

2.4 ACCESSORIES

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

2.5 GENERAL FINISH REQUIREMENTS

A Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

B Appearance of Finished Work: Noticeable variations in same piece are not acceptable. 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.

C Finish, Mesh Panels and Suspension System: Manufacturer’s standard powder coat.
1. Color: Custom color as indicated in the Finish Material Schedule on the Drawings.

PART 3 EXECUTION

3.1 EXAMINATION

A Examine substrates, areas, and conditions, including structural framing to which 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 metal pan ceilings.

B Do not proceed with installation until unsatisfactory conditions have been corrected.
1. Installation of metal ceilings indicates acceptance of surfaces and conditions.

3.2 PREPARATION

A Measure each ceiling area and establish layout of metal units to balance border widths at opposite edges of each ceiling. Avoid using less-than-half-width units at borders, and comply with layout shown on reflected ceiling plans and coordination drawings.

3.3 INSTALLATION

A General: Install ceiling assembly to comply 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 or carrying channels and to supports above with at least 3 tight turns. Connect hangers directly either to structures or to inserts, eye screws, or other devices that are secure and appropriate for substrate and that do 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 or postinstalled mechanical anchors.
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 and publications.

C Install suspension-system runners so they are securely interlocked with one another. Remove and replace dented, bent, or kinked members.

3.4 CLEANING

A Clean exposed surfaces of metal ceilings, including trim and edge moldings, after removing strippable, temporary protective covering, if any. Comply with manufacturer's written instructions for stripping of temporary protective covering, cleaning, and touchup of minor finish damage. Remove and replace ceiling components that cannot be successfully cleaned and repaired to permanently eliminate evidence of damage, including dented and bent units.

END OF SECTION 09 51 30

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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. Molding accessories.
  3. 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 manufacturer 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.
- B Samples: None required for basis-of-design products.
  1. Submit samples, in manufacturer's standard size, if other than the basis-of-design products will be provided for the Project.

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 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 RESILIENT BASE
- A Resilient Base Product Standard: ASTM F 1861, Type TP (rubber, thermoplastic), Group 1.
  1. Basis-of-Design Products (RB): 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.

2.2 MOLDING ACCESSORIES

A Description: Rubber transition strips.
1. Products: Subject to compliance with the Contract Documents provide the product indicated on the Drawings as manufactured by the rubber base manufacturer.
2. Profile and Dimensions: As indicated on the Drawings.
3. Locations: As indicated on the Drawings.

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 RESILIENT ACCESSORY INSTALLATION

A Comply with manufacturer's written instructions for installing resilient accessories.

B Resilient Molding Accessories: Butt to adjacent materials and tightly adhere to substrates throughout length of each piece.

3.4 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.

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. Supplementary components and accessories normally furnished or otherwise necessary for a complete installation.

### 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: None required for basis-of-design product.
   a. Submit samples, 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 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 For 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 Product (LVT): 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. Shaw Industries Group. (Shaw Contract).
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. Mannington Commerical.
b. Patcraft.

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 Trowelable Leveling and Patching Compounds: Latex-modified, portland cement based or blended hydraulic-cement-based formulation provided or approved by manufacturer for applications indicated.

B 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).

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, 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 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.

3.4 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 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: None required for the basis-of-design products.
   a. Submit samples, in manufacturer's standard size, 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. CPT-1, CPT-2: Shaw Industries Group, Inc. (ShawContract)
   b. CPT-3: Patcraft.
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. CPT-1, CPT-2:
      1) Mannington Commercial.
      2) Patcraft.
   b. CPT-3:
      1) Mannington Commercial.
      2) Shaw Industries Group, Inc. (ShawContract)

2.2 INSTALLATION ACCESSORIES

A Metal Trim:

1. Basis-of-Design Manufacturer: Subject to compliance with the Contract Documents provide product indicated on the Drawing as manufactured by the following.
   a. Schluter Systems.
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. Koffler Sales, LLC.
   b. Shaw Industries Group, Inc.

B Trowelable Leveling and Patching Compounds: Latex-modified, hydraulic-cement-based formulation provided or recommended by the manufacturer.

C 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

SECTION 09 72 00 - WALL COVERINGS

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. Vinyl wall covering.
2. Tackabe wall covering.
3. 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 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: None required for basis-of-design product.
   a. Submit samples, in manufacturer's standard size, if other than the basis-of-design product will be provided for the Project.

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): 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. Wolf-Gordon Inc.
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. Koroseal Interior Products, LLC.
   b. MDC Interior Solutions.

C Tackable Wall Covering: Resilient cork/linoleum tackable wallcovering.

1. Basis-of-Design Product (TB): 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. Koroseal Interior Products, LLC.
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. Forbo Flooring Systems.
   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 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, or comparble product.
   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, or comparable product.
   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.

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 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 Section.

1.2 SUMMARY
- A Section Includes:
  1. Panels tested for acoustical performance.
  2. Supplementary components and accessories normally furnished or otherwise necessary for a complete installation.

1.3 REFERENCES
- A Acronyms and Abbreviations:
  1. NRC: Noise Reduction Coefficient.
  2. SCAQMD: South Coast Air Quality Management District.
- 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.
  2. Shop Drawings: For unit assembly and installation.
     a. Include reflected ceiling plans, elevations, sections, and mounting devices and details.
     b. Include details at joints and corners; and details at ceiling intersections and intersections with walls. Indicate panel edge profile and core materials.
  3. Samples: For each color and type of unit in manufacturer’s standard size.
- B Informational Submittals:
  1. Coordination Drawings: Reflected ceiling plans and other details, drawn to scale, on which items penetrating or covered by units are shown and coordinated with each other, using input from installers of the items involved.
  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.

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.

B Acoustical Performance: Sound absorption NRC of not less than manufacturer’s tested mounting assembly according to ASTM C 423.

2.2 SOUND ABSORBING UNITS

A Sound Absorbing Wall Units: Wood fiber acoustical panels.

1. Basis-of-Design Product (SAP): Subject to compliance with the Contract Documents design is based on product indicated in the Interior Finish Materials 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 product by one of the following.
   a. Acoustical Solutions (AlphaSorb)
   b. Second Skin Audio. (Timberwool)

B Dimensions: As indicated on the Drawings.

C Mounting Method: Direct mount.

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 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 edges in alignment with walls and 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 indicated. Mount units securely to supporting substrate.

3.3 INSTALLATION TOLERANCES

A Variation from Alignment with Surfaces: Plus or minus 1/16 inch in 48 inches.

B Variation from Level and Slope: Plus or minus 1/16 inch.

C Variation of Joint Width: Not more than 1/16-inch variation from hairline 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 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 to10 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 during 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 Open Ceiling and Bar Joist Substrates (Dryfall):
1. PrimeCoat: "Pro Industrial Pro-Cyrl Primer" B66-1300 Series. Spot prime as required.
2. Intermediate Coat: Matching topcoat.
3. Topcoat: "Pro Industrial Waterborne Acrylic Dryfall Flat" B42W2181. Applied at a wet film thickness of 6.0 to 9.0 mils or 1.9 to 2.9 mils dry.

C 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.

D 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

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# SECTION 10 14 19 - DIMENSIONAL LETTER 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 SECTION INCLUDES

A Dimensional letter signage.

B Supplementary components and accessories normally furnished or otherwise necessary for a complete installation.

### 1.3 REFERENCES

A Definitions:

1. Manufacturer: Means the dimensional letter signage manufacturer unless otherwise indicated.

### 1.4 SUBMITTALS

A Action Submittals:

1. Product Data: Manufacturer's product literature for each type of dimensional letter sign, indicating style, font, colors, locations, and overall dimensions of each sign.
2. Shop Drawings: Include dimensions, locations, elevations, materials, text layout, and attachment details.
3. Samples: Submit one sample of size similar to that required for the Project, indicating sign style, font, finish, and method of attachment.

### 1.5 DELIVERY, STORAGE, AND HANDLING

A Package dimensional letter signs as required to prevent damage before installation.

B Store under cover and elevated above grade.

## PART 2 PRODUCTS

### 2.1 DIMENSIONAL LETTERS

A Applications: Exterior building identification.

1. Manufacturers: Subject to compliance with the Contract Documents provide products by one of the following.
   a. Gemini Incorporated.
   b. Letters Etc.
   c. Steel Art Company.
2. Use individual metal letters.
3. Mounting Location: As indicated on the Drawings.

B Metal Letters:

1. Material: Aluminum casting.
2. Thickness: Manufacturer's standard for letter size.
3. Letter Height: As selected by the Architect.
4. Text and Typeface: As selected by the Architect.
5. Finish: As selected by the Architect from manufacturer's full range.
6. Mounting: Pin-mounted 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.

PART 3 EXECUTION

3.1 EXAMINATION

A Verify that substrate surfaces are ready to receive work.

B Do not proceed with installation until unsatisfactory conditions have been corrected.

1. Installation of dimensional letter signage indicates acceptance of surfaces and conditions.

3.2 INSTALLATION

A Install in accordance with manufacturer's instructions and as indicated on the Drawings.

B Install with horizontal edges level.

C Protect from damage until Final Acceptance; repair or replace damaged items.

END OF SECTION 10 14 19

# 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 Accessible and Usable Buildings and Facilities (Section 703).

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 - STAINLESS-STEEL 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. Stainless-steel toilet compartments.
2. Supplementary components and accessories normally furnished or otherwise necessary for a complete installation.

### 1.3 REFERENCES

A Definitions:

1. Manufacturer: Means the toilet compartment manufacturer unless otherwise indicated.
2. Toilet Compartment(s): Means the stainless-steel 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 toilet compartments, include the following:
   a. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for toilet compartments.
   b. Current Health Product Declaration.
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 reinforcements for compartment-mounted grab bars and locations of blocking for surface-mounted toilet accessories.
   d. Show locations of centerlines of toilet fixtures.
   e. Show locations of floor drains.
   f. 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 licensed in the State of North Carolina 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: 0.
2. Smoke-Developed Index: 25 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 A117.1-2009 Accessible and Usable Buildings and Facilities for toilet compartments designated as accessible.

2.3 STAINLESS-STEEL TOILET COMPARTMENTS

A Toilet Compartments:
1. Basis-of-Design Product: Subject to compliance with the Contract Documents design is based on the following.
   a. “Sentinel Series 400” manufactured by Bradley Corp.
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. ASI Global.
   b. Hadrian.

B Toilet-Enclosure Style: Overhead braced.

C Urinal-Screen Style: Wall hung.

D Door, Panel, and Pilaster Construction: Seamless, metal facing sheets pressure laminated to core material; with continuous, interlocking molding strip or lapped-and-formed edge closures; corners secured by welding or clips and exposed welds ground smooth. Provide with no-sightline system consisting of a full-height continuous stop on latch side of door and full-height continuous filler strip on hinge side of door (unless continuous hinge is used). Exposed surfaces shall be free of pitting, seam marks, roller marks, stains, discolorations, telegraphing of core material, or other imperfections.
1. Core Material: Manufacturer's standard sound-deadening honeycomb of resin-impregnated kraft paper in thickness required to provide finished thickness of 1 inch for doors and panels and 1-1/4 inches for pilasters.
2. Grab-Bar Reinforcement: Provide concealed internal reinforcement for grab bars mounted on units of size and material adequate for panel to withstand specified structural performance requirements.
3. Tapping Reinforcement: Provide concealed reinforcement for tapping (threading) at locations where machine screws are used for attaching items to units.

E Urinal-Screen Construction: Flat-panel urinal screen matching panel construction.

F Facing Sheets and Closures: Stainless steel sheet of nominal thicknesses as follows:
1. Panels: Manufacturer's standard thickness, but not less than 0.031 inch.
2. Doors: Manufacturer's standard thickness, but not less than 0.031 inch.
3. Entrance Screens: Thickness matching panels.
4. Flat-Panel Urinal Screens: Thickness matching panels.

G Pilaster Shoes: Formed from stainless steel sheet, not less than 0.031-inch nominal thickness and 3 inches high, finished to match hardware.

H Brackets (Fittings):
1. Full-Height (Continuous) Type: Manufacturer's standard design; stainless steel.

I Stainless Steel Finish: Directional Satin Finish: ASTM A 480/A 480M, No. 4 on exposed faces. Protect exposed surfaces from damage by application of strippable, temporary protective covering before shipment.

2.4 HARDWARE AND ACCESSORIES

A Door Hardware and Accessories: Manufacturer's standard stainless-steel operating hardware and accessories.

1. Latch and Keeper: Recessed, with occupancy indicator or surface-mounted, with occupancy indicator 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.

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 anchors compatible with related materials.

2.5 MATERIALS

A Aluminum Castings: ASTM B 26/B 26M.

B Aluminum Extrusions: ASTM B 221.

C Stainless Steel Sheet: ASTM A 240/A 240M or ASTM A 666, Type 304, stretcher-leveled standard of flatness.

D 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 and solid blocking within panel 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 two 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 inswinging doors to hold doors open approximately 30 degrees from closed position when unlatched. Set hinges on outswinging 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. 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. Toilet 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.

2.3 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: Recessed.
  6. Recessed Mount Flange: 7 inches high by 7 inches wide.
  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 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 10 75 00 - FLAGPOLES

## 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 SECTION INCLUDES

A Aluminum flagpoles.

B 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.

B Definitions:

1. Manufacturer: Means the flagpole 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, operating characteristics, fittings, accessories, and finishes for flagpoles.
2. Shop Drawings: For each flagpole. Include the following.
   a. Plans, elevations, and attachment details. Show general arrangement, jointing, fittings, accessories, grounding, anchoring, and support.
   b. Section, and details of foundation system.
3. Samples: For each type of exposed finish, in manufacturer's standard sizes.
4. Delegated Design Submittals: For flagpoles.

B Closeout Submittals:

1. Operation and Maintenance Data: For flagpoles to include in operation and maintenance manuals.

### 1.5 QUALITY ASSURANCE

A Qualifications: For professional structural engineer experienced in design of this work and licensed in the State in which the Project is located.

### 1.6 DELIVERY, STORAGE, AND HANDLING

A Spiral wrap flagpole with protective covering and pack in protective shipping tubes or containers.

B Protect flagpole and accessories from damage or moisture.

## PART 2 PRODUCTS

### 2.1 PERFORMANCE REQUIREMENTS

A Delegated Design: Engage a qualified professional engineer to flagpoles, including attachment to foundation.

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: Flagpole assemblies, including anchorages and supports, shall withstand design loads indicated without permanent deformation within limits and under conditions indicated.

1. Wind Pressure Loading on Flagpole with Flag: Determine according to NAAMM FP 1001. for basic wind speed for Project location and as indicated on Drawings.
2. Base flagpole design on polyester, nylon, or cotton flags of maximum standard size suitable for use with flagpole or flag size indicated, whichever is more stringent.

2.2 MANUFACTURERS

A Flagpole Manufacturers: Subject to compliance with the Contract Documents provide flagpoles as manufactured by one of the following.
1. American Flagpole and Flag Co.
2. Concord American Flagpole.
3. U.S. Flag and Flagpole Supply.

2.3 FLAGPOLES

A Flagpoles: Designed in accordance with NAAMM FP 1001
1. Material: Aluminum.
2. Design: Cone tapered.
3. Mounting: Ground mounted type.
4. Nominal Height: As indicated on the Drawings; measured from nominal ground elevation.
5. Halyard: Internal type, manual winch operation.

2.4 POLE MATERIALS

A Aluminum: ASTM B241/B241M , 6063 alloy , T6 temper.

2.5 ACCESSORIES

A Finial Ball: Aluminum, 6 inch diameter.
B Flag: Owner-provided.
C Connecting Sleeve for Multiple Section Poles: If required, same material as pole, precision fit for field assembly of pole, concealed fasteners.

2.6 OPERATORS

A Hand Crank: Removable type.

2.7 MOUNTING COMPONENTS

A Foundation Tube Sleeve: AASHTO M 36, corrugated 16 gauge, 0.0598 inch steel, galvanized, depth as indicated.
B Pole Base Attachment: Sleeve; aluminum base with base cover.
C Lightning Ground Rod: Copper rod, 3/4 inch diameter; length as recommended or required for Project conditions.
D Lightning Ground Cable: Copper No. 6 AWG, soft drawn.

2.8 ACCESSORIES

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

2.9 FINISHING

A Metal Surfaces in Contact With Concrete: Asphaltic paint.
B Aluminum: As selected by the Architect..
C Finial: As selected by the Architect.

PART 3 EXECUTION

3.1 EXAMINATION

A Verify that concrete foundation is ready to receive work and dimensions are as indicated on shop drawings.

B Do not proceed with installation until unsatisfactory conditions have been corrected.
1. Installation of flagpoles indicates acceptance of surfaces and conditions.

3.2 PREPARATION
A Coat metal sleeve surfaces below grade and surfaces in contact with dissimilar materials with asphaltic paint.

3.3 INSTALLATION
A Install flagpole, base assembly, lightning ground rod and cable, and fittings in accordance with manufacturer's instructions.

3.4 TOLERANCES
A Maximum Variation From Plumb: 1 inch.

3.5 ADJUSTING
A Adjust operating devices so that halyard and flag function smoothly.

END OF SECTION 10 75 00

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# 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.
3. 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 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: Subject to compliance with the Contract Documents design is based on product selected by the Architect 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 selected by the Architect.
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: Subject to compliance with the Contract Documents design is based on product selected by the Architect 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 selected by the Architect.
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 Product (SSM): 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. Wilsonart LLC.

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 36 61.19 - QUARTZ AGGLOMERATE 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. Quartz agglomerate 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 quartz agglomerate material manufacturer unless otherwise indicated.

### 1.4 SUBMITTALS

A Action Submittals:

1. Product Data: For countertop materials. Include the following:
   a. Current Health Product Declaration.
   b. Current Environmental Product Declaration.
   c. Indicate VOC content for adhesive.
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 quartz agglomerate 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 utilities that will penetrate countertops or backsplashes.

PART 2 PRODUCTS

2.1 QUARTZ AGGLOMERATE COUNTERTOP MATERIALS

A Quartz Agglomerate: Solid sheets consisting of quartz aggregates bound together with a matrix of polymers, resins, and pigment and complying with ISFA 3-01.

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. Cosentino. (Silestone).
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. Cambria.
   b. Wilsonart LLC.

B Plywood: Exterior softwood plywood complying with DOC PS 1, Grade C-C Plugged, touch sanded.

2.2 FABRICATION

A General: Fabricate countertops according to manufacturer's written instructions and the AWI publication "Architectural Woodwork Standards."

1. AWI Grade: Custom.

B Countertop Configuration: As indicated on the Drawings.

C Backsplash Configuration: As indicated on the Drawings.

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: Provide the following as applicable.

1. Undercounter Plumbing Fixtures: Make cutouts for fixtures in shop using template or pattern furnished by fixture manufacturer. Form cutouts to smooth, even curves.
   a. Provide vertical edges, slightly eased at juncture of cutout edges with top and bottom surfaces of countertop and projecting 3/16 inch into fixture opening.
2. Fittings: Drill countertops in shop for plumbing fittings and similar items.

2.3 INSTALLATION MATERIALS

A Adhesive: Product 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).

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 as necessary for a complete installation.

PART 3 EXECUTION

3.1 EXAMINATION

A Examine substrates to receive quartz agglomerate countertops 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 countertops 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 as follows:

1. Installation over Subtops: Secure countertops to subtops with adhesive according to quartz agglomerate manufacturer's written instructions. Align adjacent surfaces and, using adhesive in color to match countertop, form seams to comply with quartz agglomerate manufacturer's written instructions. Carefully dress joints smooth, remove surface scratches, and clean entire surface.

C Install backsplashes and end splashes, if applicable, by adhering to wall and countertops with adhesive. Mask areas of countertops and splashes adjacent to joints to prevent adhesive smears.

D 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.

E 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.

F Apply sealant to gaps at walls; comply with Section 07 92 00 Joint Sealants.

END OF SECTION 12 36 61.19

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