

# SPECIFICATIONS



MATLACHA PINE ISLAND FIRE CONTROL DISTRICT  
5700 PINE ISLAND ROAD  
BOKEELIA, FLORIDA 33922

## **FIRE STATION #2**

**5015 STRINGFELLOW ROAD  
ST. JAMES CITY, FLORIDA 33956**

## ARCHITECTURAL

CONSTRUCTION DOCUMENTS SUBMITTAL

March 28, 2025

CTA PROJECT No. 24-101



1228 LAFAYETTE STREET SUITE #1  
CAPE CORAL, FLORIDA 33904

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SECTION 01 01 00 - SUMMARY OF WORK

PART 1 - GENERAL

1.1 RELATED DOCUMENTS:

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1-33 Specification sections, apply to work of this section.

1.2 PROJECT/WORK IDENTIFICATION:

- A. Project name is: **MATLACHA PINE ISLAND FIRE CONTROL DISTRICT - FIRE STATION #2**
- B. Related requirements and conditions that are indicated on the Contract Documents include, but are not necessarily limited to the following:
  - 1) Existing site conditions and restrictions on use of the site.
  - 2) Work to be performed concurrently by separate contractors.
  - 3) Work to be performed subsequent to work under this Contract.
  - 4) Alternates.
- C. Summary by References: Work of the Contract can be summarized by references to the Contract, General Conditions, Supplementary Conditions, Specification Sections, Drawings, addenda and modifications to the Contract Documents issued subsequent to the initial printing of this project manual and including but not necessarily limited to printed material referenced by any of these. It is recognized that work of the Contract is also unavoidably affected or influenced by governing regulations, natural phenomenon including weather conditions and other forces outside the Contract Documents.
- D. Abbreviated Written Summary: Briefly and without force and effect upon the contract documents, the work of the Contract can be summarized as follows:

- 1. **MATLACHA PINE ISLAND FIRE CONTROL DISTRICT - FIRE STATION #2.** The construction includes but is not limited to site work, site prep, landscape/irrigation, chain link fencing, asphalt paving, traffic painting, storm water system, cast-in-place concrete, slab on grade concrete, concrete footings, concrete bearing walls, steel columns, steel beams, steel joists, steel stairs, architectural casework, building insulation, metal roofing, modified bitumen roofing, metal gutters/downspouts, joint sealants, steel doors/frames, wood doors, aluminum storefront, aluminum windows, gypsum board assemblies. Ceramic tile, acoustical ceilings, resilient tile, carpet, paint, audio/visual equipment, toilet partitions, toilet accessories, window treatment, pre-engineered structures, hydraulic elevator.

1.3 CONTRACTOR USE OF PREMISES:

- A. During the entire construction period the Subcontractors will have the limited use of the premises for construction operations, including limited use of the site. Subcontractors are required to coordinate and schedule their work with the Construction Manager prior to commencement. Refer to the project schedule for the specific areas and

dates where work may be performed.

- B. Confine operations at the site to the areas permitted under the Contract. Portions of the site beyond areas on which work is indicated are not to be disturbed. Conform to site rules and regulations affecting the work while engaged in project construction.
- C. Do not unreasonably encumber the site with materials or equipment. Confine stockpiling of materials and location of storage sheds to the areas indicated. If additional storage is necessary obtain and pay for such storage off site.
- D. Any surface graded or disturbed outside the construction limits as shown on the plans will be restored, seeded, mulched, and maintained, including mowing at the Contractor's expense.

#### 1.4 OWNER OCCUPANCY:

- A. Partial Owner Occupancy: The Owner reserves the right to place and install equipment as necessary in completed areas of the building and to occupy such completed areas prior to Substantial Completion, provided such occupancy does not substantially interfere with completion of the Work. Such placing of equipment and partial occupancy shall not constitute acceptance of the Work or any portion of the Work.

#### 1.5 COORDINATION:

- A. The work of this Contract includes coordination of the entire work of the project, including preparation of general coordination drawings, diagrams and schedules, and control of site utilization from the beginning of construction activity through project close out and warranty periods.

#### 1.6 MAINTENANCE OF THE WORK

- A. Limiting Exposures of Work: To the extent possible through reasonable control and protection methods, supervise performance of the work in such a manner and by such means which will ensure that none of the work, whether completed or in progress, will be subjected to harmful, dangerous, damaging or otherwise deleterious exposure during the construction period.
- B. Cleaning and Protection: During handling and installation of work at the project site, clean and protect work in progress and adjoining work. Apply protective covering on installed work where required to ensure freedom from damage up to the time of substantial completion. Clean and perform maintenance on installed work as frequently as necessary through the remainder of the construction period. Adjust and lubricate operable components to ensure operability without damaging effects.

#### 1.7 MISCELLANEOUS PROVISIONS:

- A. Production Coordination Requirements  
It is the intent of these construction documents that all divisions of work, including mechanical and electrical systems will be compatible. It is the responsibility of each subcontractor to coordinate all of their products furnished and work performed with the work of other subcontractors with whom their work interacts. Offered as examples, but clearly not a complete listing, are the following:
  - HVAC units are to be coordinated with roof flashings and curbs.
  - Voltages of appliances and other connected equipment must be coordinated with power types provided, i.e. 110V vs. 220V.
  - Mechanical and electrical fixtures connecting to or mounting in work of general trades are to be furnished in configurations and with accessories compatible with surrounding products.
  - Operators, such as garage door operators must be furnished in proper voltage and connected in

accordance with Code requirements.

- Subcontractors requiring suitable substrate mounting for their materials must confirm suitable conditions in the work as designed, i.e. sufficient wall depth for specified recessed items; sufficient embedded steel area for mounting of motors for operators, etc.

In the event a subcontractor identifies any problem in suitably performing their work in accordance with these provisions,

they are to bring it to the attention of the CM immediately for resolution.

B. Performance Requirements for Completed Work:

The Contract Documents indicate the intended occupancy and utilization of the building and its individual systems and facilities. Compliance with governing regulations is intended and required for the Work and for the Owner's occupancy and utilization.

In addition to the requirement that every element of the Work comply with applicable requirements of the contract documents, it is also required that the Work as a whole comply with the rules of the Department of Education (DOE) and all Applicable Codes. In the event that any Subcontractor is aware or has reasonable concerns of non-compliance of the requirements of the contract documents with DOE regulations or applicable codes, he is bound to report this in writing to the Construction Manager as soon as he is aware of it.

- C. Construction Documents: The Contractor shall have one set available on the site at all times. Additional copies of plans and specifications may be obtained by the Contractor for the cost of reproduction. All contractors will be furnished at no cost, one complete set of construction drawings and specifications. Any additional documents will be provided at contractor expense.

END OF SECTION 01 01 00

SECTION 01 03 00 - ALTERNATES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS:

Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work of this section.

1.2 DESCRIPTION OF REQUIREMENTS:

Definition: An alternate is an amount proposed by Bidders and stated on the Bid Form that will be added to or deducted from Base Bid amount if the Owner decides to accept a corresponding change in either scope of work or in products, materials, equipment, systems or installation methods described in Contract Documents.

Coordination: Coordinate related work and modify or adjust adjacent work as required to ensure that work affected by each accepted alternate is complete and fully integrated into the project.

Notification: Immediately following award of Contract, prepare and distribute to each party involved, notification of the status of each alternate. Indicate whether alternates have been accepted, rejected or deferred for consideration at a later date. Include a complete description of negotiated modifications to alternates, if any.

Schedule: A "Schedule of Alternates" is included at the end of this section. Specification sections referenced in the Schedule contain requirements for materials and methods necessary to achieve the work described under each alternate.

Include as part of each alternate, miscellaneous devices, appurtenances and similar items incidental to or required for a complete installation whether or not mentioned as part of the alternate.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION

3.1 SCHEDULE OF ALTERNATES

A. Alternate No. 1

SECTION 01 04 00 - PROJECT COORDINATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS:

Drawings and general provisions of Contract, including General and Supplementary Conditions and other Division-1 Specification sections, apply to work of this section.

1.2 DESCRIPTION OF WORK:

Minimum administrative and supervisory requirements necessary for coordination of work on the project include but are not necessarily limited to the following:

Coordination and meetings.

Administrative and supervisory personnel.

Surveys and records or reports.

Limitations for use of site.

Special reports.

General installation provisions.

Cleaning and protection.

Conservation and salvage.

1.3 COORDINATION AND MEETINGS:

General: Prepare a written memorandum on required coordination activities. Include such items as required notices, reports and attendance at meetings. Distribute this memorandum to each entity performing work at the project site. Prepare similar memorandum for separate contractors where interfacing of their work is required.

Coordination Drawings: The Contractor shall prepare and submit to the Architect six (6) blue-line copies of each coordination drawings for the project. The drawings shall show the accurate interface of the separate entities, subcontractors work and materials required to complete the work and shall indicate sequences for installation. Drawings shall be provided as indicated on the Contractor's "Submittal Schedule" or if not indicated, prior to installation of any portion of the work affected by the Drawings. Any conflicts in the work shall be identified by the Contractor and presented to the Architect and resolved prior to beginning each phase of the work. Failure of the Contractor to provide the required coordination drawings shall not relieve him of coordination responsibilities.

Weekly Coordination Meetings: Hold weekly general project coordination meetings at regularly scheduled times convenient for all parties involved. These meetings are in addition to specific meetings held for other purposes, such as regular project meetings and special pre-installation meetings. Request representation at each meeting by every party currently involved in coordination or planning for the work of the entire project. Conduct meetings in a manner, which will resolve coordination problems. Record results of the meeting and distribute copies to everyone in attendance and to others affected by decisions or actions resulting from each meeting.

At Contractor's option, weekly coordination meetings can be held integrally with monthly progress meetings as specified in section "Schedules, Reports, Payments".

#### 1.4 ADMINISTRATIVE/SUPERVISORY PERSONNEL:

General: In addition to a full time, on-site Project Manager and a General Superintendent and other administrative supervisory personnel that may be required for performance of the work, provide specific coordinating personnel as specified herein.

Submittals of Staff Names, Duties: Within 15 days of Notice to Proceed, submit a listing of Contractor's principal staff assignments and consultants, naming persons and listing their addresses and telephone numbers with a complete written description of related work experience and education (Resume).

#### 1.5 SURVEYS AND RECORDS/REPORTS:

General: Working from lines and levels established by the property survey, establish and maintain bench marks and other dependable markers. Establish bench marks and markers to set lines and levels for work at each story of construction and elsewhere as needed to properly locate each element of the project. Calculate and measure required dimensions as shown within recognized tolerances. Drawings shall not be scaled to determine dimensions. Advise entities performing work, of marked lines and levels provided for their use.

Surveyor: Engage a Land Surveyor or Professional Engineer experienced and specializing in land survey work, who is registered in the State, where the project is located, to perform those services specified in this article. The General Contractor shall not employ the Civil Engineering firm of record to perform any survey work that is required under the terms of the contract.

Survey Procedures: Before proceeding with the layout of actual work, verify the layout information shown on the drawings, in relation to the property survey and existing benchmarks. As work proceeds, check every major element for line, level and plumb. Maintain a surveyor's log or record book of such checks; make this log or record book available for the Architect or Engineer's reference. Record deviations from required lines and levels, and advise the Architect or Engineer promptly upon detection of deviations that exceed indicated or recognized tolerances. Record deviations, which are accepted, and not corrected, on record drawings.

Final Property Survey: Before substantial completion, prepare a final property survey showing significant features (real property boundary, and topography the same as the design documents) that have resulted from construction of the project tie-in building to property lines and corners. Include on the survey a certification, signed by the Surveyor, to the effect that principle lines and levels of the project are accurately positioned as shown on the survey.

Submit 10 blueline copies of final property survey.

Recording: Where possible, at substantial completion, have the final property survey recorded by or with local governing authorities as the official "property survey".

#### 1.6 LIMITATIONS ON USE OF THE SITE:

General: Limitations on site usage as well as specific requirements that impact site utilization are indicated on the drawings and by other contract documents. In addition to these limitations and requirements administer allocation of available space equitably among entities needing both access and space so as to produce the best overall efficiency in performance of the total work of the project. Schedule deliveries so as to minimize space and time requirements for storage of materials and equipment on site. Refer to Section 01010 - Summary of the Work.

#### 1.7 SPECIAL REPORTS:

General: Submit special reports directly to the Owner within one day of an occurrence. Submit a copy of the report to the Architect/Engineer and other entities that are affected by the occurrence.

Reporting Unusual Events: When an event of an unusual and significant nature occurs at the site, prepare and submit a special report. List chain of events, persons participating, response by the Contractor's personnel, an evaluation of the results or effects and similar pertinent information. Advise the Owner in advance when such events are known or predictable.

Reporting Accidents: Prepare and submit reports of significant accidents, at site and anywhere else work is in progress. Record and document data and actions. For this purpose, a significant accident is defined to include events where personal injury is sustained, or property loss of substance is sustained, or where the event posed a significant threat of loss or personal injury.

PART 2 - PRODUCTS (Not Applicable)

PART 3 – EXECUTION

### 3.1 GENERAL INSTALLATION PROVISIONS:

Pre-Installation Conferences: Hold a pre-installation meeting at the project site well before installation of each unit of work which requires coordination with other work. Installer and representatives of the manufacturers and fabricators who are involved in or affected by that unit of work, and with its coordination or integration with other work that has preceded or will follow shall attend this meeting. Advise the Architect/Engineer of scheduled meeting dates.

At each meeting review progress of other work and preparations for the particular work under consideration including specific requirements for the following:

- Contract documents.
- Options.
- Related change orders.
- Purchases.
- Deliveries
- Shop drawings, product data and quality control samples.
- Possible conflicts and compatibility problems.
- Time schedules.
- Weather limitations.
- Manufacturer's recommendations.
- Compatibility of materials.
- Acceptability of substrates.
- Temporary facilities.
- Space and access limitations.
- Governing regulations.
- Safety.
- Inspection and testing requirements.
- Required performance results.
- Recording requirements.
- Protection.

Record significant discussions of each conference, and record agreements and disagreements, along with the final plan of action. Distribute the record of meeting promptly to everyone concerned, including the Owner and Architect/Engineer.

Do not proceed with the work if the pre-installation conference cannot be successfully concluded. Initiate whatever actions are necessary to resolve impediments to performance of the work and reconvene pre-installation at the earliest feasible date.

Installer's Inspection of Conditions: Require the Installer of each major unit of work to inspect the substrate to receive the work and conditions under which the work is to be performed. The Installer shall report all unsatisfactory conditions in writing to the Contractor. Do not proceed with the work until unsatisfactory conditions have been corrected in a manner acceptable to the Installer.

Manufacturer's Instructions: Where installations include manufactured products, comply with the manufacturer's applicable instructions and recommendations for installation, to the extent that these instructions and recommendations are more explicit or more stringent than requirements indicated in the Contract Documents. Provide copies of manufacturer's printed instructions with submittals and as requested by the Architect.

Inspect each item of materials or equipment immediately prior to installation. Reject damaged and defective items. Provide attachment and connection devices and methods for securing work. Secure work true to line and level, and within recognized industry tolerances. Allow expansion and building movement. Provide uniform joint width in exposed work. Arrange joints in exposed work to obtain the best visual effect. Refer questionable visual-effect choices to the Architect/Engineer for final decision.

Recheck measurements and dimensions of the work, as an integral step of starting each installation.

Install each unit-of-work during weather conditions and project status, which will ensure the best possible results in coordination with the entire work. Isolate each unit of work from incompatible work as necessary to prevent deterioration.

Coordinate enclosure of the work with required inspections and tests, so as to minimize the necessity of uncovering the work for that purpose.

Mounting Heights: Where mounting heights are not indicated, mount individual units of work at industry recognized standard, mounting heights for the particular application indicated. Refer questionable mounting height choices to the Architect/Engineer for final decision.

### 3.2 CLEANING AND PROTECTION:

General: During handling and installation of work at the project site, clean and protect work in progress and adjoining work at the basis of continuous maintenance. Apply protective covering on installed work where it is required to ensure freedom from damage or deterioration at time of substantial completion.

Clean and perform maintenance on installed work as frequently as necessary through the remainder of the construction period. Adjust and lubricate operable components to ensure operability without damaging effects

Limiting Exposures of Work: To the extent possible through reasonable control and protection methods, supervise performance of the work in such a manner and by such means which will ensure that none of the work, whether completed or in progress, will be subjected to harmful, dangerous, damaging or otherwise deleterious exposure during the construction period. Such exposures include, where applicable, but not by way of limitation the following:

- Excessive static or dynamic loading.
- Excessive internal or external pressures.
- Excessively high or low temperatures.
- Thermal shock.
- Excessively high or low humidity.
- Air contamination or pollution.
- Water or ice.
- Solvents.
- Chemicals.
- Light.
- Radiation.
- Puncture.
- Abrasion.

- Heavy traffic.
- Soiling.
- Bacteria.
- Insect infestation.
- Combustion.
- Electrical current.
- High speed operation, improper lubrication, unusual wear or other misuse.
- Incompatible interface.
- Destructive testing.
- Misalignment.
- Excessive weathering.
- Unprotected storage.
- Improper shipping or handling.
- Theft.
- Vandalism.

### 3.3 CONSERVATION AND SALVAGE:

General: It is a requirement for supervision and administration of the work that construction operations be carried out with the maximum possible consideration given to conservation of energy, water and materials. In addition, maximum consideration shall be given to salvaging materials and equipment involved in performance of the work but not incorporated therein. Refer to other sections for required disposition of salvage materials, which are the Owner's property.

END OF SECTION 01 04 00

## SECTION 01 04 50 - CUTTING AND PATCHING

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS:

Drawings and general provisions of Contract, including General and Supplementary Conditions and other Division-1 Specification sections, apply to work of this section.

#### 1.2 DESCRIPTION OF REQUIREMENTS:

Definition: "Cutting and patching includes cutting into existing construction to provide for the installation or performance of other work and subsequent fitting and patching required to restore surfaces to their original condition.

"Cutting and patching" is performed for coordination of the work, to uncover work for access or inspection, to obtain samples for testing, to permit alterations to be performed or for other similar purposes.

Cutting and patching performed during the manufacture of products, or during the initial fabrication, erection or installation processes is not considered to be "cutting and patching" under this definition. Drilling of holes to install fasteners and similar operations are also not considered to be "cutting and patching".

Refer to other sections of these specifications for specific cutting and patching requirements and limitations applicable to individual units of work.

Unless otherwise specified, requirements of this section apply to mechanical and electrical work. Refer to Division-15 and Division-16 sections for additional requirements and limitations on cutting and patching of mechanical and electrical work.

#### 1.3 QUALITY ASSURANCE:

Requirements for Structural Work: Do not cut and patch structural work in a manner that would result in a reduction of load-carrying capacity or of load-deflection ratio. When in doubt, notify Architect/Engineer.

Before cutting and patching the following categories of work, obtain the Architect/Engineer's approval to proceed with cutting and patching as described in the procedural proposal for cutting and patching.

Structural steel.

Miscellaneous structural metals, including lintels, equipment supports, stair systems and similar categories of work.

Structural concrete.

Foundation construction.

Timber and primary wood framing.

Bearing and retaining walls.

Structural decking.

Piping, ductwork, vessels and equipment.

Operational and Safety Limitations: Do not cut and patch operational elements or safety related components in a manner that would result in a reduction of their capacity to perform in the manner intended, including energy performance, or that would result in increased maintenance, or decreased operational life or decreased safety.

Before cutting and patching the following elements of work, and similar work elements where directed, obtain the Architect/Engineer's approval to proceed with cutting and patching as proposed in the proposal for cutting and patching.

Shoring, bracing, and sheeting.

Primary operational systems and equipment.

Water/moisture/vapor/air/smoke barriers, membranes and flashings.

Noise and vibration control elements and systems.

Control, communication, and electrical wiring systems.

Visual Requirements: Do not cut and patch work exposed on the building's exterior or in its occupied spaces, in a manner that would, in the Architect/Engineer's opinion, result in lessening the building's aesthetic qualities. Do not cut and patch work in a manner that would result in substantial visual evidence of cut and patch work. Remove and replace work judged by the Architect/Engineer to be cut and patched in a visually unsatisfactory manner.

If possible retain the original installer or fabricator, or another recognized experienced and specialized firm to cut and patch the following categories of exposed work.

Roofing.

Preformed metal panels.

Stucco and plaster.

Acoustical ceilings.

Resilient flooring.

Carpeting.

Wall covering.

HVAC enclosures, cabinets or covers.

#### 1.4 SUBMITTALS:

Procedural Proposal for Cutting and Patching: Where prior approval of cutting and patching is required, submit proposed procedures for this work well in advance of the time work will be performed and request approval to proceed. Include the following information, as applicable, in the submittal:

Describe nature of the work and how it is to be performed, indicating why cutting and patching cannot be avoided. Describe anticipated results of the work in terms of changes to existing work, including structural, operational and visual changes as well as other significant elements.

List products to be used and firms that will perform work.

Give dates when work is expected to be performed.

List utilities that will be disturbed or otherwise be affected by work, including those that will be relocated and those that will be out-of-service temporarily. Indicate how long utility service will be disrupted.

Where cutting and patching of structural work involves the addition of reinforcement, submit details and engineering calculations to show how that reinforcement is integrated with original structure to satisfy requirements.

Approval by the Architect/Engineer to proceed with cutting and patching work does not waive the Architect/Engineer's right to later require complete removal and replacement of work found to be cut and patched in an unsatisfactory manner.

## PART 2 - PRODUCTS

### 2.1 MATERIALS:

General: "Except as otherwise indicated, or as directed by the Architect/Engineer, use materials for cutting and patching that are identical to existing materials. If identical materials are not available, or cannot be used, use materials that match existing adjacent surfaces to the fullest extent possible with regard to visual effect. Use materials for cutting and patching that will result in equal-or-better performance characteristics

## PART 3 - EXECUTION

### 3.1 INSPECTION:

Before cutting, examine the surfaces to be cut and patched and the conditions under which the work is to be performed. If unsafe or otherwise unsatisfactory conditions are encountered, take corrective action before proceeding with the work.

Before the start of cutting work, meet at the work site with all parties involved in cutting and patching, including mechanical and electrical trades. Review areas of potential interference and conflict between the various trades. Coordinate layout of the work and resolve potential conflicts before proceeding with the work.

### 3.2 PREPARATION:

Temporary Support: To prevent failure, provide temporary support of work to be cut.

Protection: Protect other work during cutting and patching to prevent damage. Provide protection from adverse weather conditions for that part of the project that may be exposed during cutting and patching operations.

Avoid interference with use of adjoining areas or interruption of free passage to adjoining areas.

Take precautions not to cut existing pipe, conduit or duct serving the building but scheduled to be relocated until provisions have been made to bypass them.

### 3.3 PERFORMANCE:

General: Employ skilled workmen to perform cutting and patching work. Except as otherwise indicated or as approved by the Architect/Engineer, proceed with cutting and patching at the earliest feasible time and complete work without delay.

Cutting: Cut the work using methods that are least likely to damage work to be retained or adjoining work. Where possible review proposed procedures with the original installer; comply with original installer's recommendations.

In general, where cutting is required use hand or small power tools designed for sawing or grinding, not hammering and chopping. Cut through concrete and masonry using a cutting machine such as a carborundum saw or core drill to insure a neat hole. Cut holes and slots neatly to size required with minimum disturbance of adjacent work. To avoid marring existing finished surfaces, cut or drill from the exposed or finished side into concealed surfaces. Temporarily cover openings when not in use.

Comply with requirements of applicable sections of Division 2 where cutting and patching requires excavating and backfilling.

By-pass utility services such as pipe and conduit, before cutting, where such utility services are shown or required to be removed, relocated or abandoned. Cut-off conduit and pipe in walls or partitions to be removed. After by-pass and cutting, cap, valve or plug and seal tight remaining portion of pipe and conduit to prevent entrance of moisture or other foreign matter.

Patching: Patch with seams which are durable and as invisible as possible. Comply with specified tolerances for the work.

Where feasible, inspect and test patched areas to demonstrate integrity of work.

Restore exposed finishes of patched areas and where necessary extend finish restoration into retained adjoining work in a manner which will eliminate evidence of patching and refinishing.

Where removal of walls or partitions extends one finished area into another finished area, patch and repair floor and wall surfaces in the new space to provide an even surface of uniform color and appearance. If necessary, to achieve uniform color and appearance, remove existing floor and wall coverings and replace with new materials.

Where patch occurs in a smooth painted surface, extend final paint coat over entire unbroken surface containing patch, after patched area has received prime and base coat.

Patch, repair or re-hang existing ceilings as necessary to provide an even plane surface of uniform appearance.

#### 3.4 CLEANING:

Thoroughly clean areas and spaces where work is performed or used as access to work. Remove completely paint, mortar, oils, putty and items of similar nature. Thoroughly clean piping, conduit and similar features before painting or other finishing is applied. Restore damaged pipe covering to its original condition.

END OF SECTION 01 04 50

SECTION 010500 - PERMITS, LICENSES AND FEES

PART 1 – GENERAL

1.1 RELATED DOCUMENTS:

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and other Division 1-33 Specification sections, apply to work of this section.

1.2 DESCRIPTION OF WORK:

- A. It is the intent of the construction documents that the completed work conform to all applicable codes, be constructed in accordance with any applicable permit and licensure requirements, and that fees necessary for occupancy be completely paid.

PART 2 – PRODUCTS (not used)

PART 3 – EXECUTION

- A. Each CM shall be required to schedule and coordinate for all inspections and similar procedural items as required by the local government agencies having jurisdiction.
- B. All building, structural, electrical, plumbing, mechanical, etc. work items shall be installed in accordance with the latest edition of the regulations of governing local, state, county and other applicable codes, including the utilities company unless otherwise specified in the plans and specifications. The CM shall be responsible and pay all required licenses, fees and inspections associated with his work. The cost for such shall be included in the Contractor's bid price.
- C. In the event of a conflict between permits, drawings, specifications, and codes, etc., the CM shall immediately issue an RFI (Request for Information) to request a ruling from the ARCHITECT. **The CM is responsible for all actions necessary to comply with the most stringent requirement.**
- D. It is the contractor's responsibility to contact the applicable utility company (or companies) to determine if any fees, charges or costs will be due the utility company, as required by the utility company for temporary power, installations, hook-ups, etc. This fee, charge or cost shall be included in this contractor's bid price
- E. Except for impact fees, permitting fees and utility connection fees, which are to be paid by Owner, the CM shall procure and pay for all licenses, pay all charges, fees, and taxes, and give all notices necessary and incidental to the due and lawful prosecution of the work. All costs incurred shall be deemed as being included in the contractor's bid.

END OF SECTION 01 05 00

SECTION 01 09 00 - DEFINITIONS AND STANDARDS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS:

Drawings and general provisions of Contract, including General and Supplementary Conditions and other Division-1 Specification sections, apply to work of this section.

1.2 DESCRIPTIONS OF REQUIREMENTS:

General: This section specifies procedural and administrative requirements for compliance with governing regulations and codes and standards imposed upon the Work. Those requirements include obtaining permits, licenses, inspections, releases and similar documentation, as well as payments, statements and similar requirements associated with regulations, codes and standards.

The term "Regulations" is defined to include laws, statues, ordinances and lawful orders issued by governing authorities, as well as those rules, conventions and agreements within the construction industry which effectively control the performance of the Work regardless of whether they are lawfully imposed by governing authority or not.

Governing Regulations: Refer to General and Supplementary Conditions for requirements related to compliance with governing regulations.

1.3 DEFINITIONS:

General Explanation: Certain terms used in contract documents are defined in this article. Definitions and explanations contained in this section are not necessarily complete, but are general for the Work to the extent that they are not stated more explicitly in another element of the contract documents.

General Requirements: Provisions and requirements of other Division-1 sections apply to the entire work of the Contract and, where so indicated, to other elements which are included in the project.

Indicated: The term "indicated" is a cross-reference to graphic representations, notes or schedules on the drawings, to other paragraphs or schedules in the specifications, and to similar means of recording requirements in contract documents. Where terms such as "shown," "noted," "scheduled," and "specified" are used in lieu of "indicated," it is for the purpose of helping the reader locate the cross-reference, and no limitation of location is intended except as specifically noted.

Directed, Requested, etc.: Terms such as "directed," "requested," "authorized," "selected," "approved," "required," "accepted," and "permitted" mean "directed by the Architect/Engineer," "requested by the Architect/Engineer," and similar phrases. However, no such implied meaning will be interpreted to extend the Architect's Engineer's responsibility into the Contractor's area of construction supervision.

Approved: Where used in conjunction with the Architect's/Engineer's response to submittals, requests, applications, inquiries, reports and claims by the Contractor, the term "approved" will be held to limitations of the Architect's/Engineer's responsibilities and duties as specified in General and Supplementary Conditions. In no case will the Architect/Engineer's approval be interpreted as a release of the Contractor from responsibilities to fulfill requirements of contract documents or acceptance of the Work, unless otherwise provided by requirements of the contract documents.

Project Site: The term "project site" means the space available to the Contractor for performance of the Work, either exclusively or in conjunction with others performing other construction as part of the project. The extent of the project site is shown on the drawings, and may or may not be identical with the description of the land upon which the project is to be built.

Furnish: The term "furnish" is used to mean "supply and deliver to the project site, ready for unloading, unpacking, assembly, installation, and similar operations."

Install: The term "install" is used to describe operations at project site including the actual "unloading, unpacking, assembly, erection, placing, anchoring, applying, working to dimension, finishing, curing protecting, cleaning and similar operations."

Provide: The term "provide" means "to furnish and install, complete and ready for intended use."

Installer: The "installer" is "the entity" (person or firm) engaged by the Contractor, its subcontractor or sub-subcontractor for performance of a particular element of construction at the project site, including installation, erection, application and similar required operations. It is a requirement that installers are experienced in the operations they are engaged to perform.

Testing Laboratories: A "testing laboratory" is an independent entity engaged to perform specific inspections or tests of the Work, either at the project site or elsewhere, and to report, and (if required) interpret results of those inspections or tests.

#### 1.4 SPECIFICATION FORMAT AND CONTENT EXPLANATION:

General: This article is provided to help the user of these specifications more readily understand the format, language, implied requirements and similar conventions of content. None of the following explanations shall be interpreted to modify the substance of the contract requirements.

Specification Format: These specifications are organized based upon the Construction Specifications Institute's 16-Division format. The organization of these specifications into Divisions, Sections or Trade Headings conforms generally to recognized industry practices.

Specification Content: This project specification has been produced employing certain conventions in the use of language as well as conventions regarding the intended meaning of certain terms, words, and phrases when used in particular situations or circumstances. These conventions are explained as follows:

In certain circumstances, language used in specifications and other contract documents is of the abbreviated type. Implied words and meanings will be appropriately interpreted. Singular words will be interpreted as plural and plural words will be interpreted as singular where applicable and where the full context of the contract documents so indicates.

Imperative Language is used generally in the specifications. Requirements expressed imperatively are to be performed by the Contractor. At certain locations in the text, for clarity, contrasting subjective language is used to describe responsibilities, which must be fulfilled indirectly by the Contractor, or by others when so noted.

Methods of Specifying: Techniques or methods of specifying requirements vary throughout the text. The method used for specifying one element of the Work has no bearing on requirements for another element of the Work.

Assignment of Specialists: In certain circumstances, the specification requires or implies that specific elements of the Work are to be assigned to specialists who must be engaged to perform that element of the Work. Such assignments are special requirements over which the Contractor has no choice or option. They are intended to establish which party or entity involved in a specific element of the Work is considered as being sufficiently experienced in the indicated construction processes or operations to be recognized as "expert" in those processes or operations. Nevertheless, the ultimate responsibility for fulfilling all contract requirements remains with the Contractor.

These requirements should not be interpreted to conflict with the enforcement of building codes and similar regulations governing the Work. They are also not intended to interfere with local trade union jurisdictional settlements and similar conventions.

Trades: The use of certain titles such as "carpentry" in the specification is not intended to imply that the Work must be performed by accredited or unionized individuals of a corresponding generic name, such as "carpenter". It also is not intended to imply that the requirements specified apply exclusively to trades persons of that corresponding generic name.

#### 1.5 DRAWING SYMBOLS:

General: Except as otherwise indicated, graphic symbols used on the drawings are those symbols recognized in the construction industry for purposes indicated.

#### 1.6 INDUSTRY STANDARDS:

Applicability of Standards: Except where more explicit or more stringent requirements are written into the contract documents, applicable construction industry standards have the same force and effect as if bound into or copied directly into the contract documents. Such industry standards are made a part of the contract documents by reference. Individual specification sections indicate which codes and standards the Contractor must keep available at the project site for reference.

Referenced standards (standards referenced directly in the contract documents) take precedence over standards that are not referenced but generally recognized in the industry for applicability to the Work.

Un-referenced Standards: Except as otherwise limited by the contract documents, standards not referenced but recognized in the construction industry as having direct applicability will be enforced for performance of the Work. The decision as to whether an industry code or standard is applicable, or as to which of several standards are applicable, is the sole responsibility of the Architect/Engineer.

Publication Dates: Except as otherwise indicated, where compliance with an industry standard is required, comply with standard in effect as of date of contract documents.

Conflicting Requirements: Where compliance with two or more standards or contract requirements is specified, and where these standards establish different or conflicting requirements for minimum quantities or quality levels, the most stringent requirement will be enforced, unless the contract documents specifically indicate otherwise. Refer requirements that are different, but apparently equal, and uncertainties as to which quality level is more stringent to the Architect/Engineer for a decision before proceeding.

Minimum Quantities or Quality Levels: In every instance the quantity or quality level shown or specified is intended to be the minimum to be provided or performed. Unless otherwise indicated, the actual Work may either comply exactly, within specified tolerances, with the minimum quantity or quality specified, or may exceed that minimum within reasonable limits. In complying with these requirements, the indicated numeric values are either minimum or maximum values, as noted, or as appropriate for the context of the requirements. Refer instances of uncertainty to the Architect/Engineer for decision before proceeding.

Copies of Standards: The contract documents require that each entity performing work be experienced in that part of the Work being performed. Each entity is also required to be familiar with industry standards applicable to that part of the Work. Copies of applicable standards are not bound with the contract documents.

Where copies of standards are needed for proper performance of the Work, the Contractor is required to obtain such copies directly from the publication source.

Although copies of standards needed for enforcement of the requirements may be required submittals, the Architect/Engineer reserves the right to require the Contractor to submit additional copies as necessary for enforcement of the requirements.

Abbreviations and Names: Trade association names and titles of general standards are frequently abbreviated. Where acronyms or abbreviations are used in the specifications or other contract documents, they are defined to mean the recognized name of the trade

association, standards generating organization, governing authority or other entity applicable to the context of the text provision. Refer to the "Encyclopedia of Associations," published by Gale Research Co., available in most libraries.

#### 1.7 GOVERNING REGULATIONS/AUTHORITIES:

General: The procedure followed by the Architect/Engineer has been to contact governing authorities where necessary to obtain information needed for the purpose of preparing contract documents; recognizing that such information may or may not be of significance in relation to the Contractor's responsibilities for performing the Work. Contact governing authorities directly for necessary information and decisions having a bearing on performance of the Work.

1.8 SUBMITTALS:

Permits, Licenses, and Certificates: For the Owner's records, submit copies of permits, licenses, certifications, inspection reports, releases, jurisdictional settlements, notices, receipts for fee payments, judgements, and similar documents, correspondence and records established in conjunction with compliance with standards and regulations bearing upon performance of the work.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION (Not Applicable)

END OF SECTION 01 09 00

**SECTION 01 25 00  
SUBSTITUTION PROCEDURES**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Procedural requirements for proposed substitutions.

**1.02 RELATED REQUIREMENTS**

- A. Section 00 43 25 - Substitution Request Form - During Procurement: Required form for substitution requests made prior to award of contract (During procurement).
- B. Section 00 63 25 - Substitution Request Form - During Construction: Required form for substitution requests made after award of contract (During construction).
- C. Section 01 30 00 - Administrative Requirements: Submittal procedures, coordination.

**1.03 DEFINITIONS**

- A. Substitutions: Changes from Contract Documents requirements proposed by Contractor to materials, products, assemblies, and equipment.
  - 1. Substitutions for Cause: Proposed due to changed Project circumstances beyond Contractor's control.
    - a. Unavailability.
    - b. Regulatory changes.
  - 2. Substitutions for Convenience: Proposed due to possibility of offering substantial advantage to the Project.
    - a. Substitution requests offering advantages solely to the Contractor will not be considered.

**1.04 REFERENCE STANDARDS**

- A. CSI/CSC Form 1.5C - Substitution Request (During the Bidding/Negotiating Stage) Current Edition.
- B. CSI/CSC Form 13.1A - Substitution Request (After the Bidding/Negotiating Phase) Current Edition.

**PART 2 PRODUCTS - NOT USED**

**PART 3 EXECUTION**

**3.01 GENERAL REQUIREMENTS**

- A. A Substitution Request for products, assemblies, materials, and equipment constitutes a representation that the submitter:
  - 1. Has investigated proposed product and determined that it meets or exceeds the quality level of the specified product, equipment, assembly, or system.
  - 2. Agrees to provide the same warranty for the substitution as for the specified product.
  - 3. Agrees to provide same or equivalent maintenance service and source of replacement parts, as applicable.
  - 4. Agrees to coordinate installation and make changes to other work that may be required for the work to be complete, with no additional cost to Owner.
  - 5. Waives claims for additional costs or time extension that may subsequently become apparent.
  - 6. Agrees to reimburse Owner and Architect for review or redesign services associated with re-approval by authorities.
- B. Document each request with complete data substantiating compliance of proposed substitution with Contract Documents. Burden of proof is on proposer.
  - 1. Note explicitly any non-compliant characteristics.
- C. Content: Include information necessary for tracking the status of each Substitution Request, and information necessary to provide an actionable response.
  - 1. Forms indicated in the Project Manual are adequate for this purpose, and must be used.

2. No specific form is required. Contractor's Substitution Request documentation must include the following:
  - a. Project Information:
    - 1) Official project name and number, and any additional required identifiers established in Contract Documents.
    - 2) Owner's, Architect's, and Contractor's names.
  - b. Substitution Request Information:
    - 1) Discrete and consecutive Substitution Request number, and descriptive subject/title.
    - 2) Indication of whether the substitution is for cause or convenience.
    - 3) Issue date.
    - 4) Reference to particular Contract Document(s) specification section number, title, and article/paragraph(s).
    - 5) Description of Substitution.
    - 6) Reason why the specified item cannot be provided.
    - 7) Differences between proposed substitution and specified item.
    - 8) Description of how proposed substitution affects other parts of work.
  - c. Attached Comparative Data: Provide point-by-point, side-by-side comparison addressing essential attributes specified, as appropriate and relevant for the item:
  - d. Impact of Substitution:
- D. Limit each request to a single proposed substitution item.
  1. Submit three hard copies, bound and collated.
  2. Submit an electronic document, combining the request form with supporting data into single document.

### **302 SUBSTITUTION PROCEDURES DURING PROCUREMENT**

- A. Submittal Time Restrictions:
- B. Submittal Form (before award of contract):
  1. Submit substitution requests by completing the form attached to this section. See this form for additional information and instructions. Use only this form; other forms of submission are unacceptable.
  2. Submit substitution requests by completing CSI/CSC Form 1.5C - Substitution Request. See this form for additional information and instructions. Use only this form; other forms of submission are unacceptable.

### **303 SUBSTITUTION PROCEDURES DURING CONSTRUCTION**

- A. Submittal Form (after award of contract):
  1. Submit substitution requests by completing the form attached to this section. See this section for additional information and instructions. Use only this form; other forms of submission are unacceptable.
  2. Submit substitution requests by completing the form in Section 00 63 25; see this section for additional information and instructions. Use only this form; other forms of submission are unacceptable.
  3. Submit substitution requests by completing CSI/CSC Form 13.1A - Substitution Request (After Bidding/Negotiating). See this form for additional information and instructions. Use only this form; other forms of submission are unacceptable.
- B. Architect will consider requests for substitutions only within 15 days after date of Agreement.
- C. Submit request for Substitution for Cause within 14 days of discovery of need for substitution, but not later than 14 days prior to time required for review and approval by Architect, in order to stay on approved project schedule.
- D. Submit request for Substitution for Convenience immediately upon discovery of its potential advantage to the project, but not later than 14 days prior to time required for review and approval by Architect, in order to stay on approved project schedule.

1. In addition to meeting general documentation requirements, document how the requested substitution benefits the Owner through cost savings, time savings, greater energy conservation, or in other specific ways.
  2. Document means of coordinating of substitution item with other portions of the work, including work by affected subcontractors.
  3. Bear the costs engendered by proposed substitution of:
    - a. Owner's compensation to the Architect for any required redesign, time spent processing and evaluating the request.
- E. Substitutions will not be considered under one or more of the following circumstances:
1. When they are indicated or implied on shop drawing or product data submittals, without having received prior approval.
  2. Without a separate written request.
  3. When acceptance will require revisions to Contract Documents.

**304 RESOLUTION**

- A. Architect may request additional information and documentation prior to rendering a decision. Provide this data in an expeditious manner.
- B. Architect will notify Contractor in writing of decision to accept or reject request.
  1. Architect's decision following review of proposed substitution will be noted on the submitted form.

**305 ACCEPTANCE**

- A. Accepted substitutions change the work of the Project. They will be documented and incorporated into work of the project by Change Order, Construction Change Directive, Architectural Supplementary Instructions, or similar instruments provided for in the Conditions of the Contract.

**306 ATTACHMENTS**

- A. A facsimile of the Substitution Request Form (During Construction) required to be used on the Project is included after this section.

**END OF SECTION 01 25 00**

SECTION 01 31 00 - SCHEDULES, REPORTS, PAYMENTS

PART 1 - GENERAL:

1.1 RELATED DOCUMENTS:

Drawings and general provisions of Contract, including General and Supplementary Conditions and other Division-1 Specification sections, apply to work of this section.

1.2 COORDINATION:

Coordinate both the listing and timing of reports and other activities required by provisions of section and other sections, so as to provide consistency and logical coordination between the reports. Maintain coordination and correlation between separate reports by updating at monthly or shorter time intervals. Make appropriate distribution of each report and updated report to all parties involved in the work including the Architect/Engineer and Owner. In particular provide close coordination of the progress schedule, schedule of values, listing of subcontracts, schedule of submittals, progress reports, and payment requests.

1.3 PRELIMINARY PROGRESS SCHEDULE:

Bar-Chart Schedule: Submit a bar-chart type progress not more than 7 days after the date established for commencement of the work. On the schedule, indicate a time bar for each major category or unit of work to be performed at site, properly sequenced and coordinated with other elements of work. Show completion of the work sufficiently in advance of the date established for substantial completion of the work.

Superimpose an S-curve, on the schedule to show the "estimated" total dollar-volume of work performed at any date during the Contract Time, with a column of cost figures in the left-hand margin ranging from zero to Contract Sum.

Submittal Tabulation: With the bar-chart submittal, submit a tabulation, by date, of the submittals required during the first 90 days of Construction Time. This tabulation shall include both those submittals required during the initial 90 days of construction to maintain the orderly progression of the work, and those submittals required early because of long lead time for manufacture or fabrication. At the Contractor's option, submittal dates may be shown on the bar-chart schedule, in lieu of being tabulated.

1.4 FULLY-DEVELOPED PROGRESS SCHEDULE:

Bar-Chart Schedule: Based on preliminary development of the progress schedule if any, and on whatever updating and feedback may have occurred during project start-up, secure critical time commitments for performing major elements of the work. Within 30 days of the date established for "commencement of the work", submit a comprehensive bar-chart type progress schedule indicating, by stage-coded symbols, a time bar for each major category or unit of work to be performed at site; include minor elements of work which are, nevertheless, involved in overall sequencing of the work. Arrange schedule to show graphically the major sequences of work necessary for the completion of related elements of work. Arrange the schedule to show how substantial completion is scheduled to allow for Architect's/Engineer's procedure for certification of substantial completion. Prepare and maintain the schedule on either a sheet of sufficient width (or else a series of sheets) to show the required data clearly for the entire Construction Time. Prepare the schedule on sheets of stable transparency, or other reproducible material, to permit reproduction for the required distribution.

Individual Work Stages: By uniform symbols and crosshatched bars, show significant stages for each category or unit of work. Such stages shall include, but not necessarily limited to, subcontract letting, submittals, purchases, mockups, fabrication, sample testing, deliveries, installation, testing, adjusting, curing, start up and placement into final use and operation. Within long bars showing fabrication or installation of major units of work of 3 months duration, show the estimated percentage-of-completion markers at 10 percent increments. As each unit of work progresses, mark each long bar with a contrasting mark (at 10 percent increments) to show actual percentage-of-completion.

Cost Correlation: Immediately below the date line at the heading of the bar-chart, provide a two-item cost correlation line, indicating both "pre-calculated" and "actual" costs. This cost correlation line shall show dollar-volume of work performed as of same dates used for preparation of payment requests. Refer to subsequent article for cost reporting and payment procedures. In so far as it is practical to do so, use the same units of work in progress schedule as indicated in the "schedule of values" required by General Conditions and further specified herein.

Superimpose an S-curve on the schedule (only first sheet for multiple-sheet schedule) to show the "precalculated dollar-volume against time at any point during Contract Time. Provide a double column of figures in left hand margin; one column shall indicate a range from zero dollars to the Contract Sum, the other column shall indicate a percentage from zero to 100 percent. As the work progresses and, on each date, used in payment requests, plot a second S-curve showing actual dollar-volume of work performed.

#### 1.5 CPM TYPE PROGRESS SCHEDULING:

GENERAL: Prepare and maintain a progress schedule consisting of a network analysis system generally known as the Critical Path Method (CPM). Proceed with the preparations immediately following first notification of Contract award. Pursue the necessary steps of development and analysis so that the first full network diagram can be accepted and placed into unrestricted use no later than 60 days following the date of commencement of the work. Conduct educational workshops to train and inform key project personnel, including subcontractors' personnel, in the proper methods of providing data and utilizing the progress schedule information. Establish regular procedures for monitoring, updating and reporting, coordinated with progress meeting data and payment request dates.

Engage a consultant who is a recognized expert in CPM scheduling and operations, to assist with the progress scheduling procedure. When demonstrated to the Architect's/Engineer's satisfaction that Contractor's personnel are sufficiently skilled, experienced and equipped for CPM scheduling, the requirement for an engaged consultant will be waived.

Standards: Except as otherwise indicated comply with "CPM in Construction - a Manual for General Contractors" published by the Associated General Contractors of America, Inc.

Minimum Procedures: Establish procedures and processing routines and include data to whatever extent is consistent with the complexity of the work, and necessary to achieve a high degree of effectiveness and accuracy in the development of an "optimum" progress schedule. Use "one day" as the unit of time.

Activities: Before attempting to produce a network diagram, prepare a listing of activities involved; include every activity having a possible bearing on the time required to complete the work. List each activity estimated time duration, and document its interface or sequencing requirements in relation to other activities; impart the best logic which can be foreseen for the whole construction process.

Organization: Sketch the first anticipation of a skeleton network to help understand the essence of a probable critical path.

Processing: Input the prepared data to the EDP program and process to produce the output data or computer-drawn network (draw network by hand if equipment is unable to do so). Revise data, reorganize necessary sequences, and reproduce as many times as necessary to produce an optimum arrangement within the limitations of the Contract Time. Display full network on a single (or pieced together) sheet, with critical path marked and located near center of network, and locate paths with most float near edges. Sub-networks are permissible on separate sheets for activities clearly off the critical path.

Initial Issue: Prepare initial issue of progress schedule network from a listing of straight "early start-total float" sort. For identified and described activity, show associated events, duration, float, and dates for early start/finish and late start/finish. In listing, identify which items are critical. Produce a listing of dollar-volumes of total work performed calculated at intervals matching the projected times for payment requests.

Submittal and Distribution: Submit initial issue for acceptance and when authorized, distribute copies to the Architect/Engineer (3 copies), Owner, separate contractors (if any), principal subcontractors and suppliers or fabricators, and other identified (by the Contractor) with a

need-to-know schedule responsibility. Post copies in project meeting rooms and field (temporary) offices. Distribute and post subsequent updated issued to the same entities, whenever revisions are made; except delete entities from distribution which have completed assigned work and are not longer involved in performance of scheduled work.

Submit copies of each computer produced listing, in duplicate, to the Architect/Engineer.

Distribution: Following the initial submittal to and response by the Architect/Engineer, print and distribute progress schedules to Architect/Engineer (3 copies), Owner, separate contractors, the principal subcontractors and suppliers or fabricators, and others with a need-to-know schedule-compliance requirement. Post copies in the project meeting room and temporary field office. When revisions are made, distribute updated issues to the same entities and post updated issues in the same locations. Delete entities from distribution when they have completed their assigned work and are no longer involved in performance of scheduled work.

#### 1.6 SUBMITTAL SCHEDULE:

General: Immediately after the development and acceptance of the fully developed progress schedule, prepare a complete schedule of work-related submittals. Submit this schedule within 10 days of the date required for establishment of progress schedule. Correlate this submittal schedule with the listing of principal subcontractors, as required by the General Conditions, and with the "listing of products" or "procurement schedule" as specified in "Products and substitutions" sections and elsewhere in contract documents.

Form: Prepare the schedule in chronological order of submittals. Show category of the submittal, name of subcontractor, a generic description of work covered, related section numbers, activity or event number on progress schedule, the scheduled date for the first submission, re-submittal, and the final release or approval by Architect or Engineer.

#### 1.7 PROGRESS MEETINGS, REPORTING:

General: In addition to specific coordination and pre-installation meetings for each element of work, and other regular project meetings held for other purposes, hold general progress meeting each week with time coordinated with preparation of payment request. Require each entity then involved in planning, coordination or performance of work to be properly represented at each meeting. Review each entity's present and future needs including interface requirements, time, sequences, deliveries, access, site utilization, temporary facilities and services, hours of work, hazards and risks, housekeeping, change orders, and documentation of information for payment requests. Discuss whether each element of current work is ahead of schedule, on time, or behind schedule in relation with updated progress schedule. Determine how behind-schedule work will be expedited, and secure commitments from entities involved in doing so. Discuss whether schedule revisions are required to ensure that current work and subsequent work will be completed within Contract Time. Review everything of significance, which could affect progress of the work.

Initial Progress Meeting: Schedule initial progress meeting, recognized as "Pre-Construction Meeting", for a date not more than 15 days after date of commencement of the work. Use it as an organizational meeting, and review responsibilities and personnel assignments.

Reporting: Within 3 days after each progress meeting date, distribute copies of minutes-of-the-meeting to each entity present and to others who should have been present. Include a brief summary (in narrative form) of progress of the work since previous meeting and report.

Schedule Updating: Immediately following each progress meeting, where revisions to progress schedule have been made or recognized, revise progress schedule. Reissue revised schedule concurrently with report of each meeting.

Daily Reports: Prepare a daily report, recording the following information concerning events at the site; and submit duplicate copies to Architect/Engineer at regular intervals not exceeding weekly intervals:

- List of subcontractors at the site.
- List of separate contractors at the site.
- Approximate count of personnel at the site.
- High/low temperatures, general weather conditions.
- Accidents (refer to accident reports).
- Meetings and significant decisions.
- Unusual events (refer to special reports).
- Stoppages, delays, shortages, losses.
- Meter readings and similar recordings.
- Emergency procedures, field orders.
- Orders/requests by governing authorities.
- Change orders received, implemented.
- Services connected, disconnected.
- Equipment or system tests and start-ups.
- Partial completions, occupancies.
- Substantial completions authorized.

1.8 UNIT PRICE SCHEDULE:

**General:** Refer to Proposal Form and individual specification sections for units of work where establishment of unit prices is required. Methods of measurement and pricing are specified in these sections.

**Schedule:** Within 15 days of the date of commencement of the work, prepare a schedule of unit prices established in the Contract. This schedule shall indicate the generic name, unit of measurement, price per unit, related specification section and the subcontractor, if any, assigned to the work so named. Indicate whether add-prices are established to be different from deduct prices. Distribute this schedule to the Owner, Architect/Engineer, and each entity involved in performance of the work, where established unit prices could possibly come into force and effect.

**Visitors Log:** Contractor shall maintain a log in the field office to record visits by the Architect, his consultants and all visitors. This log shall become the official record of all job visits and shall show: Date, Time of arrival and departure, Name and who represented. The Owner shall furnish a form, upon request; however, the form is not required - only the information. Contractor shall submit a copy of this log with each application for Partial Payment, indicating Project Name and period covered by the log.

1.9 SCHEDULE OF VALUES:

**General:** Prepare the schedule of values, as required by the General Conditions, in conjunction with the preparation of the progress schedule. Correlate preparation of schedule of values and progress schedule. Correlate line items with other administrative schedules and forms required for the work, including the progress schedule, payment request form, listing of subcontractors, schedule of allowances, schedule of alternates, listing of products and principal suppliers and fabricators, and schedule of submittals. Provide breakdown of the Contract Sum in sufficient detail to facilitate continued evaluation of payment requests and progress reports. Break down principal subcontract amounts into several line items. Round off to nearest whole dollar, but with the total equal to Contract Sum.

**Material/Fabrication Values:** For each unit of work where payment requests will be made on account of materials or equipment purchased, fabricated, delivered, but not yet installed, show "initial value" for payment request and "value added" for subsequent stage or stages of completion on that unit of work.

**Time Coordination:** In coordination of initial submittals and other administrative "start-up" activities, submit the schedule of values to the Architect/Engineer at the earliest feasible date, but in no case later than 7 days before initial payment request is to be submitted.

**Listing:** Arrange the schedule with columns to indicate the generic name of item, related specification sections, the subcontractor, the supplier, manufacturer or fabricator, change orders (numbers) which have affected the value, the dollar value of the item, and

the percentage of the Contract Sum to the nearest one-hundredth percent and adjusted to total 100 percent.

**Margins of Cost:** Show line items of indirect costs, and margins on actual costs, only to extent such items will be individually listed in payment requests. In general, each item in the schedule of values and in payment requests shall be established to be complete with its total expenses and proportionate share of the general overhead and profit margin. Except as otherwise indicated, those major cost items that are not directly the cost of actual work-in-place, such as distinct temporary facilities, may be either shown as line items in the schedule of values or may be distributed as general overhead expense, at Contractor's option.

**Schedule Updating:** Update and resubmit schedule of values when change orders affect listing and when actual performance of the work involves necessary changes of substance to the values previously listed.

#### 1.10 PAYMENT REQUESTS:

**General:** Except as otherwise indicated, the progress payment cycle is to be regular. Each application must be consistent with previous applications and payments. Certain applications for payment, such as the initial application, the application at substantial completion, and the final payment application involve additional requirements.

**Record Drawings:** Maintain a white print set (blue-line or black-line) of contract drawings and shop drawings in clean undamaged condition with mark-up shown. Mark whichever drawing is most capable of showing "field" condition fully and accurately; however, where shop drawings are used for mark-up, record a cross-reference at corresponding location on working drawings. Mark with red erasable pencil and, where feasible, use other colors to distinguish between variations in separate categories of work. Mark-up new information which is recognized to be of importance to Owner, but was for some reason not shown on either contract drawings or shop drawings. Give particular attention to concealed work, which would be difficult to measure and record at a later date. Note related change-order numbers where applicable. Organize record drawings sheets into manageable sets, bind with durable paper cover sheets, and print suitable titles, dates and other identification on cover of each set. Delegate the responsibility for maintenance of Record Documents to one person on the Contractor's staff as approved in advance by the Architect. The Architect's approval of the current status of Record Drawings will be a prerequisite to his approval of requests for progress payment and request for final payment under the Contract. Updated sets of white prints shall be submitted with each progress payment.

**Progress Submittals:** Prior to submitting each request for progress payment secure the Architect's approval of the Record Drawings as currently maintained.

**Waivers of Lien:** For each payment application, submit waivers of lien from every entity (including Contractor) who could lawfully and possibly file a lien in excess of \$100 arising out of the Contract, and related to work covered by the payment. Submit partial waivers for the amount requested, prior to deduction or retainage, on each item. When the application shows completion of an item, submit final or full waivers. The Owner reserves the right to designate which entities involved in the work must submit waivers. All waivers must be in the original form.

**Waiver Delays:** Each progress payment must be submitted with Contractor's waiver for period of construction covered by application. At the Owner's option, each progress payment may be submitted with waivers from the subcontractors, or sub-contractors and suppliers for the previous period of construction covered by the previous application. The final payment application must be submitted together with or preceded by final or complete waivers from every entity involved with performance of the work covered by the payment request.

**Waiver Forms:** Submit original waivers on form appearing at end of this section, and executed in manner indicated. Payment Application Times: The "date" for each progress payment is as indicated in Owner-Contractor Agreement or, if none is indicated therein, it is the 25th day of each month. The period of construction work covered by each payment request is period indicated in Owner-Contractor Agreement or, if none is indicated therein, it is period ending 15 days prior to date for each progress payment, and starting day following end of preceding period.

**Payment Application Forms:** AIA Document G702 and Continuation Sheets; available from "Publications, a Division of the AIA Service Corporation", 1735 New York Ave. N. W., Washington, DC 20006 (also available at most local AIA chapter offices).

**Application Preparation:** Except as otherwise indicated, complete every entry provided for on the form, including notarization and execution by authorized persons, contractors' signatures must be sealed. Incomplete applications will be returned by Architect/Engineer, without action. Entries must match current data of schedule of values and progress schedule and report. Listing must include amounts of change orders issued prior to last day of the "period of construction" covered by application.

**Initial Payment Application:** The principal administrative actions and submittals which must precede or coincide with submittal of Contractor's first payment application can be summarized as follows, but not necessarily by way of limitation: Listing of subcontractors and principal suppliers and fabricators.

Schedule of values.

Schedule of Payments (indicating owner's cash flow requirements)

Progress schedule (preliminary if not final).

Schedule of principal products.

Schedule of unit prices.

Schedule of submittals (preliminary if not final).

Listing of Contractor's staff assignments and principal consultants.

Copies of acquired building permits and similar authorizations and licenses from governing authorities for current performance of the work.

Data needed to acquire Owner's insurance coverages.

Assignment Form (00800.2-1)

Initial progress report, including report of pre-construction meeting.

Visitors Log Form

**Monthly Payment Application:** The principal administrative actions and submittals which must precede or coincide with submittal of Contractor's monthly payment application can be summarized as follows, but not necessarily by way of limitation:

Written schedule update.

Payment Application and Continuation sheets.

Manufacturers invoices for on site stored materials.

Partial Lien Releases for previous months Payment Application.

Listing of subcontractor names for funds requested this Application.

Visitors Log Form

**Application at Time of Substantial Completion:** Following issuance of Architect's or Engineer's final "certificate of substantial completion," and also in part as applicable to prior certificates on portions of completed work as designated, a "special" payment application may be prepared and submitted by Contractor. The principal administrative actions and

submittals, which must proceed or coincide with such special applications can be summarized as follows, but not necessarily by way of limitation:

Occupancy permits and similar approvals or certifications by governing authorities and franchised services, assuring Owner's full access and use of completed work.

Final cleaning of the work.

Application for reduction (if any) of retainage, and consent of surety to this reduction.

Advice to Owner on coordination of shifting insurance coverages, including proof of extended coverages as required.

Listing of Contractor's incomplete work, recognized as exceptions to Architect's/Engineer's certificate of substantial completion.

Removal of temporary facilities, services, surplus materials, rubbish and similar elements.

Change over of door locks and other Contractor's access provisions to Owner's property.

**Final Payment Application:** The administrative actions and submittals which must precede or coincide with submittal of contractor's final payment application can be summarized as follows, but not necessarily by way of limitation.

Completion of project closeout requirements.

Completion of items specified for completion beyond time of substantial completion (regardless of whether special payment application was previously made).

Assurance, satisfactory to Owner, that unsettled claims will be settled and that work not actually completed and accepted will be completed without undue delay.

Proof, satisfactory to Owner, that taxes, fees and similar obligations of Contractor have been paid.

Warranties (guarantees), maintenance agreements and similar provisions of contract documents.

Test/adjust/balance records, maintenance instructions, meter readings, start-up performance reports, and similar change-over information germane to Owner's occupancy, use, operation and maintenance of completed work.

Transmittal of required project construction records, including "as-built" drawings, to Architect.

Consent of surety for final payment.

**Application Transmittal:** Submit 6 executed copies of each payment application, one copy of which is completed with waivers of lien and similar attachments. Transmit each copy with a transmittal form listing those attachments, and recording appropriate information related to application in a manner acceptable to Architect/Engineer. Transmit to Architect/Engineer by means ensuring receipt within 24 hours.

PART 2 - PRODUCTS & PART 3 - EXECUTION (Not Applicable)

END OF SECTION 01 31 00

Attachment: Partial Release of Liens and Guarantee  
Final Release of Lien  
Affidavit of Payment of Debts and Claims (AIA G706)  
Affidavit of Release of Liens (AIA G706A) Final ONLY  
Consent of Surety Company to Final Payment (AIA G707)  
Visitors Log Form

**PARTIAL RELEASE OF LIENS AND GUARANTEE**

I, \_\_\_\_\_ being \_\_\_\_\_ of \_\_\_\_\_  
(Individual) (Title)  
\_\_\_\_\_  
(Name and Address of Firm)

CERTIFY that I am requesting PARTIAL PAYMENT in the amount of \$ \_\_\_\_\_ for \_\_\_\_\_  
(Type of Work)  
performed to date under contract agreement with \_\_\_\_\_ under a certain contract issued by /to me  
(General Contractor)  
by them in the amount of \$ \_\_\_\_\_ dated \_\_\_\_\_ for the construction \_\_\_\_\_  
\_\_\_\_\_ and that my total draws to date have been \$ \_\_\_\_\_.  
(Name and Location of Project)

The Undersigned further certifies that all labor performed under Contract for the above stated work has been paid in full for the amount owed to date, in compliance with General Conditions of the Contract, that all materials, equipment, fees, licenses, insurances and taxes of every description have been paid to date, that there are no Liens or causes for Liens against the Undersigned, the Undersigned further certifies and states that he will indemnify and save harmless the Contractor and Owner from any and all manner of claims, liens, or suits, loss or damage arising by virtue of said Contractor or Subcontractor with the Undersigned, and hereby releases forever, all claim, title and interest in the above property as described.

The Undersigned does hereby release and discharge the said project from any and all liens and claims of lien which the Undersigned has against the property for labor, services and material, or any of these, to the date hereof.

This release does not release any lien rights which the Undersigned may acquire for labor, services or material furnished subsequent to said date.

AND the Undersigned warrants that no assignment of claims for payments nor rights to perfect a lien against said property has been made and that the Undersigned has the right to execute this waiver and partial release, has performed the labor and services and supplied the materials required of the Undersigned relative to the state of completion of said improvements as specified in the construction loan agreement as a pre-requisite for payment to the date hereof, and that all laborers employed by the Undersigned on said property have been fully paid.

\_\_\_\_\_  
(Firm)  
BY: (Authorized Representative)

STATE OF FLORIDA  
COUNTY OF \_\_\_\_\_

BEFORE ME, the Undersigned, authorized to administer oaths and take acknowledgments, personally appeared \_\_\_\_\_  
\_\_\_\_\_ known to me to be the person whose name is subscribed to the foregoing instrument and  
acknowledges before me that \_\_\_\_\_ executed the same for purposes and consideration herein expressed.

GIVEN UNDER MY HAND AND SEAL OF OFFICE THIS \_\_\_\_\_ day of \_\_\_\_\_, A.D., 20\_\_.

\_\_\_\_\_  
NOTARY PUBLIC IN AND FOR \_\_\_\_\_ COUNTY, FLORIDA

MY COMMISSION EXPIRES: \_\_\_\_\_







**AIA**<sup>®</sup>

# Document G706™ – 1994

## Contractor's Affidavit of Payment of Debts and Claims

PROJECT: *(Name and address)*

ARCHITECT'S PROJECT NUMBER:

OWNER

CONTRACT FOR:

ARCHITECT

CONTRACTOR

TO OWNER: *(Name and address)*

CONTRACT DATED:

SURETY

OTHER

STATE OF:

COUNTY OF:

The undersigned hereby certifies that, except as listed below, payment has been made in full and all obligations have otherwise been satisfied for all materials and equipment furnished, for all work, labor, and services performed, and for all known indebtedness and claims against the Contractor for damages arising in any manner in connection with the performance of the Contract referenced above for which the Owner or Owner's property might in any way be held responsible or encumbered.

EXCEPTIONS:

SUPPORTING DOCUMENTS ATTACHED HERETO:

1. Consent of Surety to Final Payment. Whenever Surety is involved, Consent of Surety is required. AIA Document G707™, Consent of Surety to Final Payment, may be used for this purpose.

Indicate attachment:  Yes  No

The following supporting documents should be attached hereto if required by the Owner:

1. Contractor's Release or Waiver of Liens, conditional upon receipt of final payment
2. Separate Releases or Waivers of Liens from Subcontractors and material and equipment suppliers, to the extent required by the Owner, accompanied by a list thereof
3. Contractor's Affidavit of Release of Liens (AIA Document G706A™)

CONTRACTOR: *(Name and address)*

BY:

*(Signature of authorized representative)*

*(Printed name and title)*

Subscribed and sworn to before me on this date:

Notary Public:

My Commission Expires:

CAUTION: Y

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**AIA**<sup>®</sup>

# Document G706A™ – 1994

## Contractor's Affidavit of Release of Liens

PROJECT: *(Name and address)*

ARCHITECT'S PROJECT NUMBER:

OWNER

CONTRACT FOR:

ARCHITECT

CONTRACTOR

TO OWNER: *(Name and address)*

CONTRACT DATED:

SURETY

OTHER

STATE OF:

COUNTY OF:

The undersigned hereby certifies that to the best of the undersigned's knowledge, information and belief, except as listed below, the Releases or Waivers of Lien attached hereto include the Contractor, all Subcontractors, all suppliers of materials and equipment, and all performers of Work, labor or services who have or may have liens or encumbrances or the right to assert liens or encumbrances against any property of the Owner arising in any manner out of the performance of the Contract referenced above.

EXCEPTIONS:

SUPPORTING DOCUMENTS ATTACHED HERETO:

1. Contractor's Release or Waiver of Liens, conditional upon receipt of final payment.
2. Separate Releases or Waivers of Liens from Subcontractors and material and equipment suppliers, to the extent required by the Owner, accompanied by a list thereof.

CONTRACTOR: *(Name and address)*

BY:

*(Signature of authorized representative)*

*(Printed name and title)*

Subscribed and sworn to before me on this date:

Notary Public:

My Commission Expires:

CAUTION: Y

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**AIA**<sup>®</sup>

# Document G707™ – 1994

## Consent of Surety to Final Payment

PROJECT: *(Name and address)*

ARCHITECT'S PROJECT NUMBER:

OWNER

CONTRACT FOR:

ARCHITECT

CONTRACTOR

TO OWNER: *(Name and address)*

CONTRACT DATED:

SURETY

OTHER

In accordance with the provisions of the Contract between the Owner and the Contractor as indicated above, the  
*(Insert name and address of Surety)*

on bond of  
*(Insert name and address of Contractor)*

, SURETY,

hereby approves of the final payment to the Contractor, and agrees that final payment to the Contractor shall not relieve  
the Surety of any of its obligations to  
*(Insert name and address of Owner)*

, CONTRACTOR,

as set forth in said Surety's bond.

, OWNER,

IN WITNESS WHEREOF, the Surety has hereunto set its hand on this date:  
*(Insert in writing the month followed by the numeric date and year.)*

\_\_\_\_\_  
*(Surety)*

\_\_\_\_\_  
*(Signature of authorized representative)*

Attest:  
*(Seal)*

\_\_\_\_\_  
*(Printed name and title)*

CAUTION: Y

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SECTION 01 34 00 - SHOP DRAWINGS, PRODUCT DATA AND SAMPLES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

Drawings and general provisions of Contract, including General and Supplementary Conditions and other Division-1 Specification sections, apply to work of this section.

1.2 DESCRIPTION OF REQUIREMENTS:

General: This section specifies procedural requirements for non-administrative submittals including shop drawings, product data, samples and other miscellaneous work-related submittals. Shop drawings, product data, samples and other work-related submittals are required to amplify, expand and coordinate the information contained in the Contract Documents.

Refer to other Division-1 sections and other contract documents for specifications on administrative, non-work-related submittals. Such submittals include, but are not limited to the following items:

- Permits.
- Payment applications.
- Performance and payment bonds.
- Insurance certificates.
- Inspection and test reports.
- Schedule of values.
- Progress Reports.
- Listing of subcontractors.

Shop drawings are technical drawings and data that have been specially prepared for this project, including but not limited to the following items:

- Fabrication and installation drawings.
- Setting diagrams.
- Shopwork manufacturing instructions.
- Templates.
- Patterns.
- Coordination drawings (for use on-site).
- Schedules.
- Design mix formulas.
- Contractor's engineering calculations.
- Standard information prepared without specific reference to a project is not considered to be shop drawings.

Product data includes standard printed information on manufactured products that has not been specially-prepared for this project, including but not limited to the following items:

- Manufacturer's product specifications and installation instructions.
- Standard color charts.
- Catalog cuts.
- Roughing-in diagram and templates.
- Standard wiring diagrams.
- Printed performance curves.
- Operational range diagrams.
- Mill reports.
- Standard product operating and maintenance manuals.

Samples are physical examples of work, including but not limited to the following items:

Partial sections of manufactured or fabricated work.

Small cuts or containers of materials.

Complete units of repetitively-used materials.

Swatches showing color, texture and pattern.

Color range sets.

Units of work to be used for independent inspection and testing.

Mock-ups are special forms of samples, which are too large or otherwise inconvenient for handling in the manner specified for transmittal of sample submittals.

Miscellaneous submittals are work-related, non-administrative submittals that do not fit in the three previous categories, including, but not limited to the following:

Specially-prepared and standard printed warranties.

Maintenance agreements.

Workmanship bonds.

Survey data and reports.

Project photographs.

Testing and certification reports.

Record drawings.

Field measurement data.

Operating and maintenance manuals.

Keys and other security protection devices.

Maintenance tools and spare parts.

Overrun stock.

### 1.3 SUBMITTAL PROCEDURES:

**General:** Refer to the General Conditions for basic procedures for submittal handling.

**Coordination:** Coordinate the preparation and processing of submittals with the performance of the work. Coordinate each separate submittal with other submittals and related activities such as testing, purchasing, fabrication, delivery and similar activities that require sequential activity. Coordinate the submittal of different units of interrelated work so that one submittal will not be delayed by the Architect/Engineer's need to review a related submittal. The Architect/Engineer reserves the right to withhold action on any submittal requiring coordination with other submittals until related submittals are forthcoming.

**Scheduling:** In each appropriate administrative submittal, such as the progress schedule, show the principal work-related submittals and time requirements for coordination of submittal activity with related work.

**Listing:** Prepare a separate listing showing principal work-related submittals and their initial submittal dates as required for coordination of the work. Organize the listing by the related specification number sequence. Submit the listing within 30 days of the date of commencement of the work.

**Coordination of Submittal Times:** Prepare and transmit each submittal to the Architect/Engineer sufficiently in advance of the scheduled performance of related work and other applicable activities. Transmit different kinds of submittals for the same unit of work so that processing will not be delayed by the Architect/Engineer's need to review submittals concurrently for coordination. All submittals for the entire project shall be received by the Architect not later than 90 days from Notice to Proceed.

**Review Time:** Allow sufficient time so that the installation will not be delayed as a result of the time required to properly process submittals, including time for resubmittal, if necessary. Advise the Architect/Engineer on each submittal, as to whether processing time is critical to the progress of the work, and if the work would be expedited if processing time could be shortened. Allow two weeks for the Architect/Engineer's initial processing of each submittal. Allow a longer time period where processing must be delayed for coordination with subsequent submittals. The Architect/Engineer will advise the Contractor promptly when it

is determined that a submittal being processed must be delayed for coordination. Allow one week for reprocessing each submittal. No extension of time will be authorized because of the Contractor's failure to transmit submittals to the Architect/Engineer sufficiently in advance of the work.

**Submittal Preparation:** Mark each submittal with a permanent label for identification. Provide the following information on the label for proper processing and recording of action taken.

Project name.

Date.

Name and address of Architect/Engineer.

Name and address of Contractor.

Name and address of subcontractor

Name and address of supplier.

Name of manufacturer.

Number and title of appropriate specification section.

Drawing number and detail references, as appropriate.

Similar definitive information as necessary.

Provide a space on the label for the Contractor review and approval markings, and a space for the Architect/Engineer's "Action" marking.

**Submittal Transmittal:** Package each submittal appropriately for transmittal and handling. Transmit each submittal from the Contractor to the Architect/Engineer, and to other destinations as indicated, by use of a transmittal form. Submittals received from sources other than the Contractor will be returned to the sender "without action".

**Transmittal Form:** The form required to be used for transmittal of submittals is shown by the sample form at the end of this section. Record relevant information and requests for data on the transmittal form. On the transmittal form, or on a separate sheet attached to the form, record deviations from the requirements of the Contract Documents, if any, including minor variations and limitations.

#### 1.4 SPECIFIC SUBMITTAL REQUIREMENTS:

**General:** Specific submittal requirements for individual units of work are specified in the applicable specification section. Except as otherwise indicated in the individual specification sections, comply with the requirements specified herein for each type of submittal. Where it is necessary to provide intermediate submittals between the initial and final submittals, provide and process intermediate submittals in the same manner as for initial submittals.

**Shop Drawings:** Information required on shop drawings includes, dimensions, identification of specific products and materials which are included in the work, compliance with specified standards and notations of coordination requirements with other work. Provide special notation of dimensions that have been established by field measurement. Highlight, encircle or otherwise indicate deviations from the contract documents on the shop drawings.

**Coordination Drawings:** Provide continuous drawings where required for the integration of the work, including work first shown in detail on shop drawings or product data. Show sequencing and relationship of separate units of work, which must interface in a restricted manner to fit in the space provided, or function as indicated. Coordination drawings are considered shop drawings and must be definitive in nature. Refer to Division-23 and Division-26 sections for additional general requirements applicable to shop drawings for mechanical and electrical work, respectively. Do not permit shop drawings copies without an appropriate final "Action" marking by the Contractor and the Architect/Engineer to be used in connection with the work.

**Preparation:** Submit newly prepared information, drawn to accurate scale on sheets not less than 8-1/2" x 11"; except for actual pattern or template type drawings, the maximum sheet size shall not exceed 24" x 36". Indicate the name of the firm that prepared each shop drawing and provide appropriate project identification in the title block. Provide a space not less than 20 sq. in. beside the title block for marking the record of the review process and the Architect/Engineer's "Action" marking. Do not

reproduce contract documents or copy standard printed information as the basis of shop drawings. Initial Submittal: Provide one correctable translucent reproducible print and one blue-line or black-line print; the reproducible print will be returned.

**Final Submittal:** Provide 3 prints plus 3 additional prints where they are required for maintenance manuals. 2 prints will be retained; the remainder will be returned. One of the prints returned will be marked-up and maintained by the Contractor as a "Record Document".

**Product Data:** General information required specifically as product data includes manufacturer's standard printed recommendations for application and use, compliance with recognized standards of trade associations and testing agencies, and the application of their labels and seals (if any), special notation of dimensions which have been verified by way of field measurement, and special coordination requirements for interfacing the material, product or system with other work. Refer to Division-15 and Division-16 sections for additional general requirements applicable to product data for mechanical and electrical work respectively.

**Preparation:** Collect required product data into a single submittal for each unit of work or system. Mark each copy to show which choices and options are applicable to the project. Where product data has been printed to include information on several similar products, some of which are not required for use on the project, or are not included on this submittal, mark the copies to show clearly that such information is not applicable. Where product data must be specially prepared for required products, materials or systems, because standard printed data is not suitable for use, submit data as "shop drawings" and not as "product data".

**Submittals:** Product data submittal is required for information and record and to determine that the products, materials and systems comply with the provisions of the contract documents. Therefore, the initial submittal is also the final submittal, except where the Architect/Engineer observes that there is non-compliance with the provisions of the contract documents and returns the submittal promptly to the Contractor marked with the appropriate "Action". Provide a preliminary single-copy submittal where required, for selection of options by the Architect/Engineer.

**Initial Submittal:** Except as otherwise indicated in individual sections of these specifications, submit 5 copies of each required product data submittal, plus 3 additional copies where required for maintenance manuals. The Architect/Engineer will retain one copy, and will return the other marked with "Action" and corrections or modifications as required. Do not submit product data or allow its use on the project, until compliance with the requirements of the contract documents has been confirmed by the Contractor.

**Final Distribution:** Furnish copies of product data to subcontractors, suppliers, fabricators, manufacturers, installers, governing authorities and others as required for proper performance of the work. Show distribution on transmittal form. Installation Copy: Do not proceed with installation of materials, products and systems until a copy of product data applicable to the installation is in the possession of the installer. Do not permit the use of unmarked copies of product data in connection with the performance of the work.

**Samples:** Submit samples for the Architect/Engineer's visual review of general generic kind, color, pattern, and texture, and for a final check of the coordination of these characteristics with other related elements of the work. Samples are also submitted for quality control comparison of these characteristics between the final sample submittal and the actual work as it is delivered and installed. Refer to individual work sections of these specifications for additional sample requirements, which may be intended for examination or testing of additional characteristics. Compliance with other required characteristics is the exclusive responsibility of the Contractor; such compliance is not considered in the Architect/Engineer's review and "Action" indication on sample submittals.

Documentation required specifically for sample submittals includes a generic description of the sample, the sample source or the product name or manufacturer, compliance with governing regulations and recognized standards. In addition, indicate limitations in terms of availability, sizes, delivery time, and similar limiting characteristics.

Refer to individual sections of these specifications for samples which, because of their relatively high cost or other special considerations, are intended to be returned, to the Contractor for incorporation in the work. Such samples must be in an

undamaged condition at the time of use. On the transmittal form to the Architect/Engineer, indicate such special requests regarding the disposition of sample submittals.

**Submittal:** At the Contractor's option, and depending upon the nature of the anticipated response from the Architect/Engineer, the initial submittal of samples may be either a preliminary submittal or a final submittal.

**Preliminary submittal,** at Contractor's option of a single set of samples, is required where requirements indicate the Architect/Engineer's selection of color, pattern, texture or, similar characteristics from a manufacturer's range of standard choices is necessary. Preliminary submittals will be reviewed and returned with the Architect/Engineer's "Action" marking.

**Final Submittals:** Submit 3 sets of samples in the final submittal, one set will be returned.

**Distribution of Samples:** Maintain the final submittal sets of samples, as returned by the Architect/Engineer, at the project site, available for quality control comparisons throughout the course of performing the work. In addition, throughout the final submittal sets may be used to obtain final acceptance of the work associated with each set. Prepare and distribute additional sets of samples to subcontractors, suppliers, fabricators, manufacturers, installers, governing authorities, and others as required for proper performance of the work. Show final distribution on transmittal forms. Mock-Ups are similar samples specified in individual work sections are special types of samples. Comply with sample submittal requirements to the fullest extent possible. Process transmittal forms to provide a record of activity.

**Miscellaneous Submittals:**

**Inspection and Test Reports:** Classify each inspection and test report as being either "shop drawings" or "product data" depending on whether the report is specially prepared for the project, or a standard publication of workmanship control testing at the point of production. Process inspection and test reports accordingly.

**Warranties:** Refer to section "Products and Substitutions" for specific general requirements on warranties, product bonds, workmanship bonds and maintenance agreement. In addition to copies desired for the Contractor's use, furnish 1 executed copy of such warranties, bonds or agreements. Provide 3 additional copies where required for Warranty manuals.

**Survey Data:** Refer to section "Project Coordination" for specific general requirements on property surveys, field measurements, quantitative records of actual work, damage surveys and similar data required by the individual sections of these specifications. None of the specified copies will be returned.

**Records of Actual Work:** Furnish 4 copies of records of actual work, which will be included in the Record Drawings as specified in section "01700 Project Closeout".

**Standards:** Where submittal of a copy of standards is indicated, and except where copies of standards are specified as an integral part of a "Product Data" submittal, submit a single copy of standards for the Architect/Engineer's use. Where workmanship, whether at the project site or elsewhere is governed by a standard, furnish additional copies of the standard to fabricators, installers and others involved in the performance of the work.

**Closeout Submittals:** Refer to section "Project Closeout" and to individual sections of these specifications for specific submittal requirements of project closeout information, materials, tools, and similar items.

**Record Documents:** Furnish set of original documents as maintained on the project site. (Contractors Field Set of Prints and Project Manual)

**Operating and Maintenance Data:** Furnish 4 bound copies of operating data and maintenance manuals.

**Materials and Tools:** Refer to individual sections of these specifications for required quantities of spare parts, extra and overrun stock, maintenance tools and devices, keys, and similar physical units to be submitted.

**General Distribution:** Provide additional distribution of submittals to contractors, suppliers, fabricators, installers, governing authorities and others as necessary for the proper performance of the work. Include such additional copies of submittals in the

transmittal to the Architect/Engineer where the submittals are required to receive "Action" marking before final distribution. Record distributions on transmittal forms.

**ARCHITECT/ENGINEER'S ACTION:**

**General:** Except for submittals for the record and similar purposes, where action and return on submittals is required or requested, the contractor shall first review and approve each submittal, after which the Architect/Engineer will review each submittal, mark with appropriate "Action", and where possible return within 2 weeks of receipt. Where the submittal must be held for coordination the Architect/Engineer will so advise the Contractor without delay.

**Action Stamp:** The Architect/Engineer will stamp each submittal to be returned with a uniform, self explanatory action stamp, appropriately marked and executed to indicate whether the submittal returned is for unrestricted use, final-but-restricted use (as marked), must be revised and resubmitted (use not permitted) or without action (as explained on the transmittal form).

**Final Unrestricted Release:** Where the submittals are marked (**FUR**), the work covered by the submittal may proceed provided it complies with the requirements of the contract documents; acceptance of the work will depend upon that compliance.

**Final-But-Restricted Release:** When the submittals are marked (**FBRR**), the work covered by the submittal may proceed provided complies with both the Architect/Engineer's notations or corrections on the submittals and with the requirements of the contract documents; acceptance of the work will depend on that compliance

**Returned for Correction:** When the submittal is marked (**RC**) do not proceed with the work covered by the submittal, including purchasing, fabrication, delivery, or other activity. Revise the submittal or prepare a new submittal in accordance with the Architect/Engineer's notations stating the reasons for returning the submittal; resubmit the submittal without delay. Repeat if necessary to obtain a different action marking. Do not permit submittals with the following marking to be used at the project site, or elsewhere where work is in progress.

**Other Action:** Where the submittal is returned, marked with the Architect/Engineer's explanation, for special processing or other Contractor activity, or is primarily for information or record purposes, the submittal will be so marked.

PART 2 - PRODUCTS & PART 3 - EXECUTION (Not Applicable).

END OF SECTION 01 34 00

Attachment: Submittal Schedule  
Sample Form of Shop Drawing Transmittal Letter

**SAMPLE SHOP DRAWING TRANSMITTAL**



1228 LAFAYETTE STREET SUITE #1  
 CAPE CORAL, FLORIDA 33904  
 AR26003303

Matlacha Pine Island Fire Control District  
 Fire Station #2  
 5015 Stringfellow Rd.  
 St. James City, FL 33956

**CONSTRUCTION MANAGER:**  
**T.B.D.**

**Transmittal Letter Shop Drawing**

**PROJECT:**

This Space for AE  
 Use: SD File No.:  
 Date  
 Rec'd:  
 Date Ret'd:  
 AE File No. 2229 000

**Attention: Shop Drawing Section**

Specification Paragraph	No. of Copies	Data or Drawing No.	Prepared By	Description	AE to Indicate Disposition (Code)
Contractor's Signature					Date

**Distribution:**

1 to Owner  
 1 to RGA  
 Remainder to CM.

**Action Code:**

FUR (Final Unrestricted Release)  
 FRR (Final But Restricted Release)  
 NA (Not Approved)  
 RC (Returned for Correction)  
 RWA (Returned Without Action)

Comments by Architect Engineer:

Project Manager:

Date:

## SECTION 01 40 00 - QUALITY CONTROL SERVICES

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS:

Drawings and general provisions of Contract, including General and Supplementary Conditions and other Division-1 Specification sections, apply to work of this section.

#### 1.2 DESCRIPTION OF REQUIREMENTS:

General: Required inspection and testing services are intended to assist in the determination of probable compliance of the work with requirements specified or indicated. These required services do not relieve the Contractor of responsibility for compliance with these requirements or for compliance with requirements of the contract documents.

Definitions: The requirements of this section relate primarily to customized fabrication and installation procedures, not to the production of standard products. Quality control services include inspections and tests and related actions including reports performed by independent agencies and governing authorities, as well as directly by the Contractor. These services do not include Contract enforcement activities performed directly by the Architect or Engineer.

Specific quality control requirements for individual units of work are specified in the section of these specifications that specify the individual element of the work. These requirements, including inspections and tests, cover both production of standard products, and fabrication of customized work. These requirements also cover quality control of the installation procedures.

Inspections, tests and related actions specified in this section and elsewhere in the contract documents are not intended to limit the Contractor's own quality control procedures which facilitate overall compliance with requirements of the contract documents.

Requirements for the Contractor to provide quality control services as required by the Architect/Engineer, the Owner, governing authorities or other authorized entities are not limited by the provisions of this section.

#### 1.3 RESPONSIBILITIES:

Contractor Responsibilities: Except where they are specifically indicated as being the Owner's responsibility, or where they are to be provided by another identified entity, inspections, tests and similar quality control services are the Contractor's responsibility; these services also include those specified to be performed by an independent agency and not directly by the Contractor. Costs for these services shall be included in the Contract Sum. The Contractor shall employ and pay an independent agency, testing laboratory or other qualified firm to perform quality control services specified.

The Owner will engage and pay for the services of an independent agency to perform inspections and tests that are specified as the Owner's responsibility.

Owner Responsibilities: Except where they are specifically indicated as being the Contractor's responsibility, or where they are to be provided by another identified entity, inspection, tests and similar quality control services specified to be performed by independent agencies and not directly by the Contractor, are the Owner's responsibility. The Owner will employ and pay for the services of an independent agency, testing laboratory or other qualified firm to perform services, which are the Owner's responsibility. Those tests shall include; Soils Compaction, Soils Moisture Content, Concrete and Structural Weld Testing.

Retest Responsibility: Where results of required inspections, tests or similar services prove unsatisfactory and do not indicate compliance of related work with the requirements of the contract documents, then retests are the responsibility of the Contractor, regardless of whether the original test was the Contractor's responsibility. Retest the work revised or replaced by the Contractor is the Contractor's responsibility, where required tests were performed on original work.

Responsibility for Associated Services: The Contractor is required to cooperate with the independent agencies performing required inspections, tests and similar services. Provide such auxiliary services as are reasonably requested. Notify the testing agency

sufficiently in advance of operations to permit assignment of personnel. These auxiliary services include but are not necessarily limited to the following:

- Providing access to the work.
- Taking samples or assistance with taking samples.
- Delivery of samples to test laboratories.
- Security and protection of samples and test equipment at the project site.

Coordination: The Contractor and each independent agency engaged to perform inspections, tests and similar services for the project shall coordinate the sequence of their activities so as to accommodate required services with a minimum of delay in the progress of the work. In addition, the Contractor and each independent testing agency shall coordinate their work so as to avoid the necessity of removing and replacing work to accommodate inspections and tests. The Contractor is responsible for scheduling times for inspections, tests, taking of samples and similar activities.

#### 1.4 QUALITY ASSURANCE:

Qualification for Service Agencies: Except as otherwise indicated, engage inspection and test service agencies, including independent testing laboratories, which are pre-qualified as complying with "Recommended Requirements for Independent Laboratory Qualification" by the American Council of Independent Laboratories, and which are recognized in the industry as specialized in the types of inspections and tests to be performed.

#### 1.5 SUBMITTALS:

General: Refer to Division-1 section on "Submittals" for the general requirements on submittals. Submit a certified written report of each inspection, test or similar service, directly to the Architect/Engineer, in duplicate, unless the Contractor is responsible for the service. If the Contractor is responsible for the service, submit a certified written report of each inspection, test or similar service through the Contractor, in duplicate. Submit additional copies of each written report directly to the governing authority, when the authority so directs.

Report Data: Written reports of each inspection, test or similar service shall include, but not be limited to the following:

- Name of testing agency or test laboratory.
- Dates and locations of samples and tests or inspections.
- Names of individuals making the inspection or test.
- Designation of the work and test method.
- Complete inspection or test data.
- Test results.
- Interpretations of test results.
- Notation of significant ambient conditions at the time of sample-taking and testing.
- Comments or professional opinion as to whether inspected or tested work complies with requirements of the contract documents.
- Recommendations on retesting, if applicable.

#### PART 2 - PRODUCTS (Not Applicable)

#### PART 3 - EXECUTION

##### 3.1 REPAIR AND PROTECTION:

General: Upon completion of inspection, testing, sample-taking and similar services performed on the work, repair damaged work and restore substrates and finishes to eliminate deficiencies, including deficiencies in the visual qualities of exposed finishes. Comply with the contract document requirements for "Cutting and Patching". Protect work exposed by or for quality control service activities, and protect repaired work. Repair and protection is the Contractor's responsibility, regardless of the assignment of responsibility for inspection, testing or similar services.

END OF SECTION 01 40 00

SECTION 01 50 00 - TEMPORARY FACILITIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS:

Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division-1 Specification sections, apply to work of this section.

1.2 DESCRIPTION OF REQUIREMENTS:

This section specifies administrative and procedural requirements for temporary services and facilities, including such items as temporary utility services, temporary construction and support facilities, and project security and protection.

Use Charges: No cost or usage charges for temporary services or facilities are chargeable to the Owner or Architect/Engineer. Cost or use charges for temporary services or facilities will not be accepted as a basis for claims for a change-order extra.

Temporary utility services required for use at the project site include, but are not limited to the following:

- Water service by Owner and distribution by Contractor
- Temporary electric power and light provided by Owner
- Storm sewer.

Temporary construction and support facilities required for the project, include but not limited to the following:

- Field offices and storage sheds.
- Sanitary facilities (portable Toilets)
- Dewatering facilities and drains.
- Temporary enclosures.
- First aid station.
- Project identification, bulletin boards and signs.
- Waste disposal services.
- Rodent and pest control.
- Construction aids and miscellaneous general services and facilities.
- Alternate temporary services and facilities, equivalent to those specified, may be used, subject to acceptance by the Architect/Engineer.

Security and protection facilities and services required for the project, include but are not limited to the following:

- Temporary fire protection.
- Barricades, warning signs, lights.
- Enclosure fence for the site.
- Environmental protection.
- Alternate security and protection methods or facilities, equivalent to those specified, may be used, subject to acceptance by the Architect/Engineer.

1.3 QUALITY ASSURANCE:

Regulations: Comply with requirements of local laws and regulations governing construction and industry standards, in the installation and maintenance of temporary services and facilities, including but not limited to the following:

- Building Codes.
- Health and safety regulations.
- Utility company regulations and recommendations governing temporary utility services.
- Police and Fire Department rules and recommendations.
- Police and Rescue Squad recommendations.
- Environmental protection regulations governing use of water and energy, and the control of dust, noise and other nuisances.

Standards: Comply with the requirements of NFPA Code 241, "Building Construction and Demolition Operations", the ANSI-A10 Series standards for "Safety Requirements for Construction and Demolition", and the NECA National Joint Guideline NJG-6 "Temporary Job Utilities and Services".

Refer to "Guidelines for Bid Conditions for Temporary Job Utilities and Services", as prepared jointly by AGC and ASC for industry recommendations.

Inspections: Inspect and test each service before placing temporary utilities in use. Arrange for required inspections and tests by governing authorities, and obtain required certifications and permits for use.

#### 1.4 SUBMITTALS:

Reports and Permits: During progress of the work, submit copies of reports and permits required by governing authorities, or necessary for installation and efficient operation of temporary services and facilities.

Reports and permits required for the use of temporary utility services and their use include but are not limited to the following:

Ventilation.

Temporary electric power and light.

Sanitary Facilities.

#### 1.5 JOB CONDITIONS:

General: Provide each temporary service and facility ready for use at each location when the service or facility is first needed to avoid delay in performance of the work. Maintain, expand as required and modify temporary services and facilities as needed throughout the progress of the Work. Do not remove until services or facilities are no longer needed, or are replaced by the authorized use of completed permanent facilities.

With the establishment of the job progress schedule, establish a schedule for the implementation and termination of service for each temporary utility. At the earliest feasible time, and when acceptable to the Owner and Architect/Engineer, change over from the use of temporary utility service to the use of the permanent service, to enable removal of the temporary utility and to eliminate possible interference with completion of the work.

Conditions of Use: Operate temporary services and facilities in a safe and efficient manner. Do not overload temporary services or facilities, and do not permit them to interfere with the progress of the work. Do not allow unsanitary conditions, public nuisances or hazardous conditions to develop or persist on the site.

Temporary Utilities: Do not permit flooding or the contamination of water sources.

Temporary Construction and Support Facilities: Maintain temporary facilities in such a manner as to prevent discomfort to users. Take necessary fire prevention measures. Maintain temporary support facilities in a sanitary manner so as to avoid health problems and other deleterious effects.

Security and Protection: Maintain site security and protection facilities in a safe, lawful and publicly acceptable manner. Take necessary measures to prevent erosion of the site.

## PART 2 - PRODUCTS:

### 2.1 MATERIALS AND EQUIPMENT:

General: Provide new materials and equipment for temporary services and facilities; used materials and equipment that are undamaged in serviceable condition may be used, if acceptable to the Architect/Engineer. Provide only materials and equipment that are recognized as being suitable for the intended use, by compliance with appropriate standards.

Temporary Utilities: When the local utility company provides only a portion of the temporary utility, provide the remainder with

matching, compatible materials and equipment. Comply with the utility company's recommendations.

**Water Hoses:** Where shut-off nozzles are used at the water hose discharge, provide heavy-duty abrasion-resistant hoses with a pressure rating greater than the maximum pressure of the water distribution system.

Where non-potable water is used, provide warning signs on the discharge end of each length of hose.

**Electrical Service:** Comply with applicable NEMA, NECA and UL standards and governing regulations for materials and layout of temporary electric service, including those requirements included in Division-16 sections.

**Voltage Differences:** Provide identification warning signs at power outlets, which are other than 110-120-volt power. Provide polarized outlets for plug-in type outlets, to prevent insertion of 110-120 volt plugs into higher voltage outlets.

**Ground-Fault Protection:** Provide receptacle outlets equipped with ground-fault circuit interrupters, reset button and pilot light, for plug-in connection of power tools and equipment.

**Electrical Power Cords:** Use only grounded extension cords; use "hard- service" cords where exposed to abrasion and traffic. Use single lengths or use waterproof connectors to connect separate lengths of electric cords, if single lengths will not reach areas of work.

**Lamps and Light Fixtures:** Provide general service incandescent lamps of wattage indicated or required for adequate illumination. Protect lamps with guard cages or tempered glass enclosures, where fixtures are exposed to breakage by construction operations. Provide exterior fixtures where fixtures are exposed to the weather or moisture.

**Temporary Construction and Support Facilities:** Provide facilities that can be maintained properly throughout their use at the project site.

**Temporary Offices and Similar Construction:** For temporary offices, fabrication shops, storage sheds and similar construction, provide either standard prefabricated or mobile units or the equivalent job-built construction. Provide insulated, weathertight units, heated or air-conditioned where indicated, lockable entrances, operable windows, roofing, foundations adequate for normal loading, including wind loads, serviceable finishes, and mechanical and electrical equipment necessary to achieve ambient conditions indicated.

**Fire-Resistance:** Provide fire-resistant construction for offices, shops, and sheds located within the construction work area, or within 50 feet of building lines. Provide UL labeled Class "A" fire treated lumber and plywood for framing, sheathing and siding, and UL Class "A" asphalt shingle or roll-roofing. Provide gypsum board (drywall) interior walls.

**Self-Contained Toilet Units:** Provide single-occupant self-contained toilet units of the chemical, aerated re-circulation, or combustion type, properly vented and fully enclosed with a glass fiber reinforced polyester shell or similar non-absorbent material.

**Tarpaulins:** Provide waterproof, fire-resistant, UL labeled tarpaulins with a flame-spread rating of 15 or less. For temporary enclosures where work is being or will be performed, provide translucent tarpaulins made of nylon reinforced laminated polyethylene to admit the maximum amount of daylight and reduce the need for temporary lighting.

**First Aid Supplies:** Comply with governing regulations and recognized recommendations within the construction industry.

**Drinking Water:** Provided by Owner

**Sign Materials:** For signs and directory boards, provide exterior type, Grade B-B High Density Concrete Form Overlay Plywood conforming to PS-1, of sizes and thicknesses indicated. Provide exterior grade acrylic-latex-base enamel for painting panels and applying graphics.

**Security and Protection Facilities:**

Fire Extinguishers: Provide Type "ABC" fire extinguishers for temporary offices and similar spaces where there is minimal danger of electrical or grease-oil-flammable liquid fires. In other locations provide type "ABC" dry chemical extinguishers, or a combination of several extinguishers of NFPA recommended types for the exposures in each case.

### PART 3 - EXECUTION

#### 3.1 INSTALLATION, GENERAL:

General: Use qualified tradesmen for installation of temporary services and facilities. Locate temporary services and facilities where they will serve the entire project adequately and result in minimum interference with the performance of the Work.

Relocate, modify and extend services and facilities as required during the course of work so as to accommodate the entire work of the project.

#### 3.2 TEMPORARY UTILITY INSTALLATION:

General: Install water service and distribution piping of sizes and pressures adequate for construction purposes during the construction period and until permanent service is in use, including but not limited to the following uses:

##### Water Service:

General: Water service is to be provided by Owner

Provide distribution piping for temporary water to each location of use. Provide one outlet for each area of construction spaced so that water can be reached with a 100-foot length of hose. Provide one 3/4" flexible rubber hose 100 feet long with an adjustable nozzle, at each outlet where work, requiring water is in progress.

Sterilization: Except piping of non-potable water, sterilize temporary water piping prior to use. Refer to Division-15 sections for procedures.

Temporary Electric Power Service: Provided by Owner.

##### Temporary Lighting:

Provide local switching of temporary lighting, spaced to allow lighting to be turned off in patterns to conserve energy and retain light suitable for work-in-progress, access traffic, security check and project lock-up.

Provide not less than one 150-watt incandescent lamp or high efficiency fluorescent unit with white enameled reflector per 1000 square feet of floor area, uniformly distributed, for general construction lighting, or equivalent illumination of a similar nature. In corridors and similar traffic areas provide one 40-watt fluorescent fixture every 50 feet.

Install and operate temporary lighting that will fulfill security and protection requirements, without the necessity of operating the entire temporary lighting system.

At a central location post a list of important telephone numbers, including the following:

- Local police and fire department.
- Doctor.
- Ambulance service.
- Contractor's temporary and home office.
- Engineer's temporary and home office.
- Owner's temporary and home office.
- Principal subcontractor's temporary and home office.

##### Sewers and Drainage:

General: If existing sewers are available for temporary drainage near the site prior to completion of permanent sewers, provide temporary connections to remove effluent that can be lawfully discharged into the sewers. If existing sewers cannot be used for discharge, provide septic tanks, dry wells, waste stabilization ponds and similar discharge facilities to remove effluent that can be lawfully discharged in that manner. If neither existing sewers nor drainage facilities can be lawfully used for discharge of effluent, provide containers to remove and dispose of effluent off the site in a lawful manner.

### 3.3 TEMPORARY CONSTRUCTION AND SUPPORT FACILITIES INSTALLATION:

General: Provide a reasonably neat and uniform appearance in temporary construction and support facilities acceptable to the Architect/Engineer and the Owner.

Locate field offices, storage and fabrication sheds and other support facilities for easy access to the Work. Position offices so that, windows give the best possible view of construction activities.

Except as otherwise indicated, make the change-over from use of temporary services and facilities to use of permanent services and facilities at the earliest feasible date at each portion of the building, to minimize hazards and interference's with performance of the Work.

Maintain field offices, storage and fabrication sheds, temporary sanitary facilities, waste collection and disposal systems, and project identification and temporary signs until near substantial completion. Immediately prior to substantial completion remove these facilities. Personnel remaining at the site beyond substantial completion will be permitted to use certain permanent facilities, under restricted use conditions acceptable to the Owner.

Field Offices: Provide temporary field offices of sufficient size to accommodate required office personnel at the project site, furnished and equipped as follows:

Contractor's Field Office: Provide adequate office space for field office personnel plus one spare work station for incidental use by subcontractor's personnel, suitably finished, furnished, equipped and air conditioned. Include separate space for project meetings, with table(s) not less than 4' x 12', and seating for not less than 20 persons; cover main walls with tack-board material for posting of notices, progress schedule and similar information. Provide shelf space adequate for storage of approved samples.

Storage and Fabrication Sheds: Install storage and fabrication sheds, properly sized, furnished and equipped, as required to accommodate the work. Comply with applicable provisions specified elsewhere for distribution and use of temporary utilities. Sheds may be open shelters or fully enclosed spaces, whether within the building construction area or elsewhere on the site.

#### Sanitary Facilities:

General: Sanitary facilities include temporary toilets, wash facilities and drinking water fixtures. Comply with governing regulations including safety and health codes for the type, number, location, operation and maintenance of fixtures and facilities; provide not less than specified requirements. Install in locations that will best serve the project's needs.

Locate toilets and drinking water fixtures so that no one within the construction area will need to walk more than 200 feet

horizontally to each these facilities.

Supply and maintain toilet tissue, paper towels, paper cups and similar disposable materials as appropriate for each facility. Provide appropriate covered waste containers for used material.

Toilets: Install self-contained toilet units or water and sewer connected temporary toilet facilities, to the extent permitted by governing regulations. Use of pit-type privies will not be permitted.

Provide separate toilet facilities for male and female construction personnel at ground level.

Drinking Water Fixtures: Provide drinking water fountains where and when piped potable, water is reasonably accessible from permanent or temporary lines. Otherwise, provide containerized tap-dispenser bottled-water type drinking water units, including the paper supply.

Where power is accessible, provide electric drinking water coolers to maintain a dispensed water temperature at 45 to 55°F (7 to 13°C).

#### Dewatering Facilities and Drains:

General: For temporary drainage and dewatering facilities and operations not directly associated with performance of the work included under individual work sections, comply with dewatering requirements of applicable Division-2 sections. Where feasible, utilize the same facilities. Maintain the site, excavations and construction free of water.

Dispose of rainwater in a lawful manner, which will not result in flooding the project or adjoining property, nor endanger either permanent work or temporary facilities.

Provide temporary drainage where the roofing or similar waterproof deck construction is completed prior to the connection and operation of the permanent drainage piping system, provide temporary drainage.

#### Temporary Enclosures:

General: At the earliest practical time provide temporary enclosure of materials, equipment, work in progress and completed portions of the Work to provide protection to the Work and employees from effects of exposure, foul weather, other construction operations, and similar activities on the site.

Coordinate enclosures with ventilating and material drying or curing requirements to avoid dangerous conditions and effects.

Enclosure: Provide temporary enclosures by installing tarpaulins or equivalent materials securely, using a minimum of wood framing and other combustible materials. Individual openings of 25 square feet or less may be closed with plywood or similar materials.

Close openings through the floor or roof decks and other horizontal surfaces with substantial load-bearing wood-framed or similar construction.

#### Project Identification and Temporary Signs:

General: Prepare project identification and other temporary signs of the size and with graphic content indicated; install signs where indicated. Support on suitable posts or framing of treated wood or steel. Maintain signs in a manner, which will properly inform the public and persons seeking entrance to the project. Do not permit installation of unauthorized signs that are visible outside the site. Provide a 4' x 8' sign size minimum, unless indicated otherwise.

Project Identification Signs: Engage an experienced sign painter to apply graphics in a neat professional manner. Comply with details and notations indicated.

Temporary Signs: Prepare temporary signs within the site, which will provide directional assistance and information to construction personnel and visitors to help locate the following:

- Access roads and parking.
- Offices and first aid stations.
- Sanitary facilities.
- Fire protection facilities.
- Barricades and obstructions.
- Hazardous elements of construction work.

#### Collection and Disposal of Wastes:

General: Establish a system for daily collection and disposal of waste materials from construction areas and elsewhere on the site. Enforce requirements strictly. Do not hold collected materials at the site longer than 7 days during normal weather or 3 days when the daily temperature is expected to rise above 80°F (27°C). Handle waste materials that are hazardous, dangerous, or unsanitary separately from other inert waste by containerizing appropriately. Dispose of waste material in a lawful manner.

Burying or burning of waste materials on the site will not be permitted.  
Washing waste materials down sewers or into waterways will not be permitted.

Provide rodent proof containers located on each floor level of construction work, to encourage depositing of garbage and similar wastes by construction personnel.

#### Rodent and Pest Control:

General: Early in the construction process before deep foundation work has been completed, retain a recognized local exterminator or insect-and-pest control company to recommend practices that will minimize attraction and harboring of rodents, roaches and other pests. Employ this service to perform extermination and control procedures at regular intervals so that the project will be relatively free of pests and their residues at substantial completion. Perform control operations in a lawful manner using environmentally safe materials

#### Construction Aids and Miscellaneous Services and Facilities:

General: Design, construct, and maintain construction aids and miscellaneous general services and facilities as needed to accommodate performance of the work. Construction aids and miscellaneous general services and facilities include, but are not limited to the following:

- Temporary stairs and ladders.
- Guardrails and barriers.
- Walkways.

### 3.4 SECURITY AND PROTECTION FACILITIES INSTALLATION:

General: Provide a reasonably neat and uniform appearance in security and protection facilities acceptable to the Architect/Engineer and Owner.

Except for utilization of permanent fire protection facilities, as soon as available in each area, do not change over from use of temporary security and protection facilities to use of permanent facilities until substantial completion, or for longer periods of time as requested by the Architect/Engineer.

#### Temporary Fire Protection:

General: Until fire protection needs may be fulfilled by permanent facilities, install and maintain temporary fire protection facilities of the types needed to adequately protect against reasonably predictable and controllable fire losses. Comply with the applicable recommendations of NFPA Standard 10 "Standard for Portable Fire Extinguishers". Locate fire extinguishers where they are most convenient and effective for their intended purpose, but provide not less than one extinguisher on each floor at or near each usable stairwell. Store combustible materials in containers in recognized fire-safe locations.

Develop and supervise an overall fire prevention and first-aid fire protection program for personnel at the project site. Review needs with the local fire department officials and establish procedures to be followed. Instruct personnel in methods and procedures to be followed. Post warnings and information and enforce strict discipline. Maintain unobstructed access to fire extinguishers, fire hydrants, temporary fire protection facilities, stairways and other access routes for fighting fires. Prohibit smoking in hazardous fire exposure areas. Provide supervision of welding operations, combustion type, temporary heating units, and similar sources of ignition for possible fires.

Permanent Fire Protection: At the earliest feasible date in each area of the project, complete installation of the permanent fire protection facility, including connected services, and place into operation and use. Instruct key personnel at the site on how to use facilities, which may not be self-explanatory.

**Barricades, Warning Signs and Lights:**

General: Comply with recognized standards and code requirements for the erection of substantial, structurally adequate barricades where needed to prevent accidents and losses. Paint with appropriate colors, graphics and warning signs to inform personnel at the site and the public, of the hazard being protected against. Provide lighting where appropriate and needed, including flashing red lights where appropriate.

**Enclosure Fence:**

General: When excavation or other substantial elements of the Work begin, install a general enclosure fence with suitable lockable entrance gates. Locate where indicated, or if not indicated, enclose substantially the entire site or portion thereof determined to be sufficient to accommodate the entire construction operation. Install in a manner that will prevent persons, dogs, cattle and similar animals from easily entering the site, except by way of the entrance gates when open.

Except as otherwise indicated, provide open-mesh, chain-link fencing with posts set in a compacted mixture of gravel and earth

Permanent site enclosure fence may be installed in lieu of or as part of the above at the Contractor's option.

**Security Enclosure and Lockup:**

General: Install substantial and durable general temporary enclosure of partially completed areas of construction. Provide locking entrances adequate to prevent unauthorized entrance, vandalism, theft and similar deleterious effects and violations of project security.

Storage: Where materials and equipment must be temporarily stored, prior to and during construction, and are of substantial value or are attractive for possible theft, provide a secure lockup and enforce strict discipline in connection with the timing of installation and release of materials, so that the opportunity for theft and vandalism is minimized.

**Environmental Protection:**

General: Provide general protection facilities, operate temporary facilities, conduct construction activities, and enforce strict discipline for personnel on the site in ways and by methods that comply with environmental regulations, and that minimize the possibility that air, waterways and subsoil might be contaminated or polluted, or that other undesirable effects might result from the performance of work at the site. Avoid the use of tools and equipment which produce harmful noise. Restrict the use of noise making tools and equipment to hours of use that will minimize noise complaints from persons or firms near the project site.

**3.5 OPERATION, TERMINATION AND REMOVAL:**

Supervision: Enforce strict discipline in use of temporary services and facilities at the site. Limit availability of temporary services and facilities to essential and intended uses to minimize waste and abuse. Do not permit temporary installations to be abused or endangered. Do not allow hazardous, dangerous or unsanitary conditions to develop or persist on the project site.

Maintenance: Operate and maintain temporary services and facilities in good operating condition throughout the time of use and until

removal is authorized. Protect from damage by freezing temperatures and similar elements.

Maintain the operation of temporary enclosures, heating, cooling, humidity control, ventilation and similar facilities on a 24-hour day basis where required to achieve indicated results in the Work and to avoid the possibility of damage to the Work or to temporary facilities.

Protection: Maintain distinct markers for underground lines. Protect from damage during excavation operations.

Termination and Removal: Unless the Architect/Engineer requests that it be maintained for a longer period of time, remove each temporary service and facility promptly when the need for it or a substantial portion of it has ended, or when it has been replaced by the authorized use of a permanent facility, or no later than substantial completion. Complete, or, if necessary, restore

permanent work, which may have been delayed because of interference with the temporary service or facility. Repair damaged work, clean exposed surfaces and replace work, which cannot be satisfactorily repaired.

Materials and facilities that constitute temporary services and facilities are and remain the property of the Contractor. The Owner reserves the right to take possession of the project identification signs.

Remove temporary roads and paving materials, which are not intended for or acceptable for integration into permanent paving. Where the area shown is intended for landscape development, remove soil and aggregate fill that does not comply with requirements for fill or subsoil in the landscape area. Remove materials contaminated with road oil, asphalt and other petro-chemical compounds, and other substances, which might impair growth of plant materials or lawns. Repair or replace street paving, curbs and sidewalks at the temporary entrances, as required by the governing authority.

At substantial completion, clean and renovate permanent services and facilities that have been used to provide temporary services and facilities during the construction period, including but not limited to the following:

Replace air filters and clean the inside of ductwork and housings.

Replace significantly worn parts and parts that have been subject to unusual operating conditions.

Replace lamps in the lighting system that are burned out or noticeably dimmed by substantial hours of use.

END OF SECTION 01 50 00

## SECTION 01 63 10 - PRODUCTS AND SUBSTITUTIONS

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS:

Drawings and general provisions of Contract, including General and Supplementary Conditions and other Division-1 Specification sections, apply to work of this section.

#### 1.2 DESCRIPTION OF REQUIREMENTS:

Definitions: Definitions used in this paragraph are not intended to negate the meaning of other terms used in the contract documents, including such terms as "specialties", "systems", "structure", "finishes", "accessories", "furnishings", "special construction" and similar terms. Such terms are self-explanatory and have recognized meanings in the construction industry.

"Products" are items purchased for incorporation in the Work, regardless of whether they were specifically purchased for the project or taken from the Contractor's previously purchased stock. The term "product" as used herein includes the terms "material", "equipment", "system" and other terms of similar intent.

"Named Products" are products identified by use of the manufacturer's name for a product, including such items as a make or model designation, as recorded in published product literature, of the latest issue as of the date of the contract documents.

"Materials" are products that must be substantially cut, shaped, worked, mixed, finished, refined or otherwise fabricated, processed, or installed to form units of work.

"Equipment" is defined as a product with operational parts, regardless of whether motorized or manually operated, and in particular, a product that requires service connections such as wiring or piping.

Substitutions: The Contractor's requests for changes in the products, materials, equipment and methods of construction required by the contract documents are considered requests for "substitutions", and are subject to the requirements specified herein. The following are not considered as substitutions:

Revisions to the contract documents, where requested by the Owner, Architect or Engineer are considered as "changes" not substitutions.

Substitutions requested during the bidding period, which have been accepted prior to the Contract Date, are included in the contract documents and are not subject to the requirements for substitutions as herein specified.

Specified Contractor options on products and construction methods included in the contract documents are choices available to the Contractor and are not subject to the requirements for substitutions as herein specified.

Except as otherwise provided in the contract documents, the Contractor's determination of and compliance with governing regulations and orders as issued by governing authorities do not constitute "substitutions" and do not constitute a basis for change orders.

Standards: Refer to Division-1 section "Definitions and Standards" for the applicability of industry standards to the products specified for the project, and for the acronyms used in the text of the specification sections.

#### 1.3 QUALITY ASSURANCE:

Source Limitations: To the fullest extent possible, provide products of the same generic kind, from a single source, for each unit of work.

Compatibility of Options: Compatibility of products is a basic requirement of product selection. When the Contractor is given the option of selecting between two or more products for use on the project, the product selected must be compatible with other products previously selected, even if the products previously selected were also Contractor options. The complete compatibility between the various choices available to the Contractor is not assured by the various requirements of the Contract documents, but must be provided by the Contractor.

Foreign Product Limitations: "Foreign products" as distinguished from "domestic products" are defined as products that are either manufactured substantially (50% or more of value) outside of the United States and its possessions, or produced or supplied by entities known to be substantially owned (more than 50%) by persons who are not citizens of nor living within the United States and its possessions. Raw materials shipped from the United States to a Foreign Country for final manufacture or fabrication, shall NOT QUALIFY as Domestic Materials, unless the exceptions below apply.

Except under one or more of the following conditions, select and provide domestic, not foreign products for inclusion of the Work:

There is no domestic product available that complies with the requirements of the contract documents.

#### 1.4 SUBMITTALS:

##### Product Listing Submittal:

General: Prepare a product-listing schedule in a form acceptable to the Architect/Engineer. Show names of the principal products required for the work, by generic name. Show proprietary product names and the name of the manufacturer for each item listed that is to be purchased and incorporated into the Work.

Form: Prepare the product-listing schedule with information on each item tabulated under the following scheduled column headings:

Generic name as used in contract documents.

Proprietary name, model number and similar product designation.

Manufacturer's and supplier's name and city/state addresses.

Related unit-of-work specification section number.

Installer's name and primary trade of workmen.

Projected delivery date, or time span of delivery period.

Submittal: Submit 3 copies of the product-listing schedule within 30 days after the date of commencement of the Work. Provide a written explanation for omissions of data, and for known variations from contract requirements.

At the Contractor's option, the initial submittal of the product-listing schedule may be limited to product selections and product designations that must be established early in the Contract Time. Submit the completed product-listing schedule within 60 days after commencement of the Work.

##### Substitution Request Submittal:

Request for Substitutions: Submit 3 copies of each request for substitution. In each request identify the product or fabrication or installation method to be replaced by the substitution; include related specification section and drawing numbers, and complete documentation showing compliance with the requirements for substitutions. Include the following information, as appropriate, with each request.

Provide complete product data, drawings and descriptions of products, and fabrication and installation procedures.

Provide samples where applicable or requested.

Provide a detailed comparison of the significant qualities of the proposed substitution with those of the work originally specified. Significant qualities include elements such as size, weight, durability, performance and visual effect where applicable.

Provide complete coordination information. Include all changes required in other elements of the work to accommodate the substitution, including work performed by the Owner and separate Contractors.

Provide a statement indicating the effect the substitution will have on the work schedule in comparison to the schedule without approval of the proposed substitution. Include information regarding the effect of the proposed substitution on the Contract Time.

Provide complete cost information, including a proposal of the net change, if any in the Contract Sum.

Provide certification by the Contractor to the effect that, in the Contractor's option, after thorough evaluation, the proposed substitution will result in work that in every significant respect is equal-to or better than the work required by the Contract documents, and that it will perform adequately in the application indicated.

Include in this certification, the Contractor's waiver of rights to additional payment or time, which may subsequently be necessary because of the failure of the substitution to perform adequately.

Change Order Form: Submit requests for substitutions in the form and in accordance with procedures required for change order proposals.

Architect/Engineer's Action: Within two weeks of receipt of the Contractor's request for substitution, the Architect/Engineer will request additional information or documentation as may be needed for evaluation of the request. Within 3 weeks of receipt of the request, or within one week of receipt of the requested additional information or documentation, which ever is later, the Architect/Engineer will notify the Contractor of either the acceptance or rejection of the proposed substitution.

Acceptance will be in the form of a change order.

Rejection will include a statement giving reasons for the rejection.

#### 1.5 PRODUCT DELIVERY, STORAGE AND HANDLING:

General: Deliver, store, and handle products in accordance with manufacturer's recommendations, using means and methods that will prevent damage, deterioration and loss, including theft. Control to prevent overcrowding of construction spaces. In particular coordinate delivery and installation to ensure minimum holding or storage times for items known or recognized to be flammable, hazardous, easily damaged, or sensitive to deterioration, theft and other sources of loss.

Deliver products to the site in the manufacturer's sealed container or other packaging system, complete with labels and instructions for handling, storage, unpacking, protecting and installing.

Store products at the site in a manner that will facilitate inspection and measurement of quantity or counting of units.

Store heavy materials away from the project structure in a manner that will not endanger the supporting construction.

#### 1.6 WARRANTIES (GUARANTEES):

Categories of Specific Warranties: Warranties on the work are in several categories, including those of General Conditions, and including (but not necessarily limited to) the following specific categories related to individual units of work specified in sections of Divisions 2 through 16 of these specifications:

**Special Project Warranty (Guarantee):** A warranty specifically written and signed by Contractor for a defined portion of the work; and, where required, countersigned by subcontractor, installer, manufacturer or other entity engaged by Contractor.

**Specified Product Warranty:** A warranty which is required by contract documents, to be provided for a manufactured product incorporated into the work; regardless of whether manufacturer has published a similar warranty without regard for specific incorporation of product into the work, or has written and executed a special product warranty as a direct result of contract document requirements.

**Coincidental Product Warranty:** A warranty which is not specifically required by contract documents (other than as specified in this Section); but which is available on a product incorporated into the work, by virtue of the fact that manufacturer of product has published warranty in connection with purchases and uses of product without regard for specific applications except as otherwise limited by terms of warranty.

Refer to individual sections of Divisions 2 through 16 for the determination of units of work which are required to be specifically or individually warranted, and for the specific requirements and terms of those warranties (or guarantees).

**General Limitations:** It is recognized that specific warranties are intended primarily to protect Owner against failure of the work to perform as required, and against deficient, defective and faulty materials and workmanship, regardless of sources. Except as otherwise indicated, specific warranties do not cover failures in the work which result from: 1) Unusual and abnormal phenomena of the elements, 2) The Owner's misuse, maltreatment or improver maintenance of the work, 3) Vandalism after time of substantial completion, or 4) Insurrection or acts of aggression including war.

**Related Damages and Losses:** In connection with Contractor's correction of warranted work which has failed, remove and replace other work of project which has been damaged as a result of such failure, or must be removed and replaced to provide access or correction of warranted work.

**Consequential Damages:** Except as otherwise indicated or required by governing regulations, special project warranties and product warranties are not extended to cover damage to building contents (other than work of Contract) which occurs as a result of failure of warranted work.

**Warranty Periods:** All warranties are to begin on date of Substantial Completion and are for specified period of time from that date. No warranty period will be for less than one year.

**Reinstatement of Warranty Period:** Except as otherwise indicated, when work covered by a special project warranty or product warranty has failed and has been correct by replacement or restoration, reinstate warranty by written endorsement for the following time period, starting on date of acceptance of replaced or restored work.

A period of time equal to original warranty period of time.

**Replacement Cost, Obligations:** Except as otherwise indicated, costs of replacing or restoring failing warranted units or products is Contractor's obligation, without regard for whether Owner has already benefited from use through a portion of anticipated useful service lives.

**Rejection of Warranties:** Owner reserves the right, at time of substantial completion or thereafter, to reject coincidental product warranties submitted by Contractor, which in opinion of Owner tend to detract from or confuse interpretation of requirements of contract documents.

**Contractor's Procurement Obligations:** Do not purchase, subcontract for, or allow others to purchase or sub-subcontract for materials or units or work for project where a special project warranty, specified product warranty, certification or similar commitment is required, until it has been determined that entities required to countersign such commitments are willing to do so.

Specific Warranty Forms: Where a special project warranty (guarantee) or specified product warranty is required, prepare a written document to contain terms and appropriate identification, ready for execution by required parties. Submit draft to Owner (through Architect/Engineer) for approval prior to final executions.

## PART 2 - PRODUCTS

### 2.1 GENERAL PRODUCT COMPLIANCE:

General: Requirements for individual products are indicated in the contract documents; compliance with these requirements is in itself a contract requirement. These requirements may be specified in any one of several different specifying methods, or in any combination of these methods. These methods include the following:

Proprietary.

Descriptive.

Performance.

Compliance with Reference Standards.

Compliance with codes, compliance with graphic details, allowances, and similar provisions of the contract documents also have a bearing on the selection process.

Procedures for Selecting Products: The Contractor's options in selecting products are limited by requirements of the contract documents and governing regulations. They are not controlled by industry traditions or procedures experienced by the Contractor on previous construction projects. Required procedures include but are not limited to the following for the various indicated methods of specifying:

#### Proprietary and Semi-proprietary Specification Requirements:

Single Product Name: Where only a single product or manufacturer is named, provide the product indicated, unless the specification indicates the possible consideration of other products. Advise the Architect/Engineer before proceeding, when it is discovered that the named product is not a reasonable or a feasible solution.

Two or More Product Names: Where two or more products or manufacturers are named, provide one of the products named, at the Contractor's option. Exclude products that do not comply with specification requirements. Do not provide or offer to provide an unnamed product, unless the specification indicates possible consideration of other products. Advise the Architect/Engineer before proceeding where none of the named products comply with specification requirements or are feasible for use.

Where products or manufacturers are specified by name, accompanied by the term or Approved Substitute or similar language, comply with the contract document provisions concerning "substitutions" to obtain approval from the Architect/Engineer for the use of an unnamed product.

Non-proprietary Specification Requirements: Where the specifications name products or manufacturers that are available and may be incorporated in the Work, but do not restrict the Contractor to the use of these products only, the Contractor may, at his option, use any available product that complies with contract requirements and meets the Owner and Architects approval.

Descriptive Specification Requirements: Where the specifications describe a product or assembly generically, in detail, listing the exact characteristics required, but without use of a brand or trade name, provide products or assemblies that provide the characteristics indicated and otherwise comply with contract requirements.

Performance Specification Requirements: Where the specifications require compliance with indicated performance requirements, provide products that comply with the specific performance requirements indicated, and that are recommended by the manufacturer for the application indicated. The manufacturer's recommendations may be contained in published product literature, or by the manufacturer's individual certification of performance. General overall performance of a product is implied where the product is

specified for specific performances.

**Compliance with Standards, Codes, and Regulations:** Where the specifications require only compliance with an imposed standard, code or regulation, the Contractor has the option of selecting a product that complies with specification requirements, including standards, codes, and regulations.

**Visual Matching:** Where matching an established sample is required, the final judgment of whether a product proposed by the Contractor matches the sample satisfactorily will be determined by the Architect. Where there is no product available within the specified product category that matches the sample satisfactorily and also complies with other specified requirements, comply with the provisions of the contract documents concerning "substitutions" and "change orders" for the selection of a matching product in another product category, or for non-compliance with specified requirements.

**Visual Selection:** Except as otherwise indicated, where specified product requirements include the phrase "...as selected from the manufacturer's standard colors, patterns, textures..." or similar phrases, the Contractor has the option of selecting the product and manufacturer, provided the selection complies with other specified requirements. The Architect is subsequently responsible for selecting the color, pattern and texture from the product line selected by the Contractor.

## 2.2 SUBSTITUTIONS:

**Conditions:** The Contractor's request for a substitution will be received and considered when extensive revisions to the contract documents are not required, when the proposed changes are in keeping with the general intent of the contract documents, when the requests are timely, fully documented and properly submitted, and when one or more of the following conditions is satisfied, all as judged by the Architect/Engineer; otherwise the requests will be returned without action except to record non-compliance with these requirements.

The Architect/Engineer will consider a request for substitution where the request is directly related to an "or equal" clause or similar language in the contract documents.

The Architect/Engineer will consider a request for substitution where the specified product or method cannot be provided within the Contract Time. However, the request will not be considered if the product or method cannot be provided as a result of the Contractor's failure to pursue the work promptly or to coordinate the various activities properly.

The Architect/Engineer will consider a request for substitution where the specified product or method cannot receive necessary approval by a governing authority, and the requested substitution can be approved.

The Architect/Engineer will consider a request for a substitution where a substantial advantage is offered the Owner, in terms of cost, time, energy conservation or other considerations of merit, after deducting of offsetting responsibilities the Owner may be required to bear. These additional responsibilities may include such considerations as additional compensation to the Architect/Engineer for redesign and evaluation services, the increased cost of other work by the Owner or separate contractors, and similar considerations.

The Architect/Engineer will consider a request for substitution when the specified product or method cannot be provided in a manner, which is compatible with other materials of the work, and where the Contractor certifies that the substitution will overcome the incompatibility.

The Architect/Engineer will consider a request for substitution when the specified product or method cannot be properly coordinated with other materials in the work, and where the Contractor certifies that the proposed substitution can be properly coordinated.

The Architect/Engineer will consider a request for substitution when the specified product or method cannot receive a warranty as required by the contract documents and where the contractor certifies that the proposed substitution receive the required warranty.

**Work-Related Submittals:** The Contractor's submittal of and the Architect/Engineer's acceptance of shop drawings, product data or samples which relate to work not complying with requirements of the contract documents, does not constitute an acceptable or valid request for a substitution, nor approval thereof.

### 2.3 GENERAL PRODUCT REQUIREMENTS:

General: Provide products that comply with the requirements of the contract documents that are undamaged and, unless otherwise indicated, unused at the time of installation. Provide products that are complete with all accessories, trim, finish, safety guards and other devices and details needed for a complete installation and for the intended use and effect.

Standard Products: Where they are available, provide standard products of types that have been produced and used successfully in similar situations on other projects.

Continued Availability: Where, because of the nature of its application, the Owner is likely to need replacement parts or additional amounts of a product at a later date, either for maintenance and repair or replacement, provide standard, domestically produced products for which the manufacturer has published assurances that the products and its parts are likely to be available to the Owner at a later date.

Nameplates: Except as otherwise indicated for required labels and operating data, do not permanently attach or imprint manufacturer's or producer's nameplates or trademarks on exposed surfaces of products which will be exposed to view either in occupied spaces or on the exterior of the completed project.

Labels: Locate required product labels and stamps on a concealed surface or, where required for observation after installation, on an accessible surface which, in occupied spaces, is not conspicuous.

Equipment Nameplates: Provide a permanent nameplate on each item of service-connected or power-operated equipment. Locate the nameplate on an easily accessible surface, which is inconspicuous in occupied spaces. The nameplate shall contain the following information and other essential operating data.

Name of manufacturer

Name of product

Model number

Serial number

Capacity

Speed

Ratings

## PART 3 - EXECUTION

### 3.1 INSTALLATION OF PRODUCTS:

General: Except as otherwise indicated in individual sections of these specifications, comply with the manufacturer's instructions and recommendations for installation of the products in the applications indicated. Anchor each product securely in place, accurately located and aligned with other work. Clean exposed surfaces and protect surfaces as necessary to ensure freedom from damage and deterioration at time of acceptance.

END OF SECTION 01 63 10

## SECTION 01 70 00 - PROJECT CLOSEOUT

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS:

Drawings and general provisions of Contract, including General and Supplementary Conditions and other Division-1 Specification sections, apply to work of this section.

#### 1.2 DESCRIPTION OF REQUIREMENTS:

Definitions: Project closeout is the term used to describe certain collective project requirements, indicating completion of the Work that are to be fulfilled near the end of the Contract time in preparation for final acceptance and occupancy of the Work by the Owner, as well as final payment to the Contractor and the normal termination of the Contract.

Specific requirements for individual units of work are included in the appropriate sections in Divisions 2 through 33.

Time of closeout is directly related to "Substantial Completion"; therefore, the time of closeout may be either a single time period for the entire Work or a series of time periods for individual elements of the Work that have been certified as substantially complete at different dates. This time variation, if any, shall be applicable to the other provisions of this section.

#### 1.3 PREREQUISITES TO SUBSTANTIAL COMPLETION:

General: Complete the following before requesting the Architect/Engineer's inspection for certification of substantial completion, either for the entire Work or for portions of the Work. List known exceptions in the request.

In the progress payment request that coincides with, or is the first request following, the date substantial completion is claimed, show either 100% completion for the portion of the Work claimed as "substantially complete", or list incomplete items, the value of incomplete work, and reasons for the Work being incomplete.

Include supporting documentation for completion as indicated in these contract documents.

Submit a statement showing an accounting of changes to the Contract Sum.

Advise Owner of pending insurance change-over requirements.

Obtain and submit releases enabling Owner's full, unrestricted use of the Work and access to services and utilities. Where required, include occupancy permits, operating certificates and similar releases.

Deliver tools, spare parts, extra stocks of material and similar physical items to the Owner.

Obtain signed receipt for items transferred and bind same into appropriate manuals with close-out information. Make the final change-over of locks and transmit the keys to the Owner. Advise the Owner's personnel of the change-over in security provisions.

Complete start-up testing of systems, and instruction of the Owner's operating and maintenance personnel. Discontinue or change over and remove temporary facilities and services from the project site, along with construction tools and facilities, mock-ups, and similar elements.

#### PREREQUISITES TO SUBSTANTIAL COMPLETION:

General:

Complete final cleaning up requirements, including touch-up painting of marred surfaces.

Touch-up and otherwise repair and restore marred exposed finishes.

Contractors listing of non-completed items and those requiring minor additional work "Contractors punch list".  
Typewritten and organized for a orderly walk through and verification.

Inspection Procedures: Upon receipt of Contractor's request for inspection, the Architect/Engineer will either proceed with inspection or advise Contractor of unfulfilled prerequisites.

Following the initial inspection, the Architect/Engineer will either prepare the certificate of substantial completion, or will advise Contractor of work, which must be performed before the certificate will be issued.

The Architect/Engineer will repeat the inspection when requested and when assured that the Work has been substantially completed.

Results of the completed inspection will form the initial "punch-list" for final acceptance.

#### 1.4 PREREQUISITES TO FINAL ACCEPTANCE:

General: Complete the following before requesting the Architect/Engineer's final inspection for certification of final acceptance, and final payment as required by the General Conditions. List known exceptions, if any, in request:

Submit the final payment request with final releases and supporting documentation not previously submitted and accepted. Include certificates of insurance for products and completed operations where required.

Submit an updated final statement, accounting for final additional changes to the Contract Sum.

Submit a certified copy of the Architect/Engineer's final punch-list of itemized work to be completed or corrected, stating that each item has been completed or otherwise resolved for acceptance and has been endorsed and dated by the Architect/Engineer.

Submit final meter readings for utilities, a measured record of stored fuel, and similar data as of the date of substantial completion, or else when the Owner took possession of and responsibility for corresponding elements of the Work. Submit record drawings, maintenance manuals, final project photographs, damage or settlement survey, property survey, and similar final record information.

Submit specific warranties, workmanship/maintenance bonds, maintenance agreements, final certifications and similar documents.

Submit affidavit of payment of debts and claims, AIA Document G706.

Submit affidavit of release of liens, AIA Document G706A.

Submit consent of surety, AIA Document G707.

#### 1.5 PREREQUISITES TO FINAL ACCEPTANCE:

General:

Submit a final liquidated damages settlement statement, acceptable to Owner.

Submit evidence of final, continuing insurance coverage complying with insurance requirements.

Submit completed Assignment of Antitrust Claims (General and Sub-Contractor)

In no case shall the project be finally complete until the required state occupancies are granted by the Department of Education, or other regulatory agencies

Re-inspection Procedure: The Architect/Engineer will re-inspect the Work upon receipt of the Contractor's notice that the work, including punch-list items resulting from earlier inspections, has been completed, except for these items whose completion has been delayed because of circumstances that are acceptable to the Architect/Engineer.

Upon completion of re-inspection, the Architect/Engineer will either prepare a certificate of final acceptance, or will advise the Contractor of work that is incomplete or of obligations that have not been fulfilled, but are required for final acceptance.

If necessary, the re-inspection procedure will be repeated.

## 1.6 RECORD DOCUMENT SUBMITTALS

General: Specific requirements for record documents are indicated in the individual sections of these specifications. Other requirements are indicated in the General Conditions (2.2.3, 7.9.3 and 8.2). General submittal requirements are indicated in "submittals" sections.

Do not use record documents for construction purposes; protect from deterioration and loss in a secure, fire-resistive location; provide access to record documents for the Architect/Engineer's reference during normal working hours.

Record Drawings: Maintain a record set of blue or black line white-prints of contract drawings and shop drawings in a clean, undamaged condition. Mark-up the set of record documents to show the actual installation where the installed work varies substantially from the work as originally shown. Mark whichever drawing is most capable of showing the actual "field" condition fully and accurately; however, where shop drawings are used for mark-up, record a cross-reference at the corresponding location on the working drawings. Give particular attention to concealed work that would be difficult to measure and record at a later date.

Mark record sets with red erasable pencil and, where feasible, use other colors to distinguish between variations in separate categories of work.

Mark-up new information which is known to be important to the Owner, but for some reason was not shown on either contract drawings or shop drawings.

Note related change-order number where applicable.

Organize record drawing sheets into manageable sets, bind with durable paper cover sheets, and print suitable titles, dates and other identification on cover of each set.

Conversion of Schematic Layouts (Record Drawings):

In most cases on the drawings, arrangement of conduits and circuits, piping, ducts, and other similar items is shown schematically and is not intended to portray precise physical layout. Final physical arrangement is as determined by the Contractor, subject to the Architect's approval. However, design of future modifications of the facility may require accurate information as to the final physical arrangement of items, which are shown only schematically on the drawings.

Show on the job set of Record Drawings, by dimension accurate to within 1" the center line of each run of items such as are described above. Clearly identify the item by accurate note such as "cast iron drain" "galvanized water", etc. Show, by symbol or note, the vertical location of identification sufficiently descriptive that it may be related reliably to the specifications.

The Architect may waive the requirements for conversion of schematic data where, in the Architect's judgment, such conversion serves no beneficial purpose. However, do not rely upon waivers being issued except as specifically issued in writing by the Architect.

Timing of entries: Be alert to changes in the work from how it is shown in the Contract Documents. Promptly, and in no case later than 24 hours after the change has occurred and been made known to the Contractor, make the entry or entries required.

Accuracy of Entries: Use all means necessary, including the proper tools for measurement, to determine actual locations of the installed items.

Delegate the responsibility for maintenance of Record Documents to one person on the Contractor's staff as approved in advance by the Architect.

Architect's approval of the current status of Record Drawings will be a prerequisite to his approval of requests for progress payment and request for progress payment and request for final payment under the Contract. Updated sets of white prints shall be submitted with each progress payment.

Progress Submittals: NOTE: Prior to submitting each request for progress payment, secure the Architect's approval of the Record Drawings as currently maintained.

Preparation of CADD Files: In preparation for certification of substantial completion on last major portion of work, review completed mark-up of record drawings with Architect. When authorized, proceed with preparation of full set of CADD drawings for contract drawings and shop drawings. Incorporate changes and additional information previously marked-up on print sets, by erasing and redrawing where applicable, and by adding details and notations where applicable; refer instances of uncertainty to Architect/Engineer for determination. The data shall be recorded in drafting ink, to scale, by a competent draftsman. Identify and date each updated drawing and the reason for the change (field condition, change order #, etc.).

Printing of original drawings to produce sepia mylars and other prints as required herein is Contractor's responsibility and cost. Architect/Engineer will make original contract drawings available to Contractor's print shop.

Copies, Distribution: Upon completion of sepia mylar record drawings, prepare 4 blue-line or black-line prints of each drawing, regardless of whether changes and additional information were recorded thereon. Organize each of 4 copies into manageable sets, bind with durable paper cover sheets, and print suitable titles, dates and other identification on cover of each set. Organize and bind mark-up set of prints (maintained during the construction period) in same manner. Organize transparencies into sets matching print sets, place set in a durable tube-type drawing container (with end caps), and mark end cap of each with suitable identification. Submit records (Architect/Engineer will retain one copy set). Permanently mark the sets 1) Facilities; 2) Maintenance; 3) Chico's; 4) Architect/Engineer.

Review of Prints: Prior to copying and distributing, submit corrected prints to Architect for review and acceptance. When acceptable, Architect will initial and date each print, indicating acceptance of general scope of changes and additional information recorded thereon, and of the general quality of draftsmanship thereon (erasures and drafting). Mark-up prints will be returned to Contractor for correcting CADD files, organizing into sets, printing, binding, and final submittal.

Record Specifications: Maintain one complete copy of the Project Manual, including specifications and addenda, and one copy of other written construction documents such as change orders and similar modifications issued in printed form during construction (posted to proper pages). Mark these documents to show substantial variations in the actual work performed in comparison with the text of the specifications and modifications as issued. Give particular attention to substitutions, selection of options and similar information on work where it is concealed or cannot otherwise be readily discerned at a later date by direct observation. Note related record drawing information and product data, where applicable and the reason for the change (field condition, change order #, etc.).

Immediately prior to the date or dates of substantial completion, complete record product data and place in good order, properly identified and bound or filed, ready for continued use and reference.

Record Product Data: Maintain one copy of each product data submittal. Mark these documents to show significant variations in the actual Work performed in comparison with the submitted information. Include both variations in the products as delivered to the site, and variations from the manufacturer's instructions and recommendations for installation. Give particular attention to concealed products and portions of the Work, which cannot otherwise be readily discerned at a later date by direct observation. Note related change orders and mark-up of record drawings and specifications.

Upon Completion of mark-up, submit complete set of record product data to the Architect/Engineer for the Owner's records.

Record Sample Submittal: Immediately prior to date or dates of substantial completion, the Contractor will meet at the site with the Architect/Engineer and the Owner's personnel, if desired, to determine which, if any, of the submitted samples that have been maintained by the Contractor during progress of the Work, are to be transmitted to the Owner for record purposes. Comply with delivery to the Owner's sample storage space.

Miscellaneous Record Submittals: Refer to other sections of these specifications for requirements of miscellaneous record-keeping and submittals in connection with the actual performance of the Work. Immediately prior to the date or dates of substantial completion, complete miscellaneous records and place in good order, properly identified and bound or filed, ready for continued use and reference. Submit to the Architect/Engineer for the Owner's records.

Provide "final property survey" including final (new) topography signed and sealed by surveyor who has maintained requirements of paragraphs entitled "Surveys and Reports/Records" in Section 0104000 - Project Coordination.

Maintenance Manuals: Organize operating and maintenance data into suitable sets of manageable size. Bind data into individual binders properly identified and indexed. Bind each set of data in a heavy-duty 2-inch, 3-ring vinyl-covered binder, with pocket folders for folded sheet information. Mark the appropriate identification on both front and spine of each binder. Submit four (4) complete sets.

Include the following types of information in operation and maintenance manuals:

- Emergency instructions.
- Spare parts listing.
- Copies of warranties.
- Wiring diagrams.
- Recommended "turn-around" cycles.
- Inspection procedures.
- Shop drawings and product data.

- Record Drawings
- Record Specifications
- Change Order Documents
- Architects Supplemental Instructions
- Warranty Documents
- Maintenance/Operating Manuals

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION

3.1 CLOSEOUT PROCEDURES:

General Operating and Maintenance Instructions: Arrange for each installer of operating equipment and other work that requires regular or continuing maintenance, to meet at the site with the Owners personnel to provide necessary basic instruction in the

proper operation and maintenance of the entire Work. Where installers are not experienced in the required procedures, include instruction by the manufacturer's representatives.

As part of this instruction provide a detailed review of the following items:

- Maintenance manuals
- Record documents
- Spare parts and materials
- Tools
- Lubricants
- Fuels
- Identification systems
- Control sequences
- Hazards
- Cleaning
- Warranties, bonds, maintenance agreements and similar continuing commitments.

As part of this instruction for operating equipment demonstrate the following procedures:

- Start-up
- Shut-down
- Emergency operations
- Noise and vibration adjustments
- Safety procedures
- Economy and efficiency adjustments
- Effective and energy utilization

### 3.2 FINAL CLEANING:

General: Special cleaning requirements for specific units of Work are included in the appropriate sections of Divisions 2 through 33. General Cleaning during the regular progress of the Work is required by the General Conditions and is included under section "Temporary Facilities".

Cleaning: Provide final cleaning of the Work at the time indicated. Employ experienced workers or professional cleaners for final cleaning. Clean each surface or unit of work to the condition expected from a normal, commercial building cleaning and maintenance program. Comply with the manufacturer's instructions for operations.

Complete the following cleaning operations before requesting the Architect/Engineer's inspection for certification of substantial completion.

Remove labels, which are not required as permanent labels.

Clean transparent materials, including mirrors and glass in doors and windows, to a polished condition. Remove putty and other substances, which are noticeable as vision-obscuring materials. Replace chipped or broken glass and other damaged transparent materials.

Clean exposed exterior and interim hard-surfaced finishes to a dust-free condition, free of dust, stains, films and similar noticeable distracting substances. Restore reflective surfaces to their original reflective condition. Leave concrete floors broom clean. Vacuum carpeted surfaces.

Wipe surfaces of mechanical and electrical equipment clean. Remove excess lubrication and other substances. Clean plumbing fixtures to a sanitary condition. Clean light fixtures and lamps.

Clean the project site, including landscape development areas, of rubbish, litter and foreign substances. Sweep paved areas to a broom-clean condition; remove stains, spills, and other foreign deposits. Rake grounds that are neither paved nor planted, to a smooth, even-textured surface.

Removal of Protection: Except as otherwise indicated or requested by the Architect/Engineer, remove temporary protection devices and facilities which were installed during the course of the work to protect previously completed work during the remainder of the construction period.

Compliances: Comply with safety standards and governing regulations for cleaning operations. Do not burn waste materials at the site. Do not bury debris or excess materials on the Owner's property. Do not discharge volatile or other harmful or dangerous materials into drainage systems. Remove waste materials from the site and dispose of in a lawful manner.

Where extra materials of value remaining after completion of associated work have become the Owner's property, dispose of these to the Owner's best advantage as directed.

END OF SECTION 01 70 00

SECTION 01 71 10 - CLEANING

PART 1 - GENERAL

1.1 SUMMARY

- A. Provide all labor, materials, tools, fabrications, reinforcement, equipment and services for cleaning as specified herein and or as shown, detailed, scheduled, implied, required or otherwise indicated to provide a complete and proper installation.
- B. Completely coordinate with Work of all other trades.
- C. Although such Work is not specifically indicated, furnish and install all supplementary or miscellaneous items, appurtenances and devices incidental to or necessary for a sound, secure and complete installation.
- D. Related Work
  - 1. Division 00
  - 2. Division 01
  - 3. Contract Documents

1.2 QUALITY ASSURANCE

- A. Conduct daily inspection, and more often if necessary, to verify that requirements for cleanliness are being met.
- B. In addition to the standards described in this section, comply with pertinent requirements of governmental agencies having jurisdiction.

PART 2 - PRODUCTS

2.1 CLEANING MATERIALS AND EQUIPMENT

- A. Provide required personnel, equipment, and materials needed to maintain the specified standard of cleanliness.

2.2 COMPATIBILITY

- A. Use only the cleaning materials and equipment which are compatible with the surface being cleaned, as recommended by the manufacturer of the material.

PART 3 - EXECUTION

3.1 PROGRESS CLEANING

- A. General:
  - 1. Retain stored items in an orderly arrangement allowing maximum access, not impeding traffic or drainage, and providing required protection of materials.
  - 2. Do not allow accumulation of scrap, debris, waste materials, and other items not required for construction of this Work.

3. At least weekly, and more often if necessary, completely remove all scrap, debris and waste material. Remove such items to the place designated for their storage.
  4. Provide adequate storage for all items awaiting removal from the job site, observing requirements for fire protection and protection of the ecology.
- B. Site:
1. Daily, and more often if necessary, inspect the site and pick up all scrap, debris, and waste material. Remove such items to the place designated for their storage.
  2. Weekly, and more often if necessary, inspect all arrangements of materials stored on the site. Restack, tidy or otherwise service arrangements to meet the requirements above.
  3. Maintain the site in a neat and orderly condition at all times.
- C. Structures:
1. Weekly, and more often if necessary, inspect the structures and pick up all scrap, debris and waste material. Remove such items to the place designated for their storage.
  2. Weekly, and more often if necessary, sweep interior spaces clean.
    - a. "Clean", for the purpose of this subparagraph, shall be interpreted as meaning free from dust and other material capable of being removed by use of reasonable effort and a hand-held broom.
  3. As required preparatory to installation of succeeding materials, clean the structures or pertinent portions thereof to the degree of cleanliness recommended by the manufacturer of the succeeding material, using equipment and materials required to achieve the necessary cleanliness.
  4. Following the installation of finish floor materials, clean the finish floor daily (and more often if necessary) at all times while work is being performed in the space in which finish materials are installed.
    - a. "Clean", for the purpose of this subparagraph, shall be interpreted as meaning free from foreign material which, in the opinion of the Architect, may be injurious to the finish floor material.

### 3.2 CLEANING DURING OWNER'S OCCUPANCY

- A. Should the Owner occupy the Work or any portion thereof prior to final completion and acceptance by the Owner, the responsibilities for cleaning any and all occupied portions shall be borne by the Owner.
- B. Should the Owner be allowed to use any portion of the Work as storage only the Contractor shall maintain cleaning services.

END OF SECTION 01 71 10

**SECTION 01 74 19  
CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL**

**PART 1 GENERAL**

**1.01 WASTE MANAGEMENT REQUIREMENTS**

- A. Owner requires that this project generate the least amount of trash and waste possible.
- B. Employ processes that ensure the generation of as little waste as possible due to error, poor planning, breakage, mishandling, contamination, or other factors.
- C. Minimize trash/waste disposal in landfills; reuse, salvage, or recycle as much waste as economically feasible.
- D. Required Recycling, Salvage, and Reuse: The following may not be disposed of in landfills or by incineration:
  - 1. Aluminum and plastic beverage containers.
  - 2. Corrugated cardboard.
  - 3. Wood pallets.
  - 4. Clean dimensional wood.
  - 5. Land clearing debris, including brush, branches, logs, and stumps; see Section 31 10 00 - Site Clearing for use options.
  - 6. Concrete: May be crushed and used as riprap, aggregate, sub-base material, or fill.
  - 7. Bricks: May be used on project if whole, or crushed and used as landscape cover, sub-base material, or fill.
  - 8. Metals, including packaging banding, metal studs, sheet metal, structural steel, piping, reinforcing bars, door frames, and other items made of steel, iron, galvanized steel, stainless steel, aluminum, copper, zinc, lead, brass, and bronze.
  - 9. Glass.
  - 10. Gypsum drywall and plaster.
  - 11. Plastic buckets.
  - 12. Carpet, carpet cushion, carpet tile, and carpet remnants, both new and removed: DuPont (<http://flooring.dupont.com>) and Interface ([www.interfaceinc.com](http://www.interfaceinc.com)) conduct reclamation programs.
  - 13. Asphalt roofing shingles.
  - 14. Paint.
  - 15. Plastic sheeting.
  - 16. Rigid foam insulation.
  - 17. Windows, doors, and door hardware.
  - 18. Plumbing fixtures.
  - 19. Mechanical and electrical equipment.
  - 20. Acoustical ceiling tile and panels.
- E. The following recycling incentive programs are mandatory for this project; Contractor is responsible for implementation:
  - 1. : Revenue or savings shall accrue to Contractor.
  - 2. : Rebates and credits must be applied for by Owner and shall accrue to Owner.
- F. Contractor shall submit periodic Waste Disposal Reports; all landfill disposal, recycling, salvage, and reuse must be reported regardless of to whom the cost or savings accrues; use the same units of measure on all reports.
- G. Contractor shall develop and follow a Waste Management Plan designed to implement these requirements.
- H. The following sources may be useful in developing the Waste Management Plan:
- I. Methods of trash/waste disposal that are not acceptable are:
  - 1. Burning on the project site.
  - 2. Burying on the project site.
  - 3. Dumping or burying on other property, public or private.

4. Other illegal dumping or burying.
  5. Incineration, either on- or off-site.
- J. Regulatory Requirements: Contractor is responsible for knowing and complying with regulatory requirements, including but not limited to Federal, state and local requirements, pertaining to legal disposal of all construction and demolition waste materials.

## **1.02 RELATED REQUIREMENTS**

- A. Section 01 30 00 - Administrative Requirements: Additional requirements for project meetings, reports, submittal procedures, and project documentation.
- B. Section 01 35 66.13 - Sustainability Certification Project Procedures - Green Globes: Procedures for sustainable design documentation.
- C. Section 01 50 00 - Temporary Facilities and Controls: Additional requirements related to trash/waste collection and removal facilities and services.
- D. Section 01 60 00 - Product Requirements: Waste prevention requirements related to delivery, storage, and handling.
- E. Section 01 70 00 - Execution and Closeout Requirements: Trash/waste prevention procedures related to demolition, cutting and patching, installation, protection, and cleaning.
- F. Section 31 10 00 - Site Clearing: Handling and disposal of land clearing debris.

## **1.03 DEFINITIONS**

- A. Clean: Untreated and unpainted; not contaminated with oils, solvents, caulk, or the like.
- B. Construction and Demolition Waste: Solid wastes typically including building materials, packaging, trash, debris, and rubble resulting from construction, remodeling, repair and demolition operations.
- C. Hazardous: Exhibiting the characteristics of hazardous substances, i.e., ignitibility, corrosivity, toxicity or reactivity.
- D. Nonhazardous: Exhibiting none of the characteristics of hazardous substances, i.e., ignitibility, corrosivity, toxicity, or reactivity.
- E. Nontoxic: Neither immediately poisonous to humans nor poisonous after a long period of exposure.
- F. Recyclable: The ability of a product or material to be recovered at the end of its life cycle and remanufactured into a new product for reuse by others.
- G. Recycle: To remove a waste material from the project site to another site for remanufacture into a new product for reuse by others.
- H. Recycling: The process of sorting, cleansing, treating and reconstituting solid waste and other discarded materials for the purpose of using the altered form. Recycling does not include burning, incinerating, or thermally destroying waste.
- I. Return: To give back reusable items or unused products to vendors for credit.
- J. Reuse: To reuse a construction waste material in some manner on the project site.
- K. Salvage: To remove a waste material from the project site to another site for resale or reuse by others.
- L. Sediment: Soil and other debris that has been eroded and transported by storm or well production run-off water.
- M. Source Separation: The act of keeping different types of waste materials separate beginning from the first time they become waste.
- N. Toxic: Poisonous to humans either immediately or after a long period of exposure.
- O. Trash: Any product or material unable to be reused, returned, recycled, or salvaged.
- P. Waste: Extra material or material that has reached the end of its useful life in its intended use. Waste includes salvageable, returnable, recyclable, and reusable material.

#### 1.04 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Sustainable Design Submittals: Submit Waste Management Plan and Waste Disposal Reports in accordance with procedures specified in Section 01 35 66.13 - Sustainability Certification Project Procedures - Green Globes.
- C. Waste Management Plan: Include the following information:
  1. Analysis of the trash and waste projected to be generated during the entire project construction cycle, including types and quantities.
  2. Landfill Options: The name, address, and telephone number of the landfill(s) where trash/waste will be disposed of, the applicable landfill tipping fee(s), and the projected cost of disposing of all project trash/waste in the landfill(s).
  3. Landfill Alternatives: List all waste materials that will be diverted from landfills by reuse, salvage, or recycling.
  4. Meetings: Describe regular meetings to be held to address waste prevention, reduction, recycling, salvage, reuse, and disposal.
  5. Materials Handling Procedures: Describe the means by which materials to be diverted from landfills will be protected from contamination and prepared for acceptance by designated facilities; include separation procedures for recyclables, storage, and packaging.
  6. Transportation: Identify the destination and means of transportation of materials to be recycled; i.e. whether materials will be site-separated and self-hauled to designated centers, or whether mixed materials will be collected by a waste hauler.
  7. Recycling Incentives: Describe procedures required to obtain credits, rebates, or similar incentives.
- D. Waste Disposal Reports: Submit at specified intervals, with details of quantities of trash and waste, means of disposal or reuse, and costs; show both totals to date and since last report.
  1. Submit updated Report with each Application for Progress Payment; failure to submit Report will delay payment.
  2. Submit Report on a form acceptable to Owner.
  3. Landfill Disposal: Include the following information:
    - a. Identification of material.
    - b. Amount, in tons or cubic yards (cubic meters), of trash/waste material from the project disposed of in landfills.
    - c. State the identity of landfills, total amount of tipping fees paid to landfill, and total disposal cost.
    - d. Include manifests, weight tickets, receipts, and invoices as evidence of quantity and cost.
  4. Recycled and Salvaged Materials: Include the following information for each:
    - a. Identification of material, including those retrieved by installer for use on other projects.
    - b. Amount, in tons or cubic yards (cubic meters), date removed from the project site, and receiving party.
    - c. Transportation cost, amount paid or received for the material, and the net total cost or savings of salvage or recycling each material.
    - d. Include manifests, weight tickets, receipts, and invoices as evidence of quantity and cost.
    - e. Certification by receiving party that materials will not be disposed of in landfills or by incineration.
  5. Material Reused on Project: Include the following information for each:
    - a. Identification of material and how it was used in the project.
    - b. Amount, in tons or cubic yards (cubic meters).
    - c. Include weight tickets as evidence of quantity.
  6. Other Disposal Methods: Include information similar to that described above, as appropriate to disposal method.

- E. Recycling Incentive Programs:
  - 1. Where revenue accrues to Contractor, submit copies of documentation required to qualify for incentive.
  - 2. Where revenue accrues to Owner, submit any additional documentation required by Owner in addition to information provided in periodic Waste Disposal Report.

## **PART 2 PRODUCTS**

### **201 PRODUCT SUBSTITUTIONS**

- A. See Section 01 60 00 - Product Requirements for substitution submission procedures.
- B. For each proposed product substitution, submit the following information in addition to requirements specified in Section 01 60 00:
  - 1. Relative amount of waste produced, compared to specified product.
  - 2. Cost savings on waste disposal, compared to specified product, to be deducted from the Contract Price.
  - 3. Proposed disposal method for waste product.
  - 4. Markets for recycled waste product.

## **PART 3 EXECUTION**

### **301 WASTE MANAGEMENT PROCEDURES**

- A. See Section 01 30 00 for additional requirements for project meetings, reports, submittal procedures, and project documentation.
- B. See Section 01 50 00 for additional requirements related to trash/waste collection and removal facilities and services.
- C. See Section 01 60 00 for waste prevention requirements related to delivery, storage, and handling.
- D. See Section 01 70 00 for trash/waste prevention procedures related to demolition, cutting and patching, installation, protection, and cleaning.

### **302 WASTE MANAGEMENT PLAN IMPLEMENTATION**

- A. Manager: Designate an on-site person or persons responsible for instructing workers and overseeing and documenting results of the Waste Management Plan.
- B. Communication: Distribute copies of the Waste Management Plan to job site foreman, each subcontractor, Owner, and Architect.
- C. Instruction: Provide on-site instruction of appropriate separation, handling, and recycling, salvage, reuse, and return methods to be used by all parties at the appropriate stages of the project.
- D. Meetings: Discuss trash/waste management goals and issues at project meetings.
  - 1. Prebid meeting.
  - 2. Preconstruction meeting.
  - 3. Regular job-site meetings.
- E. Facilities: Provide specific facilities for separation and storage of materials for recycling, salvage, reuse, return, and trash disposal, for use by all contractors and installers.
  - 1. Provide containers as required.
  - 2. Provide adequate space for pick-up and delivery and convenience to subcontractors.
  - 3. Keep recycling and trash/waste bin areas neat and clean and clearly marked in order to avoid contamination of materials.
- F. Hazardous Wastes: Separate, store, and dispose of hazardous wastes according to applicable regulations.
- G. Recycling: Separate, store, protect, and handle at the site identified recyclable waste products in order to prevent contamination of materials and to maximize recyclability of identified materials. Arrange for timely pickups from the site or deliveries to recycling facility in order to prevent contamination of recyclable materials.

- H. Reuse of Materials On-Site: Set aside, sort, and protect separated products in preparation for reuse.
- I. Salvage: Set aside, sort, and protect products to be salvaged for reuse off-site.

**END OF SECTION 01 74 19**

**SECTION 02 41 00  
DEMOLITION**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Building demolition excluding removal of hazardous materials and toxic substances.
- B. Selective demolition of built site elements.
- C. Selective demolition of building elements for alteration purposes.
- D. Abandonment and removal of existing utilities and utility structures.

**1.02 RELATED REQUIREMENTS**

- A. Section 00 31 00 - Available Project Information: Existing building survey conducted by Owner; information about known hazardous materials.
- B. Section 01 10 00 - Summary: Limitations on Contractor's use of site and premises.
- C. Section 01 10 00 - Summary: Sequencing and staging requirements.
- D. Section 01 10 00 - Summary: Description of items to be removed by Owner.
- E. Section 01 10 00 - Summary: Description of items to be salvaged or removed for re-use by Contractor.
- F. Section 01 50 00 - Temporary Facilities and Controls: Site fences, security, protective barriers, and waste removal.
- G. Section 01 57 13 - Temporary Erosion and Sediment Control.
- H. Section 01 60 00 - Product Requirements: Handling and storage of items removed for salvage and relocation.
- I. Section 01 70 00 - Execution and Closeout Requirements: Project conditions; protection of bench marks, survey control points, and existing construction to remain; reinstallation of removed products; temporary bracing and shoring.
- J. Section 01 74 19 - Construction Waste Management and Disposal: Limitations on disposal of removed materials; requirements for recycling.
- K. Section 02 65 00 - Underground Storage Tank Removal.
- L. Section 07 01 50.19 - Preparation for Re-Roofing: Removal of existing roofing, roof insulation, flashing, trim, and accessories.
- M. Section 31 10 00 - Site Clearing: Vegetation and existing debris removal.
- N. Section 31 22 00 - Grading: Topsoil removal.
- O. Section 31 22 00 - Grading: Fill material for filling holes, pits, and excavations generated as a result of removal operations.
- P. Section 31 23 23 - Fill: Fill material for filling holes, pits, and excavations generated as a result of removal operations.
- Q. Section 31 23 23 - Fill: Filling holes, pits, and excavations generated as a result of removal operations.
- R. Section 32 93 00 - Plants: Relocation of existing trees, shrubs, and other plants.
- S. Section 32 93 00 - Plants: Pruning of existing trees to remain.

**1.03 REFERENCE STANDARDS**

- A. 29 CFR 1926 - Safety and Health Regulations for Construction Current Edition.
- B. NFPA 241 - Standard for Safeguarding Construction, Alteration, and Demolition Operations 2022, with Errata (2021).

**1.04 SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

- B. Site Plan: Showing:
  - 1. Vegetation to be protected.
  - 2. Areas for temporary construction and field offices.
  - 3. Areas for temporary and permanent placement of removed materials.
- C. Demolition Plan: Submit demolition plan as specified by OSHA and local authorities.
  - 1. Indicate extent of demolition, removal sequence, bracing and shoring, and location and construction of barricades and fences.
  - 2. Identify demolition firm and submit qualifications.
  - 3. Include a summary of safety procedures.
- D. Project Record Documents: Accurately record actual locations of capped and active utilities and subsurface construction.

#### **1.05 QUALITY ASSURANCE**

- A. Demolition Firm Qualifications: Company specializing in the type of work required.

### **PART 2 PRODUCTS**

#### **201 MATERIALS**

- A. Fill Material: As specified in Section 31 23 23 - Fill.

### **PART 3 EXECUTION**

#### **301 SCOPE**

- A. Remove the entire buildings indicated on drawings
- B. Remove paving and curbs as required to accomplish new work.
- C. Remove all other paving and curbs within site boundaries.
- D. Break up paving within site boundaries to permit natural moisture drainage; leave pieces not larger than 1 square yard (1 square meter).
- E. Within area of new construction, remove foundation walls and footings to a minimum of 2 feet (600 mm) below finished grade.
- F. Outside area of new construction, remove foundation walls and footings to a minimum of 2 feet (600 mm) below finished grade.
- G. Remove concrete slabs on grade within site boundaries.
- H. Break up concrete slabs on grade within site boundaries to permit natural moisture drainage; leave pieces not larger than 1 square yard (1 square meter).
- I. Remove underground tanks.
- J. Remove underground tanks that contain or once contained petroleum products; fill and bury other types of tanks.
- K. Remove fences and gates.
- L. Remove creosote-treated wood utility poles.
- M. Remove other items indicated.

#### **302 GENERAL PROCEDURES AND PROJECT CONDITIONS**

- A. Comply with applicable codes and regulations for demolition operations and safety of adjacent structures and the public.
  - 1. Obtain required permits.
  - 2. Take precautions to prevent catastrophic or uncontrolled collapse of structures to be removed; do not allow worker or public access within range of potential collapse of unstable structures.
  - 3. Provide, erect, and maintain temporary barriers and security devices.
  - 4. Conduct operations to minimize effects on and interference with adjacent structures and occupants.
  - 5. Do not close or obstruct roadways or sidewalks without permit.

6. Conduct operations to minimize obstruction of public and private entrances and exits; do not obstruct required exits at any time; protect persons using entrances and exits from removal operations.
  7. Obtain written permission from owners of adjacent properties when demolition equipment will traverse, infringe upon or limit access to their property.
- B. Do not begin removal until receipt of notification to proceed from Owner.
  - C. Protect existing structures and other elements that are not to be removed.
    1. Provide bracing and shoring.
    2. Prevent movement or settlement of adjacent structures.
    3. Stop work immediately if adjacent structures appear to be in danger.
  - D. Perform demolition in a manner that maximizes salvage and recycling of materials.
    1. Dismantle existing construction and separate materials.
    2. Set aside reusable, recyclable, and salvageable materials; store and deliver to collection point or point of reuse.
  - E. Partial Removal of Paving and Curbs: Neatly saw cut at right angle to surface.
  - F. Underground Storage Tanks: Remove and dispose of as specified in Section 02 65 00.

### **3.03 EXISTING UTILITIES**

- A. Coordinate work with utility companies; notify before starting work and comply with their requirements; obtain required permits.
- B. Protect existing utilities to remain from damage.
- C. Do not disrupt public utilities without permit from authority having jurisdiction.
- D. Do not close, shut off, or disrupt existing life safety systems that are in use without at least 7 days prior written notification to Owner.
- E. Do not close, shut off, or disrupt existing utility branches or take-offs that are in use without at least 3 days prior written notification to Owner.
- F. Locate and mark utilities to remain; mark using highly visible tags or flags, with identification of utility type; protect from damage due to subsequent construction, using substantial barricades if necessary.
- G. Remove exposed piping, valves, meters, equipment, supports, and foundations of disconnected and abandoned utilities.

### **3.04 SELECTIVE DEMOLITION FOR ALTERATIONS**

- A. Drawings showing existing construction and utilities are based on casual field observation and existing record documents only.
  1. Verify that construction and utility arrangements are as indicated.
  2. Report discrepancies to Architect before disturbing existing installation.
  3. Beginning of demolition work constitutes acceptance of existing conditions that would be apparent upon examination prior to starting demolition.
- B. Remove existing work as indicated and as required to accomplish new work.
  1. Remove items indicated on drawings.
- C. Services (Including but not limited to: Remove existing systems and equipment as indicated).
  1. Maintain existing active systems that are to remain in operation; maintain access to equipment and operational components.
  2. Where existing active systems serve occupied facilities but are to be replaced with new services, maintain existing systems in service until new systems are complete and ready for service.
  3. Verify that abandoned services serve only abandoned facilities before removal.
  4. Remove abandoned pipe, ducts, conduits, and equipment, including those above accessible ceilings; remove back to source of supply where possible, otherwise cap stub and tag with identification.

- D. Protect existing work to remain.
  - 1. Prevent movement of structure; provide shoring and bracing if necessary.
  - 2. Perform cutting to accomplish removals neatly and as specified for cutting new work.
  - 3. Repair adjacent construction and finishes damaged during removal work.
  - 4. Patch as specified for patching new work.

**305 DEBRIS AND WASTE REMOVAL**

- A. Remove debris, junk, and trash from site.
- B. Remove from site all materials not to be reused on site.
- C. Leave site in clean condition, ready for subsequent work.
- D. Clean up spillage and wind-blown debris from public and private lands.

**END OF SECTION 02 41 00**

**SECTION 03 05 16  
UNDERSLAB VAPOR BARRIER**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Sheet vapor barrier under concrete slabs on grade.

**1.02 RELATED REQUIREMENTS**

- A. Section 03 30 00 - Cast-in-Place Concrete: Preparation of subgrade, granular fill, placement of concrete.

**1.03 REFERENCE STANDARDS**

- A. ASTM E1643 - Standard Practice for Selection, Design, Installation and Inspection of Water Vapor Retarders Used in Contact with Earth or Granular Fill Under Concrete Slabs 2018a.
- B. ASTM E1745 - Standard Specification for Plastic Water Vapor Retarders Used in Contact with Soil or Granular Fill Under Concrete Slabs 2017.

**1.04 SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Submit manufacturers' data on manufactured products.
- C. Test Data: Submit report of tests showing compliance with specified requirements.
- D. Samples: Submit samples of underslab vapor barrier to be used.
- E. Manufacturer's Installation Instructions: Indicate installation procedures and interface required with adjacent construction.

**PART 2 PRODUCTS**

**2.01 MATERIALS**

- A. Underslab Vapor Barrier:
  - 1. Water Vapor Permeance: Not more than 0.010 perms (0.6 ng/(s m<sup>2</sup> Pa)), maximum.
  - 2. Complying with ASTM E1745 Class A.
  - 3. Thickness: 6 mil
  - 4. Subject to compliance with Requirements provide one of the following:
    - a. Stego Industries LLC; Stego Wrap Vapor Barrier (6-mil):
    - b. Reef Industries, "Griffolyn", Vapor Barrier (6-mil.)
    - c. Substitutions: See Section 01 60 00 - Product Requirements.
- B. Accessory Products: Vapor barrier manufacturer's recommended tape, adhesive, mastic, etc., for sealing seams and penetrations in vapor barrier.

**PART 3 EXECUTION**

**3.01 EXAMINATION**

- A. Verify that surface over which vapor barrier is to be installed is complete and ready before proceeding with installation of vapor barrier.

**3.02 INSTALLATION**

- A. Install vapor barrier in accordance with manufacturer's instructions and ASTM E1643.
- B. Install vapor barrier under interior slabs on grade; lap sheet over footings and seal to foundation walls.
- C. Lap joints minimum 6 inches (150 mm).
- D. Seal joints, seams and penetrations watertight with manufacturer's recommended products and follow manufacturer's written instructions.
- E. No penetration of vapor barrier is allowed except for reinforcing steel and permanent utilities.
- F. Repair damaged vapor retarder before covering with other materials.

**END OF SECTION 03 05 16**

**SECTION 03 10 00  
CONCRETE FORMING AND ACCESSORIES**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Formwork for cast-in place concrete, with shoring, bracing and anchorage.
- B. Openings for other work.
- C. Form accessories.
- D. Form stripping.

**1.02 RELATED REQUIREMENTS**

- A. Section 03 30 00 - Cast-in-Place Concrete.
- B. Section 04 20 00 - Unit Masonry: Reinforcement for masonry.
- C. Section 04 26 13 - Masonry Veneer: Spacing for veneer anchor reglets recessed in concrete.
- D. Section 05 12 00 - Structural Steel Framing: Placement of embedded steel anchors and plates in cast-in-place concrete.
- E. Section 05 21 00 - Steel Joist Framing: Placement of embedded steel anchors, plates and joist seats in cast-in-place concrete.
- F. Section 05 31 00 - Steel Decking: Placement of steel anchors in composite decking.

**1.03 REFERENCE STANDARDS**

- A. ACI 117 - Specification for Tolerances for Concrete Construction and Materials 2010 (Reapproved 2015).
- B. ACI 301 - Specifications for Concrete Construction 2020.
- C. ACI 347R - Guide to Formwork for Concrete 2014 (Reapproved 2021).
- D. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process 2020.
- E. ASTM C578 - Standard Specification for Rigid, Cellular Polystyrene Thermal Insulation 2019.
- F. COE CRD-C 572 - Handbook for Concrete and Cement Corps of Engineers Specifications for Polyvinylchloride Waterstop 1974.
- G. NSF 372 - Drinking Water System Components - Lead Content 2022.
- H. NSF 61 - Drinking Water System Components - Health Effects 2021.

**1.04 SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Samples: Submit two, 12 inch (305 mm) long samples of waterstops and construction joint devices.

**1.05 QUALITY ASSURANCE**

**PART 2 PRODUCTS**

**201 FORMWORK - GENERAL**

- A. Provide concrete forms, accessories, shoring, and bracing as required to accomplish cast-in-place concrete work.
- B. Design and construct concrete that complies with design with respect to shape, lines, and dimensions.
- C. Comply with applicable state and local codes with respect to design, fabrication, erection, and removal of formwork.

## **202 WOOD FORM MATERIALS**

- A. Plywood: Douglas Fir species; solid one side grade; sound undamaged sheets with clean, true edges.

## **203 FORMWORK ACCESSORIES**

- A. Form Ties: Removable type, galvanized metal, fixed length, cone type, with waterproofing washer, free of defects that could leave holes larger than 1 inch (25 mm) in concrete surface.
- B. Form Release Agent: Capable of releasing forms from hardened concrete without staining or discoloring concrete or forming bugholes and other surface defects, compatible with concrete and form materials, and not requiring removal for satisfactory bonding of coatings to be applied.
  - 1. Composition: Colorless, reactive, water-based or solvent-based compound.
  - 2. Do not use materials containing diesel oil or petroleum-based compounds.
  - 3. VOC Content: In compliance with applicable local, State, and federal regulations.
  - 4. Products:
    - a. Nox-Crete Inc; Quick Release Series: [www.nox-crete.com/#sle](http://www.nox-crete.com/#sle).
    - b. W. R. Meadows, Inc; Duogard II (water-based): [www.wrmeadows.com/#sle](http://www.wrmeadows.com/#sle).
    - c. W. R. Meadows, Inc; Duogard NE: [www.wrmeadows.com/#sle](http://www.wrmeadows.com/#sle).
- C. Dowel Sleeves: Plastic sleeve and nailable plastic base for smooth, round, steel load-transfer dowels.
  - 1. Products:
    - a. BoMetals, Inc: [www.bometals.com/#sle](http://www.bometals.com/#sle).
    - b. Substitutions: See Section 01 60 00 - Product Requirements.
- D. Dovetail Anchor Slot: Galvanized steel, at least 22 gauge, 0.0299 inch (0.76 mm) thick, foam filled, release tape sealed slots, anchors for securing to concrete formwork.
- E. Waterstops: Bentonite and butyl rubber, complying with NSF 61 and NSF 372.
  - 1. Configuration: As indicated on drawings.
  - 2. Size: As indicated on drawings.

## **PART 3 EXECUTION**

### **301 EXAMINATION**

- A. Verify lines, levels and centers before proceeding with formwork. Ensure that dimensions agree with drawings.

### **302 EARTH FORMS**

- A. Earth forms are not permitted.

### **303 ERECTION - FORMWORK**

- A. Erect formwork, shoring and bracing to achieve design requirements, in accordance with requirements of ACI 301.
- B. Provide bracing to ensure stability of formwork. Shore or strengthen formwork subject to overstressing by construction loads.

### **304 APPLICATION - FORM RELEASE AGENT**

- A. Apply form release agent on formwork in accordance with manufacturer's recommendations.

### **305 INSERTS, EMBEDDED PARTS, AND OPENINGS**

- A. Provide formed openings where required for items to be embedded in passing through concrete work.
- B. Position recessed anchor slots for brick veneer masonry anchors to spacing and intervals specified in Section 04 26 13.

### **306 FORM REMOVAL**

- A. Do not remove forms or bracing until concrete has gained sufficient strength to carry its own weight and imposed loads.

- B. Loosen forms carefully. Do not wedge pry bars, hammers, or tools against finish concrete surfaces scheduled for exposure to view.

**END OF SECTION 03 10 00**

**SECTION 03 20 00  
CONCRETE REINFORCING**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

**1.02 RELATED REQUIREMENTS**

- A. Section 03 10 00 - Concrete Forming and Accessories.
- B. Section 03 30 00 - Cast-in-Place Concrete.
- C. Section 04 20 00 - Unit Masonry: Reinforcement for masonry.

**1.03 REFERENCE STANDARDS**

- A. ACI 318 - Building Code Requirements for Structural Concrete 2019, with Errata (2021).
- B. ACI SP-66 - ACI Detailing Manual 2004.
- C. ASTM A184/A184M - Standard Specification for Welded Deformed Steel Bar Mats for Concrete Reinforcement 2019.
- D. ASTM A615/A615M - Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement 2022.
- E. ASTM A704/A704M - Standard Specification for Welded Steel Plain Bar or Rod Mats for Concrete Reinforcement 2019, with Editorial Revision.
- F. ASTM A706/A706M - Standard Specification for Deformed and Plain Low-Alloy Steel Bars for Concrete Reinforcement 2022.
- G. ASTM A767/A767M - Standard Specification for Zinc-Coated (Galvanized) Steel Bars for Concrete Reinforcement 2019.
- H. ASTM A996/A996M - Standard Specification for Rail-Steel and Axle-Steel Deformed Bars for Concrete Reinforcement 2016.
- I. ASTM A1064/A1064M - Standard Specification for Carbon-Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete 2018a.

**1.04 SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Shop Drawings: Comply with requirements of ACI SP-66. Include bar schedules, shapes of bent bars, spacing of bars, and location of splices.
  - 1. Prepare shop drawings under seal of a Professional Structural Engineer experienced in design of work of this type and licensed in the State in which the Project is located.
- C. Manufacturer's Certificate: Certify that reinforcing steel and accessories supplied for this project meet or exceed specified requirements.

**1.05 QUALITY ASSURANCE**

**PART 2 PRODUCTS**

**2.01 MANUFACTURERS**

**2.02 REINFORCEMENT**

- A. Reinforcing Steel: ASTM A615/A615M, Grade 60 (60,000 psi) (420 MPa).
  - 1. Galvanized in accordance with ASTM A767/A767M, Class I.
- B. Reinforcing Steel: ASTM A706/A706M, deformed low-alloy steel bars.
- C. Reinforcing Steel: Deformed bars, ASTM A996/A996M Grade 40 (280), Type A.
  - 1. Galvanized in accordance with ASTM A767/A767M, Class I.
- D. Reinforcing Steel Mat: ASTM A704/A704M, using ASTM A615/A615M, Grade 40 (40,000 psi) (280 MPa) steel bars or rods, unfinished.
- E. Stirrup Steel: ASTM A1064/A1064M steel wire, unfinished.

- F. Reinforcement Accessories:
1. Tie Wire: Annealed, minimum 16 gauge, 0.0508 inch (1.29 mm).
  2. Chairs, Bolsters, Bar Supports, Spacers: Sized and shaped for adequate support of reinforcement during concrete placement.
  3. Provide stainless steel components for placement within 1-1/2 inches (38 mm) of weathering surfaces.

**203 RE-BAR SPLICING:**

- A. Dowel Bar Splicer with Dowel-Ins: Mechanical devices for connecting dowels; capable of developing full steel reinforcing design strength in tension and compression.

**204 FABRICATION**

- A. Welding of reinforcement is not permitted.

**PART 3 EXECUTION**

**301 PLACEMENT**

- A. Place, support and secure reinforcement against displacement. Do not deviate from required position.
- B. Do not displace or damage vapor barrier.
- C. Comply with applicable code for concrete cover over reinforcement.
- D. Bond and ground all reinforcement to requirements of Section 26 05 26.

**302 FIELD QUALITY CONTROL**

- A. An independent testing agency, as specified in Section 01 40 00 - Quality Requirements, will inspect installed reinforcement for compliance with contract documents before concrete placement.

**END OF SECTION 03 20 00**

**SECTION 03 30 00  
CAST-IN-PLACE CONCRETE**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Concrete formwork.
- B. Concrete for composite floor construction.
- C. Floors and slabs on grade.
- D. Concrete reinforcement.
- E. Joint devices associated with concrete work.
- F. Miscellaneous concrete elements, including equipment pads, equipment pits, light pole bases, flagpole bases, thrust blocks, and manholes.
- G. Concrete curing.

**1.02 RELATED REQUIREMENTS**

- A. Section 03 10 00 - Concrete Forming and Accessories: Forms and accessories for formwork.
- B. Section 03 20 00 - Concrete Reinforcing.
- C. Section 03 35 11 - Concrete Floor Finishes: Densifiers, hardeners, applied coatings, and polishing.
- D. Section 07 92 00 - Joint Sealants: Products and installation for sealants and joint fillers for saw cut joints and isolation joints in slabs.
- E. Section 07 95 13 - Expansion Joint Cover Assemblies.
- F. Section 31 31 16 - Termite Control: Field-applied termiticide and mildewcide for concrete surfaces.

**1.03 REFERENCE STANDARDS**

- A. ACI 117 - Specification for Tolerances for Concrete Construction and Materials 2010 (Reapproved 2015).
- B. ACI 211.1 - Standard Practice for Selecting Proportions for Normal, Heavyweight, and Mass Concrete 1991 (Reapproved 2009).
- C. ACI 211.2 - Standard Practice for Selecting Proportions for Structural Lightweight Concrete 1998 (Reapproved 2004).
- D. ACI 301 - Specifications for Concrete Construction 2020.
- E. ACI 302.1R - Guide to Concrete Floor and Slab Construction 2015.
- F. ACI 304R - Guide for Measuring, Mixing, Transporting, and Placing Concrete 2000 (Reapproved 2009).
- G. ACI 308R - Guide to External Curing of Concrete 2016.
- H. ACI 318 - Building Code Requirements for Structural Concrete 2019, with Errata (2021).
- I. ACI 347R - Guide to Formwork for Concrete 2014 (Reapproved 2021).
- J. ASTM A767/A767M - Standard Specification for Zinc-Coated (Galvanized) Steel Bars for Concrete Reinforcement 2019.
- K. ASTM A1064/A1064M - Standard Specification for Carbon-Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete 2018a.
- L. ASTM C33/C33M - Standard Specification for Concrete Aggregates 2018.
- M. ASTM C39/C39M - Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens 2021.
- N. ASTM C94/C94M - Standard Specification for Ready-Mixed Concrete 2022.

- O. ASTM C109/C109M - Standard Test Method for Compressive Strength of Hydraulic Cement Mortars (Using 2-in. or [50 mm] Cube Specimens) 2021.
- P. ASTM C143/C143M - Standard Test Method for Slump of Hydraulic-Cement Concrete 2020.
- Q. ASTM C260/C260M - Standard Specification for Air-Entraining Admixtures for Concrete 2010a (Reapproved 2016).
- R. ASTM C330/C330M - Standard Specification for Lightweight Aggregates for Structural Concrete 2017a.
- S. ASTM C494/C494M - Standard Specification for Chemical Admixtures for Concrete 2019.
- T. ASTM C618 - Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use in Concrete 2019.
- U. ASTM C685/C685M - Standard Specification for Concrete Made by Volumetric Batching and Continuous Mixing 2017.
- V. ASTM C827/C827M - Standard Test Method for Change in Height at Early Ages of Cylindrical Specimens of Cementitious Mixtures 2016.
- W. ASTM C1059/C1059M - Standard Specification for Latex Agents for Bonding Fresh to Hardened Concrete 2021.
- X. ASTM C1107/C1107M - Standard Specification for Packaged Dry, Hydraulic-Cement Grout (Nonshrink) 2020.
- Y. ASTM C1240 - Standard Specification for Silica Fume Used in Cementitious Mixtures 2020.
- Z. ASTM C1602/C1602M - Standard Specification for Mixing Water Used in the Production of Hydraulic Cement Concrete 2018.
- AA. ASTM C1708/C1708M - Standard Test Methods for Self-leveling Mortars Containing Hydraulic Cements 2019.
- BB. ASTM D471 - Standard Test Method for Rubber Property--Effect of Liquids 2016a (Reapproved 2021).
- CC. ASTM E1155 - Standard Test Method for Determining FF Floor Flatness and FL Floor Levelness Numbers 2020.
- DD. ASTM E1155M - Standard Test Method for Determining FF Floor Flatness and FL Floor Levelness Numbers (Metric) 2014.
- EE. ASTM E1643 - Standard Practice for Selection, Design, Installation and Inspection of Water Vapor Retarders Used in Contact with Earth or Granular Fill Under Concrete Slabs 2018a.
- FF. ASTM E1745 - Standard Specification for Plastic Water Vapor Retarders Used in Contact with Soil or Granular Fill Under Concrete Slabs 2017.
- GG. ASTM E1993/E1993M - Standard Specification for Bituminous Water Vapor Retarders Used in Contact with Soil or Granular Fill Under Concrete Slabs 1998 (Reapproved 2020).
- HH. COE CRD-C 572 - Handbook for Concrete and Cement Corps of Engineers Specifications for Polyvinylchloride Waterstop 1974.
- II. ICRI 310.2R - Selecting and Specifying Concrete Surface Preparation for Sealers, Coatings, Polymer Overlays, and Concrete Repair 2013.

#### **1.04 SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Submit manufacturers' data on manufactured products showing compliance with specified requirements and installation instructions.
  - 1. For curing compounds, provide data on method of removal in the event of incompatibility with floor covering adhesives.
  - 2. For chemical-resistant waterstops, provide data on ASTM D471 test results.
- C. Mix Design: Submit proposed concrete mix design.

1. Indicate proposed mix design complies with requirements of ACI 301, Section 4 - Concrete Mixtures.
  2. Indicate proposed mix design complies with requirements of ACI 318, Chapter 26- Concrete Quality, Mixing and Placing.
- D. Samples: Submit samples of underslab vapor retarder to be used.
- E. Samples: Submit two, 12 inch (305 mm) long samples of waterstops and construction joint devices.
- F. Test Reports: Submit report for each test or series of tests specified.
- G. Test Reports: Submit termite-resistant sheet manufacturer's summary of independent laboratory and field testing for effectiveness in subterranean termite exclusion.
- H. Manufacturer's Installation Instructions: For concrete accessories, indicate installation procedures and interface required with adjacent construction.
- I. Sustainable Design Submittals: If any wood or wood-based form materials, including supports, are permanently installed in the project, submit documentation required for sustainably harvested wood as specified in Section 01 60 00 - Product Requirements.
- J. Sustainable Design Submittal: If any fly ash, ground granulated blast furnace slag, silica fume, rice hull ash, or other waste material is used in mix designs to replace Portland cement, submit the total volume of concrete cast in place, mix design(s) used showing the quantity of portland cement replaced, reports showing successful cylinder testing, and temperature on day of pour if cold weather mix is used.
- K. Project Record Documents: Accurately record actual locations of embedded utilities and components that will be concealed from view upon completion of concrete work.
- L. Warranty: Submit manufacturer warranty and ensure forms have been completed in Owner's name and registered with manufacturer.

#### **1.05 QUALITY ASSURANCE**

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

#### **1.06 WARRANTY**

- A. See Section 01 78 00 - Closeout Submittals, for additional warranty requirements.
- B. Slabs with Moisture Vapor Reducing Admixture (MVRA): Provide warranty to cover cost of flooring failures due to moisture migration from slabs for ten years.
1. Include cost of repair or removal of failed flooring, placement of topical moisture remediation system, and replacement of flooring with comparable flooring system.
- C. Moisture Emission-Reducing Curing and Sealing Compound, Membrane-Forming: Provide warranty to cover cost of flooring delamination failures for 10 years.
1. Include cost of repair or removal of failed flooring, remediation with a moisture vapor impermeable surface coating, and replacement of flooring with comparable flooring system.

### **PART 2 PRODUCTS**

#### **201 FORMWORK**

- A. Comply with requirements of Section 03 10 00.
- B. Formwork Design and Construction: Comply with guidelines of ACI 347R to provide formwork that will produce concrete complying with tolerances of ACI 117.
- C. Form Materials: Contractor's choice of standard products with sufficient strength to withstand hydrostatic head without distortion in excess of permitted tolerances.
1. Form Facing for Exposed Finish Concrete: Contractor's choice of materials that will provide smooth, stain-free final appearance.
  2. Form Facing for Exposed Finish Concrete: Steel.
  3. Form Ties: Cone snap type that will leave no metal within 1-1/2 inches (38 mm) of concrete surface.

## 202 REINFORCEMENT MATERIALS

- A. Comply with requirements of Section 03 20 00.
- B. Reinforcing Steel: ASTM A615/A615M, Grade 60 (60,000 psi) (420 MPa).
  - 1. Type: Deformed billet-steel bars.
  - 2. Finish: Unfinished, unless otherwise indicated.
  - 3. Finish: Galvanized in accordance with ASTM A767/A767M, Class I, unless otherwise indicated.
- C. Steel Welded Wire Reinforcement (WWR): Galvanized, plain type, ASTM A1064/A1064M.
- D. Reinforcement Accessories:
  - 1. Tie Wire: Annealed, minimum 16 gauge, 0.0508 inch (1.29 mm).
  - 2. Chairs, Bolsters, Bar Supports, Spacers: Sized and shaped for adequate support of reinforcement during concrete placement.
  - 3. Provide stainless steel, galvanized, plastic, or plastic coated steel components for placement within 1-1/2 inches (38 mm) of weathering surfaces.

## 203 CONCRETE MATERIALS

- A. Cement: ASTM C150/C150M, Type I - Normal Portland type.
  - 1. Acquire cement for entire project from same source.
- B. Fine and Coarse Aggregates: ASTM C33/C33M.
  - 1. Acquire aggregates for entire project from same source.
- C. Lightweight Aggregate: ASTM C330/C330M.
- D. Calcined Pozzolan: ASTM C618, Class N.
- E. Silica Fume: ASTM C1240, proportioned in accordance with ACI 211.1.
- F. Water: ASTM C1602/C1602M; clean, potable, and not detrimental to concrete.

## 204 ADMIXTURES

- A. Chemical Admixture:
  - 1. Manufacturers:
- B. Do not use chemicals that will result in soluble chloride ions in excess of 0.1 percent by weight of cement.
- C. Air Entrainment Admixture: ASTM C260/C260M.
  - 1. Manufacturers:
    - a. Darex by Grace.
    - b. Sika Aer by Sika Chemical Co. .
- D. High Range Water Reducing Admixture: ASTM C494/C494M Type F.
  - 1. Manufacturers:
    - a. Euclid Chemical Company; PLASTOL 6420: [www.euclidchemical.com/#sle](http://www.euclidchemical.com/#sle).

## 205 ACCESSORY MATERIALS

- A. Underslab Vapor Retarder.
  - 1. Sheet Material: ASTM E1745, Class A; stated by manufacturer as suitable for installation in contact with soil or granular fill under concrete slabs. Single ply polyethylene is prohibited. **See Section 03 05 16 Stego Vapor Barrier.**
  - 2. Accessory Products: Vapor retarder manufacturer's recommended tape, adhesive, mastic, prefabricated boots, etc., for sealing seams and penetrations.
- B. Non-Shrink Cementitious Grout: Premixed compound consisting of non-metallic aggregate, cement, water reducing and plasticizing agents.
  - 1. Grout: Comply with ASTM C1107/C1107M.
  - 2. Height Change, Plastic State; when tested in accordance with ASTM C827/C827M:
    - a. Maximum: Plus 4 percent.
    - b. Minimum: Plus 1 percent.

3. Minimum Compressive Strength at 48 Hours, ASTM C109/C109M: 2,000 pounds per square inch (13.7 MPa).
4. Minimum Compressive Strength at 28 Days, ASTM C109/C109M: 7,000 pounds per square inch (48 MPa).
5. Low-Slump, Dry Pack Products:
  - a. Euclid Chemical Company; DRY PACK GROUT: [www.euclidchemical.com/#sle](http://www.euclidchemical.com/#sle).
  - b. L&M Construction Chemicals, Inc, a subsidiary of Laticrete International, Inc; Duragrout: [www.lmcc.com/#sle](http://www.lmcc.com/#sle).
  - c. W. R. Meadows, Inc; PAC-IT: [www.wrmeadows.com/#sle](http://www.wrmeadows.com/#sle).
- C. Non-Shrink Epoxy Grout: Moisture-insensitive, two-part; consisting of epoxy resin, non-metallic aggregate, and activator.
  1. Composition: High solids content material exhibiting positive expansion when tested in accordance with ASTM C827/C827M.
    - a. Maximum Height Change: Plus 4 percent.
    - b. Minimum Height Change: Plus 1 percent.
- D. Heavy Duty, Abrasion-Resistant Concrete Floor Topping:
  1. See Section 09 91 00 Interior Painting "Concrete Floor at work bays".
- E. Self-Leveling Cementitious Concrete Floor Topping:
  1. Minimum Compressive Strength at 28 Days, ASTM C1708/C1708M: 7,000 pounds per square inch (48 MPa).
  2. Manufacturers:
    - a. LATICRETE International, Inc; LATICRETE SUPERCAP SC650-MC: [www.laticrete.com/#sle](http://www.laticrete.com/#sle).
- F. Non-Shrink Epoxy Chocking Compound:
  1. Manufacturers:
    - a. Kaufman Products Inc; K Pro HP Grout: [www.kaufmanproducts.net/#sle](http://www.kaufmanproducts.net/#sle).

## **206 BONDING AND JOINTING PRODUCTS**

- A. Latex Bonding Agent: Non-redispersable acrylic latex, complying with ASTM C1059/C1059M, Type II.
  1. Manufacturers:
    - a. Euclid Chemical Company; AKKRO-7T: [www.euclidchemical.com/#sle](http://www.euclidchemical.com/#sle).
    - b. Kaufman Products Inc; SureBond: [www.kaufmanproducts.net/#sle](http://www.kaufmanproducts.net/#sle).
    - c. W. R. Meadows, Inc; ACRY-LOK-: [www.wrmeadows.com/#sle](http://www.wrmeadows.com/#sle).
- B. Waterstops: Synthetic rubber; swells to 1000 percent of original size in clean water.
  1. Manufacturers:
    - a. Kryton International, Inc; Krytonite Swelling Waterstop: [www.kryton.com/#sle](http://www.kryton.com/#sle).
- C. Reglets: Formed steel sheet, galvanized, with temporary filler to prevent concrete intrusion during placement.
  1. Size: As indicated on drawings.
- D. Slab Isolation Joint Filler: 1/2 inch (13 mm) thick, height equal to slab thickness, with removable top section that will form 1/2 inch (13 mm) deep sealant pocket after removal.
  1. Material: Closed-cell, non-absorbent, compressible polymer foam in sheet form.
  2. Manufacturers:
    - a. Nomaco, Inc; Nomaflex Expansion Joint Filler with Void CapOption: [www.nomaco.com/#sle](http://www.nomaco.com/#sle).
    - b. W. R. Meadows, Inc; Deck-O-Foam Joint Filler with pre-scored top strip: [www.wrmeadows.com/#sle](http://www.wrmeadows.com/#sle).
    - c. W. R. Meadows, Inc; Ceramar Joint Filler with Snap-Cap: [www.wrmeadows.com/#sle](http://www.wrmeadows.com/#sle).
- E. Slab Contraction Joint Device: Preformed linear strip intended for pressing into wet concrete to provide straight route for shrinkage cracking.

- F. Slab Construction Joint Devices: Combination keyed joint form and screed, galvanized steel, with rectangular or round knockout holes for conduit or rebar to pass through joint form at 6 inches (150 mm) on center; ribbed steel stakes for setting.

### **207 CURING MATERIALS**

- A. Evaporation Reducer: Liquid thin-film-forming compound that reduces rapid moisture loss caused by high temperature, low humidity, and high winds; intended for application immediately after concrete placement.
  - 1. Manufacturers:
    - a. Euclid Chemical Company ; EUCOBAR: [www.euclidchemical.com/#sle](http://www.euclidchemical.com/#sle).
    - b. W. R. Meadows, Inc ; Evapre or Evapre-RTU: [www.wrmeadows.com/#sle](http://www.wrmeadows.com/#sle).

### **208 CONCRETE MIX DESIGN**

- A. Proportioning Normal Weight Concrete: Comply with ACI 211.1 recommendations.
- B. Admixtures: Add acceptable admixtures as recommended in ACI 211.1 and at rates recommended or required by manufacturer.
- C. Normal Weight Concrete:
  - 1. Compressive Strength, when tested in accordance with ASTM C39/C39M at 28 days: 4,000 pounds per square inch (27.6 MPa). For all concrete other than tilt up panels, 5,000PSI for tilt up panels.
  - 2. Water-Cement Ratio: Maximum 50 percent by weight.
  - 3. Maximum Aggregate Size: 1" for normal weight concrete, 3/4" for lightweight concrete.

### **209 MIXING**

- A. On Project Site: Mix in drum type batch mixer, complying with ASTM C685/C685M. Mix each batch not less than 1-1/2 minutes and not more than 5 minutes.
- B. Transit Mixers: Comply with ASTM C94/C94M.
- C. Adding Water: If concrete arrives on-site with slump less than suitable for placement, do not add water that exceeds the maximum water-cement ratio or exceeds the maximum permissible slump.

## **PART 3 EXECUTION**

### **301 PREPARATION**

- A. Formwork: Comply with requirements of ACI 301. Design and fabricate forms to support all applied loads until concrete is cured, and for easy removal without damage to concrete.
- B. Where new concrete is to be bonded to previously placed concrete, prepare existing surface by cleaning and applying bonding agent in according to bonding agent manufacturer's instructions.
  - 1. Use latex bonding agent only for non-load-bearing applications.
- C. Interior Slabs on Grade: Install vapor retarder under interior slabs on grade. Comply with ASTM E1643. Lap joints minimum 6 inches (150 mm). Seal joints, seams and penetrations watertight with manufacturer's recommended products and follow manufacturer's written instructions. Repair damaged vapor retarder before covering.
  - 1. Install composite vapor retarder sheet with non-woven geotextile surface facing concrete.

### **302 INSTALLING REINFORCEMENT AND OTHER EMBEDDED ITEMS**

- A. Comply with requirements of ACI 301. Clean reinforcement of loose rust and mill scale, and accurately position, support, and secure in place to achieve not less than minimum concrete coverage required for protection.
- B. Install welded wire reinforcement in maximum possible lengths, and offset end laps in both directions. Splice laps with tie wire.
- C. Verify that anchors, seats, plates, reinforcement and other items to be cast into concrete are accurately placed, positioned securely, and will not interfere with concrete placement.

### 303 PLACING CONCRETE

- A. Place concrete in accordance with ACI 304R.
- B. Ensure reinforcement, inserts, waterstops, embedded parts, and formed construction joint devices will not be disturbed during concrete placement.

### 304 SLAB JOINTING

- A. Locate joints as indicated on drawings.
- B. Anchor joint fillers and devices to prevent movement during concrete placement.
- C. Isolation Joints: Use preformed joint filler with removable top section for joint sealant, total height equal to thickness of slab, set flush with top of slab.
- D. Saw Cut Contraction Joints: Saw cut joints before concrete begins to cool, within 4 to 12 hours after placing; use 3/16 inch (5 mm) thick blade and cut at least 1 inch (25 mm) deep but not less than one quarter (1/4) the depth of the slab.
- E. Contraction Joint Devices: Use preformed joint device, with top set flush with top of slab.
- F. Construction Joints: Where not otherwise indicated, use metal combination screed and key form, with removable top section for joint sealant.

### 305 FLOOR FLATNESS AND LEVELNESS TOLERANCES

- A. Maximum Variation of Surface Flatness:
- B. Minimum F(F) Floor Flatness and F(L) Floor Levelness Values:
  - 1. Exposed to View and Foot Traffic: F(F) of 20; F(L) of 15, on-grade only.
  - 2. Under Raised Access Flooring: F(F) of 20; F(L) of 15, on-grade only.
  - 3. Under Thick-Bed Tile: F(F) of 20; F(L) of 15, on-grade only.
  - 4. Under Carpeting: F(F) of 25; F(L) of 20, on-grade only.
  - 5. Under Thin Resilient Flooring and Thinset Tile: F(F) of 35; F(L) of 25, on-grade only.
- C. Measure F(F) Floor Flatness and F(L) Floor Levelness in accordance with ASTM E1155 (ASTM E1155M), within 48 hours after slab installation; report both composite overall values and local values for each measured section.
- D. Correct defects by grinding or by removal and replacement of the defective work. Areas requiring corrective work will be identified. Re-measure corrected areas by the same process.

### 306 CONCRETE FINISHING

- A. Repair surface defects, including tie holes, immediately after removing formwork.
- B. Unexposed Form Finish: Rub down or chip off fins or other raised areas 1/4 inch (6 mm) or more in height.
- C. Exposed Form Finish: Rub down or chip off and smooth fins or other raised areas 1/4 inch (6 mm) or more in height. Provide finish as follows:
  - 1. Smooth Rubbed Finish: Wet concrete and rub with carborundum brick or other abrasive, not more than 24 hours after form removal.
  - 2. Grout Cleaned Finish: Wet areas to be cleaned and apply grout mixture by brush or spray; scrub immediately to remove excess grout. After drying, rub vigorously with clean burlap, and keep moist for 36 hours.
- D. Concrete Slabs: Finish to requirements of ACI 302.1R, and as follows:
  - 1. Surfaces to Receive Thick Floor Coverings: "Wood float" as described in ACI 302.1R; thick floor coverings include quarry tile, ceramic tile, and Portland cement terrazzo with full bed setting system.
  - 2. Surfaces to Receive Thin Floor Coverings: "Steel trowel" as described in ACI 302.1R; thin floor coverings include carpeting, resilient flooring, seamless flooring, resinous matrix terrazzo, thin set quarry tile, and thin set ceramic tile.
  - 3. Other Surfaces to Be Left Exposed: Trowel as described in ACI 302.1R, minimizing burnish marks and other appearance defects.

### **3.07 CURING AND PROTECTION**

- A. Comply with requirements of ACI 308R. Immediately after placement, protect concrete from premature drying, excessively hot or cold temperatures, and mechanical injury.
- B. Maintain concrete with minimal moisture loss at relatively constant temperature for period necessary for hydration of cement and hardening of concrete.
  - 1. Normal concrete: Not less than seven days.
  - 2. High early strength concrete: Not less than four days.
- C. Surfaces Not in Contact with Forms:
  - 1. Slabs and Floors To Receive Adhesive-Applied Flooring: Curing compounds and other surface coatings are usually considered unacceptable by flooring and adhesive manufacturers. If such materials must be used, either obtain the approval of the flooring and adhesive manufacturers prior to use or remove the surface coating after curing to flooring manufacturer's satisfaction.
  - 2. Initial Curing: Start as soon as free water has disappeared and before surface is dry. Keep continuously moist for not less than three days by water ponding, water-saturated sand, water-fog spray, or saturated burlap.
  - 3. Final Curing: Begin after initial curing but before surface is dry.

### **3.08 FIELD QUALITY CONTROL**

- A. An independent testing agency will perform field quality control tests, as specified in Section 01 40 00 - Quality Requirements.
- B. Provide free access to concrete operations at project site and cooperate with appointed firm.
- C. Submit proposed mix design of each class of concrete to inspection and testing firm for review prior to commencement of concrete operations.
- D. Compressive Strength Tests: ASTM C39/C39M, for each test, mold and cure three concrete test cylinders. Obtain test samples for every 100 cubic yards (76 cu m) or less of each class of concrete placed.
- E. Perform one slump test for each set of test cylinders taken, following procedures of ASTM C143/C143M.
- F. Slab Testing: Cooperate with manufacturer of specified moisture vapor reducing admixture (MVRA) to allow access for sampling and testing concrete for compliance with warranty requirements.

### **3.09 DEFECTIVE CONCRETE**

- A. Defective Concrete: Concrete not complying with required lines, details, dimensions, tolerances or specified requirements.
- B. Repair or replacement of defective concrete will be determined by the Architect. The cost of additional testing shall be borne by Contractor when defective concrete is identified.
- C. Do not patch, fill, touch-up, repair, or replace exposed concrete except upon express direction of Architect for each individual area.

### **3.10 PROTECTION**

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

**END OF SECTION 03 30 00**

**SECTION 03 45 00**  
**PRECAST ARCHITECTURAL CONCRETE**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Architectural precast concrete accessories.
- B. Supports, anchors, and attachments.
- C. Precast sills.
- D. Precast coping.

**1.02 RELATED REQUIREMENTS**

- A. Section 03 20 00 - Concrete Reinforcing.
- B. Section 03 30 00 - Cast-in-Place Concrete: Admixtures.
- C. Section 07 62 00 - Sheet Metal Flashing and Trim: Reglets recessed in units.
- D. Section 07 92 00 - Joint Sealants: Sealing perimeter and intermediate joints.

**1.03 REFERENCE STANDARDS**

- A. ACI 301 - Specifications for Concrete Construction 2020.
- B. ACI 318 - Building Code Requirements for Structural Concrete 2019, with Errata (2021).
- C. ASTM A36/A36M - Standard Specification for Carbon Structural Steel 2019.
- D. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware 2016a.
- E. ASTM A615/A615M - Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement 2022.
- F. ASTM A767/A767M - Standard Specification for Zinc-Coated (Galvanized) Steel Bars for Concrete Reinforcement 2019.
- G. ASTM C31/C31M - Standard Practice for Making and Curing Concrete Test Specimens in the Field 2021a.
- H. ASTM C143/C143M - Standard Test Method for Slump of Hydraulic-Cement Concrete 2020.
- I. AWS B2.1/B2.1M - Specification for Welding Procedure and Performance Qualification 2021.
- J. PCI MNL-117 - Manual for Quality Control for Plants and Production of Architectural Precast Concrete Products 2013.
- K. PCI MNL-120 - PCI Design Handbook 2017, with Errata (2021).
- L. PCI MNL-122 - Architectural Precast Concrete: Fully Revised Manual Including New Sections, Extensive Updates, and Detailed Specifications to Meet Today's Construction Needs. 2007.
- M. PCI MNL-123 - Connections Manual: Design and Typical Details of Connections for Precast and Prestressed Concrete 1988.
- N. PCI MNL-135 - Tolerance Manual for Precast and Prestressed Concrete Construction 2000.

**1.04 SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Manufacturer's information on accessory products, including pigments, admixtures, inserts, plates, etc.
- C. Shop Drawings: Indicate layout, unit locations, configuration, unit identification marks, reinforcement, integral insulation, insulated panel system connectors, connection details, support items, location of lifting devices, dimensions, openings, and relationship to adjacent materials. Provide erection drawings.
  - 1. Include details of mix designs.
  - 2. Include structural design calculations.

- D. Samples: Submit two , 12" X 12" in size, illustrating surface finish, color and texture.
- E. Designer's Qualification Statement.
- F. Thin Prestressed Panel Manufacturer's Qualification Statement.
- G. Fabricator's Qualification Statement: Provide documentation showing precast concrete fabricator is accredited under IAS AC157.
- H. Welders' Qualification Statement: Welders' certificates in accordance with AWS B2.1/B2.1M and dated no more than 12 months before start of scheduled welding work.
- I. Sustainable Design Reporting: If any fly ash, ground granulated blast furnace slag, silica fume, rice hull ash, or other waste material is used in mix designs to replace Portland cement, submit the total volume of concrete, mix design(s) used showing the quantity of Portland cement replaced, reports showing successful cylinder testing, and temperature on day of pour if cold weather mix is used.

#### **1.05 MOCK-UP**

- A. Provide mock-up, 2' long by 1' wide, with lifting device, and attachment points, and finish in accordance with approved sample.
- B. See Section 01 40 00 - Quality Requirements for additional requirements.
- C. Include mock-up panel with typical window.
- D. Locate where directed.
- E. Mock-up may remain as part of the Work.

#### **1.06 DELIVERY, STORAGE, AND HANDLING**

- A. Handling: Lift and support precast units only from support points.
- B. Blocking and Lateral Support During Transport and Storage: Use materials that are clean, non-staining, and non-harmful to exposed surfaces. Provide temporary lateral support to prevent bowing and warping.
- C. Protect units to prevent staining, chipping, or spalling of concrete.
- D. Mark units with date of production in location that will be concealed after installation.

### **PART 2 PRODUCTS**

#### **201 MANUFACTURERS**

- A. Architectural Precast Concrete: Precast Sills, Coping and accessories.
  - 1. Premier Stoneworks, LLC: [www.premier-stoneworks.com/#sle](http://www.premier-stoneworks.com/#sle).
  - 2. Any manufacturer holding a PCI Group A Plant Certification for the types of products specified; see [www.pci.org/#sle](http://www.pci.org/#sle).
  - 3. Substitutions: See Section 01 60 00 - Product Requirements.
- B. Thin Prestressed Precast Concrete Panels:
  - 1. AltusGroup, Inc: [www.arcispanel.com/#sle](http://www.arcispanel.com/#sle).

#### **202 PRECAST UNITS, GENERAL**

- A. Precast Architectural Concrete Units: Comply with PCI MNL-120, PCI MNL-122, PCI MNL-123, PCI MNL-135, and ACI 318.
  - 1. Concrete Face Mix: Minimum 5000 psi (34 MPa), 28 day strength, air entrained to 5 to 7 percent; comply with ACI 301.
  - 2. Design Loads: Static loads, anticipated dynamic loading, including positive and negative wind loads, thermal movement loads, and erection forces as defined by applicable code.
  - 3. Calculate structural properties of units in accordance with ACI 318.
  - 4. Accommodate construction tolerances, deflection of building structural members, and clearances of intended openings.
  - 5. Provide connections that accommodate building movement and thermal movement and adjust to misalignment of structure without unit distortion or damage.

- B. Finish Type A: Ensure exposed-to-view finish surfaces of precast units are uniform in color and appearance.

### **203 REINFORCEMENT**

- A. Comply with requirements of Section 03 20 00.
- B. Reinforcing Steel: ASTM A615/A615M, Grade 40 (40,000 psi) (280 MPa).
  - 1. Deformed billet-steel bars.
  - 2. Galvanized in accordance with ASTM A767/A767M, Class I.

### **204 CONCRETE MATERIALS**

- A. Cement: ASTM C150/C150M, Type I - Normal Portland type.
- B. Other Cementitious Materials:

### **205 FORM LINERS**

- A. Manufacturers:
  - 1. Fitzgerald Formliners: [www.formliners.com/#sle](http://www.formliners.com/#sle).
  - 2. Greenstreak: [www.greenstreak.com/#sle](http://www.greenstreak.com/#sle).
  - 3. Symons Corporation: [www.symons.com/#sle](http://www.symons.com/#sle).
  - 4. Substitutions: See Section 01 60 00 - Product Requirements.
- B. Material: Glass fiber reinforced polyester, Acrylonitrile butadiene styrene, Polyvinyl chloride, Polystyrene, or Polyurethane.

### **206 SUPPORT DEVICES**

- A. Connecting and Support Devices; Anchors and Inserts: ASTM A36/A36M steel; hot-dip galvanized in accordance with ASTM A153/A153M.
  - 1. Clean surfaces of rust, scale, grease, and foreign matter.
  - 2. Prime paint in one coat, except surfaces in direct contact with concrete or requiring field welding.

### **207 FABRICATION**

- A. Fabricate in compliance with PCI MNL-117 and PCI MNL-135.
- B. Maintain plant records and quality control program during production of precast units. Make records available upon request.
- C. Use rigid molds, constructed to maintain precast unit uniform in shape, size, and finish.
- D. Use form liners in accordance with manufacturer's instructions.
- E. Place thin brick in form liner in accordance with manufacturer's instructions. Mix bricks from several cartons for uniform distribution of color variations.
- F. Place recessed flashing reglets continuous and straight.
- G. Locate hoisting devices to permit removal after erection.

### **208 FABRICATION TOLERANCES**

- A. Comply with PCI MNL-117 and PCI MNL-135, except as specifically amended below.
  - 1. Maximum Variation From Nominal Face Dimensions: Plus or minus 3/32 in (2.4 mm).
  - 2. Maximum Variation From Square or Designated Skew: Plus or minus 1/8 inch in 10 feet (1 mm per m).

### **209 ACCESSORIES**

- A. Bearing Pads: High density plastic; Shore A Durometer ; 1/8 inch (3 mm) thick, smooth both sides.
- B. Reglets: Specified in Section 07 62 00.

### **210 SOURCE QUALITY CONTROL**

- A. Provide testing and analysis of concrete mix.

- B. Take one concrete test cylinders for every cubic yard of concrete placed; make and cure in accordance with ASTM C31/C31M.
- C. Take **two slump tests for every four test** cylinders in accordance with ASTM C143/C143M.
- D. Take one air entrainment test cylinders for each set of exterior concrete test cylinders taken.
- E. Take water absorption test in accordance with PCI MNL-117.

### **PART 3 EXECUTION**

#### **301 EXAMINATION**

- A. Verify that building structure, anchors, devices, and openings are ready to receive work of this section.

#### **302 PREPARATION**

- A. Provide for erection procedures and induced loads during erection. Maintain temporary bracing in place until final support is provided.

#### **303 ERECTION**

- A. Erect units without damage to shape or finish. Replace or repair damaged panels.
- B. Erect units level and plumb within allowable tolerances.
- C. Align and maintain uniform horizontal and vertical joints as erection progresses.
- D. When units require adjustment beyond design or tolerance criteria, discontinue affected work; advise Architect.
- E. Fasten units in place with mechanical connections.

#### **304 PROTECTION**

- A. Do not permit traffic over unprotected floor surface.

**END OF SECTION 03 45 00**

**SECTION 03 52 16  
LIGHTWEIGHT INSULATING CONCRETE**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Insulating concrete fill over structural roof decking.
- B. Perimeter joint filler.

**1.02 RELATED REQUIREMENTS**

- A. Section 07 52 00 - Modified Bituminous Membrane Roofing.
- B. Section 07 71 00 - Roof Specialties: Installation of roof vents.

**1.03 REFERENCE STANDARDS**

- A. ASTM A1064/A1064M - Standard Specification for Carbon-Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete 2018a.
- B. ASTM C138/C138M - Standard Test Method for Density (Unit Weight), Yield, and Air Content (Gravimetric) of Concrete 2017a.
- C. ASTM C150/C150M - Standard Specification for Portland Cement 2022.
- D. ASTM C1602/C1602M - Standard Specification for Mixing Water Used in the Production of Hydraulic Cement Concrete 2018.
- E. ASTM C332 - Standard Specification for Lightweight Aggregates for Insulating Concrete 2017.
- F. ASTM C495/C495M - Standard Test Method for Compressive Strength of Lightweight Insulating Concrete 2012 (Reapproved 2019).
- G. ASTM C796/C796M - Standard Test Method for Foaming Agents for Use in Producing Cellular Concrete Using Preformed Foam 2019.
- H. ASTM C869/C869M - Standard Specification for Foaming Agents Used in Making Preformed Foam for Cellular Concrete 2011 (Reapproved 2016).

**1.04 ADMINISTRATIVE REQUIREMENTS**

- A. Preinstallation Meeting: Convene at least two weeks prior to commencing work of this section.
  - 1. Attendance Required:
    - a. Contractor
    - b. LWIC Manufacturer's representative
    - c. LWIC Installer
    - d. Subcontractors of each part of the Roof Assembly and substrate
    - e. Installers of roof-top units and other work in and around roofing that must precede or follow LWIC work (including mechanical work if any).
    - f. Any other Subcontractors associated with roofing work.
    - g. Architect
    - h. Owner
  - 2. Agenda shall include:
    - a. Review preparation and installation procedures and coordinating and scheduling required with related work.
    - b. Review LWIC system requirements (drawings, specifications, product approvals and other contract documents).
    - c. Review Shop Drawings and associated submittals.
    - d. Review manufacturer's technical materials.
    - e. Review and finalize construction schedule related to roofing work and verify availability of materials, personnel, equipment and facilities needed to make progress and avoid delays.
    - f. Review required inspection, testing, certifying and material usage accounting procedures.

- g. Review weather and forecasted weather conditions, and procedures for coping with unfavorable conditions, including temporary roofing.
- h. Tour representative areas of LWIC substrates (decks), inspect and discuss condition of the substrate, roofing system, roof drains, curbs, penetrations and other preparatory work performed by other trades.

#### **1.05 SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Shop Drawings: Include the following:
  1. Provide complete roof plan showing layout of slopes, drain locations, interruptions, roof penetrations, thickness of styrene, and details for proper installation.
  2. Show openings such as hatches, vents, equipment curbs, portals, as well as crickets.
  3. Show details of interface between deck, steel blocking, and LWIC insulation.
  4. Provide design and calculations prepared, signed and sealed by State of Florida Registered Specialty Structural Engineer, in accordance with FBC and ASCE 7.
    - a. Design the LWIC system to comply with wind resistance requirements of applicable building codes for specific negative wind pressures at various building elevations (heights) as indicated on the Drawings.
- C. Product Data: Provide physical characteristics, thermal values, product limitations and the following.
  1. Provide copy of current Miami-Dade Notice of Acceptance (NOA) or Florida Building Code "FLA (PAD)" Product Approval.
  2. Minimum thickness of concrete at thinnest point over styrene, as stated in FLA (PAD).
  3. Thermal resistance values from ASTM C177 or C518 tests.
- D. Certificates: Certify that products of this section meet or exceed specified requirements and that densities, indicated thicknesses, and thermal values have been achieved.
- E. Installer Certification: Affidavit, from LWIC producer, approving installer.
- F. Manufacturer's Installation Instructions: Indicate mix instructions.

#### **1.06 QUALITY ASSURANCE**

- A. Coordinate Roof Assembly roof insulation work with work before and after.
- B. Installer Qualifications: Company specializing in performing work of the type specified and with at least five years of documented experience and approved by manufacturer .
- C. Roof Assembly Fire Resistance Classification: Class A; tested in accordance with ASTM E108 or UL 790.
- D. Product Approvals: Roofing assembly shall have current Miami-Dade Notice of Acceptance (NOA) or Florida Building Code "FLA (PAD)" Product Approval for each roofing system applied to each type of substrate.
  1. Insulation system must meet requirements of the tested Roofing assembly and be compatible with proposed roofing membrane.

#### **1.07 WARRANTY**

- A. Provide Owner with a no-dollar limit insulating concrete warranty for a minimum of 10-years, signed by the manufacturer stating:
  1. Insulating concrete system shall retain a minimum of 80% of designed thermal resistance for the warranty period.
  2. Warranty shall include the composite roof deck system - both the concrete and insulation board.
  3. Insulating concrete system shall remain re-roofable for the warranty period.
  4. Warranty shall not limit by geographic location the Owner's right for claims, actions, or proceedings.
  5. Insulating concrete shall remain in place when the roof membrane sustains wind damage.

### **1.08 FIELD CONDITIONS**

- A. Do not place insulating concrete mix at ambient temperatures lower than 40 degrees F (5 degrees C) without heating mix water to 90 to 110 degrees F (32 to 43 degrees C).
- B. Inspection: The Installer shall be responsible for inspection and approval of the substrate as being suitable for the roof insulation system.

## **PART 2 PRODUCTS**

### **2.01 MANUFACTURERS**

- A. Lightweight Insulating Concrete:
  - 1. Elastizell Corp. of America: [www.elastizell.com/#sle](http://www.elastizell.com/#sle).
  - 2. Substitutions: See Section 01 60 00 - Product Requirements.

### **2.02 REGULATORY REQUIREMENTS**

- A. Comply with applicable codes for combustibility requirements.
- B. Provide certificate of compliance from authority having jurisdiction indicating approval of lightweight insulating concrete materials in the required fire rated assembly.

### **2.03 MATERIALS**

- A. Cement: ASTM C150/C150M, Portland Type I - Normal, gray color.
- B. Lightweight Aggregate: ASTM C332; Group I, perlite.
- C. Water: ASTM C1602/C1602M; clean, potable, and not detrimental to concrete.
- D. Foaming Agent: Comply with ASTM C869/C869M, when tested according to ASTM C796/C796M.

### **2.04 CONCRETE MIX**

- A. Test for compressive strength in accordance with ASTM C495/C495M, for wet density in accordance with ASTM C138/C138M, and for dry density after oven drying.
- B. Provide concrete mix with the following minimum properties:
  - 1. Cast Density: 34 to 42 pounds per cubic foot (545 to 673 kg/sq m).
  - 2. Compressive Strength: 160 pounds per square inch (1.1 MPa)
  - 3. Slump: .

### **2.05 ACCESSORIES**

- A. Reinforcement:
  - 1. Hexagonal woven wire mesh; galvanized, sizes as indicated on drawings.
  - 2. ASTM A1064/A1064M steel welded wire reinforcement, galvanized, sizes as indicated on drawings.
- B. Perimeter Joint Filler: Glass fiber strips, compressible to 50 percent original thickness under load of 25 psi (170 kPa) with full recovery.
- C. Vents: Type recommended by lightweight aggregate manufacturer, supplied for installation under Section 07 71 00.
- D. Insulation: ASTM C578, Type I molded polystyrene with venting holes to 3 percent of board area.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Verify joints in precast roof members are grouted or taped to prevent seepage of wet insulating concrete.
- B. Verify roof deck is free of standing water, dirt, debris, ice, or other detrimental materials.
- C. Verify roof slopes and elevations are as shown on the drawings and ready to receive insulating concrete.
- D. Notify Architect immediately of conditions that would prevent correct and timely installation.

- E. Do not proceed with work until detrimental conditions have been corrected.

**302 PREPARATION**

- A. Install 1 inch (25 mm) thick expansion joint filler at:
  - 1. Perimeter of roof decking.
  - 2. Around penetrations through deck.
  - 3. Every 100 ft (30 m) of deck surface dimension.
  - 4. Each change of deck direction on metal roof deck surfaces.

**303 INSTALLATION**

- A. Mix and pump into place under provisions of manufacturer's instructions using equipment designed specifically for this type of work.
- B. Slurry deck surface; place insulation; use mix to fill holes and breaks.
- C. Lay insulation board in compliance with the tested assembly in the NOA or FLA (PAD).
- D. Place insulating concrete and screed surface to achieve minimum 2 inch (50 mm) thickness.
- E. Slope top surface to 1/4 inch/foot (1:50) for roof surface drainage.
- F. Slope concrete for roof surface drainage as indicated.
  - 1. Slope top surface to 1/4 inch/foot for roof surface drainage.
  - 2. Provide minimum 1/2 inch/foot sloped crickets on the high side of roof equipment curbs.

**304 CURING**

- A. Cure in accordance with lightweight aggregate manufacturer's instructions.
- B. Protect insulating concrete from excess evaporation of surface moisture.
- C. During low humidity conditions, sprinkle water over concrete surface to aid hydration and curing.

**305 FIELD QUALITY CONTROL**

- A. An independent testing agency, as specified in Section 01 40 00 - Quality Requirements, will perform field inspection and testing for dry density.
  - 1. Testing Agency: Take three test samples from each 100 cubic yards (76.5 cu m) of insulating concrete placed.

**END OF SECTION 03 52 16**

**SECTION 04 20 00  
UNIT MASONRY**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Concrete block.
- B. Mortar and grout.
- C. Reinforcement and anchorage.
- D. Flashings.
- E. Lintels.
- F. Accessories.

**1.02 RELATED REQUIREMENTS**

- A. Section 03 10 00 - Concrete Forming and Accessories: Dovetail slots for masonry anchors.
- B. Section 03 20 00 - Concrete Reinforcing: Reinforcing steel for grouted masonry.
- C. Section 03 30 00 - Cast-in-Place Concrete: Installation of dovetail slots for masonry anchors.
- D. Section 07 11 13 - Bituminous Dampproofing: Dampproofing parged masonry surfaces.
- E. Section 07 21 00 - Thermal Insulation: Insulation for cavity spaces.
- F. Section 07 62 00 - Sheet Metal Flashing and Trim: Through-wall masonry flashings.
- G. Section 07 84 00 - Firestopping: Firestopping at penetrations of fire-rated masonry and at top of fire-rated walls.
- H. Section 07 92 00 - Joint Sealants: Sealing control and expansion joints.

**1.03 REFERENCE STANDARDS**

- A. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware 2016a.
- B. ASTM A615/A615M - Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement 2022.
- C. ASTM A666 - Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar 2015.
- D. ASTM A951/A951M - Standard Specification for Steel Wire for Masonry Joint Reinforcement 2016, with Editorial Revision (2018).
- E. ASTM A1008/A1008M - Standard Specification for Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, Required Hardness, Solution Hardened, and Bake Hardenable 2021a.
- F. ASTM A1064/A1064M - Standard Specification for Carbon-Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete 2018a.
- G. ASTM C90 - Standard Specification for Loadbearing Concrete Masonry Units 2022.
- H. ASTM C91/C91M - Standard Specification for Masonry Cement 2018.
- I. ASTM C129 - Standard Specification for Nonloadbearing Concrete Masonry Units 2017.
- J. ASTM C144 - Standard Specification for Aggregate for Masonry Mortar 2018.
- K. ASTM C150/C150M - Standard Specification for Portland Cement 2022.
- L. ASTM C207 - Standard Specification for Hydrated Lime for Masonry Purposes 2018.
- M. ASTM C270 - Standard Specification for Mortar for Unit Masonry 2019a, with Editorial Revision.
- N. ASTM C404 - Standard Specification for Aggregates for Masonry Grout 2018.
- O. ASTM C476 - Standard Specification for Grout for Masonry 2020.

- P. ASTM C780 - Standard Test Method for Preconstruction and Construction Evaluation of Mortars for Plain and Reinforced Unit Masonry 2020.
- Q. ASTM C1314 - Standard Test Method for Compressive Strength of Masonry Prisms 2021.
- R. ASTM C1714/C1714M - Standard Specification for Preblended Dry Mortar Mix for Unit Masonry 2019a.
- S. ASTM E11 - Standard Specification for Woven Wire Test Sieve Cloth and Test Sieves 2022.
- T. BIA Technical Notes No. 7 - Water Penetration Resistance – Design and Detailing 2017.
- U. BIA Technical Notes No. 13 - Ceramic Glazed Brick Exterior Walls 2017.
- V. ICC-ES AC308 - Acceptance Criteria for Termite Physical Barrier Systems 2014, with Editorial Revision (2017).
- W. TMS 402/602 - Building Code Requirements and Specification for Masonry Structures 2016.
- X. UL (FRD) - Fire Resistance Directory Current Edition.

#### **1.04 SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data for masonry units, fabricated wire reinforcement, mortar, and masonry accessories.
- C. Shop Drawings: Indicate pertinent dimensions, materials, anchorage, size and type of fasteners, and accessories for brickwork support system.
  - 1. Include the design engineer's stamp or seal on each sheet of shop drawings.
- D. Manufacturer's Certificate: Certify that masonry units meet or exceed specified requirements.
- E. Manufacturer's Certificate: Certify that water repellent admixture manufacturer has certified masonry unit manufacturer as an approved user of water repellent admixture in the manufacture of concrete block.
- F. Test Reports: Concrete masonry manufacturer's test reports for units with integral water repellent admixture.
- G. Designer's Qualification Statement.
- H. Manufacturer's Qualification Statement.
- I. Installer's Qualification Statement.
- J. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
  - 1. See Section 01 60 00 - Product Requirements, for additional provisions.

#### **1.05 QUALITY ASSURANCE**

- A. Comply with provisions of TMS 402/602, except where exceeded by requirements of Contract Documents.
  - 1. Maintain one copy of each document on project site.
- B. Fire Rated Assemblies: Comply with applicable code.
- C. Designer Qualifications: Perform design under direct supervision of a Professional Engineer experienced in design of this type of work and licensed in the State in which the Project is located.
- D. Manufacturer Qualifications: Company specializing in manufacturing the type of products specified in this section with minimum three years of documented experience.

#### **1.06 MOCK-UP**

- A. Construct a masonry wall as a mock-up panel sized 8 feet (2.4 m) long by 6 feet (1.8 m) high; include mortar, accessories, structural backup, and flashings (with lap joint, corner, and end dam) in mock-up.
- B. Locate where directed.
- C. Mock-up may remain as part of the Work.

## **PART 2 PRODUCTS**

### **201 CONCRETE MASONRY UNITS**

- A. Concrete Block: Comply with referenced standards and as follows:
  - 1. Size: Standard units with nominal face dimensions of 16 by 8 inches (400 by 200 mm) and nominal depth of 8 inches (200 mm).
  - 2. Special Shapes: Provide non-standard blocks configured for corners.
    - a. Provide bullnose units for outside corners.
  - 3. Load-Bearing Units: ASTM C90, normal weight.
    - a. Exposed Faces: Manufacturer's standard color and texture where indicated.
  - 4. Non-Loadbearing Units: ASTM C129.
    - a. Hollow block, as indicated.

### **202 MORTAR AND GROUT MATERIALS**

- A. Masonry Cement: ASTM C91/C91M, Type N.
- B. Portland Cement: ASTM C150/C150M, Type I
  - 1. Not more than 0.60 percent alkali.
- C. Hydrated Lime: ASTM C207, Type S.
- D. Mortar Aggregate: ASTM C144.
- E. Grout Aggregate: ASTM C404.
- F. Moisture-Resistant Admixture: Water repellent compound designed to reduce capillarity.
- G. Packaged Dry Material for Mortar for Unit Masonry: Premixed Portland cement, hydrated lime, and sand; complying with ASTM C1714/C1714M and capable of producing mortar of the specified strength in accordance with ASTM C270 with the addition of water only.
  - 1. Type: Type N.
  - 2. Color: Standard gray.
- H. Packaged Dry Material for Mortar for Unit Masonry: Premixed masonry cement and mason's sand; complying with ASTM C1714/C1714M and capable of producing mortar of the specified strength in accordance with ASTM C270 with the addition of water only.
  - 1. Type: Type N.
  - 2. Color: Standard gray.
- I. Packaged Dry Material for Mortar for Repointing: Premixed Portland cement, hydrated lime, and graded sand; capable of producing Type O mortar in accordance with ASTM C270 with the addition of water only.
  - 1. Color: Standard gray.

### **203 REINFORCEMENT AND ANCHORAGE**

- A. Manufacturers:
  - 1. Blok-Lok Limited: [www.blok-lok.com/#sle](http://www.blok-lok.com/#sle).
  - 2. Hohmann & Barnard, Inc; X-Seal Anchor: [www.h-b.com/#sle](http://www.h-b.com/#sle).
  - 3. WIRE-BOND [www.wirebond.com/#sle](http://www.wirebond.com/#sle).
  - 4. Substitutions: See Section 01 60 00 - Product Requirements.
- B. Reinforcing Steel: Type specified in Section 03 20 00; size as indicated on drawings; galvanized finish.
- C. Reinforcing Steel: ASTM A615/A615M, Grade 40 (40,000 psi) (280 MPa), deformed billet bars; galvanized.
- D. Single Wythe Joint Reinforcement: ASTM A951/A951M.
  - 1. Type: Ladder.
- E. Masonry Veneer Anchors: 2-piece anchors that permit differential movement between masonry veneer and structural backup, hot dip galvanized to ASTM A 153/A 153M, Class B.
  - 1. Anchor plates: Not less than 0.075 inch (1.91 mm) thick, designed for fastening to structural backup through sheathing by two fasteners; provide design with legs that

- penetrate sheathing and insulation to provide positive anchorage.
- 2. Wire ties: Manufacturer's standard shape, 0.1875 inch (4.75 mm) thick.
- 3. Vertical adjustment: Not less than 3-1/2 inches (89 mm).

#### **204 FLASHINGS**

- A. Metal Flashing Materials:
  - 1. Stainless Steel Flashing: ASTM A666, Type 304, soft temper; 26 gauge, 0.0187 inch (0.48 mm) thick; finish 2B to 2D.
- B. Drip Edge: Stainless steel; angled drip with hemmed edge; compatible with membrane and adhesives.
  - 1. Manufacturers:
    - a. Hohmann & Barnard, Inc; [\_\_\_\_\_]: [www.h-b.com/#sle](http://www.h-b.com/#sle).

#### **205 ACCESSORIES**

- A. Preformed Control Joints: Rubber material. Provide with corner and tee accessories, fused joints.
- B. Joint Filler: Closed cell polyvinyl chloride; oversized 50 percent to joint width; self expanding; in maximum lengths available.
- C. Termite-Excluding Weep and Vent:
  - 1. Type: Polytetrafluoroethylene (PTFE) vent body with stainless-steel mesh closure.
  - 2. Termite Resistance: 100 percent when tested in accordance with ICC-ES AC380.
  - 3. Stainless Steel Mesh: ASTM E11 ; opening size 0.018 inch (0.44 mm), maximum.
- D. Cleaning Solution: Non-acidic, not harmful to masonry work or adjacent materials.

#### **206 LINTELS**

- A. Precast Concrete Lintels: size shown on drawings, strength at 28 days: 3000PSI.

#### **207 MORTAR AND GROUT MIXING**

- A. Mortar for Unit Masonry: ASTM C270, using the Proportion Specification.
  - 1. Masonry below grade and in contact with earth: Type S.
  - 2. Exterior, loadbearing masonry: Type N.
  - 3. Exterior, non-loadbearing masonry: Type N.
  - 4. Interior, loadbearing masonry: Type N.
  - 5. Interior, non-loadbearing masonry: Type O.
- B. Grout: ASTM C476; consistency required to fill completely volumes indicated for grouting; fine grout for spaces with smallest horizontal dimension of 2 inches (50 mm) or less; coarse grout for spaces with smallest horizontal dimension greater than 2 inches (50 mm).
- C. Admixtures: Add to mixture at manufacturer's recommended rate and in accordance with manufacturer's instructions; mix uniformly.
- D. Mixing: Use mechanical batch mixer and comply with referenced standards.

### **PART 3 EXECUTION**

#### **301 EXAMINATION**

- A. Verify that field conditions are acceptable and are ready to receive masonry.

#### **302 PREPARATION**

#### **303 COURSING**

- A. Establish lines, levels, and coursing indicated. Protect from displacement.
- B. Maintain masonry courses to uniform dimension. Form vertical and horizontal joints of uniform thickness.
- C. Concrete Masonry Units:
  - 1. Bond: Stacked.
  - 2. Coursing: One unit and one mortar joint to equal 8 inches (200 mm).

3. Mortar Joints: Concave.

**304 PLACING AND BONDING**

- A. Lay solid masonry units in full bed of mortar, with full head joints, uniformly jointed with other work.
- B. Lay hollow masonry units with face shell bedding on head and bed joints.
- C. Buttering corners of joints or excessive furrowing of mortar joints is not permitted.
- D. Remove excess mortar and mortar smears as work progresses.

**305 WEEPS/CAVITY VENTS**

- A. Install weeps in veneer and cavity walls at 24 inches (600 mm) on center horizontally on top of through-wall flashing above shelf angles and lintels and at bottom of walls.

**306 CAVITY MORTAR CONTROL**

- A. Do not permit mortar to drop or accumulate into cavity air space or to plug weep/cavity vents.
- B. For cavity walls, build inner wythe ahead of outer wythe to accommodate accessories.
- C. Install cavity mortar control panels continuously throughout full height of exterior masonry cavities during construction of exterior wythe, complying with manufacturer's installation instructions.
  - 1. Verify that airspace width is no more than 3/8 inch (9 mm) greater than panel thickness.
  - 2. Hold cavity mortar control panel tight to face wythe.

**307 REINFORCEMENT AND ANCHORAGE - GENERAL, SINGLE WYTHE MASONRY, AND CAVITY WALL MASONRY**

- A. Unless otherwise indicated on drawings or specified under specific wall type, install horizontal joint reinforcement 16 inches (400 mm) on center.

**308 REINFORCEMENT AND ANCHORAGE - MASONRY VENEER**

- A. Masonry Back-Up: Embed anchors to bond veneer at maximum 16 inches (400 mm) on center vertically and 36 inches (900 mm) on center horizontally. Place additional anchors at perimeter of openings and ends of panels, so maximum spacing of anchors is 8 inches (200 mm) on center.
- B. Stud Back-Up: Secure veneer anchors to stud framed back-up and embed into masonry veneer at maximum 1.77 sq ft (0.16 sq m) of wall surface per anchor. Place additional anchors at perimeter of openings and ends of panels, so maximum spacing of anchors is 8 inches (200 mm) on center.

**309 REINFORCEMENT AND ANCHORAGES - MULTIPLE WYTHE UNIT MASONRY**

- A. Use individual metal ties installed in horizontal joints to bond wythes together. Provide ties spaced as indicated on drawings.
- B. Support and secure reinforcing bars from displacement. Maintain position within 1/2 inch (13 mm) of dimensioned position.

**310 MASONRY FLASHINGS**

- A. Whether or not specifically indicated, install masonry flashing to divert water to exterior at all locations where downward flow of water will be interrupted.
  - 1. Extend flashings full width at such interruptions and at least 6 inches (152 mm), minimum, into adjacent masonry or turn up flashing ends at least 1 inch (25.4 mm), minimum, to form watertight pan at non-masonry construction.
- B. Terminate flashing up 8 inches (203 mm) minimum on vertical surface of backing:
- C. Install flashing in accordance with manufacturer's instructions and BIA Technical Notes No. 7.
- D. Extend metal flashings through exterior face of masonry and terminate in an angled drip with hemmed edge. Install joint sealer below drip edge to prevent moisture migration under flashing.

- E. Extend metal flashings to within 1/2 inch (12 mm) of exterior face of masonry and adhere to top of stainless steel angled drip with hemmed edge.

**3.11 LINTELS**

- A. Install precast concrete lintels over openings.
- B. Install reinforced unit masonry lintels over openings where steel or precast concrete lintels are not scheduled.
  - 1. Openings to 42 inches (1070 mm): Place two, No. 3 (M9) reinforcing bars 1 inch (25 mm) from bottom web.
  - 2. Openings from 42 inches (1070 mm) to 78 inches (1980 mm): Place two, No. 5 (M16) reinforcing bars 1 inch (25 mm) from bottom web.
  - 3. Openings over 78 inches (1980 mm): Reinforce openings as detailed.
  - 4. Do not splice reinforcing bars.
- C. Install thermal brick support system in accordance with manufacturer's instructions at locations indicated on drawings

**3.12 GROUTED COMPONENTS**

- A. Lap splices minimum 24 bar diameters.
- B. Support and secure reinforcing bars from displacement. Maintain position within 1/2 inch (13 mm) of dimensioned position.
- C. Place and consolidate grout fill without displacing reinforcing.

**3.13 CONTROL AND EXPANSION JOINTS**

- A. Do not continue horizontal joint reinforcement through control or expansion joints.
- B. Install preformed control joint device in continuous lengths. Seal butt and corner joints in accordance with manufacturer's instructions.

**3.14 CLEANING**

- A. Remove excess mortar and mortar droppings.
- B. Replace defective mortar. Match adjacent work.
- C. Clean soiled surfaces with cleaning solution.

**END OF SECTION 04 20 00**

**SECTION 05 12 00  
STRUCTURAL STEEL FRAMING**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Structural steel framing members.
- B. Structural steel support members and struts.
- C. Base plates, shear stud connectors and expansion joint plates.
- D. Grouting under base plates.

**1.02 RELATED REQUIREMENTS**

- A. Section 05 21 00 - Steel Joist Framing.
- B. Section 05 31 00 - Steel Decking: Support framing for small openings in deck.
- C. Section 05 50 00 - Metal Fabrications: Steel fabrications affecting structural steel work.

**1.03 REFERENCE STANDARDS**

- A. AISC (MAN) - Steel Construction Manual 2017.
- B. AISC 303 - Code of Standard Practice for Steel Buildings and Bridges 2016.
- C. ASTM A36/A36M - Standard Specification for Carbon Structural Steel 2019.
- D. ASTM A108 - Standard Specification for Steel Bar, Carbon and Alloy, Cold-Finished 2018.
- E. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products 2017.
- F. ASTM A242/A242M - Standard Specification for High-Strength Low-Alloy Structural Steel 2013 (Reapproved 2018).
- G. ASTM A514/A514M - Standard Specification for High-Yield-Strength, Quenched and Tempered Alloy Steel Plate, Suitable for Welding 2018, with Editorial Revision (2019).
- H. ASTM A529/A529M - Standard Specification for High-Strength Carbon-Manganese Steel of Structural Quality 2019.
- I. ASTM A992/A992M - Standard Specification for Structural Steel Shapes 2020.
- J. ASTM E165/E165M - Standard Practice for Liquid Penetrant Testing for General Industry 2018.
- K. ASTM E709 - Standard Guide for Magnetic Particle Testing 2021.
- L. ASTM F1554 - Standard Specification for Anchor Bolts, Steel, 36, 55, and 105-ksi Yield Strength 2020.
- M. AWS A2.4 - Standard Symbols for Welding, Brazing, and Nondestructive Examination 2020.
- N. AWS B2.1/B2.1M - Specification for Welding Procedure and Performance Qualification 2021.
- O. AWS D1.1/D1.1M - Structural Welding Code - Steel 2020, with Errata (2022).
- P. IAS AC172 - Accreditation Criteria for Fabricator Inspection Programs for Structural Steel AC172 2019.
- Q. RCSC (HSBOLT) - Specification for Structural Joints Using High-Strength Bolts; Research Council on Structural Connections 2020.
- R. SSPC-SP 3 - Power Tool Cleaning 2018.
- S. UL (FRD) - Fire Resistance Directory Current Edition.

**1.04 SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Shop Drawings:
  - 1. Indicate profiles, sizes, spacing, locations of structural members, openings, attachments, and fasteners.

2. Connections not detailed.
3. Indicate cambers and loads.

## **1.05 QUALITY ASSURANCE**

- A. Fabricate structural steel members in accordance with AISC (MAN) "Steel Construction Manual."
- B. Structural steel members designated as architecturally-exposed structural steel (AESS) to also comply with Section 05 12 13.
- C. Welder Qualifications: Welding processes and welding operators qualified in accordance with AWS D1.1/D1.1M and no more than 12 months before start of scheduled welding work.
- D. Fabricator Qualifications: A qualified steel fabricator that is accredited by the International Accreditation Service (IAS) Fabricator Inspection Program for Structural Steel in accordance with IAS AC172.
- E. Design connections not detailed on drawings under direct supervision of a Professional Structural Engineer experienced in design of this work and licensed in the State in which the Project is located.

## **PART 2 PRODUCTS**

### **2.01 MATERIALS**

- A. Steel Angles and Plates: ASTM A36/A36M.
- B. Steel W Shapes and Tees: ASTM A992/A992M.
- C. Rolled Steel Structural Shapes: ASTM A992/A992M.
- D. Steel Shapes, Plates, and Bars: ASTM A242/A242M high-strength, corrosion-resistant structural steel.
- E. Steel Shapes, Plates, and Bars: ASTM A529/A529M high-strength, carbon-manganese structural steel, Grade 50.
- F. Steel Bars: ASTM A108 Grade 5117.
- G. Steel Plate: ASTM A514/A514M.

### **2.02 FABRICATION**

- A. Shop fabricate to greatest extent possible.
- B. Continuously seal joined members by continuous welds. Grind exposed welds smooth.
- C. Fabricate connections for bolt, nut, and washer connectors.
- D. Develop required camber for members.

### **2.03 FINISH**

- A. Prepare structural component surfaces in accordance with SSPC-SP 3.
- B. Shop prime structural steel members. Do not prime surfaces that will be fireproofed, field welded, in contact with concrete, or high strength bolted.
- C. Leave structural steel members un-primed.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Verify that conditions are appropriate for erection of structural steel and that the work may properly proceed.

### **3.02 ERECTION**

- A. Erect structural steel in compliance with AISC 303.

### **3.03 TOLERANCES**

- A. Maximum Variation From Plumb: 1/4 inch (6 mm) per story, non-cumulative.
- B. Maximum Offset From True Alignment: 1/4 inch (6 mm).

**304 FIELD QUALITY CONTROL**

- A. An independent testing agency will perform field quality control tests, as specified in Section 01 40 00 - Quality Requirements.
- B. High-Strength Bolts: Provide testing and verification of field-bolted connections in accordance with RCSC (HSBOLT) "Specification for Structural Joints Using High-Strength Bolts," testing at least [ ] percent of bolts at each connection.
- C. Welded Connections: Visually inspect all field-welded connections and test at least [\_\_\_\_\_] percent of welds using one of the following:
  - 1. Liquid penetrant inspection performed in accordance with ASTM E165/E165M.
  - 2. Magnetic particle inspection performed in accordance with ASTM E709.

**END OF SECTION 05 12 00**

**SECTION 05 21 00  
STEEL JOIST FRAMING**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Open web steel joists and shear stud connectors, with bridging, attached seats and anchors.
- B. Loose bearing members, such as plates or angles, and anchor bolts for site placement.
- C. Supplementary framing for floor and roof openings greater than 18 inches (450 mm).

**1.02 RELATED REQUIREMENTS**

- A. Section 05 12 00 - Structural Steel Framing: Grouting base plates and bearing plates. Superstructure framing.
- B. Section 05 12 00 - Structural Steel Framing: Superstructure framing.
- C. Section 05 31 00 - Steel Decking: Bearing plates and angles.
- D. Section 05 50 00 - Metal Fabrications: Non-framing steel fabrications attached to joists.

**1.03 REFERENCE STANDARDS**

- A. ASTM A36/A36M - Standard Specification for Carbon Structural Steel 2019.
- B. ASTM A108 - Standard Specification for Steel Bar, Carbon and Alloy, Cold-Finished 2018.
- C. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products 2017.
- D. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware 2016a.
- E. ASTM A307 - Standard Specification for Carbon Steel Bolts, Studs, and Threaded Rod 60 000 PSI Tensile Strength 2021.
- F. ASTM A563 - Standard Specification for Carbon and Alloy Steel Nuts 2021a.
- G. ASTM A563M - Standard Specification for Carbon and Alloy Steel Nuts (Metric) 2021a.
- H. ASTM F3125/F3125M - Standard Specification for High Strength Structural Bolts and Assemblies, Steel and Alloy Steel, Heat Treated, Inch Dimensions 120 ksi and 150 ksi Minimum Tensile Strength, and Metric Dimensions 830 MPa and 1040 MPa Minimum Tensile Strength 2022.
- I. ASTM F436/F436M - Standard Specification for Hardened Steel Washers Inch and Metric Dimensions 2019.
- J. AWS D1.1/D1.1M - Structural Welding Code - Steel 2020, with Errata (2022).
- K. RCSC (HSBOLT) - Specification for Structural Joints Using High-Strength Bolts; Research Council on Structural Connections 2020.
- L. SJI 100 - Standard Specifications for K-Series, LH-Series, and DLH-Series Open Web Steel Joists, and for Joist Girders 2020.
- M. SJI Technical Digest No. 9 - Handling and Erection of Steel Joists and Joist Girders 2008.
- N. SSPC-Paint 15 - Steel Joist Shop Primer/Metal Building Primer 2004.
- O. SSPC-SP 2 - Hand Tool Cleaning 2018.

**1.04 SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Shop Drawings: Indicate standard designations, joist coding, configurations, sizes, spacings, cambers, locations of joists, joist leg extensions, bridging, connections, and attachments.

**1.05 QUALITY ASSURANCE**

- A. Perform Work, including that for headers and other supplementary framing, in accordance with SJI 100 Standard Specifications Load Tables and SJI Technical Digest No. 9.

## **PART 2 PRODUCTS**

### **201 MANUFACTURERS**

- A. Steel Joists:
  - 1. Canam Group Inc: [www.canam-steeljoists.ws](http://www.canam-steeljoists.ws)
  - 2. Nucor-Vulcraft Group: [www.vulcraft.com/#sle](http://www.vulcraft.com/#sle).
  - 3. Substitutions: See Section 01 60 00 - Product Requirements.

### **202 MATERIALS**

- A. Open Web Joists: SJI Type K Joists:
  - 1. Minimum End Bearing on Steel Supports: Comply with referenced SJI standard.
  - 2. Minimum End Bearing on Concrete or Masonry Supports: Comply with referenced SJI standard.
- B. Open Web Joists: SJI 100 Type LH Joists:
  - 1. Minimum End Bearing on Steel Supports: Comply with referenced SJI standards.
  - 2. Finish: Shop primed.
- C. Anchor Bolts, Nuts and Washers: ASTM A307 hot-dip galvanized per ASTM A153/A153M Class C.
- D. High-Strength Structural Bolts, Nuts, and Washers: ASTM F3125/F3125M, Type 1, with matching compatible ASTM A563 or ASTM A563M nuts and ASTM F436/F436M washers.
- E. Shear Stud Connectors: Made from ASTM A108 Grade 1015 bars.
- F. Structural Steel For Supplementary Framing and Joist Leg Extensions: ASTM A36/A36M.
- G. Welding Materials: AWS D1.1/D1.1M; type required for materials being welded.
- H. Shop and Touch-Up Primer: SSPC-Paint 15, complying with VOC limitations of authorities having jurisdiction.

### **203 FINISH**

- A. Shop prime joists as specified.
  - 1. Do not prime surfaces that will be fireproofed.
  - 2. Galvanize steel ledge angles.
- B. Prepare surfaces to be finished in accordance with SSPC-SP 2.

## **PART 3 EXECUTION**

### **301 EXAMINATION**

- A. Verify existing conditions prior to beginning work.

### **302 ERECTION**

- A. Erect joists with correct bearing on supports.
- B. Allow for erection loads. Provide sufficient temporary bracing to maintain framing safe, plumb, and in true alignment.
- C. Coordinate the placement of anchors for securing loose bearing members furnished as part of the work of this section.
- D. After joist alignment and installation of framing, field weld joist seats to steel bearing surfaces.
- E. Install supplementary framing for floor and roof openings greater than 18 inches (450 mm).
- F. Do not permit erection of decking until joists are braced, bridged, and secured or until completion of erection and installation of permanent bridging and bracing.
- G. Do not field cut or alter structural members without approval of joist manufacturer.

### **303 TOLERANCES**

- A. Maximum Variation From Plumb: 1/4 inch (6 mm).
- B. Maximum Offset From True Alignment: 1/4 inch (6 mm).

**304 FIELD QUALITY CONTROL**

- A. An independent testing agency will perform field quality control tests, as specified in Section 01 40 00 - Quality Requirements.
- B. High-Strength Bolts: Provide testing and verification of field-bolted connections in accordance with RCSC (HSBOLT) "Specification for Structural Joints Using High-Strength Bolts", testing at least **10 percent** of bolts at each connection.

**END OF SECTION 05 21 00**

**SECTION 05 31 00  
STEEL DECKING**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Acoustical roof deck.
- B. Roof deck.
- C. Composite floor deck.
- D. Supplementary framing for openings up to and including 18 inches (450 mm).
- E. Bearing plates and angles.
- F. Stud shear connectors.
- G. Acoustical insulation in roof deck flutes.

**1.02 RELATED REQUIREMENTS**

- A. Section 03 30 00 - Cast-in-Place Concrete: Concrete topping over metal deck.
- B. Section 04 20 00 - Unit Masonry: Placement of anchors for bearing plates embedded in unit masonry assemblies.
- C. Section 05 21 00 - Steel Joist Framing: Support framing for openings larger than 18 inches (450 mm) and shear stud connectors.
- D. Section 05 50 00 - Metal Fabrications: Steel angle concrete stops at deck edges.

**1.03 REFERENCE STANDARDS**

- A. ASTM C423 - Standard Test Method for Sound Absorption and Sound Absorption Coefficients by the Reverberation Room Method; 2017.
- B. ASTM A36/A36M - Standard Specification for Carbon Structural Steel 2019.
- C. ASTM A108 - Standard Specification for Steel Bar, Carbon and Alloy, Cold-Finished 2018.
- D. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products 2017.
- E. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process 2020.
- F. ASTM A1008/A1008M - Standard Specification for Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, Required Hardness, Solution Hardened, and Bake Hardenable 2021a.
- G. AWS B2.1/B2.1M - Specification for Welding Procedure and Performance Qualification 2021.
- H. AWS D1.1/D1.1M - Structural Welding Code - Steel 2020, with Errata (2022).
- I. AWS D1.3/D1.3M - Structural Welding Code - Sheet Steel 2018.
- J. FM (AG) - FM Approval Guide current edition.
- K. IAS AC172 - Accreditation Criteria for Fabricator Inspection Programs for Structural Steel AC172 2019.
- L. ICC-ES AC70 - Acceptance Criteria for Fasteners Power Driven into Concrete, Steel and Masonry Elements 2016.
- M. SDI (DM) - Publication No.30, Design Manual for Composite Decks, Form Decks, and Roof Decks 2007.
- N. SSPC-Paint 15 - Steel Joist Shop Primer/Metal Building Primer 2004.
- O. SSPC-Paint 20 - Zinc-Rich Coating (Type I - Inorganic, and Type II - Organic) 2019.
- P. UL (FRD) - Fire Resistance Directory Current Edition.

#### **1.04 SUBMITTALS**

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

#### **1.05 QUALITY ASSURANCE**

- A. Design deck layout, spans, fastening, and joints under direct supervision of a Professional Structural Engineer experienced in design of this work and licensed in Florida.
- B. Welder Qualifications: Welding processes and welding operators qualified in accordance with AWS D1.1/D1.1M and AWS D1.3/D1.3M and dated no more than 12 months before start of scheduled welding work.

### **PART 2 PRODUCTS**

#### **201 MANUFACTURERS**

- A. Steel Deck:
  - 1. Canam Steel Corporation: [www.canam-steeljoists.ws](http://www.canam-steeljoists.ws).
  - 2. Cordeck, Inc: [www.cordeck.com/#sle](http://www.cordeck.com/#sle).
  - 3. Nucor-Vulcraft Group: [www.vulcraft.com/#sle](http://www.vulcraft.com/#sle).
  - 4. Epic Metals Corp.
  - 5. Substitutions: See Section 01 60 00 - Product Requirements.

#### **202 STEEL DECK**

- A. All Deck Types: Select and design metal deck in accordance with SDI Design Manual.
  - 1. Calculate to structural working stress design and structural properties specified.
  - 2. Maximum Vertical Deflection of Floor Deck: 1/360 of span.
- B. Acoustical Roof Deck: Non-composite type, steel sheet with plain vertical flute faces perforated with 1/8 inch (3 mm) diameter holes staggered 3/8 inch (10 mm) on center:
  - 1. Galvanized Steel Sheet: ASTM A653/A653M, Structural Steel (SS) Grade 33/230, with G90/Z275 galvanized coating.
    - a. Grade as required to meet performance criteria.
  - 2. Primer: Shop coat of manufacturer's standard primer paint over cleaned and phosphatized substrate.
  - 3. Minimum Base Metal Thickness: 20 gauge, 0.0359 inch (0.91 mm).
- C. Roof Deck: Non-composite type, fluted steel sheet:
  - 1. Galvanized Steel Sheet: ASTM A653/A653M, Structural Steel (SS) Grade 33/230, with G90/Z275 galvanized coating.
  - 2. Minimum Base Metal Thickness: 20 gauge, 0.0359 inch (0.91 mm).
- D. Composite Floor Deck: Fluted steel sheet embossed to interlock with concrete:
  - 1. Galvanized Steel Sheet: ASTM A653/A653M, Structural Steel (SS) Grade 33/230, with G90/Z275 galvanized coating.
    - a. Grade as required to meet performance criteria.
  - 2. Ungalvanized Steel Sheet: ASTM A1008/A1008M, Designation SS, Grade 33, Type 1.
  - 3. Span Design: Double.
  - 4. Nominal Height: 1-1/2 inches (38 mm).
  - 5. Profile: Fluted; SDI NR.
  - 6. Formed Sheet Width: 24 inch (600 mm).

7. Side Joints: Lock seam.
8. End Joints: Lapped, welded.
9. Fire Resistance Classification: Comply with UL (FRD) Assembly Number .

### **203 ACCESSORY MATERIALS**

- A. Bearing Plates and Angles: ASTM A36/A36M steel, galvanized per ASTM A123/A123M.
- B. Stud Shear Connectors: Made from ASTM A108 Grade 1015 bars.
- C. Welding Materials: AWS D1.1/D1.1M.
- D. Fasteners: Galvanized hardened steel, self tapping.
- E. Powder Actuated Mechanical Fasteners: Steel; with knurled shank and forged ballistic point. Comply with applicable requirements of ICC-ES AC70.
- F. Weld Washers: Mild steel, uncoated, 3/4 inch (19 mm) outside diameter, 1/8 inch (3 mm) thick.
- G. Shop and Touch-Up Primer: SSPC-Paint 15, complying with VOC limitations of authorities having jurisdiction.
- H. Touch-Up Primer for Galvanized Surfaces: SSPC-Paint 20, complying with VOC limitations of authorities having jurisdiction.
- I. Acoustical Insulation: Glass fiber type, minimum 1.1 lb/cu ft (18 kg/cu m) density; profiled to suit deck.

### **204 FABRICATED DECK ACCESSORIES**

- A. Sheet Metal Deck Accessories: Metal closure strips, wet concrete stops, and cover plates, 22 gauge, 0.0299 inch (0.76 mm) thick sheet steel; of profile and size as indicated; finished same as deck.
- B. Cant Strips: Formed sheet steel, [ ] gauge, [ ] inch ([ ] mm) minimum thickness, 45 degree slope, 3-1/2 inch (87.5 mm) nominal width and height, flange for attachment.
- C. Floor Drain Pans: Formed sheet steel, 14 gauge, 0.0747 inch (1.90 mm) minimum thickness, flat bottom, sloped sides, recessed 1-1/2 inches (38 mm) below floor deck surface, bearing flange 3 inches (75 mm) wide, sealed watertight.

## **PART 3 EXECUTION**

### **301 EXAMINATION**

- A. Verify existing conditions prior to beginning work.

### **302 INSTALLATION**

- A. Erect metal deck in accordance with SDI Design Manual and manufacturer's instructions. Align and level.
- B. Clinch lock seam side laps.
- C. Weld deck in accordance with AWS D1.3/D1.3M.
- D. Place metal cant strips in position and fusion weld.
- E. Position floor drain pans with flange bearing on top surface of deck. Fusion weld at each deck flute.
- F. Weld stud shear connectors through steel deck to structural members below.
- G. Immediately after welding deck and other metal components in position, coat welds, burned areas, and damaged surface coating, with touch-up primer.

**END OF SECTION 05 31 00**

**SECTION 05 40 00  
COLD-FORMED METAL FRAMING**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Formed steel stud exterior wall and interior wall framing.
- B. Formed steel joist and purlin framing and bridging.
- C. Water-resistive barrier over sheathing.

**1.02 RELATED REQUIREMENTS**

- A. Section : Structural building framing.
- B. Section 05 31 00 - Steel Decking.
- C. Section 06 10 00 - Rough Carpentry: Wood blocking and miscellaneous framing.
- D. Section 07 21 00 - Thermal Insulation: Insulation within framing members.
- E. Section 07 62 00 - Sheet Metal Flashing and Trim: Head and sill flashings.
- F. Section 07 92 00 - Joint Sealants.
- G. Section 09 21 16 - Gypsum Board Assemblies: Gypsum-based sheathing.
- H. Section 09 22 16 - Non-Structural Metal Framing.
- I. Section 09 22 36 - Lath.
- J. Section 09 23 00 - Gypsum Plastering.
- K. Section 09 24 00 - Cement Plastering.
- L. Section 09 51 00 - Acoustical Ceilings: Ceiling suspension system.
- M. Section 31 31 16 - Termite Control: Field-applied termiticide and mildewcide for metal framing.

**1.03 REFERENCE STANDARDS**

- A. AISI S100 - North American Specification for the Design of Cold-Formed Steel Structural Members 2016, with Supplement (2020).
- B. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware 2016a.
- C. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process 2020.
- D. ASTM A1008/A1008M - Standard Specification for Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, Required Hardness, Solution Hardened, and Bake Hardenable 2021a.
- E. ASTM C208 - Standard Specification for Cellulosic Fiber Insulating Board 2022.
- F. ASTM C578 - Standard Specification for Rigid, Cellular Polystyrene Thermal Insulation 2019.
- G. ASTM C1007 - Standard Specification for Installation of Load Bearing (Transverse and Axial) Steel Studs and Related Accessories 2020.
- H. ASTM C1289 - Standard Specification for Faced Rigid Cellular Polyisocyanurate Thermal Insulation Board 2022.
- I. ASTM C1396/C1396M - Standard Specification for Gypsum Board 2017.
- J. AWS B2.1/B2.1M - Specification for Welding Procedure and Performance Qualification 2021.
- K. AWS D1.1/D1.1M - Structural Welding Code - Steel 2020, with Errata (2022).
- L. PS 1 - Structural Plywood 2009 (Revised 2019).
- M. SSPC-Paint 15 - Steel Joist Shop Primer/Metal Building Primer 2004.

- N. SSPC-Paint 20 - Zinc-Rich Coating (Type I - Inorganic, and Type II - Organic) 2019.

#### **1.04 ADMINISTRATIVE REQUIREMENTS**

##### **1.05 SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements for submittal procedures.
- B. Product Data: Provide data on standard framing members; describe materials and finish, product criteria, limitations.
- C. Shop Drawings: Indicate component details, framed openings, bearing, anchorage, loading, welds, and type and location of fasteners, and accessories or items required of related work.
  - 1. Design data:
    - a. Shop drawings signed and sealed by a professional structural engineer.
  - 2. Calculations for loadings and stresses of specially fabricated framing, signed and sealed by a professional structural engineer.
- D. Manufacturer's Installation Instructions: Indicate special procedures, conditions requiring special attention.

##### **1.06 QUALITY ASSURANCE**

- A. Designer Qualifications: Design framing system under direct supervision of a Professional Structural Engineer experienced in design of this work and licensed in the State in which the Project is located.
- B. Manufacturer Qualifications: Company specializing in manufacturing the types of products specified in this section, and with minimum three years of documented experience.

#### **PART 2 PRODUCTS**

##### **201 MANUFACTURERS**

- A. Metal Framing:
  - 1. CEMCO: [www.cemcosteel.com/#sle](http://www.cemcosteel.com/#sle).
  - 2. ClarkDietrich: [www.clarkdietrich.com/#sle](http://www.clarkdietrich.com/#sle).
  - 3. Jaimes Industries: [www.jaimesind.com/#sle](http://www.jaimesind.com/#sle).
  - 4. Marino: [www.marinoware.com/#sle](http://www.marinoware.com/#sle).
  - 5. SCAFCO Corporation: [www.scafco.com/#sle](http://www.scafco.com/#sle).
  - 6. Substitutions: See Section 01 60 00 - Product Requirements.
- B. Framing Connectors and Accessories:
  - 1. Substitutions: See Section 01 60 00 - Product Requirements.

##### **202 FRAMING SYSTEM**

- A. Provide primary and secondary framing members, bridging, bracing, plates, gussets, clips, fittings, reinforcement, and fastenings as required to provide a complete framing system.
- B. Design Requirements: Provide completed framing system having the following characteristics:
  - 1. Design: Calculate structural characteristics of cold-formed steel framing members according to AISI S100.
  - 2. Structural Performance: Design, engineer, fabricate, and erect to withstand specified design loads for project conditions within required limits.
  - 3. Design Loads: In accordance with applicable codes.
  - 4. Live load deflection meeting the following, unless otherwise indicated:
    - a. Floors: Maximum vertical deflection under live load of 1/480 of span.
    - b. Roofs: Maximum vertical deflection under live load of 1/240 of span.
    - c. Exterior Walls: Maximum horizontal deflection under wind load of 1/180 of span.
    - d. Design non-axial loadbearing framing to accommodate not less than 1/2 in (13 mm) vertical deflection.
  - 5. Able to tolerate movement of components without damage, failure of joint seals, undue stress on fasteners, or other detrimental effects when subject to seasonal or cyclic day/night temperature ranges.

6. Able to accommodate construction tolerances, deflection of building structural members, and clearances of intended openings.

### 203 FRAMING MATERIALS

- A. Studs and Track: ASTM C955; studs formed to channel, C- or Sigma-shaped with punched web; U-shaped track in matching nominal width and compatible height.
  1. Gauge and Depth: As required to meet specified performance levels.
  2. Galvanized in accordance with **ASTM A653/A653M, G90/Z275 coating.**
  3. Provide components fabricated from ASTM A1008/A1008M Designation SS (structural steel).
- B. Jamb Studs: Engineered, C-shaped with wide flanges, designed to replace conventional double-stud framing at openings.
- C. Joists and Purlins: Fabricated from **ASTM A653/A653M steel sheet, with G90/Z275 hot dipped** galvanized coating.
  1. Base Metal: Structural Steel (SS), Grade 33/230.
  2. Base Metal: As required to meet specified performance levels within maximum depths indicated.
  3. Gauge and Depth: As required to meet specified performance levels.
  4. Products:
- D. Framing Connectors: Factory-made, formed steel sheet.
  1. Material: **ASTM A653/A653M SS Grade 33 and 40 (minimum), with G90/Z275 hot** dipped galvanized coating for base metal thickness less than 10 gauge, 0.1345 inch (3.42 mm), and factory punched holes and slots.
  2. Structural Performance: Maintain load and movement capacity required by applicable code, when evaluated in accordance with AISI S100.
  3. Movement Connections: Provide mechanical anchorage devices that accommodate movement using slotted holes, shouldered screws or screws and anti-friction or stepped bushings, while maintaining structural performance of framing. Provide movement connections where indicated on drawings.
    - a. Where continuous studs bypass elevated floor slab, connect stud to slab in manner allowing vertical and horizontal movement of slab without affecting studs; allow for minimum movement of 1/2 inch (13 mm).
    - b. Where top of stud wall terminates below structural floor or roof, connect studs to structure in manner allowing vertical and horizontal movement of slab without affecting studs; allow for minimum movement of 1/2 inch (13 mm).
    - c. Products:
      - 1) ClarkDietrich; Drift FastClip Slide Clip D-FCSC: [www.clarkdietrich.com/#sle](http://www.clarkdietrich.com/#sle).
      - 2) ClarkDietrich; FastClip Slide Clip FCSC: [www.clarkdietrich.com/#sle](http://www.clarkdietrich.com/#sle).
      - 3) Simpson Strong Tie: [www.strongtie.com/#sle](http://www.strongtie.com/#sle).
      - 4) Super Stud Building Products, Inc; Deflection Clips: [www.buysuperstud.com/#sle](http://www.buysuperstud.com/#sle).
      - 5) Substitutions: See Section 01 60 00 - Product Requirements.
  4. Fixed Connections: Provide non-movement connections for tie-down to foundation, floor-to-floor tie-down, roof-to-wall tie-down, joist hangers, gusset plates, and stiffeners.
    - a. Products:
      - 1) Simpson Strong Tie: [www.strongtie.com/#sle](http://www.strongtie.com/#sle).
      - 2) Substitutions: See Section 01 60 00 - Product Requirements.
  5. Wall Stud Bridging Connections: Provide mechanical load-transferring devices that accommodate wind load torsion and weak axis buckling induced by axial compression loads. Provide bridging connections where indicated on the drawings.
  6. Products:
    - a. ClarkDietrich; Spazzer 5400 Bridging Bar: [www.clarkdietrich.com/#sle](http://www.clarkdietrich.com/#sle).
    - b. ClarkDietrich; FastBridge Clip: [www.clarkdietrich.com/#sle](http://www.clarkdietrich.com/#sle).
    - c. Substitutions: See Section 01 60 00 - Product Requirements.

## **204 FASTENERS**

- A. Self-Drilling, Self-Tapping Screws, Bolts, Nuts and Washers: Hot dip galvanized per ASTM A153/A153M.
  - 1. Products:
    - a. ITW Commercial Construction North America; ITW CCNA-Buildex Teks Select Series: [www.ITWBuildex.com/#sle](http://www.ITWBuildex.com/#sle).
    - b. Substitutions: See Section 01 60 00 - Product Requirements.
- B. Anchorage Devices: Powder actuated.
- C. Welding: Comply with AWS D1.1/D1.1M.

## **205 WALL SHEATHING**

- A. Plywood; PS 1, Grade C-D, Exposure I.
- B. Fiberboard; ASTM C208, Type IV, Grade 1 - Regular, square edges.
- C. Gypsum Board Wall Sheathing: See Section 09 21 16.
- D. Gypsum board; complying with requirements of ASTM C1396/C1396M for gypsum sheathing, V-shaped long edges, 5/8 inch (15.9 mm) thick, Type X - Fire Resistant
- E. Board Insulation Wall Sheathing: See Section 07 21 00.
- F. Extruded polystyrene (XPS) board insulation, ASTM C578, Type IV, tongue and groove along edges; 3/4 inch (19 mm) thick.
- G. Polyisocyanurate (ISO) foam board insulation; ASTM C1289, Type I - Faced with aluminum foil on both major surfaces of core foam, and Class 1 - Non-reinforced core foam; 3/4 inch (19 mm) thick.

## **206 ACCESSORIES**

- A. Bracing, Furring, Bridging: Formed sheet steel, thickness determined for conditions encountered; finish to match framing components.
- B. Bracing, Furring, Bridging: Formed sheet steel, thickness; finish to match framing components.
- C. Shop and Touch-Up Primer: SSPC-Paint 15, complying with VOC limitations of authorities having jurisdiction.
- D. Touch-Up Primer for Galvanized Surfaces: SSPC-Paint 20 Type I - Inorganic, complying with VOC limitations of authorities having jurisdiction.

## **PART 3 EXECUTION**

### **301 EXAMINATION**

- A. Verify that substrate surfaces are ready to receive work.

### **302 INSTALLATION OF STUDS**

- A. Install components in accordance with manufacturers' instructions and ASTM C1007 requirements.
- B. Align floor and ceiling tracks; locate to wall layout. Secure in place with fasteners at maximum 24 inches (600 mm) on center. Coordinate installation of sealant with floor and ceiling tracks.
- C. Construct corners using minimum of three studs. Install double studs at wall openings, door and window jambs.
- D. Install framing between studs for attachment of mechanical and electrical items, and to prevent stud rotation.
- E. Touch-up field welds and damaged galvanized surfaces with primer.

### **303 INSTALLATION OF JOISTS AND PURLINS**

- A. Install framing components in accordance with manufacturer's instructions.
- B. Make provisions for erection stresses. Provide temporary alignment and bracing.

- C. Place joists at 12 inches (300 mm) on center; not more than 2 inches (50 mm) from abutting walls, and connect joists to supports using fastener method.
- D. Set floor and ceiling joists parallel and level, with lateral bracing and bridging.
- E. Locate joist end bearing directly over load-bearing studs or provide load distributing member to top of stud track.
- F. Provide web stiffeners at reaction points.
- G. Touch-up field welds and damaged primed surfaces with primer.

**304 INSTALLATION OF WALL SHEATHING**

- A. Install wall sheathing with long dimension perpendicular to wall studs, with ends over firm bearing and staggered, using self-tapping screws.
  - 1. Provide fiberboard wall sheathing at least 32 inches (0.81 m) wide at building corners, measured horizontally.
  - 2. Provide steel diagonal bracing at corners with foam insulation or gypsum board wall sheathing.
  - 3. Place water-resistive barrier horizontally over wall sheathing, weather lapping edges, and ends.

**END OF SECTION 05 40 00**

**SECTION 05 50 00  
METAL FABRICATIONS**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Shop fabricated steel and aluminum items.
- B. Downspout boots.

**1.02 RELATED REQUIREMENTS**

- A. Section 03 30 00 - Cast-in-Place Concrete: Placement of metal fabrications in concrete.
- B. Section 04 20 00 - Unit Masonry: Placement of metal fabrications in masonry.
- C. Section 05 12 00 - Structural Steel Framing: Structural steel column anchor bolts.
- D. Section 05 31 00 - Steel Decking: Bearing plates for metal deck bearing, including anchorage.
- E. Section 05 51 33 - Metal Ladders.
- F. Section 05 52 13 - Pipe and Tube Railings.
- G. Section 07 71 23 - Manufactured Gutters and Downspouts: Downspout boots.
- H. Section 09 91 13 - Exterior Painting: Paint finish.
- I. Section 09 91 23 - Interior Painting: Paint finish.

**1.03 REFERENCE STANDARDS**

- A. AAMA 611 - Voluntary Specification for Anodized Architectural Aluminum 2020.
- B. ASTM A276/A276M - Standard Specification for Stainless Steel Bars and Shapes 2017.
- C. ASTM A36/A36M - Standard Specification for Carbon Structural Steel 2019.
- D. ASTM A48/A48M - Standard Specification for Gray Iron Castings 2022.
- E. ASTM A53/A53M - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless 2020.
- F. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products 2017.
- G. ASTM A283/A283M - Standard Specification for Low and Intermediate Tensile Strength Carbon Steel Plates 2018.
- H. ASTM A307 - Standard Specification for Carbon Steel Bolts, Studs, and Threaded Rod 60 000 PSI Tensile Strength 2021.
- I. ASTM A501/A501M - Standard Specification for Hot-Formed Welded and Seamless Carbon Steel Structural Tubing 2021.
- J. ASTM A554 - Standard Specification for Welded Stainless Steel Mechanical Tubing 2021.
- K. ASTM A666 - Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar 2015.
- L. ASTM B210/B210M - Standard Specification for Aluminum and Aluminum-Alloy Drawn Seamless Tubes 2019a.
- M. ASTM B209 - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate 2014.
- N. ASTM B209M - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate (Metric) 2014.

- O. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes 2021.
- P. AWS A2.4 - Standard Symbols for Welding, Brazing, and Nondestructive Examination 2020.
- Q. AWS B2.1/B2.1M - Specification for Welding Procedure and Performance Qualification 2021.
- R. AWS D1.1/D1.1M - Structural Welding Code - Steel 2020, with Errata (2022).
- S. AWS D1.2/D1.2M - Structural Welding Code - Aluminum 2014, with Errata (2020).
- T. IAS AC172 - Accreditation Criteria for Fabricator Inspection Programs for Structural Steel AC172 2019.
- U. SSPC-Paint 15 - Steel Joist Shop Primer/Metal Building Primer 2004.
- V. SSPC-SP 2 - Hand Tool Cleaning 2018.

#### **1.04 SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Shop Drawings: Indicate profiles, sizes, connection attachments, reinforcing, anchorage, size and type of fasteners, and accessories. Include erection drawings, elevations, and details where applicable.
  - 1. Indicate welded connections using standard AWS A2.4 welding symbols. Indicate net weld lengths.
  - 2. Design data: Submit drawings and supporting calculations, signed and sealed by a qualified professional structural engineer.
    - a. Include the following, as applicable:
      - 1) Design criteria.
      - 2) Engineering analysis depicting stresses and deflections.
      - 3) Member sizes and gauges.
- C. Welders' Qualification Statement: Welders' certificates in accordance with AWS B2.1/B2.1M and dated no more than 12 months before start of scheduled welding work.
- D. Designer's Qualification Statement.

#### **1.05 QUALITY ASSURANCE**

- A. Design under direct supervision of a Professional Structural Engineer experienced in design of this work and licensed in the State in which the Project is located.
- B. Welder Qualifications: Welding processes and welding operators qualified in accordance with AWS D1.1/D1.1M and AWS D1.2/D1.2M and dated no more than 12 months before start of scheduled welding work.
- C. Fabricator Qualifications: A qualified steel fabricator that is accredited by IAS AC172.

### **PART 2 PRODUCTS**

#### **201 MATERIALS - STEEL**

- A. Steel Sections: ASTM A36/A36M.
- B. Steel Tubing: ASTM A501/A501M hot-formed structural tubing.
- C. Plates: ASTM A283/A283M.
- D. Pipe: ASTM A53/A53M, Grade B Schedule 40, black finish.
- E. Stainless Steel, General: ASTM A666, Type 304.
- F. Stainless Steel Tubing: ASTM A554, Type 304, 16 gauge, 0.0625 inch (1.59 mm) minimum metal thickness, 1-1/2 inch (38 mm) diameter.
- G. Stainless Steel Bars, Shapes and Moldings: ASTM A276/A276M, Type 304.
- H. Bolts, Nuts, and Washers: ASTM A307, Grade A, plain.
- I. Shop and Touch-Up Primer: SSPC-Paint 15, complying with VOC limitations of authorities having jurisdiction.

## **202 MATERIALS - ALUMINUM**

- A. Extruded Aluminum: ASTM B221 (ASTM B221M), 6063 alloy, T6 temper.
- B. Sheet Aluminum: ASTM B209 (ASTM B209M), 5052 alloy, H32 or H22 temper.
- C. Aluminum-Alloy Drawn Seamless Tubes: ASTM B210/B210M, 6063 alloy, T6 temper.

## **203 FABRICATION**

- A. Fit and shop assemble items in largest practical sections, for delivery to site.
- B. Fabricate items with joints tightly fitted and secured.
- C. Grind exposed joints flush and smooth with adjacent finish surface. Make exposed joints butt tight, flush, and hairline. Ease exposed edges to small uniform radius.
- D. Supply components required for anchorage of fabrications. Fabricate anchors and related components of same material and finish as fabrication, except where specifically noted otherwise.

## **204 FABRICATED ITEMS**

- A. Ledge Angles, Shelf Angles, Channels, and Plates Not Attached to Structural Framing: For support of metal decking; prime paint finish.

## **205 DOWNSPOUT BOOTS**

- A. Downspout Boots: Smooth interior without boxed corners or choke points; include integral lug slots, integral cleanout, cleanout cover, and tamper proof fasteners.
  - 1. Configuration: Angular.
  - 2. Material: Cast iron; ASTM A48/A48M; casting thickness 3/8 inch (9.5 mm), minimum.
  - 3. Finish: Manufacturer's standard factory applied powder coat finish.
  - 4. Color: To be selected by Architect from manufacturer's standard range.
  - 5. Accessories: Manufacturer's standard stainless steel fasteners, stainless steel building wall anchors, integral neoprene gaskets, and rubber coupling.

## **206 FINISHES - STEEL**

- A. Prepare surfaces to be primed in accordance with SSPC-SP2.
- B. Clean surfaces of rust, scale, grease, and foreign matter prior to finishing.
- C. Prime Painting: One coat.

## **207 FINISHES - ALUMINUM**

- A. Interior Aluminum Surfaces: Class I natural anodized.
- B. Class I Natural Anodized Finish: AAMA 611 AA-M12C22A41 Clear anodic coating not less than 0.7 mils (0.018 mm) thick.

## **208 FABRICATION TOLERANCES**

- A. Squareness: 1/8 inch (3 mm) maximum difference in diagonal measurements.
- B. Maximum Offset Between Faces: 1/16 inch (1.5 mm).
- C. Maximum Misalignment of Adjacent Members: 1/16 inch (1.5 mm).
- D. Maximum Bow: 1/8 inch (3 mm) in 48 inches (1.2 m).
- E. Maximum Deviation From Plane: 1/16 inch (1.5 mm) in 48 inches (1.2 m).

## **PART 3 EXECUTION**

### **301 EXAMINATION**

- A. Verify that field conditions are acceptable and are ready to receive work.

### **302 INSTALLATION**

- A. Install items plumb and level, accurately fitted, free from distortion or defects.
- B. Provide for erection loads, and for sufficient temporary bracing to maintain true alignment until completion of erection and installation of permanent attachments.

- C. Obtain approval prior to site cutting or making adjustments not scheduled.

**END OF SECTION 05 50 00**

**SECTION 05 51 33  
METAL LADDERS**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Shop-fabricated metal ladders.
- B. Prefabricated ladders.
- C. Prefabricated ship ladders.
- D. Ladder safety systems.

**1.02 RELATED REQUIREMENTS**

- A. Section 05 51 00 - Metal Stairs.
- B. Section 05 52 13 - Pipe and Tube Railings.
- C. Section 09 91 13 - Exterior Painting: Paint finish.
- D. Section 09 91 23 - Interior Painting: Paint finish.

**1.03 REFERENCE STANDARDS**

- A. 29 CFR 1910.23 - Ladders Current Edition.
- B. 29 CFR 1910.28 - Duty to have Fall Protection and Falling Object Protection Current Edition.
- C. 29 CFR 1910.29 - Fall Protection Systems and Falling Object Protection - Criteria and Practices Current Edition.
- D. 29 CFR 1910.140 - Personal fall protection systems Current Edition.
- E. 29 CFR 1926.1053 - Ladders Current Edition.
- F. AAMA 611 - Voluntary Specification for Anodized Architectural Aluminum 2020.
- G. ANSI A14.3 - American National Standard for Ladders -- Fixed -- Safety Requirements 2008 (Reaffirmed 2018).
- H. ANSI/ASSP Z359.15 - Safety Requirements for Single Anchor Lifelines and Fall Arresters for Personal Fall Arrest Systems 2014.
- I. ANSI/ASSP Z359.16 - Safety Requirements for Climbing Ladder Fall Arrest Systems 2016.
- J. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products 2017.
- K. ASTM A36/A36M - Standard Specification for Carbon Structural Steel 2019.
- L. ASTM A53/A53M - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless 2020.
- M. ASTM A283/A283M - Standard Specification for Low and Intermediate Tensile Strength Carbon Steel Plates 2018.
- N. ASTM A307 - Standard Specification for Carbon Steel Bolts, Studs, and Threaded Rod 60 000 PSI Tensile Strength 2021.
- O. ASTM A501/A501M - Standard Specification for Hot-Formed Welded and Seamless Carbon Steel Structural Tubing 2021.
- P. ASTM B26/B26M - Standard Specification for Aluminum-Alloy Sand Castings 2018, with Editorial Revision.
- Q. ASTM B85/B85M - Standard Specification for Aluminum-Alloy Die Castings 2018, with Editorial Revision.
- R. ASTM B209 - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate 2014.
- S. ASTM B209M - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate (Metric) 2014.

- T. ASTM B210/B210M - Standard Specification for Aluminum and Aluminum-Alloy Drawn Seamless Tubes 2019a.
- U. ASTM B211/B211M - Standard Specification for Aluminum and Aluminum-Alloy Rolled or Cold Finished Bar, Rod, and Wire 2019.
- V. ASTM B85/B85M - Standard Specification for Aluminum-Alloy Die Castings 2018, with Editorial Revision.
- W. ASTM F3125/F3125M - Standard Specification for High Strength Structural Bolts and Assemblies, Steel and Alloy Steel, Heat Treated, Inch Dimensions 120 ksi and 150 ksi Minimum Tensile Strength, and Metric Dimensions 830 MPa and 1040 MPa Minimum Tensile Strength 2022.
- X. AWS A2.4 - Standard Symbols for Welding, Brazing, and Nondestructive Examination 2020.
- Y. AWS B2.1/B2.1M - Specification for Welding Procedure and Performance Qualification 2021.
- Z. AWS D1.1/D1.1M - Structural Welding Code - Steel 2020, with Errata (2022).
- AA. AWS D1.2/D1.2M - Structural Welding Code - Aluminum 2014, with Errata (2020).
- BB. IAS AC172 - Accreditation Criteria for Fabricator Inspection Programs for Structural Steel AC172 2019.
- CC. SSPC-Paint 15 - Steel Joist Shop Primer/Metal Building Primer 2004.
- DD. SSPC-Paint 20 - Zinc-Rich Coating (Type I - Inorganic, and Type II - Organic) 2019.
- EE. SSPC-SP 2 - Hand Tool Cleaning 2018.

#### **1.04 SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide manufacturer's data sheets on each ladder safety system product to be used, including installation instructions.
- C. Shop Drawings:
  - 1. Indicate profiles, sizes, connection attachments, reinforcing, anchorage, size and type of fasteners, and accessories. Include erection drawings, elevations, and details where applicable.
  - 2. Indicate welded connections using standard AWS A2.4 welding symbols. Indicate net weld lengths.
- D. Certificate: Provide documentation that ladder safety system products of this section meet or exceed cited 29 CFR 1910.28, 29 CFR 1910.29, ANSI/ASSP Z359.16, and ANSI A14.3 requirements.
- E. Welders' Qualification Statement: Welders' certificates in accordance with AWS B2.1/B2.1M and dated no more than 12 months before start of scheduled welding work.
- F. Fabricator's Qualification Statement: Provide documentation showing steel fabricator is accredited under IAS AC172.

#### **1.05 QUALITY ASSURANCE**

- A. Design under direct supervision of a Professional Structural Engineer experienced in design of this work and licensed in the state Florida.
- B. Welder Qualifications: Welding processes and welding operators qualified in accordance with AWS D1.1/D1.1M and AWS D1.2/D1.2M and dated no more than 12 months before start of scheduled welding work.

### **PART 2 PRODUCTS**

#### **201 MATERIALS - STEEL**

- A. Steel Sections: ASTM A36/A36M.
- B. Steel Tubing: ASTM A501/A501M hot-formed structural tubing.
- C. Plates: ASTM A283/A283M.

- D. Pipe: ASTM A53/A53M, Grade B Schedule 40, black finish.
- E. Mechanical Fasteners: Same material or compatible with materials being fastened; type consistent with design and specified quality level.
- F. Bolts, Nuts, and Washers: ASTM A307, plain.
- G. Bolts, Nuts, and Washers: ASTM F3125/F3125M, Type 1, plain.
- H. Welding Materials: AWS D1.1/D1.1M; type required for materials being welded.
- I. Shop and Touch-Up Primer: SSPC-Paint 15, complying with VOC limitations of authorities having jurisdiction.
- J. Touch-Up Primer for Galvanized Surfaces: SSPC-Paint 20, Type I - Inorganic, complying with VOC limitations of authorities having jurisdiction.

## **202 MATERIALS - ALUMINUM**

- A. Extruded Aluminum: ASTM B211/B211M, 6063 alloy, T6 temper.
- B. Sheet Aluminum: ASTM B209 (ASTM B209M), 5052 alloy, H32 or H22 temper.
- C. Aluminum-Alloy Drawn Seamless Tubes: ASTM B210/B210M, 6063 alloy, T6 temper.
- D. Aluminum-Alloy Bars: ASTM B211/B211M, 6061 alloy, T6 temper.
- E. Aluminum-Alloy Sand Castings: ASTM B26/B26M.
- F. Aluminum-Alloy Die Castings: ASTM B85/B85M .
- G. Bolts, Nuts, and Washers: Stainless steel.
- H. Welding Materials: AWS D1.2/D1.2M; type required for materials being welded.

## **203 FABRICATION**

- A. Fit and shop assemble items in largest practical sections, for delivery to site.
- B. Fabricate items with joints tightly fitted and secured.
- C. Grind exposed joints flush and smooth with adjacent finish surface. Make exposed joints butt tight, flush, and hairline. Ease exposed edges to small uniform radius.
- D. Supply components required for anchorage of fabrications. Fabricate anchors and related components of same material and finish as fabrication, except where specifically noted otherwise.

## **204 FABRICATED LADDERS**

- A. Ladders: Steel; in compliance with ANSI A14.3; with mounting brackets and attachments; prime paint finish.

## **205 PREFABRICATED LADDERS**

- A. Prefabricated Ladder: Welded metal unit complying with ANSI A14.3; factory fabricated to greatest degree practical and in the largest components possible.
  - 1. Components: Manufacturer's standard rails, rungs, treads, handrails. returns, platforms and safety devices complying with the requirements of the MATERIALS article of this section.
  - 2. Materials: Aluminum; ASTM B211/B211M 6063 alloy, T52 temper.
  - 3. Finish: Manufacturer's standard clear anodized coating, comply with AAMA 611, Class 1.
  - 4. Manufacturers:
    - a. Industrial Ladder & Scaffolding, Inc.: [www.anyladder.com/#sle](http://www.anyladder.com/#sle).
    - b. O'Keeffe's Inc; Model 500: [www.okeeffes.com/#sle](http://www.okeeffes.com/#sle).
    - c. Precision Ladders, LLC; Fixed Aluminium Wall Ladder: [www.precisionladders.com/#sle](http://www.precisionladders.com/#sle).
    - d. Substitutions: See Section 01 60 00 - Product Requirements.
- B. Prefabricated Ship Ladder: Welded metal unit complying with ANSI A14.3; factory fabricated to greatest degree practical and in the largest components possible.
  - 1. Materials: Aluminum; ASTM B211/B211M 6063 alloy, T52 temper.

2. Incline: 60 degrees.
3. Finish: Powder coat; color to be selected by Architect from manufacturer's standard range.
4. Finish: Manufacturer's standard clear anodized coating, comply with AAMA 611, Class 1.
5. Manufacturers:
  - a. O'Keeffe's Inc; Model 520: [www.okeeffes.com/#sle](http://www.okeeffes.com/#sle).
  - b. Precision Ladders, LLC; Aluminium Ship Stairs: [www.precisionladders.com/#sle](http://www.precisionladders.com/#sle).
  - c. Substitutions: See Section 01 60 00 - Product Requirements.

## 206 LADDER SAFETY SYSTEMS

- A. Climbing Ladder Fall Arrest System (CLAFS): Comply with 29 CFR 1910.29, 29 CFR 1926.1053, Section 7 of ANSI A14.3 and ANSI/ASSP Z359.16; climbing ladder fall arrest system allows worker to climb up and down using both hands; does not require employee continuously, hold, push, or pull any part of system while climbing.
  1. Install on new fixed ladders over 24 feet (7315 mm) in height.
  2. Anchorage: Fixed ladder meeting requirements of 29 CFR 1910.23.
  3. Rigid Carrier: Fixed 304 stainless steel U-shaped slotted track with top, bottom and intermediate supports; meeting requirements of ANSI/ASSP Z359.16.
  4. Fall Arrester: Stainless steel and aluminum automatic pass-through carrier sleeve fall arrester meeting requirements of ANSI/ASSP Z359.15 and ANSI/ASSP Z359.16; compatible with carrier.
    - a. If designed to be removable from carrier, arrester removable only by at least two deliberate manual action(s) by user.
    - b. Includes an anti-inversion device to prevent installation of carrier sleeve upside down on carrier.
    - c. Carrier sleeve movement is automatic and does not require continuous manual intervention during climbing or descending.
    - d. Includes panic grab (secondary locking mechanism) feature.
  5. Manufacturers; ANSI/ASSP Z359.16-compliant:
    - a. 3M Personal Safety Division: [www.3M.com/FallProtection/#sle](http://www.3M.com/FallProtection/#sle).
    - b. MSA Safety Incorporated: [www.msasafety.com/#sle](http://www.msasafety.com/#sle).
    - c. Substitutions: See Section 01 60 00 - Product Requirements.
- B. Ladder Safety System: Comply with 29 CFR 1910.29, 29 CFR 1926.1053, and Section 7 of ANSI A14.3; ladder safety system allows the worker to climb up and down using both hands; does not require the employee continuously, hold, push, or pull any part of the system while climbing.
  1. Install on new fixed ladders over 24 feet (7315 mm) in height.
  2. Rigid Carrier: Fixed 304 stainless steel U-shaped slotted track with top, bottom and intermediate supports.
    - a. Provide with stainless steel extension post at top of ladder.
  3. Fall Arrester: Stainless steel automatic pass-through carrier sleeve fall arrester; compatible with carrier.
  4. Manufacturers; Non-ANSI/ASSP Z359.16 compliant:

## 207 FINISHES - STEEL

- A. Prime paint steel items.
  1. Do not prime surfaces in direct contact with concrete.
  2. Do not prime surfaces where field welding is required.
- B. Prepare surfaces to be primed in accordance with SSPC-SP2.
- C. Clean surfaces of rust, scale, grease, and foreign matter prior to finishing.
- D. Prime Painting: One coat.
- E. Galvanizing of Structural Steel Members: Galvanize after fabrication to ASTM A123/A123M requirements. Provide minimum 1.7 oz/sq ft galvanized coating. ( Provide minimum 530 g/sq m galvanized coating.)

- F. Galvanizing of Non-structural Items: Galvanize after fabrication to ASTM A123/A123M requirements.

**208 FINISHES - ALUMINUM**

- A. Exterior Aluminum Surfaces: Class I natural anodized.
- B. Interior Aluminum Surfaces: Class I natural anodized.
- C. Class I Natural Anodized Finish: AAMA 611 AA-M12C22A41 Clear anodic coating not less than 0.7 mils (0.018 mm) thick.
- D. Apply one coat of bituminous paint to concealed aluminum surfaces in contact with cementitious or dissimilar materials.

**209 FABRICATION TOLERANCES**

- A. Squareness: 1/8 inch (3 mm) maximum difference in diagonal measurements.
- B. Maximum Offset Between Faces: 1/16 inch (1.5 mm).
- C. Maximum Misalignment of Adjacent Members: 1/16 inch (1.5 mm).
- D. Maximum Bow: 1/8 inch (3 mm) in 48 inches (1.2 m).
- E. Maximum Deviation From Plane: 1/16 inch (1.5 mm) in 48 inches (1.2 m).

**PART 3 EXECUTION**

**301 EXAMINATION**

- A. Verify that field conditions are acceptable and are ready to receive work.
- B. Confirm that the ladder structure to which the ladder safety system is installed is capable of withstanding the loads applied by the system in the event of a fall.

**302 PREPARATION**

- A. Clean and strip primed steel items to bare metal where site welding is required.
- B. Supply setting templates to the appropriate entities for steel items required to be cast into concrete or embedded in masonry.

**303 INSTALLATION**

- A. Install items plumb and level, accurately fitted, free from distortion or defects.
- B. Install ladder safety system in accordance with manufacturer's instructions.
- C. Provide for erection loads, and for sufficient temporary bracing to maintain true alignment until completion of erection and installation of permanent attachments.
- D. Field weld components as indicated on drawings.
- E. Perform field welding in accordance with AWS D1.1/D1.1M.
- F. Obtain approval prior to site cutting or making adjustments not scheduled.
- G. After erection, prime welds, abrasions, and surfaces not shop primed, except surfaces to be in contact with concrete.

**304 TOLERANCES**

- A. Maximum Variation From Plumb: 1/4 inch (6 mm) per story, non-cumulative.
- B. Maximum Offset From True Alignment: 1/4 inch (6 mm).
- C. Maximum Out-of-Position: 1/4 inch (6 mm).

**END OF SECTION 05 51 33**

**SECTION 05 52 13  
PIPE AND TUBE RAILINGS**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Wall mounted handrails.
- B. Stair railings and guardrails.
- C. Free-standing railings at steps.
- D. Balcony railings and guardrails.

**1.02 RELATED REQUIREMENTS**

- A. Section 03 30 00 - Cast-in-Place Concrete: Placement of anchors in concrete.
- B. Section 05 51 00 - Metal Stairs: Handrails other than those specified in this section.
- C. Section 09 91 13 - Exterior Painting: Paint finish.
- D. Section 09 91 23 - Interior Painting: Paint finish.

**1.03 REFERENCE STANDARDS**

- A. AAMA 611 - Voluntary Specification for Anodized Architectural Aluminum 2020.
- B. AAMA 2603 - Voluntary Specification, Performance Requirements and Test Procedures for Pigmented Organic Coatings on Aluminum Extrusions and Panels (with Coil Coating Appendix) 2021.
- C. AAMA 2604 - Voluntary Specification, Performance Requirements and Test Procedures for High Performance Organic Coatings on Aluminum Extrusions and Panels (with Coil Coating Appendix) 2021, with Errata (2022).
- D. ADA Standards - 2010 ADA Standards for Accessible Design 2010.
- E. AISC 201 - AISC Certification Program for Structural Steel Fabricators, Standard for Steel Building Structures 2006.
- F. ASTM A500/A500M - Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes 2021a.
- G. ASTM B211/B211M - Standard Specification for Aluminum and Aluminum-Alloy Rolled or Cold Finished Bar, Rod, and Wire 2019.
- H. ASTM B241/B241M - Standard Specification for Aluminum and Aluminum-Alloy Seamless Pipe and Seamless Extruded Tube 2016.
- I. ASTM B429/B429M - Standard Specification for Aluminum-Alloy Extruded Structural Pipe and Tube 2020.
- J. ASTM B483/B483M - Standard Specification for Aluminum and Aluminum-Alloy Drawn Tube and Drawn Pipe for General Purpose Applications 2021.
- K. ASTM E935 - Standard Test Methods for Performance of Permanent Metal Railing Systems and Rails for Buildings 2021.
- L. AWS A2.4 - Standard Symbols for Welding, Brazing, and Nondestructive Examination 2020.
- M. AWS B2.1/B2.1M - Specification for Welding Procedure and Performance Qualification 2021.
- N. AWS D1.1/D1.1M - Structural Welding Code - Steel 2020, with Errata (2022).
- O. IAS AC172 - Accreditation Criteria for Fabricator Inspection Programs for Structural Steel AC172 2019.

**1.04 SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Shop Drawings: Indicate profiles, sizes, connection attachments, anchorage, size and type of fasteners, and accessories.

- C. Samples: Submit two, 12" long samples of handrail. Submit two samples of elbow, wall bracket, and end stop.
- D. Welders' Qualification Statement: Welders' certificates in accordance with AWS B2.1/B2.1M and dated within the previous 12 months.
- E. Designer's Qualification Statement.
- F. Fabricator's Qualification Statement.

#### **1.05 QUALITY ASSURANCE**

- A. Structural Designer Qualifications: Professional Structural Engineer experienced in design of this work and licensed in the State in which the Project is located, or personnel under direct supervision of such an engineer.
- B. Welder Qualifications: Welding processes and welding operators qualified within previous 12 months.
- C. Fabricator Qualifications:
  - 1. A qualified steel fabricator that is certified by the American Institute for Steel Construction (AISC) under AISC 201.
- D. Warr
  - 1. See Section 01 7800 - Closeout Submittals, for additional warranty requirements.
  - 2. Submit manufacturer's standard ten-year finish warranty.

### **PART 2 PRODUCTS**

#### **201 MANUFACTURERS**

- A. Handrails and Railings:
  - 1. Alumi-Guard: [www.alumi-guard.com/#sle](http://www.alumi-guard.com/#sle).
  - 2. Spaceguard Products; BeastWire Mezzanine Safety Railguard System: [www.spaceguardproducts.com/#sle](http://www.spaceguardproducts.com/#sle).
  - 3. The Wagner Companies; [\_\_\_\_]: [www.wagnercompanies.com/#sle](http://www.wagnercompanies.com/#sle).

#### **202 RAILINGS - GENERAL REQUIREMENTS**

- A. Design, fabricate, and test railing assemblies in accordance with the most stringent requirements of applicable local code.
- B. Distributed Loads: Design railing assembly, wall rails, and attachments to resist distributed force of 75 pounds per linear foot (1095 N/m) applied to the top of the assembly and in any direction, without damage or permanent set. Test in accordance with ASTM E935
- C. Concentrated Loads: Design railing assembly, wall rails, and attachments to resist a concentrated force of 200 pounds (890 N) applied at any point on the top of the assembly and in any direction, without damage or permanent set. Test in accordance with ASTM E935
- D. Allow for expansion and contraction of members and building movement without damage to connections or members.
- E. Dimensions: See drawings for configurations and heights.
  - 1. Intermediate Rails: 1-1/4 by 1 inch (32 by 25 mm) rectangular.
- F. Provide anchors and other components as required to attach to structure, made of same materials as railing components unless otherwise indicated; where exposed fasteners are unavoidable provide flush countersunk fasteners.
- G. Provide slip-on non-weld mechanical fittings to join lengths, seal open ends, and conceal exposed mounting bolts and nuts, including but not limited to elbows, T-shapes, splice connectors, flanges, escutcheons, and wall brackets.

#### **203 ALUMINUM MATERIALS**

- A. Aluminum Pipe: Schedule 40; ASTM B429/B429M, ASTM B241/B241M, or ASTM B483/B483M.

- B. Aluminum Tube: Minimum wall thickness of 0.127 inch (3.2 mm); ASTM B429/B429M, ASTM B241/B241M, or ASTM B483/B483M.
- C. Solid Bars and Flats: ASTM B211/B211M.

#### **204 STEEL RAILING SYSTEM**

- A. Non-Weld Mechanical Fittings: Slip-on, galvanized malleable iron castings, for Schedule 40 pipe, with flush setscrews for tightening by standard hex wrench, no bolts or screw fasteners.
- B. Welding Fittings: Factory- or shop-welded from matching pipe or tube; seams continuously welded; joints and seams ground smooth.
- C. Exposed Fasteners: No exposed bolts or screws.

#### **205 FABRICATION**

- A. Accurately form components to suit specific project conditions and for proper connection to building structure.
- B. Fit and shop assemble components in largest practical sizes for delivery to site.
- C. Fabricate components with joints tightly fitted and secured. Provide spigots and sleeves to accommodate site assembly and installation.
- D. Welded Joints:
  - 1. Exterior Components: Continuously seal joined pieces by intermittent welds and plastic filler. Drill condensate drainage holes at bottom of members at locations that will not encourage water intrusion.
  - 2. Interior Components: Continuously seal joined pieces by intermittent welds and plastic filler.
  - 3. Grind exposed joints flush and smooth with adjacent finish surface. Make exposed joints butt tight, flush, and hairline. Ease exposed edges to small uniform radius.

#### **206 ALUMINUM FINISHES**

- A. Class I Color Anodized Finish: AAMA 611 AA-M12C22A44 Electrolytically deposited colored anodic coating not less than 0.7 mils (0.018 mm) thick.

### **PART 3 EXECUTION**

#### **301 EXAMINATION**

- A. Verify that field conditions are acceptable and are ready to receive work.

#### **302 PREPARATION**

- A. Apply one coat of bituminous paint to concealed aluminum surfaces that will be in contact with cementitious or dissimilar materials.

#### **303 INSTALLATION**

- A. Install in accordance with manufacturer's instructions.
- B. Install components plumb and level, accurately fitted, free from distortion or defects, with tight joints.
- C. Install railings in compliance with ADA Standards for accessible design at applicable locations.
- D. Anchor railings securely to structure.

#### **304 TOLERANCES**

- A. Maximum Variation From Plumb: 1/4 inch (6 mm) per floor level, non-cumulative.
- B. Maximum Offset From True Alignment: 1/4 inch (6 mm).
- C. Maximum Out-of-Position: 1/4 inch (6 mm).

**END OF SECTION 05 52 13**

**SECTION 05 80 00**  
**ARCHITECTURAL JOINT SYSTEMS**

**PART – GENERAL**

**1.01 RELATED DOCUMENTS**

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

**1.02 SUMMARY**

- A. Types of joints for which architectural joint systems are specified include the following:
  - 1. Exterior roof joints.
  - 2. Interior pedestrian traffic joints.
  - 3. Interior wall joints.
- B. Related Sections include the following:
  - 1. Division 3, Section 03 30 00 - CONCRETE WORK for block-outs and cast-in anchorage and frames for architectural joint systems in concrete floors and walls.
  - 2. Division 7, Section 07 60 00 - SHEET METAL FLASHING AND TRIM for sheet metal roof and wall joint systems.
  - 3. Division 7, Section 07 84 00 - THROUGH-PENETRATION FIRESTOP SYSTEMS for general requirements and associated materials for sealing penetrations in fire-rated partitions and assemblies.
  - 4. Division 7, Section 07 92 00 - JOINT SEALANTS for elastomeric sealants and preformed compressed-foam sealants without metal frames.

**1.03 DEFINITIONS**

- A. Architectural Joint System: Any filler or cover used to span, fill, cover, or seal a joint, except expanding foam seals and poured or foamed in-place sealants.
- B. Cyclic Movement: Periodic change between widest and narrowest joint widths in an automatically mechanically controlled system.
- C. Fire Barriers: Any material or material combination, when fire tested after cycling, designated to resist passage of flame and hot gases through a movement joint.
- D. Maximum Joint Width: Widest linear gap a joint system tolerates and performs its designed function without damaging its functional capabilities.
- E. Minimum Joint Width: Narrowest linear gap a joint system tolerates and performs its designed function without damaging its functional capabilities.
- F. Movement Capability: Value obtained from the difference between widest and narrowest widths of a joint opening typically expressed in numerical values (mm or inches) or a percentage of nominal value of joint width.
- G. Nominal Joint Width: Width of linear gap indicated as representing the conditions existing when architectural joint systems will be installed or, if no nominal joint width is indicated, a width equal to the sum of maximum and minimum joint widths divided by two.

**1.04 PERFORMANCE REQUIREMENTS**

- A. General: Provide factory-fabricated architectural joint systems capable of withstanding the types of loads and of accommodating the kinds of movement, and the other functions for which they are designed including those specified below, without failure. Types of failure include those listed in Appendix X3 of ASTM E 1399.
  - 1. Pedestrian Traffic Joints: Support pedestrian traffic across joint.
  - 2. Exterior Joints: Maintain continuity of weather enclosure.
  - 3. Joints in Fire-Resistance-Rated Assemblies: Maintain fire-resistance ratings of assemblies.
  - 4. Joints in Smoke Barriers: Maintain integrity of smoke barrier.
  - 5. Joints in Acoustically Rated Assemblies: Inhibit passage of airborne noise.

6. Other Joints: Where indicated, provide joint systems that prevent penetration of water, moisture, and other substances deleterious to building components or content.
7. Joints in Surfaces with Architectural Finishes: Serve as finished architectural joint closures.

#### **1.05 SUBMITTALS**

- A. Product Data: Include manufacturer's product specifications, construction details, material and finish descriptions, and dimensions of individual components and seals.
- B. Shop Drawings: For each joint system specified, provide the following:
  1. Placement Drawings: Include line diagrams showing entire route of each joint system, plans, elevations, sections, details, joints, splices, locations of joints and splices, and attachments to other Work. Where joint systems change planes, provide Isometric Drawings depicting how components interconnect to achieve continuity of joint covers and fillers.
- C. Samples for Initial Selection: Manufacturer's color charts consisting of units or sections of units showing the full range of colors, textures, and patterns available for each exposed metal and elastomeric material of joint system indicated.
  1. Include similar Samples of material for joints and accessories involving color selection.
- D. Product Test Reports: From a qualified testing agency indicating architectural joint systems comply with requirements, based on comprehensive testing of current products.

#### **1.06 QUALITY ASSURANCE**

- A. Source Limitations: Obtain architectural joint systems through one source from a single manufacturer. Coordinate compatibility with adjoining joint systems specified in other Sections.
- B. Fire-Test-Response Characteristics: Where indicated, provide joint systems incorporating fire barriers that are identical to those of assemblies tested for fire resistance per ASTM E 119 and ASTM E 814, including hose-stream test of vertical wall assemblies, by a testing and inspecting agency acceptable to authorities having jurisdiction.
- C. Product Options: Drawings indicate size, profiles, and dimensional requirements of architectural joint systems and are based on the specific systems indicated. Other manufacturers' systems complying with requirements may be considered. Refer to Division 1 requirements regarding substitutions.
  1. Do not modify intended aesthetic effects, as judged solely by Architect, except with Architect's approval. If modifications are proposed, submit comprehensive explanatory data to Architect for review.

### **PART – PRODUCTS**

#### **201 MANUFACTURERS**

- A. Basis-of-Design Products: The design for each architectural joint system specified in Part 2 "Architectural Joint Systems" Article below is based on the products of MM Systems Corporation. Comparable joint systems from the following manufacturers may be submitted for review:
  1. Balco Metalines.
  2. Conspec Systems Inc.
  3. EMSEAL Joint Systems, Ltd.
  4. Architectural Art Mfg. Inc.

#### **202 MATERIALS**

- A. Aluminum: ASTM B 221, alloy 6063-T5 for extrusions; ASTM B 209, alloy 6061-T6 for sheet and plate.
  1. Apply manufacturer's standard protective coating on aluminum surfaces to be placed in contact with cementitious materials.
  2. Recycled Content of Aluminum Products: Provide products with an average recycled content of aluminum products so postconsumer recycled content plus one-half of pre-consumer recycled content is not less than 60 percent.

- B. **Preformed Seals:** Single or multicellular extruded elastomeric seals designed with or without continuous, longitudinal, internal baffles. Formed to be installed in frames or with anchored flanges, in color indicated or, if not indicated, as selected by Architect from manufacturer's standard colors.
- C. **Strip Seals:** Elastomeric membrane or tubular extrusions with a continuous longitudinal internal baffle system throughout complying with ASTM E 1783; used with compatible frames, flanges, and molded-rubber anchor blocks.
- D. **Compression Seals:** Preformed, elastomeric extrusions having internal baffle system complying with ASTM E 1612 in sizes and profiles indicated or as recommended by manufacturer.
- E. **Fire Barriers:** Any material or material combination, when fire tested after cycling, designated to resist the passage of flame and hot gases through a movement joint.
- F. **Accessories:** Manufacturer's standard anchors, clips, fasteners, set screws, spacers, flexible moisture barrier and filler materials, drain tubes, lubricants, adhesives, and other accessories compatible with material in contact, as indicated or required for complete installations.

### **203 ARCHITECTURAL JOINT SYSTEMS**

- A. **General:** Provide joint systems of design, basic profile, materials, and operation indicated. Provide units with the capability to accommodate joint widths indicated and variations in adjacent surfaces.
  - 1. Furnish units in longest practicable lengths to minimize number of end joints. Provide hairline mitered corners where joint changes directions or abuts other materials.
  - 2. Include closure materials and transition pieces, tee-joints, corners, curbs, cross-connections, and other accessories as required to provide continuous joint systems.
  - 3. **Frames for Strip Seals:** Designed with semi closed cavity that provides a mechanical lock for seals of type indicated.
- B. **Interior Floor Joints:**
  - 1. **Floor-to-Floor:**
    - a. **Basis of Design:** MM Systems Corporation "FSSR-150".
    - b. **Nominal Joint Width:** 1-1/2 inches.
    - c. **Type of Movement Capability:** Expansion and contraction.
    - d. **Exposed Frame Material:** Aluminum.
    - e. **Elastomeric Gasket:** Manufacturer's standard. Color to be selected by Architect from manufacturer's full range.
  - 2. **Floor-to-Wall:**
    - a. **Basis of Design:** MM Systems Corporation "FSSRE-150".
    - b. **Nominal Joint Width:** 1-1/2 inches.
    - c. **Type of Movement Capability:** Expansion and contraction.
    - d. **Exposed Frame Material:** Aluminum.
    - e. **Elastomeric Gasket:** Manufacturer's standard. Color to be selected by Architect from manufacturer's full range.
- C. **Interior Wall Joints:**
  - 1. **Gypsum Board-to-Gypsum Board (in plane).**
    - a. **Basis of Design:** MM Systems Corporation "FSW-150".
      - 1) **Nominal Joint Width:** 1-1/2 inches.
    - b. **Type of Movement Capability:** Expansion and contraction.
    - c. **Exposed Frame Material:** Aluminum.
    - d. **Elastomeric Gasket:** Manufacturer's standard. Color to be selected by Architect from manufacturer's full range.
  - 2. **Gypsum Board-to-Gypsum Board (Perpendicular).**
    - a. **Basis of Design:** MM Systems Corporation "FSWL-150".
      - 1) **Nominal Joint Width:** 1-1/2 inches.
    - b. **Type of Movement Capability:** Expansion and contraction.

- c. Exposed Frame Material: Aluminum.
- d. Elastomeric Gasket: Manufacturer's standard. Color to be selected by Architect from manufacturer's full range.
- 3. Gypsum Board-to-Masonry (Perpendicular).
  - a. Basis of Design: MM Systems Corporation "FSAL-150".
    - 1) Nominal Joint Width: 1-1/2 inches.
  - b. Type of Movement Capability: Expansion and contraction.
  - c. Exposed Frame Material: Aluminum.
  - d. Elastomeric Gasket: Manufacturer's standard. Color to be selected by Architect from manufacturer's full range.
- 4. Tilt up-to-Tilt up
  - a. Basis of Design: MM Systems Corporation "X-M-3".
    - 1) Nominal Joint Width: 2-1/4 inches.
- D. Roof Joint:
  - 1. Roof-to-Roof
    - a. Basis of Design: MM Systems Corporation "Series WJK Aluminum".
    - b. Nominal Joint Width: 1-1/2 inches.
  - 2. Roof-to-Wall
    - a. Basis of Design: MM Systems Corporation "Series WJL Aluminum".
    - b. Nominal Joint Width: 1-1/2 inches.

#### **204 FINISHES, GENERAL**

- A. Comply with NAAMM's "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.

#### **205 ALUMINUM FINISHES**

- A. Finish designations prefixed by AA comply with the system established by the Aluminum Association for designating aluminum finishes.
- B. Class II, Clear Anodic Finish: AA-M12C22A31 (Mechanical Finish: nonspecular as fabricated; Chemical Finish: etched, medium matte; Anodic Coating: Architectural Class II, clearcoating 0.010 mm or thicker) complying with AAMA 607.1.

### **PART – EXECUTION**

#### **301 PREPARATION**

- A. Prepare substrates according to architectural joint system manufacturer's written instructions.
- B. Coordinate and furnish anchorages, Placement Drawings, and instructions for installing joint systems to be embedded in or anchored to concrete or to have recesses formed into edges of concrete slab for later placement and grouting-in of frames.
- C. Fastening to In-Place Construction: Provide anchorage devices and fasteners where necessary to secure joint systems to in-place construction, including threaded fasteners with drilled-in expansion shields for masonry and concrete where anchoring members are not embedded in concrete. Provide fasteners of metal, type, and size to suit type of construction indicated and to provide for secure attachment of joint systems.

#### **302 INSTALLATION**

- A. Comply with manufacturer's written instructions for handling and installing architectural joint assemblies and materials, unless more stringent requirements are indicated.
- B. Coordinate installation of architectural joint assembly materials and associated work so complete assemblies comply with assembly performance requirements.
- C. Terminate exposed ends of exterior architectural joint assemblies with factory-fabricated termination devices to maintain waterproof system.

- D. Install factory-fabricated transitions between building expansion-joint cover assemblies and roof expansion-joint assemblies to provide continuous, uninterrupted, watertight construction.
- E. Cutting, Fitting, and Placement: Perform cutting, drilling, and fitting required to install joint systems.
  - 1. Install joint cover assemblies in true alignment and proper relationship to joints and adjoining finished surfaces measured from established lines and levels.
  - 2. Allow adequate free movement for thermal expansion and contraction of metal to avoid buckling.
  - 3. Set covers in horizontal surfaces at elevations that place exposed surfaces flush with adjoining finishes.
  - 4. Locate wall covers in continuous contact with adjacent surfaces.
  - 5. Securely attach in place with required accessories.
  - 6. Locate anchors at interval recommended by manufacturer, but not less than 3 inches from each end and not more than 24 inches o.c.
- F. Continuity: Maintain continuity of joint systems with a minimum number of end joints and align metal members. Cut and fit ends to produce joints that will accommodate thermal expansion and contraction of metal to avoid buckling of frames. Adhere flexible filler materials, if any, to frames with adhesive or pressure-sensitive tape as recommended by manufacturer.
- G. Extruded Preformed Seals: Install seals to comply with manufacturer's written instructions and with minimum number of end joints.
  - 1. For straight sections, provide preformed seals in continuous lengths.
  - 2. Vulcanize or heat-weld field splice joints in preformed seal material to provide watertight joints using procedures recommended by manufacturer.
  - 3. Apply adhesive, epoxy, or lubricant adhesive approved by manufacturer to both frame interfaces before installing preformed seals.
  - 4. Seal transitions according to manufacturer's written instructions.
- H. Joint Systems with Seals: Seal end joints within continuous runs and joints at transitions according to manufacturer's written instructions to provide a watertight installation.
- I. Fire Barriers: Install fire barriers to provide continuous, uninterrupted fire resistance throughout length of joint, including transitions and end joints.

### **303 CLEANING AND PROTECTION**

- A. Do not remove protective covering until finish work in adjacent areas is complete. When protective covering is removed, clean exposed metal surfaces to comply with manufacturer's written instructions.

**END OF SECTION 05 80 00**

**SECTION 06 10 00  
ROUGH CARPENTRY**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Nonstructural dimension lumber framing.
- B. Sheathing.
- C. Roof-mounted curbs.
- D. Roofing nailers.
- E. Roofing cant strips.
- F. Preservative treated wood materials.
- G. Communications and electrical room mounting boards.
- H. Concealed wood blocking, nailers, and supports.
- I. Miscellaneous wood nailers, furring, and grounds.

**1.02 RELATED REQUIREMENTS**

- A. Section 03 30 00 - Cast-in-Place Concrete: Setting anchors in concrete.
- B. Section 05 12 00 - Structural Steel Framing: Prefabricated beams and columns for support of wood framing.
- C. Section 06 18 00 - Glued-Laminated Construction.
- D. Section 07 25 00 - Weather Barriers: Air barrier over sheathing.
- E. Section 07 25 00 - Weather Barriers: Water-resistive barrier over sheathing.
- F. Section 07 62 00 - Sheet Metal Flashing and Trim: Sill flashings.
- G. Section 07 72 00 - Roof Accessories: Prefabricated roof curbs.
- H. Section 09 21 16 - Gypsum Board Assemblies: Gypsum-based sheathing.

**1.03 REFERENCE STANDARDS**

- A. ANSI A208.1 - American National Standard for Particleboard 2022.
- B. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware 2016a.
- C. AWPA U1 - Use Category System: User Specification for Treated Wood 2022.
- D. PS 20 - American Softwood Lumber Standard 2021.
- E. SPIB (GR) - Grading Rules 2014.
- F. WCLIB (GR) - Standard Grading Rules for West Coast Lumber No. 17 2018.

**1.04 SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements for submittal procedures.
- B. Product Data: Provide technical data on insulated sheathing, wood preservative materials, and application instructions.

**PART 2 PRODUCTS**

**2.01 GENERAL REQUIREMENTS**

- A. Dimension Lumber: Comply with PS 20 and requirements of specified grading agencies.
  - 1. If no species is specified, provide species graded by the agency specified; if no grading agency is specified, provide lumber graded by grading agency meeting the specified requirements.
  - 2. Grading Agency: Grading agency whose rules are approved by the Board of Review, American Lumber Standard Committee at [www.alsc.org](http://www.alsc.org), and who provides grading service for the species and grade specified; provide lumber stamped with grade mark

unless otherwise indicated.

## **202 TIMBERS FOR CONCEALED APPLICATIONS**

- A. Grading Agency: Southern Pine Inspection Bureau, Inc; SPIB (GR).
- B. Grading Agency: West Coast Lumber Inspection Bureau; WCLIB (GR).
- C. Sizes: Nominal sizes as indicated on drawings, S4S.
- D. Moisture Content: S-dry (23 percent maximum).
- E. Beams and Posts 5 inches (125 mm) and over in thickness:
  - 1. Grade: Select Structural.

## **203 CONSTRUCTION PANELS**

### **204 FACTORY WOOD TREATMENT**

- A. Treated Lumber and Plywood: Comply with requirements of AWPA U1 - Use Category System for wood treatments determined by use categories, expected service conditions, and specific applications. Fire Retardant Wood is not allowed.
  - 1. Preservative-Treated Wood: Provide lumber and plywood marked or stamped by an ALSC-accredited testing agency, certifying level and type of treatment in accordance with AWPA standards.

## **PART 3 EXECUTION**

### **301 PREPARATION**

- A. Coordinate installation of rough carpentry members specified in other sections.

### **302 INSTALLATION - GENERAL**

- A. Select material sizes to minimize waste.
- B. Reuse scrap to the greatest extent possible; clearly separate scrap for use on site as accessory components, including: shims, bracing, and blocking.
- C. Where treated wood is used on interior, provide temporary ventilation during and immediately after installation sufficient to remove indoor air contaminants.

### **303 INSTALLATION OF CONSTRUCTION PANELS**

- A. Roof Sheathing: Secure panels with long dimension perpendicular to framing members, with ends staggered and over firm bearing.
  - 1. Nail panels to framing; staples are not permitted.
- B. Communications and Electrical Room Mounting Boards: Secure with screws to studs with edges over firm bearing; space fasteners at maximum 24 inches (610 mm) on center on all edges and into studs in field of board.
  - 1. At fire-rated walls, install board over wall board indicated as part of the fire-rated assembly.
  - 2. Where boards are indicated as full floor-to-ceiling height, install with long edge of board parallel to studs.
  - 3. Install adjacent boards without gaps.

**END OF SECTION 06 10 00**

**SECTION 06 41 00**  
**ARCHITECTURAL WOOD CASEWORK**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Specially fabricated cabinet units.
- B. Countertops.
- C. Hardware.
- D. Factory finishing.

**1.02 RELATED REQUIREMENTS**

- A. Section 06 10 00 - Rough Carpentry: Support framing, grounds, and concealed blocking.
- B. Section 09 91 23 - Interior Painting: Field finishing of cabinet exterior.
- C. Section 09 93 00 - Staining and Transparent Finishing: Field finishing of cabinet exterior.

**1.03 REFERENCE STANDARDS**

- A. AWI (QCP) - Quality Certification Program Current Edition.
- B. AWMAC/WI (NAAWS) - North American Architectural Woodwork Standards 2021, with Errata.
- C. BHMA A156.9 - Cabinet Hardware 2020.
- D. NEMA LD 3 - High-Pressure Decorative Laminates 2005.

**1.04 SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Shop Drawings: Indicate materials, component profiles, fastening methods, jointing details, and accessories.
- C. Product Data: Provide data for hardware accessories.
- D. Samples: Submit actual samples of architectural cabinet construction, minimum 12 inches (300 mm) square, illustrating proposed cabinet, countertop, and shelf unit substrate and finish.
- E. Samples: Submit actual sample items of proposed pulls, hinges, shelf standards, and locksets, demonstrating hardware design, quality, and finish.
- F. Certificate: Submit labels and certificates required by quality assurance and quality control programs.
- G. Sustainable Design Submittal: Documentation for sustainably harvested wood-based components.

**1.05 QUALITY ASSURANCE**

- A. Fabricator Qualifications: Company specializing in fabricating the products specified in this section with minimum five years of documented experience.
  - 1. Company with at least one project in the past 5 years with value of woodwork within 20 percent of cost of woodwork for this Project.
  - 2. Accredited participant in the specified certification program prior to the commencement of fabrication and throughout the duration of the project.
- B. Quality Certification:
  - 1. Comply with AWI (QCP) woodwork association quality certification service/program in accordance with requirements for work specified in this section: [www.awiqcp.org/#sle](http://www.awiqcp.org/#sle).
    - a. This AWI (QCP) project is registered as project number .
  - 2. Provide labels or certificates indicating that the installed work complies with AWI/AWMAC/WI (AWS) or AWMAC/WI (NAAWS) requirements for grade or grades specified.
  - 3. Provide designated labels on shop drawings as required by certification program.
  - 4. Provide designated labels on installed products as required by certification program.

5. Submit certifications upon completion of installation that verifies this work is in compliance with specified requirements.
6. Replace, repair, or rework all work for which certification is refused.

## **PART 2 PRODUCTS**

### **201 MANUFACTURERS**

### **202 CABINETS**

- A. Quality Standard: Custom Grade, in accordance with AWI/AWMAC/WI (AWS) or AWMAC/WI (NAAWS), unless noted otherwise.
- B. Plastic Laminate Faced Cabinets: Custom grade.

### **203 WOOD-BASED COMPONENTS**

- A. Wood fabricated from old growth timber is not permitted.

### **204 LAMINATE MATERIALS**

- A. Manufacturers:
  1. Formica Corporation: [www.formica.com/#sle](http://www.formica.com/#sle).
  2. Panolam Industries International, Inc; Nevamar ChemGuard: [www.panolam.com/#sle](http://www.panolam.com/#sle).
  3. Wilsonart LLC: [www.wilsonart.com/#sle](http://www.wilsonart.com/#sle).
- B. Thermally Fused Laminate (TFL): Melamine resin, NEMA LD 3, Type VGL laminate panels.
  1. Manufacturers:
    - a. Wilsonart LLC: [www.wilsonart.com/#sle](http://www.wilsonart.com/#sle).

### **205 COUNTERTOPS**

- A. General: Refer to drawings for schedule/location of specific countertop materials.
  1. Fabricate in accordance with AWI/AWMAC/WI (AWS), Section 11 - Countertops, Custom Grade.
  2. Surface Burning Characteristics: Flame spread index of 25, maximum; smoke developed index of 450, maximum; when tested in accordance with ASTM E84.
- B. Plastic Laminate Countertops:
  1. High Pressure Decorative Laminate (HPDL) on 3/4" plywood.
    - a. Marine grade plywood (3/4") at wet areas or countertops with sinks.
  2. Surface Color and Pattern: As indicated on drawings.
  3. Exposed Edge Treatment: Square, substrate built up to minimum 1-1/4 inch (32 mm) thick; covered with matching laminate.
  4. Back and End Splashes: Same material, same construction.
  5. All countertop corners that are not captured by walls or other cabinets shall be radiused a minimum of the countertop thickness.
- C. Solid Surfacing Countertops: Solid Surfacing Sheet and Plastic Resin Castings: Complying with ISFA 2-01 and NEMA LD 3; acrylic resin, mineral filler, and pigments; homogenous, non-porous and capable of being worked and repaired using standard woodworking tools; no surface coating; color and pattern consistent throughout thickness.
  1. Manufacturers:
    - a. Dupont: [www.corian.com](http://www.corian.com).
    - b. Formica Corporation: [www.formica.com](http://www.formica.com).
    - c. Wilsonart: [www.wilsonart.com](http://www.wilsonart.com).
  2. Surface Burning Characteristics: Flame spread index of 25, maximum; smoke developed index of 450, maximum; when tested in accordance with ASTM E84.
  3. Finish on Exposed Surfaces: Matte, gloss rating of 5 to 20.
  4. Color and Pattern: As indicated on drawings.
- D. Other Components Thickness: 1/2 inch, minimum.
- E. Exposed Edge Treatment: Built up to minimum 1-1/4 inch thick; square edge; use marine edge at sinks.

- F. Back and End Splashes: Same sheet material, square top; minimum 4 inches high.
- G. Colors: As selected from LCSD Process Documentation dated 7 24 2020 showing colors for countertops and backsplashes.

## **206 ACCESSORIES**

- A. Adhesive: Type recommended by fabricator to suit application.
- B. Fasteners: Size and type to suit application.
- C. Bolts, Nuts, Washers, Lags, Pins, and Screws: Of size and type to suit application; galvanized or chrome-plated finish in concealed locations and stainless steel or chrome-plated finish in exposed locations.
- D. Concealed Joint Fasteners: Threaded steel.
- E. Adjustable Drawer Organization Systems: Drawer trays, dividers, and connectors.
  - 1. Products:
    - a. Blum, Inc; AMBIA-LINE; [www.blum.com/#sle](http://www.blum.com/#sle).
    - b. Blum, Inc; ORGA-LINE; [www.blum.com/#sle](http://www.blum.com/#sle).
    - c. Substitutions: See Section 01 60 00 - Product Requirements.
- F. Grommets: Standard plastic, painted metal, or rubber grommets for cut-outs, in color to match adjacent surface.
- G. Silencers: Use neoprene type with self-adhesive at all cabinet doors.

## **207 HARDWARE**

- A. Hardware: BHMA A156.9, types as recommended by fabricator for quality grade specified.
- B. Manufacturers: Provide Basis of Design as noted for each product or approved equal by the following manufacturers:
  - 1. Accuride International, Inc: [www.accuride.com](http://www.accuride.com).
  - 2. Epco: [www.epcohardware.com](http://www.epcohardware.com).
  - 3. Grant hardware Products by Hettich America, [www.hettichamerica.com](http://www.hettichamerica.com).
  - 4. Hafele America Co.: [www.hafele.com/us](http://www.hafele.com/us)
  - 5. Julius Blum Inc. [www.blum.com](http://www.blum.com).
  - 6. Knappe & Vogt Manufacturing Company: [www.knappeandvogt.com](http://www.knappeandvogt.com).
  - 7. Olympus Lock, Inc.: [www.olympus-lock.com](http://www.olympus-lock.com)
  - 8. Rockford Process Control, LLC: [rockfordprocesshingesandhardware.com](http://rockfordprocesshingesandhardware.com).
  - 9. Schlage: [www.schlage.com](http://www.schlage.com).
  - 10. Stanley: [www.stanleycommercialhardware.com](http://www.stanleycommercialhardware.com)
  - 11. Substitutions: See Section 01 6000 - Product Requirements.
- C. Adjustable Shelf Supports: Standard side-mounted system using recessed metal shelf standards or multiple holes for pin supports and coordinated self rests, polished chrome finish, for nominal 1 inch (25 mm) spacing adjustments.
  - 1. Product: Basis of Design: 233 & 237 ZC Series manufactured by Knappe & Vogt.
- D. Fixed Standard Shelf, Countertop, and Workstation Brackets:
  - 1. Material: Steel.
  - 2. Finish: Brushed; with clear, factory-applied coating.
- E. Fixed Americans with Disabilities Act (ADA)-Compliant Vanity and Countertop Brackets:
  - 1. Material: Steel.
  - 2. Finish: Manufacturer's standard, factory-applied, textured powder coat.
  - 3. Color: Selected by Architect from manufacturer's standard range.
- F. Countertop Supports:
  - 1. Material: Aluminum
  - 2. Finish/Color: Clear anodized.
- G. Drawer and Door Pulls: "U" shaped wire pull, steel with chrome finish, 4 inch centers ("U" shaped wire pull, steel with chrome finish, 100 mm centers).

1. Product: Basis of Design: 4484 manufactured by Stanley products.
- H. Cabinet Locks: Keyed cylinder, two keys per lock, master keyed, steel with chrome finish.
  1. Provide 50 percent lockable cabinets at all other spaces.
  2. Product: Basis of Design: Schlage CL 888R/ CL 777R, with strike; [www.schlage.com](http://www.schlage.com).
  3. Master key: Master key doors and drawers of cabinetry in each room with each other and
  4. the main entrance room door.
- I. Catches: Magnetic.
  1. Product: Basis of Design: CD41/CD45 manufactured by Stanley.
- J. Drawer Slides:
  1. Type: Extension types as indicated.
  2. Static Load Capacity: Commercial grade.
  3. Mounting: Side mounted.
  4. Stops: Integral type.
  5. Features: Provide self closing/stay closed type.
  6. Manufacturers:
    - a. Knap & Vogt Manufacturing Company; Heavy-Duty Drawer Slides: [www.knapeandvogt.com/#sle](http://www.knapeandvogt.com/#sle). KV 8400
    - b. Substitutions: See Section 01 60 00 - Product Requirements.
- K. Hinges: Concealed (fully mortised) type, steel with nickel-plated finish.
  1. Manufacturers:
    - a. Rockford Process Control, LLC, Part No. 74, SS with Hospital Tips

## **208 SITE FINISHING MATERIALS**

### **209 FABRICATION**

- A. General:
- B. All exposed cabinet and countertop edges shall be beveled or rounded to prevent sharp edges and corners.
- C. Provide High Pressure Decorative Laminate (HPDL) finish on all exposed surfaces of cabinets, including doors, drawers, countertops, and back splashes unless otherwise noted.
- D. Assembly: Shop assemble cabinets for delivery to site in units easily handled and to permit passage through building openings.
- E. Fitting: When necessary to cut and fit on site, provide materials with ample allowance for cutting. Provide matching trim for scribing and site cutting.
- F. Plastic Laminate: Apply plastic laminate finish in full uninterrupted sheets consistent with manufactured sizes. Fit corners and joints hairline; secure with concealed fasteners. Slightly bevel arises. Locate counter butt joints minimum 2 feet from sink cut-outs.
  1. Apply laminate backing sheet to reverse side of plastic laminate finished surfaces.
  2. Cap exposed plastic laminate finish edges with material of same finish and pattern.
- G. Backsplash and Aprons: Square edge, direct bond cover and full returns. Make corners and joints hairline.
- H. Mechanically fasten back splash to countertops as recommended by fabricator at 16 inches on center.
- I. Provide cutouts for plumbing fixtures and fixtures and fittings. Verify locations of cutouts from

## **PART 3 EXECUTION**

### **301 EXAMINATION**

- A. Verify adequacy of backing and support framing.
- B. Verify location and sizes of utility rough-in associated with work of this section.
- C. Do not proceed with casework installation until finish flooring has been installed under casework locations.

**302 INSTALLATION**

- A. Install work in accordance with AWI/AWMAC/WI (AWS) or AWMAC/WI (NAAWS) requirements for grade indicated.
- B. Set and secure custom cabinets in place, assuring that they are rigid, plumb, and level.
- C. Use fixture attachments in concealed locations for wall mounted components.
- D. Use concealed joint fasteners to align and secure adjoining cabinet units.
- E. Carefully scribe casework abutting other components, with maximum gaps of 1/32 inch (0.79 mm). Do not use additional overlay trim for this purpose.
- F. Secure cabinets to floor using appropriate angles and anchorages.

**303 ADJUSTING**

- A. Adjust installed work.
- B. Adjust moving or operating parts to function smoothly and correctly.

**304 CLEANING**

- A. Clean casework, counters, shelves, hardware, fittings, and fixtures.

**END OF SECTION 06 41 00**

**SECTION 07 11 13  
BITUMINOUS DAMPPROOFING**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Bituminous dampproofing.

**1.02 REFERENCE STANDARDS**

- A. ASTM D41/D41M - Standard Specification for Asphalt Primer Used in Roofing, Dampproofing, and Waterproofing 2011 (Reapproved 2016).
- B. ASTM D1187/D1187M - Standard Specification for Asphalt-Base Emulsions for Use as Protective Coatings for Metal 1997 (Reapproved 2018).
- C. ASTM D1227/D1227M - Standard Specification for Emulsified Asphalt Used as a Protective Coating for Roofing 2013, with Editorial Revision (2019).

**1.03 QUALITY ASSURANCE**

- A. Installer Qualifications: Company specializing in performing the work of this section with at least three years of documented experience.

**PART 2 PRODUCTS**

**2.01 MANUFACTURERS – SEE ARCHITECTURAL DRAWINGS**

**2.02 BITUMINOUS DAMPPROOFING**

- A. Bituminous Dampproofing: Cold-applied water-based emulsion; asphalt with mineral colloid or chemical emulsifying agent; with or without fiber reinforcement; asbestos-free; suitable for application on vertical and horizontal surfaces.
  - 1. Composition - Vertical Application: ASTM D1227/D1227M Type III or ASTM D1187/D1187M Type I.
  - 2. Composition - Horizontal and Low-Slope Application: ASTM D1227/D1227M Type II or III.
  - 3. VOC Content: Not more than permitted by local, State, and federal regulations.
  - 4. Applied Thickness: 1/16 inch (1.5 mm), minimum, wet film.
- B. Primers, Mastics, and Related Materials: Type as recommended by dampproofing manufacturer.

**PART 3 EXECUTION**

**3.01 APPLICATION**

- A. Foundation Walls: Apply two coats of asphalt dampproofing.
- B. Hollow Metal Frames: At all HM Frames receiving grout fill and at exterior.
- C. Perform this work in accordance with manufacturer's instructions and NRCA (WM) applicable requirements.
- D. Apply bitumen with mop.
- E. Seal items watertight with mastic, that project through dampproofing surface.

**END OF SECTION 07 11 13**

**SECTION 07 21 00  
THERMAL INSULATION**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Board insulation and integral vapor retarder at cavity wall construction, perimeter foundation wall, underside of floor slabs, over roof deck, over roof sheathing, exterior wall behind [ ] wall finish, and interior wall with facer providing exposed finish.
- B. Batt insulation and vapor retarder in exterior wall, ceiling, and roof construction.
- C. Batt insulation for filling perimeter window and door shim spaces and crevices in exterior wall and roof.

**1.02 RELATED REQUIREMENTS**

- A. Section 06 10 00 - Rough Carpentry: Installation requirements for board insulation over steep slope roof sheathing or roof structure.
- B. Section 07 25 00 - Weather Barriers: Separate air barrier and vapor retarder materials.
- C. Section 07 51 00 - Built-Up Bituminous Roofing: Installation requirements for board insulation over low slope roof deck specified in this section.

**1.03 REFERENCE STANDARDS**

- A. ASTM C240 - Standard Test Methods for Testing Cellular Glass Insulation Block 2021.
- B. ASTM C423 - Standard Test Method for Sound Absorption and Sound Absorption Coefficients by the Reverberation Room Method 2022.
- C. ASTM C518 - Standard Test Method for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus 2021.
- D. ASTM C578 - Standard Specification for Rigid, Cellular Polystyrene Thermal Insulation 2019.
- E. ASTM C665 - Standard Specification for Mineral-Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing 2017.
- F. ASTM C1289 - Standard Specification for Faced Rigid Cellular Polyisocyanurate Thermal Insulation Board 2022.
- G. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials 2022.
- H. ASTM E96/E96M - Standard Test Methods for Gravimetric Determination of Water Vapor Transmission Rate of Materials 2022.
- I. ASTM E136 - Standard Test Method for Assessing Combustibility of Materials Using a Vertical Tube Furnace at 750°C 2019a.
- J. ASTM E2357 - Standard Test Method for Determining Air Leakage of Air Barrier Assemblies 2018.
- K. FM DS 1-28 - Wind Design 2015, with Editorial Revision (2022).
- L. ICC-ES AC239 - Acceptance Criteria for Termite-Resistant Foam Plastic 2008, with Editorial Revision (2014).
- M. NFPA 285 - Standard Fire Test Method for Evaluation of Fire Propagation Characteristics of Exterior Wall Assemblies Containing Combustible Components 2019.

**1.04 SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements for submittal procedures.
- B. Product Data: Provide data on product characteristics, performance criteria, and product limitations.
- C. ABAA Field Quality Control Submittals: Submit third-party reports of testing and inspection required by ABAA QAP.

- D. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.
- E. ABAA Manufacturer Qualification: Submit documentation of current evaluation of proposed manufacturer and materials.
- F. ABAA Installer Qualification: Submit documentation of current contractor accreditation and current installer certification. Keep copies of contractor accreditation and installer certification on project site during and after installation. Present on-site documentation upon request.

## **1.05 QUALITY ASSURANCE**

- A. Air Barrier Association of America (ABAA) Quality Assurance Program (QAP); [www.airbarrier.org/#sle](http://www.airbarrier.org/#sle):
  - 1. Installer Qualification: Use accredited contractors, certified installers, evaluated materials, and third-party field quality control audit.
  - 2. Manufacturer Qualification: Use evaluated materials from a single manufacturer regularly engaged in air barrier material manufacture. Use secondary materials approved in writing by primary material manufacturer.

## **PART 2 PRODUCTS**

### **201 APPLICATIONS**

- A. Insulation Under Concrete Slabs: Extruded polystyrene (XPS) board. See Freezer Cooler Spec.
- B. Insulation Inside Masonry Cavity Walls: Extruded polystyrene (XPS) carbon black board.
- C. Insulation Over Metal Stud Framed Walls, Continuous: Extruded polystyrene (XPS) carbon black board.

### **202 FOAM BOARD INSULATION MATERIALS**

- A. Extruded Polystyrene (XPS) Board Insulation: Complies with ASTM C578 with either natural skin or cut cell surfaces.
  - 1. Flame Spread Index (FSI): Class A - 0 to 25, when tested in accordance with ASTM E84.
  - 2. Smoke Developed Index (SDI): 450 or less, when tested in accordance with ASTM E84.
  - 3. Type and Thermal Resistance, R-value (RSI-value): Type IV, 5.0 (0.88) per 1 inch (25.4 mm) thickness at 75 degrees F (24 degrees C) mean temperature.
- B. Extruded Polystyrene (XPS) Continuous Insulation (CI) Board: Complies with ASTM C578, and manufactured using carbon black technology.
  - 1. Flame Spread Index (FSI): Class A - 0 to 25, when tested in accordance with ASTM E84.
  - 2. Smoke Developed Index (SDI): 450 or less, when tested in accordance with ASTM E84.
  - 3. Type and Thermal Resistance, R-value (RSI-value): Type IV, 5.6 (0.98), minimum, per 1 inch (25.4 mm) thickness at 75 degrees F (24 degrees C) mean temperature.
  - 4. Board Size: 48 inch by 96 inch (1220 mm by 2440 mm).
  - 5. Board Thickness: 1-3/4 inch (44.5 mm).
  - 6. Board Edges: Shiplap, at long edges.
- C. Extruded Polystyrene (XPS) Cavity Wall Insulation Board: Complies with ASTM C578, and manufactured using carbon black technology.
  - 1. Flame Spread Index (FSI): Class A - 0 to 25, when tested in accordance with ASTM E84.
  - 2. Smoke Developed Index (SDI): 450 or less, when tested in accordance with ASTM E84.
  - 3. Type and Thermal Resistance, R-value (RSI-value): Type IV, 5.6 (0.98), minimum, per 1 inch (25.4 mm) thickness at 75 degrees F (24 degrees C) mean temperature.
  - 4. Board Size: 15-3/4 inch by 96 inch (400 mm by 2440 mm).
  - 5. Board Thickness: 1-3/4 inch (44.5 mm).
  - 6. Board Edges: Square.
- D. Polyisocyanurate (ISO) Board Insulation: Rigid cellular foam, complying with ASTM C1289.
  - 1. Classifications:
    - a. Type I: Faced with aluminum foil on both major surfaces of the core foam.
      - 1) Class 1 - Non-reinforced core foam.

- 2) Compressive Strength: 16 psi (110 kPa), minimum.
- 3) Thermal Resistance, R-value (RSI-value): At 1-1/2 inch (38.1 mm) thick; 9.0 (1.59) at 75 degrees F (24 degrees C).
2. Board Size: 48 inch by 96 inch (1220 mm by 2440 mm).
3. Board Thickness: 1.5 inch (37.5 mm).
4. Board Edges: Square.
5. Products:
  - a. Atlas Roofing Corporation; EnergyShield CGF PRO: [www.atlasroofing.com/#sle](http://www.atlasroofing.com/#sle).
  - b. Dow Chemical Company; THERMAX Sheathing: [www.dowbuilding-solutions.com/#sle](http://www.dowbuilding-solutions.com/#sle).
  - c. Hunter Panels; Xci Foil (Class A): [www.hunterpanels.com/#sle](http://www.hunterpanels.com/#sle).
  - d. Johns Manville; AP Foil-Faced: [www.jm.com/#sle](http://www.jm.com/#sle).
  - e. Substitutions: See Section 01 60 00 - Product Requirements.

### 203 BATT INSULATION MATERIALS

- A. Glass Fiber Batt Insulation: Flexible preformed batt or blanket, complying with ASTM C665; friction fit.
  1. Flame Spread Index: 75 or less, when tested in accordance with ASTM E84.
  2. Combustibility: Non-combustible, when tested in accordance with ASTM E136, except for facing, if any.
  3. Products:
    - a. Johns Manville; [\_\_\_\_\_]: [www.jm.com/#sle](http://www.jm.com/#sle).
    - b. Owens Corning Corporation; EcoTouch PINK FIBERGLAS Insulation: [www.ocbuildingspec.com/#sle](http://www.ocbuildingspec.com/#sle).
    - c. Substitutions: See Section 01 60 00 - Product Requirements.
- B. Mineral Fiber Batt Insulation: Flexible or semi-rigid preformed batt or blanket, complying with ASTM C665; friction fit; unfaced flame spread index of 0 (zero) when tested in accordance with ASTM E84.
  1. Flame Spread Index: 25 or less, when tested in accordance with ASTM E84.
  2. Smoke Developed Index: 0 (zero), when tested in accordance with ASTM E84.
  3. Thickness: [ ] inch ([ ] mm).
  4. Products:
    - a. Johns Manville; MinWool Sound Attenuation Fire Batts: [www.jm.com/#sle](http://www.jm.com/#sle).
    - b. ROCKWOOL (ROXUL, Inc); COMFORTBATT: [www.rockwool.com/#sle](http://www.rockwool.com/#sle).
    - c. Thermafiber, Inc; SAFB: [www.thermafiber.com/#sle](http://www.thermafiber.com/#sle).
    - d. Substitutions: See Section 01 60 00 - Product Requirements.

### 204 ACCESSORIES

- A. Tape: Bright aluminum self-adhering type, mesh reinforced, 2 inch (50 mm) wide.
- B. Insulation Fasteners: Lengths of unfinished, 13 gauge, 0.072 inch (1.83 mm) high carbon spring steel with chisel or mitered tips, held in place by tension, length to suit insulation thickness and substrate, capable of securely supporting insulation in place.
- C. Adhesive: Type recommended by insulation manufacturer for application.

## PART 3 EXECUTION

### 301 EXAMINATION

- A. Verify that substrate, adjacent materials, and insulation materials are dry and that substrates are ready to receive insulation.
- B. Verify substrate surfaces are flat, free of honeycomb, fins, irregularities, or materials or substances that may impede adhesive bond.

### 302 BOARD INSTALLATION AT FOUNDATION PERIMETER

- A. Install boards horizontally on foundation perimeter.
- B. Cut and fit insulation tightly to protrusions or interruptions to the insulation plane.

- C. Immediately following application of board insulation, place protective boards over exposed insulation surfaces.

**303 BOARD INSTALLATION AT EXTERIOR WALLS**

- A. Install rigid insulation directly to steel studs or exterior grade sheathing at 16 inches (406 mm) on center with manufacturer recommended mechanical fasteners, and tape joints with manufacturer's minimum 4 inches (102 mm) wide sealant tape; comply with ASTM E2357.
- B. Install boards horizontally on walls.
- C. Cut and fit insulation tightly to protrusions or interruptions to the insulation plane.
- D. Tape insulation board joints.

**304 BOARD INSTALLATION AT CAVITY WALLS**

- A. Install boards to fit snugly between wall ties.
- B. Install boards horizontally on walls.
- C. Cut and fit insulation tightly to protrusions or interruptions to the insulation plane.

**305 BOARD INSTALLATION UNDER CONCRETE SLABS**

- A. Place insulation under slabs on grade after base for slab has been compacted.
- B. Cut and fit insulation tightly to protrusions or interruptions to the insulation plane.
- C. Prevent insulation from being displaced or damaged while placing vapor retarder and placing slab.

**306 BATT INSTALLATION**

- A. Install insulation and vapor retarder in accordance with manufacturer's instructions.
- B. Install insulation in accordance with manufacturer's instructions.
- C. Install without gaps or voids. Do not compress insulation.
- D. Trim insulation neatly to fit spaces. Insulate miscellaneous gaps and voids.
- E. Fit insulation tightly in cavities and tightly to exterior side of mechanical and electrical services
- F. Install in exterior wall and roof spaces without gaps or voids. Do not compress insulation.
- G. Trim insulation neatly to fit spaces. Insulate miscellaneous gaps and voids.
- H. Fit insulation tightly in cavities and tightly to exterior side of mechanical and electrical services within the plane of the insulation.

**307 PROTECTION**

- A. Do not permit installed insulation to be damaged prior to its concealment.

**END OF SECTION 07 21 00**

**SECTION 07 21 19  
FOAMED-IN-PLACE INSULATION**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Foamed-in-place insulation.
  - 1. In masonry cavity walls.
  - 2. In exterior wall crevices.

**1.02 REFERENCE STANDARDS**

- A. ASTM C518 - Standard Test Method for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus 2021.
- B. ASTM D1621 - Standard Test Method for Compressive Properties of Rigid Cellular Plastics 2016.
- C. ASTM D1622 - Standard Test Method for Apparent Density of Rigid Cellular Plastics 2020.
- D. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials 2022.
- E. ASTM E2178 - Standard Test Method for Determining Air Leakage Rate and Calculation of Air Permeance of Building Materials 2021a.
- F. FM 4880 - Evaluating the Fire Performance of Insulated Building Panel Assemblies and Interior Finish Materials 2017.
- G. NFPA 275 - Standard Method of Fire Tests for the Evaluation of Thermal Barriers 2022.
- H. NFPA 286 - Standard Methods of Fire Tests for Evaluating Contribution of Wall and Ceiling Interior Finish to Room Fire Growth 2019.
- I. UL 1040 - Standard for Safety Fire Test of Insulated Wall Construction Current Edition, Including All Revisions.
- J. UL 1715 - Standard for Safety Fire Test of Interior Finish Material Current Edition, Including All Revisions.

**1.03 SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements for submittal procedures.
- B. Certificates: Certify that products of this section meet or exceed specified requirements.
- C. Manufacturer Qualification: Submit documentation of current evaluation of proposed manufacturer and materials.
- D. Installer Qualification: Submit documentation of current contractor accreditation and current installer certification. Keep copies of all contractor accreditation and installer certification on site during and after installation. Present on-site documentation upon request.

**1.04 QUALITY ASSURANCE**

**1.05 FIELD CONDITIONS**

- A. Do not apply foam when temperature is within 5 degrees F (2.78 degrees C) of dew point.

**PART 2 PRODUCTS**

**2.01 MANUFACTURERS**

**2.02 MATERIALS**

- A. Foamed-In-Place Insulation: Low-density, flexible, open or closed cell, water vapor permeable polyurethane foam; foamed on-site, using blowing agent of water or non-ozone-depleting gas.
  - 1. Regulatory Requirements: Comply with applicable code for flame and smoke, concealment, and fire protection requirements.
    - a. Fire Protection: Provide 15 minute thermal barrier of 1/2 inch (12.7 mm) gypsum board or equivalent material complying with NFPA 275 test method, or foamed-in-place insulation either exposed or with covering that complies with FM 4880, NFPA

286, UL 1040, or UL 1715.

2. Thermal Resistance: R-value (RSI-value) of 3.0 (0.53), minimum, per 1 inch (25.4 mm) thickness at 75 degrees F (24 degrees C) mean temperature when tested in accordance with ASTM C518.
3. Air Permeance: 0.04 cfm per square foot (0.2 L/(s/sq m)), maximum, when tested at intended thickness in accordance with ASTM E2178 at 1.57 psf (75 Pa).
4. Surface Burning Characteristics: Flame spread/Smoke developed index of 75/450, maximum, when tested in accordance with ASTM E84.
5. Basis of Design:
  - a. Carlisle Spray Foam Insulation; SealTite Pro Open Cell: [www.carlislefi.com/#sle](http://www.carlislefi.com/#sle).
  - b. Icynene-Lapolla; Icynene Classic Plus: [www.icynene.com/#sle](http://www.icynene.com/#sle).

### **PART 3 EXECUTION**

#### **301 EXAMINATION**

- A. Verify work within construction spaces or crevices is complete prior to insulation application.
- B. Verify that surfaces are clean, dry, and free of matter that may inhibit insulation or overcoat adhesion.

#### **302 APPLICATION**

- A. Apply insulation in accordance with manufacturer's instructions.

#### **303 PROTECTION**

- A. Do not permit subsequent construction work to disturb applied insulation.

**END OF SECTION 07 21 19**

**SECTION 07 21 23  
LOOSE-FILL INSULATION**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Loose-fill insulation in cells of concrete masonry unit (CMU) walls and spaces between masonry wythes.

**1.02 RELATED REQUIREMENTS**

- A. Section 01 61 16 - Volatile Organic Compound (VOC) Content Restrictions.
- B. Section 04 20 00 - Unit Masonry: Masonry wall system to receive loose-fill insulation.

**1.03 REFERENCE STANDARDS**

- A. ASHRAE Std 90.1 I-P - Energy Standard for Buildings Except Low-Rise Residential Buildings Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- B. ASTM C516 - Standard Specification for Vermiculite Loose Fill Thermal Insulation 2019.
- C. ASTM C549 - Standard Specification for Perlite Loose Fill Insulation 2018.
- D. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials 2022.

**1.04 SYSTEM DESCRIPTION**

**1.05 SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Manufacturer's Installation Instructions: Indicate procedures for preparation and installation.

**1.06 QUALITY ASSURANCE**

- A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section, with at least three years of documented experience.
- B. Installer Qualifications: Company specializing in performing work of the type specified and with at least three years of documented experience.

**PART 2 PRODUCTS**

**2.01 MANUFACTURERS**

- A. Vermiculite Loose-Fill Insulation:
  - 1. Schundler Company: [www.schundler.com/#sle](http://www.schundler.com/#sle).
  - 2. Supreme Perlite Company: [www.perlite.com/#sle](http://www.perlite.com/#sle).
  - 3. Substitutions: See Section 01 60 00 - Product Requirements.
- B. Perlite Loose-Fill Insulation:
  - 1. Substitutions: See Section 01 60 00 - Product Requirements.

**2.02 MATERIALS**

- A. Vermiculite Loose-Fill Insulation: ASTM C516, vermiculite type, water repellent, fire resistant; flame spread/smoke developed index of 0/0, when tested in accordance with ASTM E84.
- B. Perlite Loose-Fill Insulation: ASTM C549, perlite type, water repellent, fire resistant; flame spread/smoke developed index of 0/0, when tested in accordance with ASTM E84.
- C. Thermal Resistance [R-value (RSI-value)]: Provided minimum values in accordance with applicable edition of ASHRAE Std 90.1 I-P for envelope requirements of building location and climate zone.
- D. Provide loose-fill insulation in accordance with requirements of Section 01 61 16 - Volatile Organic Compound (VOC) Content Restrictions.

**203 APPLICATIONS**

- A. Provide loose-fill insulation in the following application(s) as indicated on drawings:

**PART 3 EXECUTION**

**301 EXAMINATION**

- A. Verify that substrate and adjacent materials are dry and ready to receive insulation.
- B. Verify wall spaces are free of mortar blockage allowing for free flow of insulation.

**302 PREPARATION**

- A. Verify holes and openings have been sealed to prevent escape of insulation.

**303 INSTALLATION**

- A. Install loose-fill insulation in accordance with manufacturer's instructions.
- B. Deposit loose-fill insulation as wall is erected and completely fill spaces.

**304 PROTECTION**

- A. Place temporary signs warning workers in areas that contain loose-fill insulated walls to use caution and to prevent loss of insulation when cutting into walls.

**END OF SECTION 07 21 23**

**SECTION 07 21 29  
SPRAYED INSULATION**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Sprayed cellulose thermal insulation.

**1.02 REFERENCE STANDARDS**

- A. ASHRAE Std 90.1 I-P - Energy Standard for Buildings Except Low-Rise Residential Buildings Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- B. ASTM C177 - Standard Test Method for Steady-State Heat Flux Measurements and Thermal Transmission Properties by Means of the Guarded-Hot-Plate Apparatus 2019.
- C. ASTM C518 - Standard Test Method for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus 2021.
- D. ASTM C739 - Standard Specification for Cellulosic Fiber Loose-Fill Thermal Insulation 2021a.
- E. ASTM D1622 - Standard Test Method for Apparent Density of Rigid Cellular Plastics 2020.
- F. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials 2022.
- G. ASTM E136 - Standard Test Method for Assessing Combustibility of Materials Using a Vertical Tube Furnace at 750°C 2019a.
- H. ITS (DIR) - Directory of Listed Products Current Edition.
- I. UL (DIR) - Online Certifications Directory Current Edition.

**1.03 SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data on materials, describing insulation properties.
- C. Certificates: Certify that products of this section meet or exceed specified requirements.
- D. Manufacturer's Installation Instructions: Indicate special procedures and perimeter conditions requiring special attention.
- E. Manufacturer's Qualification Statement.
- F. Installer's Qualification Statement.

**1.04 QUALITY ASSURANCE**

- A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section, with not less than three years of documented experience.
- B. Installer Qualifications: Company specializing in performing work of the type specified and with at least three years of documented experience.

**1.05 MOCK-UP**

- A. Provide a single mock-up, 10' long by 10' wide, illustrating wall construction.
- B. Locate where directed.
- C. Mock-up may remain as part of the Work.

**1.06 FIELD CONDITIONS**

- A. Do not install insulation, sealer when ambient and surface temperatures are lower than 50 degrees F
- B. Maintain acceptable ambient and substrate surface temperatures prior to, during, and after installation of primer and insulation materials and overcoat.

## **PART 2 PRODUCTS**

### **201 MANUFACTURERS**

- A. Cellulosic Fiber Sprayed Insulation:
  - 1. GreenFiber: [www.greenfiber.com/#sle](http://www.greenfiber.com/#sle).
  - 2. International Cellulose Corp: [www.spray-on.com/#sle](http://www.spray-on.com/#sle).
  - 3. ThermoCon, Inc: [www.thermocon.com/#sle](http://www.thermocon.com/#sle).
  - 4. Substitutions: See Section 01 60 00 - Product Requirements.

### **202 MATERIALS**

- A. Cellulosic Fiber Insulation: ASTM C739; treated cellulosic fiber, white color.
  - 1. Thermal Resistance (R-value (RSI-value)): 3.9 (0.67), at 1 inch (25.4 mm) thick when tested in accordance with ASTM C177 at 75 degrees F (23 degrees C) temperature
  - 2. Density: 2 lb/cu ft (32 kg/cu m), when tested in accordance with ASTM D1622.
  - 3. Noise Reduction Coefficient (NRC): 0.75 for 1 inch (25 mm) thickness.
  - 4. Moisture Absorption: Maximum 15 percent by weight.
  - 5. Flame Spread / Smoke Developed Index: 0-25 / 0-450, Class A, when tested in accordance with ASTM E84.
  - 6. Combustibility: Passing ASTM E136.
- B. Provide blown insulation in accordance with requirements of Section 01 61 16 - Volatile Organic Compound (VOC) Content Restrictions.
- C. Thermal Resistance [R-value (RSI-value)]: Provided minimum values in accordance with applicable edition of ASHRAE Std 90.1 I-P for envelope requirements of building location and climate zone.

### **203 ACCESSORIES**

- A. Primer: As required by insulation manufacturer.
- B. Surface Sealer: Clear, latex based for placement over insulation.
- C. Insulation Stop: Plastic, profiled and sized to suit rafter spacing and wall/sloped roof configuration.
- D. Roof Ventilation Baffles: Prefabricated ventilation channels for placement under roof sheathing with baffles to prevent wind-washing.
  - 1. Material: Polyvinyl chloride (PVC).
  - 2. Roof Joist/Truss Spacing: 16 inch (406 mm) on center, nominal.
  - 3. Manufacturers:
    - a. Brentwood Industries, Inc; AccuVent Original: [www.brentwoodindustries.com/#sle](http://www.brentwoodindustries.com/#sle).
    - b. Substitutions: See Section 01 60 00 - Product Requirements.

## **PART 3 EXECUTION**

### **301 EXAMINATION**

- A. Verify that surfaces are clean, dry, and free of matter that may inhibit adhesion.
- B. Verify that ceiling hangers and supporting clips have been installed correctly.
- C. Verify other work on and within spaces to be insulated is complete prior to application.

### **302 PREPARATION**

- A. Mask and protect adjacent surfaces from overspray or damage.
- B. Apply primer in accordance with manufacturer's instructions.
- C. Install insulation stops between rafters at wall/sloped roof construction to prevent insulation from covering soffit vents or from limiting air circulation from soffit to attic space.

### **303 INSTALLATION**

- A. Install sprayed insulation in accordance with manufacturer's instructions.
- B. Install sprayed insulation to a uniform monolithic density without voids.

- C. Tamp wet sprayed insulation surface to improve adhesion and to achieve a smooth surface.

**304 FIELD QUALITY CONTROL**

- A. Independent agency field inspection will be provided under provisions of Section 01 40 00 - Quality Requirements.
- B. Inspection will include verification of sprayed insulation and surface sealer thickness and density.

**305 PROTECTION**

- A. Do not permit subsequent construction work to disturb applied sprayed insulation.

**END OF SECTION 07 21 29**

**SECTION 07 25 00  
WEATHER BARRIERS**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Water-Resistive Barrier: Under exterior wall cladding, over sheathing or other substrate; not air tight or vapor retardant.
- B. Vapor Retarders: Materials to make exterior walls, joints between exterior walls and roof, joints around frames of openings in exterior walls, and [ ] water vapor resistant and air tight.
- C. Air Barriers: Materials that form a system to stop passage of air through exterior walls, joints between exterior walls and roof, joints around frames of openings in exterior walls, and [ ].

**1.02 RELATED REQUIREMENTS**

- A. Section 03 30 00 - Cast-in-Place Concrete: Vapor retarder under concrete slabs on grade.
- B. Section 05 40 00 - Cold-Formed Metal Framing: Water-resistive barrier under exterior cladding.
- C. Section 06 10 00 - Rough Carpentry: Water-resistive barrier under exterior cladding.
- D. Section 07 52 00 - Modified Bituminous Membrane Roofing: Vapor retarder installed as part of roofing system.
- E. Section 09 21 16 - Gypsum Board Assemblies: Water-resistive barrier under exterior cladding.

**1.03 DEFINITIONS**

- A. Weather Barrier: Assemblies that form either water-resistive barriers, air barriers, or vapor retarders.
- B. Air Barrier: Air tight barrier made of material that is relatively air impermeable but water vapor permeable, both to the degree specified, with sealed seams and with sealed joints to adjacent surfaces. Note: For the purposes of this specification, vapor impermeable air barriers are classified as vapor retarders.
- C. Vapor Retarder: Air tight barrier made of material that is relatively water vapor impermeable, to the degree specified, with sealed seams and with sealed joints to adjacent surfaces.
- D. Water-Resistive Barrier: Water-shedding barrier made of material that is moisture resistant, to the degree specified, intended to be installed to shed water without sealed seams.

**1.04 REFERENCE STANDARDS**

- A. ASTM D412 - Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers--Tension 2016 (Reapproved 2021).
- B. ASTM D1970/D1970M - Standard Specification for Self-Adhering Polymer Modified Bituminous Sheet Materials Used as Steep Roofing Underlayment for Ice Dam Protection 2021.
- C. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials 2022.
- D. ASTM E1745 - Standard Specification for Plastic Water Vapor Retarders Used in Contact with Soil or Granular Fill Under Concrete Slabs 2017.
- E. ASTM E2178 - Standard Test Method for Determining Air Leakage Rate and Calculation of Air Permeance of Building Materials 2021a.
- F. ICC-ES AC148 - Acceptance Criteria for Flexible Flashing Materials 2017.
- G. ICC-ES AC212 - Acceptance Criteria for Water-Resistive Coatings Used as Water-Resistive Barriers over Exterior Sheathing 2015.
- H. NFPA 285 - Standard Fire Test Method for Evaluation of Fire Propagation Characteristics of Exterior Wall Assemblies Containing Combustible Components 2019.

**1.05 SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

- B. Product Data: Provide data on material characteristics.
- C. Shop Drawings: Provide drawings of special joint conditions.
- D. ABAA Field Quality Control Submittals: Submit third-party reports of testing and inspection required by ABAA QAP.
- E. Manufacturer's Installation Instructions: Indicate preparation.
- F. ABAA Manufacturer Qualification: Submit documentation of current evaluation of proposed manufacturer and materials.
- G. Testing Agency Qualification Statement.
- H. Warranty Documentation for Installation of Building Rainscreen Assembly: Submit installer warranty and ensure that forms have been completed in Owner's name and registered with installer.

#### **1.06 QUALITY ASSURANCE**

- A. Air Barrier Association of America (ABAA) Quality Assurance Program (QAP); [www.airbarrier.org/#sle](http://www.airbarrier.org/#sle):
  - 1. Installer Qualification: Use accredited contractor, certified installers, evaluated materials, and third-party field quality control audit.
  - 2. Manufacturer Qualification: Use evaluated materials from a single manufacturer regularly engaged in air barrier material manufacture, and use secondary materials approved in writing by primary material manufacturer.

#### **1.07 MOCK-UP**

- A. Install air barrier, vapor retarder, and water-resistive barrier materials in mock-up.

#### **1.08 FIELD CONDITIONS**

- A. Maintain temperature and humidity recommended by the materials manufacturers before, during and after installation.

#### **1.09 SPECIAL BUILDING ENCLOSURE WARRANTY**

- A. See Section 01 78 00 - Closeout Submittals, for additional warranty requirements.
- B. Installation Warranty for Building Rainscreen Assembly: Installer of exterior rainscreen assembly (including air/vapor barrier and attachments, framing, and exterior panels) to provide 10-year warranty that includes coverage for defective materials and/or workmanship. This warranty will also clearly include materials, labor, necessary activity to access these areas, and removal of any materials to effect repairs and restore to watertight conditions.  
[www.edacontractors.com/#sle](http://www.edacontractors.com/#sle)

### **PART 2 PRODUCTS**

#### **201 WEATHER BARRIER ASSEMBLIES**

- A. Water-Resistive Barrier: Provide on exterior walls under exterior cladding.
- B. Interior Vapor Retarder:
  - 1. On inside face of studs of exterior walls, under cladding, use mechanically fastened vapor retarder sheet.

#### **202 AIR BARRIER MATERIALS (WATER VAPOR PERMEABLE AND WATER-RESISTIVE)**

- A. Air Barrier, Fluid Applied: Vapor permeable, elastomeric waterproofing.
  - 1. Air Barrier Coating:
    - a. Applications: Applied to exterior wall, behind metal panels, and where indicated in Drawings.
    - b. Single component, water-based and cures to a tough monolithic rubber-like membrane, which resists air leakage and water penetration.
    - c. Dry Film Thickness (DFT): 40 mils, 0.040 inch (1.016 mm), minimum.
    - d. Air Permeance: 0.004 cfm/sq ft (0.02 L/(s sq m)), maximum, when tested in accordance with ASTM E2178.

- e. Water Vapor Permeance: 10 perms (574 ng/(Pa s sq m)), minimum, when tested in accordance with ASTM E96/E96M Procedure B (Water Method) at 73.4 degrees F (23 degrees C).
- f. Ultraviolet (UV) and Weathering Resistance: Approved in writing by manufacturer for up to four months of weather exposure after application.
- g. Elongation: 300 percent, minimum, when tested in accordance with ASTM D412.
- h. Surface Burning Characteristics: Flame spread index of 25 or less, smoke developed index of 450 or less, when tested in accordance with ASTM E84.
- i. Complies with NFPA 285 wall assembly requirements.
- j. Nail Sealability: Pass, when tested in accordance with ASTM D1970/D1970M.
- k. VOC Content: 100 g per L or less.
- l. Code Acceptance: Comply with applicable requirements of ICC-ES AC212.
- m. Sealants, Tapes and Accessories: As recommended by coating manufacturer.
- n. Manufacturers:
  - 1) GCP Applied Technologies; Perm-A-Barrier VPL: [www.gcpat.com/#sle](http://www.gcpat.com/#sle).
  - 2) Henry Company; Air-Bloc 17MR: [www.henry.com/#sle](http://www.henry.com/#sle). Basis of Design.
  - 3) Pecora Corporation; Pecora XL-Perm Ultra VP with Pecora XL-Flash Liquid Flashing and Joint Filler, AVB Silicone Surface Transitions, and XL-Span Transition Membrane: [www.pecora.com/#sle](http://www.pecora.com/#sle).
  - 4) W.R. Meadows, Inc; Air-Shield TMP: [www.wrmeadows.com/#sle](http://www.wrmeadows.com/#sle).
  - 5) Substitutions: See Section 01 60 00 - Product Requirements.
- 2. Foamed-in-Place Air and Vapor Barrier: Medium-density, rigid or semi-rigid, closed cell polyurethane foam; foamed on-site, using blowing agent of water or non-ozone-depleting gas.
  - a. Regulatory Requirements: Comply with applicable code for flame and smoke limitations.
  - b. Air Permeance: 0.004 cfm/sq ft (0.02 L/(s sq m)), maximum, when tested in accordance with ASTM E2178.
  - c. Water Vapor Permeance: Vapor retarder; 2 perms (115 ng/(Pa s sq m)), maximum, when tested at intended thickness in accordance with ASTM E96/E96M Procedure A (Desiccant Method) at 73.4 degrees F (23 degrees C).
  - d. Closed Cell Content: At least 90 percent.
  - e. Surface Burning Characteristics: Flame spread/Smoke developed index of 25/450, maximum, when tested in accordance with ASTM E84.
  - f. Manufacturers:
    - 1) Soudal; Soudaflex Foam: [www.soudalusa.com](http://www.soudalusa.com).
    - 2) BASF Corporation: [www.spf.basf.com/#sle..](http://www.spf.basf.com/#sle..)
    - 3) Substitutions: See Section 01 60 00 - Product Requirements.

### 203 VAPOR RETARDER MATERIALS (AIR BARRIER AND WATER-RESISTIVE)

- A. Vapor Retarder Sheet: ASTM D1970/D1970M.
  - 1. Type: Rubberized asphalt bonded to thermoplastic sheet, self-adhesive.
  - 2. Thickness: 40 mil, 0.040 inch (1.016 mm), nominal.
  - 3. Sheet Width: 18 inches (457 mm) and 36 inches (914 mm).
  - 4. Water Vapor Permeance: 0.05 perm (2.87 ng/(Pa s sq m)), maximum, when tested in accordance with ASTM E96/E96M.
  - 5. Seam and Perimeter Tape: As recommended by sheet manufacturer.
  - 6. Manufacturers:
    - a. Basis of Design: Henry Company; Blueskin SA: [www.henry.com/#sle](http://www.henry.com/#sle).

### 204 ACCESSORIES

- A. Sealants, Tapes, and Accessories for Sealing Weather Barrier and Sealing Weather Barrier to Adjacent Substrates: As specified or as recommended by weather barrier manufacturer.
- B. Sealant for Cracks and Joints In Substrates: Resilient elastomeric joint sealant compatible with substrates and waterproofing materials.

1. Application: Apply at 30 to 40 mil, 0.030 to 0.40 inch (0.76 to 1.02 mm) nominal thickness.
  2. Elongation: 1,300 percent, measured in accordance with ASTM D412.
  3. Hydrostatic Head Pressure: Resists head pressure of 57 ft (17.4 m), maximum, when tested in accordance with ASTM D751.
  4. Manufacturers:
    - a. Rubber Polymer Company; Rub-R-Wall Mastic: [www.rpcinfo.com/#sle](http://www.rpcinfo.com/#sle).
- C. Primer: Liquid applied polymer.
1. Color: Green.
  2. Elongation: 1,300 percent, measured in accordance with ASTM D412.
  3. Manufacturers:
    - a. Rubber Polymer Company; Rub-R-Wall Aqua Mastic: [www.rpcinfo.com/#sle](http://www.rpcinfo.com/#sle).
- D. Flexible Flashing: Self-adhesive sheet flashing complying with ASTM D1970/D1970M, except slip resistance requirement is waived if not installed on a roof.
1. Composition: Butyl rubber sheet laminated to elasticized polyethylene sheet.
  2. Composition: Precured silicone rubber.
  3. Composition: Any material that meets physical requirements of ASTM D1970/D1970M with exceptions indicated.
  4. Thickness: 70 mil, 0.070 inch (1.8 mm), nominal.
  5. Thickness: 20 mil, 0.020 inch (0.51 mm), nominal; exception from ASTM D1970/D1970M.
  6. Manufacturers:
    - a. DuPont de Nemours, Inc; DuPont FlexWrap: [building.dupont.com/#sle](http://building.dupont.com/#sle).
    - b. Fortifiber Building Systems Group; FortiFlash: [www.fortifiber.com/#sle](http://www.fortifiber.com/#sle).
- E. Liquid Flashing: One part, fast curing, non-sag, elastomeric, gun grade, trowelable liquid flashing.
1. Manufacturers:
    - a. Master Builders Solutions by BASF; MasterSeal AWB 900: [www.master-builders-solutions.basf.us/en-us/#sle](http://www.master-builders-solutions.basf.us/en-us/#sle).
    - b. Master Wall Inc; SuperiorFlash: [www.masterwall.com/#sle](http://www.masterwall.com/#sle).
    - c. Pecora Corporation; [\_\_\_\_\_]: [www.pecora.com/#sle](http://www.pecora.com/#sle).
    - d. Substitutions: See Section 01 60 00 - Product Requirements.

### **PART 3 EXECUTION**

#### **301 EXAMINATION**

- A. Verify that surfaces and conditions are ready to accept the work of this section.

#### **302 PREPARATION**

- A. Remove projections, protruding fasteners, and loose or foreign matter that might interfere with proper installation.
- B. Clean and prime substrate surfaces to receive adhesives in accordance with manufacturer's instructions.

#### **303 INSTALLATION**

- A. Install materials in accordance with manufacturer's instructions.
- B. Self-Adhered Sheets:
  1. Prepare substrate in manner recommended by sheet manufacturer; fill and tape joints in substrate and between dissimilar materials.
  2. Lap sheets shingle-fashion to shed water and seal laps air tight.
  3. Once sheets are in place, press firmly into substrate with resilient hand roller; ensure that laps are firmly adhered with no gaps or fishmouths.
  4. Use same material, or other material approved by sheet manufacturer for the purpose, to seal to adjacent construction and as flashing.
  5. At wide joints, provide extra flexible membrane allowing joint movement.
- C. Coatings:

1. Prepare substrate in manner recommended by coating manufacturer; treat joints in substrate and between dissimilar materials as recommended by manufacturer.
  2. Use flashing to seal to adjacent construction and to bridge joints.
- D. Openings and Penetrations in Exterior Weather Barriers:
1. Install flashing over sills, covering entire sill frame member, extending at least 5 inches (125 mm) onto weather barrier and at least 6 inches (150 mm) up jambs; mechanically fasten stretched edges.
  2. At openings to be filled with frames having nailing flanges, seal head and jamb flanges using a continuous bead of sealant compressed by flange and cover flanges with sealing tape at least 4 inches (100 mm) wide; do not seal sill flange.
  3. At openings to be filled with non-flanged frames, seal weather barrier to each side of opening framing, using flashing at least 9 inches (230 mm) wide, covering entire depth of framing.
  4. At head of openings, install flashing under weather barrier extending at least 2 inches (50 mm) beyond face of jambs; seal weather barrier to flashing.
  5. At interior face of openings, seal gap between window/door frame and rough framing, using joint sealant over backer rod.
  6. Service and Other Penetrations: Form flashing around penetrating item and seal to weather barrier surface.

### **304 FIELD QUALITY CONTROL**

- A. See Section 01 40 00 - Quality Requirements for additional requirements.
- B. Coordination of ABAA Tests and Inspections:
  1. Provide testing and inspection required by ABAA QAP.
  2. Notify ABAA in writing of schedule for air barrier work, and allow adequate time for testing and inspection.
  3. Cooperate with ABAA testing agency.
  4. Allow access to air barrier work areas and staging.
  5. Do not cover air barrier work until tested, inspected, and accepted.
- C. Do not cover installed weather barriers until required inspections have been completed.
- D. Obtain approval of installation procedures by the weather barrier manufacturer based on a mock-up installed in place, prior to proceeding with remainder of installation.
- E. Take digital photographs of each portion of the installation prior to covering up.

### **305 PROTECTION**

- A. Do not leave materials exposed to weather longer than recommended by manufacturer.
- B. Do not leave paper- or felt-based barriers exposed to weather for longer than one week.

**END OF SECTION 07 25 00**

**SECTION 075423**  
**THERMOPLASTIC POLYOLEFIN (TPO) MEMBRANE ROOFING**

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Adhered TPO membrane roofing system.
- B. Mechanically fastened TPO membrane roofing system.
- C. Induction welded TPO membrane roofing system.
- D. Self-Adhered TPO membrane roofing system.
- E. Cover board.
- F. Roof insulation.
- G. Vapor retarder.
- H. Base sheet.
- I. Substrate board.

1.2 RELATED SECTIONS

- A. Division 03 Section "Lightweight Insulating Concrete" for lightweight insulating concrete.
- B. Division 03 Section "Concrete" for concrete.
- C. Division 05 Section "Steel Decking" for steel roof deck.
- D. Division 06 Section "Miscellaneous Rough Carpentry" for wood nailers, cants, curbs, and blocking [and for wood-based, structural-use roof deck panels].
- E. Division 07 Section "Sheet Metal Flashing and Trim" flashings and counter flashings.
- F. Division 22 Section "Storm Drainage Piping Specialties" for roof drains.

1.3 REFERENCES

- A. Roofing Terminology: Refer to the following publications for definitions of roofing work related terms in this Section:
  - 1. ASTM D 1079 "Standard Terminology Relating to Roofing and Waterproofing."
  - 2. Glossary of NRCA's "The NRCA Roofing and Waterproofing Manual."
  - 3. Roof Consultants Institute "Glossary of Building Envelope Terms."

4. Single Ply Roofing Industry (SPRI)
5. International Building Code (IBC)
6. American Society of Civil Engineers (ASCE-7) Minimum Design Loads for Buildings & Other Structures

B. Sheet Metal Terminology and Techniques: SMACNA "Architectural Sheet Metal Manual."

#### 1.4 DESIGN CRITERIA

- A. General: Installed roofing membrane system shall remain watertight; and resist specified wind uplift pressures, thermally induced movement, and exposure to weather without failure.
- B. Material Compatibility: Roofing materials shall be compatible with one another under conditions of service and application required, as demonstrated by roofing system manufacturer based on testing and field experience.
- C. Installer shall comply with current code requirements based on authority having jurisdiction.
- D. Wind Uplift Performance: Roofing system shall meet the intent of systems that have been successfully tested by a qualified testing and inspecting agency to resist wind uplift pressure calculated in accordance with ASCE 7.
- E. Fire-Test-Response Characteristics: Provide roofing materials with the fire-test-response characteristics indicated as determined by testing identical products per test method below by UL, FMG, or another testing and inspecting agency acceptable to authorities having jurisdiction. Materials shall be identified with appropriate markings of applicable testing and inspecting agency.
  1. Exterior Fire-Test Exposure: Class **[A] [B] [C]**; UL 790, for application and roof slopes indicated.

#### 1.5 SUBMITTALS

- A. Product Data: Manufacturer's data sheets for each product to be provided.
- B. Detail Drawings: Provide roofing system details and details of attachment to other work, including:
  1. Base flashings and membrane terminations.
  2. Tapered insulation, including slopes.
  3. Crickets, saddles, and tapered edge strips, including slopes.
  4. Insulation fastening and adhesive patterns.
- C. Verification Samples: Provide for each product specified.
- D. Installer Certificates: confirmation that installer is approved, authorized, or licensed by manufacturer to install roofing system.
- E. Maintenance Data: Refer to Johns Manville's latest published documents on [www.JM.com](http://www.JM.com).
- F. Guarantees: Provide manufacturer's current guarantee specimen.

G. Roofing sub-contractor shall provide a copy of the final System Assembly Letter issued by Johns Manville Roofing Systems indicating that the products and system to be installed shall be eligible to receive the specified manufacturer's guarantee when installed by a certified JM contractor in accordance with our application requirements, inspected and approved by a JM Technical Representative.

H. Prior to roofing system installation, roofing sub-contractor shall provide a copy of the Guarantee Application Confirmation document issued by Johns Manville Roofing Systems indicating that the project has been reviewed for eligibility to receive the specified guarantee and registered.

## 1.6 QUALITY ASSURANCE

A. Installer Qualifications: Qualified firm that is approved, authorized, or licensed by roofing system manufacturer to install manufacturer's product and who is eligible to receive the specified manufacturer's guarantee.

B. Manufacturer Qualifications: Qualified domestic U.S. owned and based manufacturer that has **[UL listing] and [FMG Approval] and [Florida Product Approval]** or accredited testing agency listing for roofing system identical to that used for this Project.

C. Testing Agency Qualifications: An independent testing agency with the experience and capability to conduct the testing indicated, as documented according to ASTM E 329.

D. Test Reports:

1. Roof drain and leader test or submit plumber's verification.
2. Core cut, if required.
3. Roof deck fastener pullout test, if required.
4. Bonded pull test, if required.

E. Moisture Survey, if required:

1. Submit prior to installation, results of a non-destructive moisture test of roof system completed by approved third party. Utilize one of the approved methods:
  - a. Infrared Thermography
  - b. Nuclear Backscatter

F. Source Limitations: Obtain all components from the single source roofing manufacturer guaranteeing the roofing system. All products used in the system shall be labeled by the single source roofing manufacturer issuing the guarantee.

## 1.7 DELIVERY, STORAGE, AND HANDLING

A. Deliver roofing materials in original containers with seals unbroken and labeled with manufacturer's name, product brand name and type, date of manufacture, and directions for storage.

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.

- C. Protect roof insulation materials from physical damage and from deterioration by sunlight, moisture, soiling, and other sources. 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 PROJECT CONDITIONS

- A. Weather Limitations: Proceed with installation only when current and forecasted weather conditions permit roofing system to be installed in accordance with manufacturer's written instructions and guarantee requirements.

## PART 2 - PRODUCTS

### 2.1 THERMOPLASTIC POLYOLEFIN ROOFING MEMBRANE - TPO

- A. Fabric-Reinforced Thermoplastic Polyolefin Sheet: ASTM D 6878, uniform, flexible sheet formed from a thermoplastic polyolefin, internally fabric or scrim reinforced. Basis of design: **[JM TPO] [JM TPO FB 115] [JM TPO FB 135] [JM TPO FB 150] [JM TPO FB 175] [JM TPO SA 60]**
  - 1. Membrane Thickness: **[45 mils (1.14 mm), minimum] [60 mils (1.52 mm), nominal] [80 mils (2.03 mm), nominal]**
  - 2. Fabric Fleece Backed Membrane Thickness: **[60 mils (1.52 mm), nominal] [80 mils (2.03 mm), nominal]**
  - 3. Exposed Face Color: White
- B. Self-Adhered Membrane Thickness: 60 mils (1.52 mm), nominal
  - a. Exposed Face Color: White
  - b. Serviceable Installation Temperature: 20°F (-7°C) and above.

### 2.2 AUXILIARY ROOFING MATERIALS – SINGLE PLY

- A. General: Auxiliary materials recommended by roofing system manufacturer for intended use and compatible with membrane roofing.
  - 1. Liquid-type auxiliary materials shall meet VOC limits of authorities having jurisdiction.
- B. Sheet Flashing: Manufacturer's internally reinforced or scrim reinforced. Basis of design: JM TPO 60 mil
- C. Sheet Flashing (Self-Adhered): 60 mil (1.5 mm) thick, manufacturer's internally reinforced or scrim reinforced with weldable selvage edges on each side of roll, one encapsulated edge and self-adhering capabilities in a wide installation temperature range. Basis of design: JM TPO SA – Flashing Membrane
  - 1. Serviceable Installation Substrate Temperature: 20°F (-7°C) and rising.

- D. Bonding Adhesive: Manufacturer's standard **[solvent] [water]**-based bonding adhesive for membrane, and **[solvent] [water]**-based bonding adhesive for base flashings. Basis of design: **[JM Membrane Bonding Adhesive (TPO&EPDM)] [JM LVOC Membrane Adhesive (TPO & EPDM)] [JM TPO Water Based Membrane Adhesive] [JM TPO 1168 Membrane Adhesive] [JM All Season Sprayable Bonding Adhesive]**
1. Serviceable Installation Ambient Air Temperature: 25°F and rising
- E. Flashing Adhesive: Manufacturer's standard-**[solvent] [water]** - based bonding adhesive for base flashings. Basis of design: **[JM Membrane Bonding Adhesive (TPO&EPDM)] [JM LVOC Membrane Adhesive (TPO & EPDM)] [JM TPO Water Based Membrane Adhesive] [JM TPO 1168 Membrane Adhesive] [JM All Season Sprayable Bonding Adhesive]**
1. Serviceable Installation Ambient Air Temperature: 25°F and rising.
- F. Urethane Adhesive: Manufacturer's standard two component no VOC urethane adhesive for fleece-backed membranes. Basis of design: **JM Roofing Systems Urethane Adhesive (RSUA)**
- G. Urethane Adhesive: Manufacturer's self-contained two-part, low-rise foam adhesive formulated to adhere fleece-backed membranes to substrate. Basis of design: **JM Two-Part Urethane Insulation Adhesive Canister**
- H. Self-Adhered Primer: One-part penetrating primer solution to enhance the adhesion of self-adhering membranes. Basis of design: **[SA Primer] [SA Primer Low VOC]**
- I. Roofing Asphalt: ASTM D 312-15, Type IV
- J. **Asphalt Primer: ASTM D 41. Basis of design: JM Asphalt Primer**
- K. Liquid Applied Flashing: Manufacturer's single ply liquid and fabric reinforced flashing system created with a fleece polyester scrim and a two-component polyurethane-based liquid applied flashing material, consisting of a liquid resin and a curing agent. Basis of design: JM SP Liquid Flashing Resin and JM SP Liquid Flashing Scrim
- L. Liquid Applied Flashing Primer: Manufacturer's single ply liquid flashing primer. Basis of design: JM SP Liquid Flashing TPO and PVC Primer, JM SP Liquid Flashing Concrete Primer, or JM SP Liquid Flashing Metal and Wood Primer
- M. Slip Sheet: Manufacturer's recommended slip sheet, of type required for application. Basis of design: **[JM 3 -oz Polyester Slipsheet] [ JM Polyester Mat Protection Slipsheet]**
- N. Metal Termination Bars: Manufacturer's standard predrilled stainless-steel or aluminum bars, with anchors. Basis of design: JM Termination Systems
- O. Fasteners: Factory-coated steel fasteners and metal plates meeting corrosion-resistance provisions in FMG 4470, designed for fastening membrane to substrate, and acceptable to membrane roofing system manufacturer. Basis of design: **[High Load Fasteners and Plates] [High Load Fasteners and JM VSH Plates] [Extra High Load Fasteners and Plates] [JM Purlin Fasteners] [All Purpose Fasteners and High Load Plates]**
- P. Polymer Fasteners: Glass-reinforced nylon fasteners with ¼" square drive and 1" head with Galvalume®-coated 2" metal stress plates, designed to lock into the fastener head.

Fasteners designed for fastening roof insulation to substrate and furnished by roofing system manufacturer. Basis of design: **Polymer Auger Fasteners and Plates**

- Q. Induction Welding Plate: A round specially coated Galvalume® plate with a recessed center and raised flat bonding surface specifically designed for induction welding application. Basis of design: **JM TPO RhinoPlates**
- R. Miscellaneous Accessories: Provide all accessories to meet the roofing manufacturer's guarantee requirements.

### 2.3 WALKWAYS AND SAFETY STRIPS

- A. Flexible Walkways: Factory-formed, nonporous, heavy-duty, slip-resisting, surface-textured walkway pads sourced from membrane roofing system manufacturer. Basis of design: **[JM TPO Walkpad] [JM TPO Safety Walkpad]**
- B. Safety Strips: Manufacturer's minimum 65 mils total thickness, comprise of 30 mil yellow non-reinforced TPO membrane laminated to 35 mil white cured seaming tape. Basis of design: JM Single Ply Safety Strip
  - 1. Exposed Face Color: Yellow

### 2.4 COVER BOARD

- A. Polyisocyanurate Board: ASTM C 1289, Type II, Class **[1] [2]**, Grade **[2 (20 psi)] [3 (25 psi)]**, polyisocyanurate bonded in-line to **[fiber glass reinforced] [inorganic coated glass]** facer. Basis of design: **[SeparatoR] [SeparatoR CGF]**
  - 1. Thickness: ½ inch (13mm)
  - 2. R-value: 2.85-2.9
- B. Perlite Board: ASTM C 728, Type 3; composed of expanded perlite, cellulosic fibers, binders and waterproofing agents with top surface seal coated. Basis of design: RetroPlus Roof Board.
- C. High-Density Polyisocyanurate: ASTM C 1289, Type II, Class 4, Grade 1, High-density Polyisocyanurate technology bonded in-line to inorganic coated glass facers with greater than 80 lbs of compressive strength. Basis of design: ProtectoR HD
  - 1. Thickness: 1/2 inch (13 mm)
  - 2. R-value: 2.5
- D. High-Density Polyisocyanurate: High-density Polyisocyanurate bonded to glass reinforced facers. For mechanically fastened membrane attachment only. Basis of Design: ENRGY 3 HD
  - 1. Size: 48 inches (1220 mm) by 96 inches (2440 mm)
  - 2. Thickness: ½ inch (12.7 mm)
  - 3. Dimensional Stability: 1.0% linear change, when tested per ASTM D 2126
  - 4. R-Value: 2.5 based on ASTM C 518
  - 5. Water Absorption: 3.0%, maximum, when tested per ASTM C 209
  - 6. Compressive Strength: 80 psi(551 kPa) min, when tested per ASTM D1621

- E. Gypsum Board: ASTM C 1177, coated glass-mat facer, water-resistant gypsum substrate for mechanically attached roof applications, [**1/4 inch (6 mm)**] [**1/2 inch (13 mm)**] [**5/8 inch (16 mm)**] thick. Basis of design: [**Securock Ultralight Glass-Mat Roof Board**] [**DEXcell Glass Mat Roof Board**] [**Dens Deck Roof Board**]
- F. Gypsum Board: ASTM C 1177, Heavy duty coated glass-mat facer [**with Eonic primed face**], water-resistant gypsum substrate for adhered roof applications, [**1/4 inch (6 mm)**] [**1/2 inch (13 mm)**] [**5/8 inch (16 mm)**] thick. Basis of design: [**DEXcell FA Glass Mat Roof Board**] [**Dens Deck Prime Roof Board**]
- G. Gypsum Fiber Board: ASTM C 1278, non-faced, gypsum and cellulose fiber substrate, [**1/4 inch (6 mm)**] [**3/8 inch (9.5 mm)**] [**1/2 inch (13 mm)**] [**5/8 inch (16 mm)**] thick. Basis of design: **Securock Gypsum-Fiber Roof Board**

## 2.5 ROOF INSULATION – FLUTE FILLER

- A. General: Preformed roof insulation boards that comply with requirements and referenced standards, selected from manufacturer's standard sizes and of thicknesses indicated.
- B. Polyisocyanurate Board Insulation: ASTM C 1289, Type II, Class 1, Grade 2, Product: ENRGY 3
  - 1. Provide metal roof flute filler insulation package with thickness to fill flutes the height of the standing seam.

## 2.6 ROOF INSULATION

- A. General: Preformed roof insulation boards that comply with requirements and referenced standards, selected from manufacturer's standard sizes and of thicknesses indicated.
- B. Lightweight insulating concrete in accordance with section 03 52 16 – Lightweight Insulating Concrete.
- C. Polyisocyanurate Board Insulation: ASTM C 1289, Type II, Class [**1**] [**2**], Grade [**2 (20 psi)**] [**3 (25 psi)**], Basis of design: [**ENRGY 3**] [**ENRGY 3 25 PSI**] [**ENRGY 3 CGF**] [**ENRGY 3 25 PSI CGF**]
  - 1. Provide insulation package with minimum R Value: [**insert R Value**] [**minimum required by applicable code**].
  - 2. Provide insulation package with minimum thickness: [**insert thickness**].
  - 3. Provide insulation package in multiple layers.
  - 4. Minimum Long-Term Thermal Resistance (LTTR): 5.7 per inch.
    - a. Determined in accordance with CAN/ULC S770 at 75°F (24°C)

## 2.7 TAPERED INSULATION

- A. Tapered Insulation: ASTM C 1289, Type II, Class [**1**] [**2**], Grade [**2 (20 psi)**] [**3 (25 psi)**], provide factory-tapered insulation boards fabricated to slope of **1/4 inch per 12 inches (1:48)**, unless otherwise indicated. Basis of design: [**Tapered ENRGY 3**] [**Tapered ENRGY 3 25 PSI**] [**Tapered ENRGY 3 CGF**] [**Tapered ENRGY 3 25 PSI CGF**]

## 2.8 INSULATION ACCESSORIES

- A. General: Roof insulation accessories recommended by insulation manufacturer for intended use and compatible with membrane roofing.
- B. Provide saddles, crickets, tapered edge strips, and other insulations shapes where indicated for sloping to drain. Fabricate to slopes indicated. Basis of design: Tapered Fesco Edge Strips.
- C. Fasteners: Factory-coated steel fasteners and metal or plastic plates meeting corrosion-resistance provisions in FMG 4470, designed for fastening roof insulation to substrate, and furnished by roofing system manufacturer. Basis of design: **[UltraFast Fasteners and UltraFast Plates] [UltraFast Fasteners and JM VSH Plates] [All Purpose Fasteners and UltraFast Plate] [Lite-Deck Fasteners and Plates]**
- D. Polymer Fasteners: Glass-reinforced nylon fasteners with ¼" square drive and 1" head with Galvalume®-coated 3" metal stress plates, designed to lock into the fastener head. Fasteners designed for fastening roof insulation to substrate and furnished by roofing system manufacturer. Basis of design: **Polymer Auger Fasteners and Plates**
- E. Urethane Adhesive: Manufacturer's two component polyurethane adhesive formulated to adhere insulation to substrate. Basis of design: **[JM Two-Part Urethane Insulation Adhesive (UIA)] [JM One-Step Foamable Adhesive] [Roofing Systems Urethane Adhesive (RSUA)] [JM Two-Part Urethane Insulation Adhesive Canister]**
- F. Wood Nailer Strips: Comply with requirements in Division 06 Section **"Miscellaneous Rough Carpentry."**

## 2.9 SUBSTRATE BOARD

- A. Gypsum Board: ASTM C 1177, coated glass-mat facer, water-resistant gypsum substrate for mechanically attached roof applications, **[1/4 inch (6 mm)] [1/2 inch (13 mm)] [5/8 inch (16 mm)]** thick. Basis of design: **[Securock Ultralight Glass-Mat Roof Board] [DEXcell Glass Mat Roof Board] [Dens Deck Roof Board]**
- B. Gypsum Board: ASTM C 1177, Heavy duty coated glass-mat facer, water-resistant gypsum substrate for adhered roof applications, **5/8 inch (16 mm)** thick. Basis of design: **[DEXcell FA Glass Mat Roof Board] [Dens Deck Prime Roof Board]**
- C. Gypsum Fiber Board: ASTM C 1278, non-faced, gypsum and cellulose fiber substrate, **[1/4 inch (6 mm)] [3/8 inch (9.5 mm)] [1/2 inch (13 mm)] [5/8 inch (16 mm)]** thick. Basis of design: **Securock Gypsum-Fiber Roof Board**
- D. High-Density Polyisocyanurate: ASTM C 1289, Type II, Class 4, Grade 1, High-density Polyisocyanurate technology bonded in-line to inorganic coated glass facers with greater than 80 lbs of compressive strength. Basis of design: ProtectoR HD
  - 1. Thickness: 1/2 inch (13 mm)
  - 2. R-value: 2.5

2.10 EDGE METAL COMPONENTS

- A. Coping System: Manufacturer's factory fabricated coping consisting of a base piece and a snap-on cap. Provide product from single-source roofing system supplier that is included in the No Dollar Limit guarantee. Basis of design: Presto-Lock Gold Coping
- B. Fascia System: Manufacturer's factory fabricated fascia consisting of a base piece and a snap-on cover. Provide product from single-source roofing system supplier that is included in the No Dollar Limit guarantee. Basis of design: Presto-Tite Edge One Fascia
- C. Metal Edge System: Manufacturer's factory fabricated metal edge system used to terminate the roof at the perimeter of the structure. Provide product from single-source roofing system supplier that is included in the No Dollar Limit guarantee. Basis of design: JM TPO-Coated Metal
- D. Shop-Fabricated Edge Metal: Custom-fabricated edge metal meeting the criterion of ANSI/SPRI ES-1. Must be approved by manufacturer technical representative. Minimum requirements:
  - 1. Steel: 24 gauge, TPO coated fastened 6 inches on center.
  - 2. Aluminum: 0.05 inch thick, fastened 6 inches on center.
- E. Metal Flashing Sheet: Metal flashing sheet is specified in Division 07 Section "Sheet Metal Flashing and Trim."
- F. Roof Edge Drainage Systems: Gutter Systems: Manufactured in section lengths not exceeding 12 feet with 0.100-inch mill aluminum internal Gutter Hangers, 24 inches on center, and 2-inch-wide formed external wind straps 6'-0" on center

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions for compliance with the requirements affecting performance of roofing system.
  - 1. General:
    - a. Verify that roof openings and penetrations are in place and set and braced and that roof drains are securely clamped in place.
    - b. Verify that wood cants, blocking, curbs, and nailers are securely anchored to roof deck at penetrations and terminations and that nailers match thicknesses of insulation.
  - 2. **Steel Decks:**
    - a. Verify that surface plane flatness and fastening of steel roof deck complies with requirements in Division 05 Section "Steel Decking."
    - b. Verify that decking is visibly dry and free of moisture.
    - c. Verify that the decking is smooth and free of large cracks, holes, or sharp changes in elevation of the surface.

- d. When applicable perform pull test with the specific fastener being used on the project to confirm the fastener resistance meets the requirements for that particular system.

**3. Wood Decks:**

- a. Verify that wood decking is visibly dry and free of moisture.
  - b. Verify that wood has ability to provide minimum fastener pull-out resistance.
    - 1) Provide documentation of pull-out resistance values in accordance with ANSI/SPRI FX-1 2016.
  - 4. Ensure general rigidity and proper slope for drainage.
  - 5. Verify that deck is securely fastened with no projecting fasteners and with no adjacent units more than 1/16 inch (1.6 mm) out of plane relative to adjoining deck.
- B. Unacceptable panels should be brought to the attention of the General Contractor and Project Owner's Representative and shall be corrected prior to installation of roofing system.

**3.2 PREPARATION**

- A. Clean and remove from substrate sharp projections, dust, debris, moisture, and other substances detrimental to roofing installation in accordance with roofing system manufacturer's written instructions.
- B. Prevent materials from entering and clogging roof drains and conductors and from spilling or migrating onto surfaces of other construction.
- C. If applicable, prime surface of deck at a rate recommended by roofing manufacturer and allow primer to dry.
- D. Proceed with each step of installation only after unsatisfactory conditions have been corrected.

**3.3 SUBSTRATE BOARD INSTALLATION**

- A. Install substrate board with long joints in continuous straight lines, perpendicular to roof slopes with end joints staggered between rows. Tightly butt substrate boards together.
- B. Mechanically Fastened Substrate Board: (Where Feasible) Install substrate board and secure to deck using mechanical fasteners designed and sized for fastening specified substrate board to deck type.
  - 1. Fasten substrate board to top flanges of steel deck according to recommendations in FMG's "Approval Guide" for specified Windstorm Resistance Classification.
  - 2. Fasten substrate board to [top flanges of steel deck] [wood deck] to resist uplift pressure at corners, perimeter, and field of roof per roofing system manufacturer's written instructions.
- C. Adhered Substrate Board: Adhere substrate board to substrate as follows:

1. Install in a two-part urethane adhesive according to roofing system manufacturer's instruction.
2. Install to resist uplift pressure at corners, perimeter, and field of roof.

### 3.4 BASE-SHEET INSTALLATION

A. Install one lapped base sheet course and mechanically fasten to substrate per roofing system manufacturer's written instructions.

1. Enhance fastening rate in perimeter and corner zones per code requirements, wind uplift system approvals or manufacturer's guarantee requirements, whichever is more stringent.

B. Comply with roofing system manufacturer's written instructions for installing roof insulation.

### 3.5 FLUTE FILLER INSULATION INSTALLATION

A. Coordinate installation of roof system components so insulation is not exposed to precipitation or left exposed at the end of the workday.

B. Comply with roofing system manufacturer's written instructions for installing roof insulation.

C. Loose lay Polyisocyanurate flute filler insulation between the metal roof standing seams.

### 3.6 INSULATION INSTALLATION

A. Coordinate installation of roof system components so insulation and cover board are not exposed to precipitation or left exposed at the end of the workday.

B. Comply with roofing system manufacturer's written instructions for installation of roof insulation and cover board.

C. Install tapered insulation under area of roofing to conform to slopes indicated.

D. Install insulation boards with long joints in a continuous straight line. Joints should be staggered between rows, abutting edges and ends per manufacturer's written instructions. Fill gaps exceeding 1/4 inch (6 mm) with like material.

E. Install 2 or more layers with joints of each succeeding layer staggered from joints of previous layer a minimum of 6 inches (150 mm) in each direction.

F. Trim surface of insulation boards where necessary at roof drains so completed surface is flush and does not restrict flow of water.

G. Install tapered edge strips at perimeter edges of roof that do not terminate at vertical surfaces.

H. Preliminarily Fastened Insulation [for Mechanically Fastened Membrane Systems]: Install insulation with fasteners at rate required by roofing system manufacturer.

1. Fasten top layer to resist uplift pressure at corners, perimeter, and field of roof.

- I. Adhered Insulation: Adhere insulation to substrate as follows:
  - 1. Install each layer in a two-part urethane adhesive according to roofing system manufacturer's instruction.
  - 2. Install each layer in a solid mopping of hot roofing asphalt according to roofing system manufacturer's instruction.
  - 3. Install each layer to resist uplift pressure at corners, perimeter, and field of roof.
  
- J. Loose Laid Insulation with Top Insulation Layer Mechanically Fastened: Loose lay insulation with staggered joints and secure top layer of insulation to deck using mechanical fasteners designed and sized for fastening specified board-type to deck type.
  - 1. Fasten top layer according to requirements in FMG's "Approval Guide" for specified Windstorm Resistance Classification.
  - 2. Fasten top layer to resist uplift pressure at corners, perimeter, and field of roof.
  
- K. Loose Laid Insulation: Loose lay all layers of insulation with staggered joints.
  
- L. Mechanically Fastened with Subsequent Layers Adhered Insulation: Secure first layer of insulation to deck using mechanical fasteners designed and sized for fastening specified board-type to deck type.
  - 1. Fasten first layer according to requirements in FMG's "Approval Guide" for specified Windstorm Resistance Classification.
  - 2. Fasten first layer to resist uplift pressure at corners, perimeter, and field of roof.
  - 3. Install subsequent layers in a two-part urethane adhesive according to roofing system manufacturer's instruction.
  - 4. Install subsequent layers in a solid mopping of hot roofing asphalt according to roofing system manufacturer's instruction.
  - 5. Install each layer to resist uplift pressure at corners, perimeter, and field of roof.

### 3.7 COVER BOARD INSTALLATION

- A. Coordinate installing membrane roofing system components so cover board is not exposed to precipitation or left exposed at the end of the workday.
  
- B. Comply with membrane roofing system manufacturer's written instructions for installing roof cover board.
  
- C. Install cover board with long joints in a continuous straight line. Joints should be staggered between rows, abutting edges and ends per manufacturer's written instructions. Fill gaps exceeding 1/4 inch (6 mm) with cover board.
  - 1. Cut and fit cover board within 1/4 inch (6 mm) of nailers, projections, and penetrations.
  
- D. Trim surface of cover board where necessary at roof drains so completed surface is flush and does not restrict flow of water.
  - 1. Install tapered edge strips at perimeter edges of roof that do not terminate at vertical surfaces.

- E. Preliminarily Fastened cover board for Mechanically Fastened Systems: Install cover board with fasteners at rate required by roofing system manufacturer or applicable authority, whichever is more stringent.
- F. Adhered Cover Board: Adhere cover board to substrate as follows:
  - 1. Install in a two-part urethane adhesive according to roofing system manufacturer's instruction.
  - 2. Install to resist uplift pressure at corners, perimeter, and field of roof.
- G. Mechanically Fastened Cover Board: Install cover board and secure to deck using mechanical fasteners designed and sized for fastening specified cover board to deck type.
  - 1. Fasten according to requirements in FMG's "Approval Guide" for specified Windstorm Resistance Classification.
  - 2. Fasten to resist uplift pressure at corners, perimeter, and field of roof.

### 3.8 ROOFING MEMBRANE INSTALLATION, GENERAL

- A. Install roofing membrane in accordance with roofing system manufacturer's written instructions, applicable recommendations of the roofing manufacturer and requirements in this Section.
- B. Cooperate with testing and inspecting agencies engaged or required to perform services for installing roofing system.
- C. Coordinate installing roofing system so insulation and other components of the roofing membrane system not permanently exposed are not subjected to precipitation or left uncovered at the end of the workday or when rain is imminent.
  - 1. Provide tie-offs at end of each day's work to cover exposed roofing membrane sheets and insulation.
  - 2. Complete terminations and base flashings and provide temporary seals to prevent water from entering completed sections of roofing system.
  - 3. Remove and discard temporary seals before beginning work on adjoining roofing.
- D. Asphalt Heating: Heat roofing asphalt to temperature recommended by roofing manufacturer to flux modified membrane. Do not exceed roofing asphalt manufacturer's recommended temperature limits during roofing asphalt heating. Discard roofing asphalt maintained at a temperature exceeding finished blowing temperature for more than 4 hours.
  - 1. Substrate-Joint Penetrations: Prevent roofing asphalt from penetrating substrate joints, entering building, or damaging roofing system components or adjacent building construction.

### 3.9 ADHERED ROOFING MEMBRANE INSTALLATION

- A. Install roofing membrane over area to receive roofing in accordance with membrane roofing system manufacturer's written instructions.
  - 1. Unroll roofing membrane and allow to relax before installing.
  - 2. Install sheet in accordance with roofing system manufacturer's written instructions.

- B. Accurately align roofing membrane and maintain uniform side and end laps of minimum dimensions required by manufacturer. Stagger end laps.
- C. Solvent Based Bonding Adhesive for smooth backed membranes: Apply solvent-based bonding adhesive to substrate and underside of roofing membrane at rate required by manufacturer and allow to partially dry before installing roofing membrane. Do not apply bonding adhesive to splice area of roofing membrane.
- D. Water Based Bonding Adhesive for smooth backed membranes: Apply water-based bonding adhesive to substrate at rate required by manufacturer and immediately install roofing membrane. Do not apply bonding adhesive to splice area of roofing membrane.
- E. Water Based Bonding Adhesive for fleece backed membranes: Apply water-based bonding adhesive to substrate at rate required by manufacturer and immediately install roofing membrane. Do not apply bonding adhesive to splice area of roofing membrane.
- F. Urethane Membrane Adhesive for fleece backed membranes: Apply Urethane Adhesive to substrate at rate required by manufacturer and install fleece-backed roofing membrane. Do not apply bonding adhesive to splice area of roofing membrane.
- G. Asphalt for fleece backed membranes: Adhere to substrate in a solid mopping of hot roofing asphalt applied at temperatures recommended by roofing system manufacturer.
- H. Mechanically fasten roofing membrane securely at terminations, penetrations, and perimeter of roofing.
- I. Apply roofing membrane with side laps shingled with roof slope, where possible.
- J. Seams: Clean seam areas, overlap roofing membrane, and hot-air weld side and end laps of roofing membrane 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 roofing membrane.
  - 2. Verify field strength of seams a minimum of twice daily and repair seam sample areas.
    - a. Remove and repair any unsatisfactory sections before proceeding with installation.
  - 3. Repair tears, voids, and incorrectly lapped seams in roofing membrane that do not meet requirements.
- K. Spread sealant or mastic bead over deck drain flange at deck drains and securely seal roofing membrane in place with clamping ring.

### 3.10 MECHANICALLY FASTENED ROOFING MEMBRANE INSTALLATION

- A. Install roofing membrane over area to receive roofing in accordance with roofing system manufacturer's written instructions.
  - 1. Unroll roofing membrane and allow it to relax before installing.
  - 2. Install sheet in accordance with roofing system manufacturer's written instructions.

- B. Accurately align roofing membranes and maintain uniform side and end laps of minimum dimensions required by manufacturer. Stagger end laps.
- C. Mechanically fasten roofing membrane securely at terminations, penetrations, and perimeter of roofing.
- D. Always install membrane laps perpendicular to the steel deck flutes. "Picture Frame" installation method is not permitted.
- E. Apply roofing membrane with side laps shingled with roof slope, where possible.
- F. Seams: Clean seam areas, overlap roofing membrane, and hot-air weld side and end laps of roofing membrane 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 roofing membrane.
  - 2. Verify field strength of seams a minimum of twice daily and repair seam sample areas.
    - a. Remove and repair any unsatisfactory sections before proceeding with work.
  - 3. Repair tears, voids, and lapped seams in roofing membrane that do not meet requirements.
- G. Spread sealant or mastic bead over deck drain flange at deck drains and securely seal roofing membrane in place with clamping ring.
- H. In-Splice Attachment: Secure one edge of roofing membrane using fastening plates or metal battens centered within membrane splice and mechanically fasten roofing membrane to roof deck. Field-splice seam.
- I. Install roofing membrane and auxiliary materials to tie into existing roofing.

### 3.11 SELF-ADHERED ROOFING MEMBRANE INSTALLATION

- A. Install roofing membrane over area to receive roofing in accordance with membrane roofing system manufacturer's written instructions.
  - 1. Unroll roofing membrane and allow to relax before installing (minimum 15-30 minutes, colder temperatures might require longer relaxation times).
  - 2. Install sheet in accordance with roofing system manufacturer's written instructions.
- B. Accurately align roofing membrane and maintain uniform side and end laps of minimum dimensions required by manufacturer.
- C. Align sheet end laps of consecutive membranes. The end laps will be stripped in with minimum 8-inch JM TPO Reinforced Cover Strip per manufacturer's written instructions.
- D. Self-Adhere membrane to approved substrate per manufacturer's written instructions.
  - 1. Keep all flammable materials away while peeling the release liner.
  - 2. Adjust speed and tension on membrane to avoid wrinkles in the material.

3. Broom membrane in once both sides are down to promote adhesion and assist in removing air pockets.
  4. Roll-in adhered membrane with 100lb split roller completely.
- E. Mechanically fasten roofing membrane securely at terminations, penetrations, and perimeter of roofing.
- F. Apply roofing membrane with side laps shingled with roof slope, where possible.
- G. Seams: Clean seam areas, overlap roofing membrane, and hot-air weld side laps of roofing membrane 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 roofing membrane.
  2. Verify field strength of seams a minimum of twice daily and repair seam sample areas.
    - a. Remove and repair any unsatisfactory sections before proceeding with installation.
  3. End laps are seamed by stripping with 8-inch reinforced cover strip following standard practices.
  4. Repair tears, voids, and incorrectly lapped seams in roofing membrane that do not meet requirements.
- H. Spread sealant or mastic bead over deck drain flange at deck drains and securely seal roofing membrane in place with clamping ring.
- I. Install roofing membrane and auxiliary materials to tie into existing roofing.

### 3.12 BASE FLASHING INSTALLATION

- A. Install sheet flashings and preformed flashing accessories and adhere to substrates per membrane roofing system manufacturer's written instructions.
- B. Apply solvent-based bonding adhesive at required rate and allow to partially dry. Do not apply bonding adhesive to seam area of flashing.
- C. Apply water-based bonding adhesive in two-sided application, at required rate, and allow to partially dry. Do not apply bonding adhesive to seam area of flashing.
- D. Self-Adhere membrane to smooth approved substrates, when substrate temperatures are 40°F (4.5°C) and rising.
1. The use of SA Primer or SA LVOC Primer is required for flashing applications on curbs and parapet walls for temperatures between 40°F (4.5°C) and 20°F (-7°C).
  2. The use of SA Primer or SA LVOC Primer is required for flashing applications over approved substrates with a porous or rough surface, including: Dens Deck Prime, Dens Deck, DEXcell, concrete and smooth faces CMU.
- E. Apply single ply liquid applied flashing system per manufacturer's written instructions.

- F. Flash penetrations and field-formed inside and outside corners per manufacturer's installation instructions.
- G. Clean seam areas and overlap and firmly roll sheet flashings into the adhesive. Weld side and end laps to ensure a watertight seam installation.
- H. Terminate and seal top of sheet flashings and mechanically anchor to substrate through termination bars.

### 3.13 EDGE METAL INSTALLATION

- A. Examine substrates and conditions under which sheet metal flashing and trim are to be installed and verify that work may properly commence. Do not proceed with installation until unsatisfactory conditions have been corrected.
- B. Provide edge details as indicated on the Drawings. Install in accordance with the membrane manufacturer's requirements and SMACNA's "Architectural Sheet Metal Manual."
- C. Join individual sections in accordance with the membrane manufacturer's requirements and SMACNA's "Architectural Sheet Metal Manual."

### 3.14 SLIP SHEET INSTALLATION

- A. Install polyester slip sheet as a loosely laid single layer above single ply membrane, per manufacturer's written instructions.

### 3.15 WALKWAY INSTALLATION

- A. Flexible Walkways: Install walkway products in locations indicated. Heat weld and adhere walkway products to substrate according to roofing system manufacturer's written instructions.
- B. Roof-Paver Walkways: Install walkway roof pavers with applicable slip sheet per manufacturer's written instructions in locations indicated, to form walkways.

### 3.16 FIELD QUALITY CONTROL

- A. Owner or designated representative will provide on-site observation and inspection during installation.
- B. Owner will engage a qualified independent testing and inspecting agency to perform roof tests and inspections and to prepare test reports.
- C. Final Roof Inspection: Arrange for roofing system manufacturer's technical representative to inspect roofing installation on completion and submit report to Architect.
  - 1. Notify Architect or Owner 48 hours in advance of date and time of inspection.
- D. Repair or remove and replace components of roofing system where test results or inspections indicate that they do not comply with specified requirements.

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

3.17 PROTECTION AND CLEANING

- A. Protect roofing system from damage and wear during remainder of construction period.
- 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 Substantial Completion 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 075423

**SECTION 07 62 00**  
**SHEET METAL FLASHING AND TRIM**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Fabricated sheet metal items, including .
- B. Sealants for joints within sheet metal fabrications.
- C. Precast concrete splash pads.

**1.02 RELATED REQUIREMENTS**

- A. Section 03 10 00 - Concrete Forming and Accessories: Placement of recessed reglets in formwork.
- B. Section 04 20 00 - Unit Masonry: Metal flashings embedded in masonry.
- C. Section 06 10 00 - Rough Carpentry: Wood nailers for sheet metalwork.
- D. Section 07 71 00 - Roof Specialties: Manufactured copings, flashings, and expansion joint covers.
- E. Section 07 72 00 - Roof Accessories: Manufactured metal roof curbs.
- F. Section 07 92 00 - Joint Sealants: Sealing non-lap joints between sheet metal fabrications and adjacent construction.

**1.03 REFERENCE STANDARDS**

- A. ASTM A666 - Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar 2015.
- B. ASTM B32 - Standard Specification for Solder Metal 2020.
- C. ASTM B209 - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate 2014.
- D. ASTM B209M - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate (Metric) 2014.
- E. ASTM C920 - Standard Specification for Elastomeric Joint Sealants 2018.
- F. ASTM D2178/D2178M - Standard Specification for Asphalt Glass Felt Used in Roofing and Waterproofing 2015a (Reapproved 2021).
- G. ASTM D4479/D4479M - Standard Specification for Asphalt Roof Coatings - Asbestos-Free 2007 (Reapproved 2018).
- H. ASTM D4586/D4586M - Standard Specification for Asphalt Roof Cement, Asbestos-Free 2007 (Reapproved 2018).
- I. CDA A4050 - Copper in Architecture - Handbook current edition.
- J. SMACNA (ASMM) - Architectural Sheet Metal Manual 2012.

**1.04 SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements for submittal procedures.
- B. Shop Drawings: Indicate material profile, jointing pattern, jointing details, fastening methods, flashings, terminations, and installation details.
- C. Samples: Submit two samples, in size illustrating material of typical standing seam.
- D. Samples: Submit two samples 12" X 12" in size illustrating metal finish color.

**1.05 QUALITY ASSURANCE**

- A. Perform work in accordance with SMACNA (ASMM) and CDA A4050 requirements and standard details, except as otherwise indicated.

## **PART 2 PRODUCTS**

### **201 MANUFACTURERS**

- A. Sheet Metal Flashing and Trim Manufacturers:
  - 1. Fairview Architectural LLC: [www.fairview-na.com/#sle](http://www.fairview-na.com/#sle).
  - 2. OMG Roofing Products: [www.omgroofing.com/#sle](http://www.omgroofing.com/#sle).
  - 3. Petersen Aluminum Corporation: [www.pac-clad.com/#sle](http://www.pac-clad.com/#sle).

### **202 SHEET MATERIALS**

- A. Stainless Steel: ASTM A666, Type 304 alloy, soft temper, 28 gauge, (0.0156 inch) (0.40 mm) thick; smooth No. 4 - Brushed finish.

### **203 FABRICATION**

- A. Form sections true to shape, accurate in size, square, and free from distortion or defects.
- B. Form pieces in longest possible lengths.
- C. Hem exposed edges on underside 1/2 inch (13 mm); miter and seam corners.
- D. Form material with flat lock seams, except where otherwise indicated; at moving joints, use sealed lapped, bayonet-type or interlocking hooked seams.
- E. Fabricate flashings to allow toe to extend 2 inches (50 mm) over roofing gravel. Return and brake edges.

### **204 GUTTER AND DOWNSPOUT FABRICATION**

- A. Gutters: SMACNA (ASMM) Rectangular profile.
- B. Downspouts: Rectangular profile.
- C. Gutters and Downspouts: Size for rainfall intensity determined by a storm occurrence of 1 in 10 years in accordance with SMACNA (ASMM).
- D. Gutters and Downspouts: Size indicated.
- E. Accessories: Profiled to suit gutters and downspouts.
  - 1. Anchorage Devices: In accordance with SMACNA (ASMM) requirements.
  - 2. Gutter Supports: Brackets.
- F. Seal metal joints.

### **205 EXTERIOR PENETRATION FLASHING PANELS**

- A. Flashing Panels for Exterior Wall Penetrations: Premanufactured components and accessories as required to preserve integrity of building envelope; suitable for conduits and facade materials to be installed.

### **206 ACCESSORIES**

- A. Fasteners: Stainless steel, with soft neoprene washers.
- B. Underlayment: ASTM D226/D226M, organic roofing felt, Type I (No. 15).
- C. Underlayment: ASTM D2178/D2178M, glass fiber roofing felt.
- D. Primer: Zinc chromate type.
- E. Concealed Sealants: Non-curing butyl sealant.
- F. Exposed Sealants: ASTM C920; elastomeric sealant, with minimum movement capability as recommended by manufacturer for substrates to be sealed; color to match adjacent material.

## **PART 3 EXECUTION**

### **301 EXAMINATION**

- A. Verify roof openings, curbs, pipes, sleeves, ducts, and vents through roof are solidly set, reglets in place, and nailing strips located.
- B. Verify roofing termination and base flashings are in place, sealed, and secure.

**3.02 PREPARATION**

- A. Install starter and edge strips, and cleats before starting installation.
- B. Install surface mounted reglets true to lines and levels, and seal top of reglets with sealant.

**3.03 INSTALLATION**

- A. Comply with drawing details.
  - 1. : SMACNA (ASMM), Detail .
- B. Secure flashings in place using concealed fasteners, and use exposed fasteners only where permitted..
- C. Apply plastic cement compound between metal flashings and felt flashings.
- D. Fit flashings tight in place; make corners square, surfaces true and straight in planes, and lines accurate to profiles.
- E. Secure gutters and downspouts in place with concealed fasteners.

**3.04 FIELD QUALITY CONTROL**

- A. Inspection will involve surveillance of work during installation to ascertain compliance with specified requirements.

**3.05 SCHEDULE**

- A. Through-Wall Flashing in Masonry:
- B. Gutters and Downspouts:
- C. Scuppers:
- D. Coping, Cap, Parapet, Sill and Ledge Flashings:
- E. Flashings Associated with Shingle Roofing, including Valley, Hip, Ridge, Eave, Gutter Edge, Gable Edge:
- F. Sheet Metal Roof Expansion Joint Covers, and Roof-to-Wall Joint Covers:
- G. Counterflashings at Roofing Terminations (over roofing base flashings):
- H. Counterflashings at Curb-Mounted Roof Items, including skylights and roof hatches:
- I. Roofing Penetration Flashings, for Pipes, Structural Steel, and Equipment Supports:

**END OF SECTION 07 62 00**

**SECTION 07 71 00  
ROOF SPECIALTIES**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Manufactured roof specialties, including copings, fascias, and gravel stops.
- B. Roof membrane breather vents.
- C. Factory fabricated cornices.

**1.02 RELATED REQUIREMENTS**

- A. Section 07 72 00 - Roof Accessories: Manufactured curbs, roof hatches, and snow guards.

**1.03 REFERENCE STANDARDS**

- A. AAMA 611 - Voluntary Specification for Anodized Architectural Aluminum 2020.
- B. AAMA 2603 - Voluntary Specification, Performance Requirements and Test Procedures for Pigmented Organic Coatings on Aluminum Extrusions and Panels (with Coil Coating Appendix) 2021.
- C. AAMA 2604 - Voluntary Specification, Performance Requirements and Test Procedures for High Performance Organic Coatings on Aluminum Extrusions and Panels (with Coil Coating Appendix) 2021, with Errata (2022).
- D. ANSI/SPRI/FM 4435/ES-1 - Test Standard for Edge Systems Used with Low Slope Roofing Systems 2017.
- E. ASTM E283/E283M - Standard Test Method for Determining Rate of Air Leakage Through Exterior Windows, Skylights, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen 2019.
- F. ASTM E2178 - Standard Test Method for Determining Air Leakage Rate and Calculation of Air Permeance of Building Materials 2021a.
- G. NRCA (RM) - The NRCA Roofing Manual 2022.
- H. SMACNA (ASMM) - Architectural Sheet Metal Manual 2012.

**1.04 SUBMITTALS**

- A. Product Data: Provide data on shape of components, materials and finishes, anchor types and locations.
- B. Shop Drawings: Indicate configuration and dimension of components, adjacent construction, required clearances and tolerances, and other affected work.
- C. Samples: Submit two appropriately sized samples of coping and gravel stop.
- D. Manufacturer's Installation Instructions: Indicate special procedures, fasteners, supporting members, and perimeter conditions requiring special attention.

**PART 2 PRODUCTS**

**2.01 MANUFACTURERS**

- A. Roof Edge Flashings and Copings:
  - 1. Architectural Products Co: [www.archprod.com/#sle](http://www.archprod.com/#sle).
  - 2. ATAS International, Inc; Rapid-Lok Fascia: [www.atas.com/#sle](http://www.atas.com/#sle).
  - 3. Drexel Metals Inc: [www.drexmet.com/#sle](http://www.drexmet.com/#sle).
  - 4. Metal-Era Inc: [www.metalera.com/#sle](http://www.metalera.com/#sle).
  - 5. Metal Roofing Systems, Inc; Rapid Lock Coping: [www.metalroofingsystems.biz/#sle](http://www.metalroofingsystems.biz/#sle).
  - 6. OMG Roofing Products; Formed Coping Plus: [www.omgroofing.com/#sle](http://www.omgroofing.com/#sle).
  - 7. MM Systems Corp: [www.mmsystemscorp.com/#sle](http://www.mmsystemscorp.com/#sle). Basis of Design.
  - 8. Substitutions: See Section 01 60 00 - Product Requirements.
- B. Factory Fabricated Cornices:
  - 1. Drexel Metals Inc: [www.drexmet.com/#sle](http://www.drexmet.com/#sle).

2. SAF Perimeter Systems, a division of Southern Aluminum Finishing Company, Inc:  
[www.saf.com/#sle](http://www.saf.com/#sle).
  3. MM Systems Corp: [www.mmsystemscorp.com/#sle](http://www.mmsystemscorp.com/#sle).
  4. Substitutions: See Section 01 60 00 - Product Requirements.
- C. Roof Breather Vents:
1. Construction Specialties, Inc; Roof Vents: [www.c-sgroup.com/#sle](http://www.c-sgroup.com/#sle).
  2. Menzies Metals, [www.menzies-metal.com](http://www.menzies-metal.com) 4" spun aluminum.
  3. Substitutions: See Section 01 60 00 - Product Requirements.

## 202 COMPONENTS

- A. Copings: Factory fabricated to sizes required; corners mitered; concealed fasteners.
1. Configuration: Concealed continuous hold down cleat at both legs; internal splice piece at joints of same material, thickness, and finish as cap; concealed stainless steel fasteners.
  2. Pull-Off Resistance: Tested in accordance with ANSI/SPRI/FM 4435/ES-1 using test method RE-3 to positive and negative design wind pressure as defined by applicable local building code.
  3. Wall Width: As indicated on drawings.
  4. Outside Face Height: As indicated on drawings.
  5. Inside Face Height: As indicated on drawings.
  6. Material: Formed aluminum sheet, 0.063 inch (1.6 mm) thick, minimum.
  7. Finish: Anodized natural (clear).
  8. Products:
    - a. Metal-Era Inc: [www.metalera.com/#sle](http://www.metalera.com/#sle).
    - b. OMG Roofing Products; Formed Coping Plus: [www.omgroofing.com/#sle](http://www.omgroofing.com/#sle).
    - c. Substitutions: See Section 01 60 00 - Product Requirements.
- B. Factory Fabricated Cornices: Factory fabricated, assembled, and finished sheet metal architectural details, including profiles, returns, mitered corners, end caps, rakes, gables, etc; finished unit mechanically fastened to structural support.
1. Material: Aluminum sheet, ASTM B209 alloy 3003 or 5005.
  2. Sheet Thickness: 0.04 inch (1.02 mm).
  3. Section Length: 10 feet (3.05 m), maximum, between joints.
  4. Joint Splice Plates: Same material as cornice sections, 6 inch (152 mm) wide, minimum, and formed to match inside surface of cornice profile.
  5. Support Brackets: Factory fabricated from 1/8 inch by 1 inch (3.17 mm by 25.4 mm) extruded aluminum bar, ASTM B221 or ASTM B221M.
  6. Fastener Holes: Elongated; factory punched or drilled.
  7. Products:
    - a. SAF Perimeter Systems, a division of Southern Aluminum Finishing Company, Inc:  
[www.saf.com/#sle](http://www.saf.com/#sle).
    - b. Substitutions: See Section 01 60 00 - Product Requirements.
- C. Roofing Vents: Formed aluminum, with watertight construction to allow construction below roof membrane to breathe; with attachment flanges.
1. Finish: Mill finish.
  2. Products:
    - a. Menzies Metal Products; Built Up Roof (BUR) Vent 4" spun aluminum: [www.menzies-metal.com/#sle](http://www.menzies-metal.com/#sle).
    - b. Substitutions: See Section 01 60 00 - Product Requirements.

## 203 FINISHES

- A. Clear Anodized Finish: AAMA 611 AA-M12C22A41, Class I, clear anodic coating not less than 0.7 mil, 0.0007 inch (0.018 mm) thick.

## 204 ACCESSORIES

- A. Sealant for Joints in Linear Components: As recommended by component manufacturer.

- B. Adhesive for Anchoring to Roof Membrane: Compatible with roof membrane and approved by roof membrane manufacturer.
- C. Insulation Board Adhesive: Two-component, low-rise polyurethane foam adhesive used for adhering insulation to low slope roof deck materials.
  - 1. Products:
    - a. OMG Roofing Products; OlyBond500: [www.roofing.com/#sle](http://www.roofing.com/#sle).
    - b. Substitutions: See Section 01 60 00 - Product Requirements.
- D. Roof Cement: ASTM D4586/D4586M, Type I.

### **PART 3 EXECUTION**

#### **3.01 EXAMINATION**

- A. Verify that deck, curbs, roof membrane, base flashing, and other items affecting work of this Section are in place and positioned correctly.
  - 1. See Section 07 72 00 for information on roofing related accessories.

#### **3.02 INSTALLATION**

- A. Install components in accordance with manufacturer's instructions and NRCA (RM) applicable requirements.
- B. Seal joints within components when required by component manufacturer.
- C. Anchor components securely.
- D. Comply with NRCA (RM) drawing details as noted:
- E. Coordinate installation of components of this section with installation of roofing membrane and base flashings.
- F. Coordinate installation of sealants and roofing cement with work of this section to ensure water tightness.
- G. Coordinate installation of flashing flanges into reglets.

**END OF SECTION 07 71 00**

**SECTION 07 72 00  
ROOF ACCESSORIES**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Roof curbs.
- B. Roof penetrations mounting curbs.
- C. Roof hatches, manual and automatic operation, including smoke vents.
- D. Roof hatches with access ladders.

**1.02 RELATED REQUIREMENTS**

- A. Section 05 31 00 - Steel Decking.
- B. Section 07 62 00 - Sheet Metal Flashing and Trim: Roof accessory items fabricated from sheet metal.
- C. Section 07 71 00 - Roof Specialties: Other manufactured roof items.

**1.03 REFERENCE STANDARDS**

- A. 29 CFR 1910.23 - Ladders Current Edition.
- B. 29 CFR 1910.29 - Fall Protection Systems and Falling Object Protection - Criteria and Practices Current Edition.
- C. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products 2017.
- D. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware 2016a.
- E. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process 2020.
- F. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes 2021.
- G. ASTM B221M - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes (Metric) 2021.
- H. MSS SP-58 - Pipe Hangers and Supports - Materials, Design, Manufacture, Selection, Application, and Installation 2018, with Amendment (2019).

**1.04 SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements for submittal procedures.
- B. Shop Drawings: Submit detailed layout developed for this project and provide dimensioned location and number for each type of roof accessory.
- C. Certificate: For smoke hatches, provide certificate of approval from authority having jurisdiction.
- D. Product Approval: Miami-Dade Notice of Acceptance (NOA) or Florida Building Code "FLA (PAD)" Product Approval.
- E. Warranty Documentation:
  - 1. Submit manufacturer warranty.
  - 2. Ensure that forms have been completed in Owner's name and registered with manufacturer.
  - 3. Submit documentation that roof accessories are acceptable to roofing manufacturer, and do not limit the roofing warranty.

**1.05 DELIVERY, STORAGE, AND HANDLING**

- A. See Section 01 74 19 - Construction Waste Management and Disposal for packaging waste requirements.
- B. Store products in manufacturer's unopened packaging until ready for installation.

- C. Store products under cover and elevated above grade.

#### **1.06 WARRANTY**

- A. See Section 01 78 00 - Closeout Submittals for additional warranty requirements.  
B. Correct defective Work within a five year period after Date of Substantial Completion.

### **PART 2 PRODUCTS**

#### **201 ROOF CURBS**

- A. Manufacturers:
1. AES Industries Inc: [www.aescurb.com/#sle](http://www.aescurb.com/#sle).
  2. The Pate Company: [www.patecurbs.com/#sle](http://www.patecurbs.com/#sle).
  3. LMCurbs; Roof Curbs: [www.lmcurbs.com/#sle](http://www.lmcurbs.com/#sle).
  4. MKT Metal Manufacturing: [www.mktduct.com/#sle](http://www.mktduct.com/#sle).
  5. Substitutions: See Section 01 60 00 - Product Requirements.
- B. Roof Curbs Mounting Assemblies: Factory fabricated hollow sheet metal construction, internally reinforced, and capable of supporting superimposed live and dead loads and designated equipment load with fully mitered and sealed corner joints welded or mechanically fastened, and integral counterflashing with top and edges formed to shed water.
1. Applications: Roof curbs used for roof penetrations/openings as indicated on drawings.
  2. Roof Curb Mounting Substrate: Curb substrate consists of standing seam metal roof panel system.
  3. Sheet Metal Material:
    - a. Aluminum: 0.080 inch (2.03 mm) minimum thickness, with 3003 alloy, and H14 temper.
      - 1) Finish: Mill finish.
    - b. Galvanized Steel: Hot-dip zinc coated steel sheet complying with ASTM A653/A653M, SS Grade 33 (230); G60 (Z180) coating designation; 18 gauge, 0.048 inch (1.21 mm) thick.
      - 1) Finish: Factory primed.
      - 2) Color: As selected by Architect from manufacturer's standard line of colors.
  4. Fabricate curb bottom and mounting flanges for installation directly on metal roof panel system to match slope and configuration of system.
    - a. Extend side flange to next adjacent roof panel seam and comply with seam configurations and seal connection, providing at least 6 inch (152 mm) clearance between curb and metal roof panel flange allowing water to properly flow past curb.
    - b. Where side of curb aligns with metal roof panel flange, attach fasteners on upper slope of flange to curb connection allowing water to flow past below fasteners, and seal connection.
    - c. Maintain at least 12 inch (305 mm) clearance from curb, and lap upper curb flange on underside of down sloping metal roof panel, and seal connection.
    - d. Lap lower curb flange overtop of down sloping metal roof panel and seal connection.
  5. Provide layouts and configurations indicated on drawings.

#### **202 ROOF HATCHES AND VENTS**

- A. Roof Hatch Manufacturers:
1. Babcock-Davis; ThermalMAX: [www.babcockdavis.com/#sle](http://www.babcockdavis.com/#sle).
  2. Bilco Company; Type TB (various types and special size): [www.bilco.com/#sle](http://www.bilco.com/#sle).
  3. Milcor, Inc: [www.milcorinc.com/#sle](http://www.milcorinc.com/#sle).
  4. Nystrom, Inc: [www.nystrom.com/#sle](http://www.nystrom.com/#sle).
  5. Precision Ladders, LLC; Model PH-A: [www.precisionladders.com/#sle](http://www.precisionladders.com/#sle).
  6. Substitutions: See Section 01 60 00 - Product Requirements.
- B. Roof Hatches: Factory-assembled aluminum frame and cover, complete with operating and release hardware.
1. Style: Provide flat metal covers unless otherwise indicated.

2. Mounting Substrate: Provide frames and curbs suitable for mounting on corrugated metal roof deck with insulation.
  3. Mounting: Provide frames and curbs suitable for mounting conditions as indicated on drawings.
  4. Size: As indicated on drawings; single-leaf style unless otherwise indicated.
  5. For Ladder Access: Single leaf; 30 by 36 inches (762 by 914 mm).
- C. Frames and Curbs: One-piece curb and frame with integral cap flashing to receive roof flashings; extended bottom flange to suit mounting.
1. Material: Mill finished aluminum, 11 gauge, 0.0907 inch (2.3 mm) thick.
  2. Insulation: Manufacturer's standard; 1 inch (25 mm) rigid glass fiber, located on outside face of curb.
  3. Curb Height: 12 inches (305 mm) from surface of roof deck, minimum.
- D. Metal Covers: Flush, insulated, hollow metal construction.
1. Capable of supporting 40 psf (1.92 kPa) live load.
  2. Material: Mill finished aluminum; outer cover 11 gauge, 0.0907 inch (2.3 mm) thick, liner 0.04 inch (1.0 mm) thick.
  3. Insulation: Manufacturer's standard 1 inch (25 mm) rigid glass fiber.
  4. Gasket: EPDM, continuous around cover perimeter.
- E. Safety Railing System: Roof hatch manufacturer's standard accessory safety rail system mounted directly to curb.
1. Railing: Comply with 29 CFR 1910.23 for ladder safety, with a safety factor of two.
  2. Posts and Rails: Galvanized steel tubing.
  3. Gate: Same material as railing; automatic closing with latch.
  4. Gate Hinges and Post Guides: ASTM B221 (ASTM B221M), 6063 alloy, T5 temper aluminum.
  5. Mounting Brackets: Hot dipped galvanized steel, 1/4 inch (6.4 mm) thick, minimum.
- F. Hardware: Type 316 stainless steel, unless otherwise indicated or required by manufacturer.
1. Lifting Mechanisms: Compression or torsion spring operator with shock absorbers that automatically opens upon release of latch; capable of lifting covers despite 10 psf (475 kPa) load.
  2. Hinges: Heavy duty pintle type.
  3. Hold open arm with vinyl-coated handle for manual release.
  4. Latch: Upon closing, engage latch automatically and reset manual release.
  5. Manual Release: Pull handle on interior.
  6. Locking: Padlock hasp on interior.

### **PART 3 EXECUTION**

#### **301 EXAMINATION**

- A. Do not begin installation until substrates have been properly prepared.
- B. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

#### **302 PREPARATION**

- A. Clean surfaces thoroughly prior to installation.
- B. Prepare surfaces using methods recommended by manufacturer for achieving acceptable results for applicable substrate under project conditions.

#### **303 INSTALLATION**

- A. Install in accordance with manufacturer's instructions, in manner that maintains roofing system weather-tight integrity.

#### **304 CLEANING**

- A. Clean installed work to like-new condition.

**305 PROTECTION**

- A. Protect installed products until completion of project.
- B. Touch-up, repair or replace damaged products before Date of Substantial Completion.

**END OF SECTION 07 72 00**

**SECTION 07 92 00  
JOINT SEALANTS**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Nonsag gunnable joint sealants.
- B. Self-leveling pourable joint sealants.
- C. Joint backings and accessories.

**1.02 RELATED REQUIREMENTS**

- A. Section 01 61 16 - Volatile Organic Compound (VOC) Content Restrictions: Additional requirements for sealants and primers.
- B. Section 07 25 00 - Weather Barriers: Sealants required in conjunction with air barriers and vapor retarders.
- C. Section 07 84 00 - Firestopping: Firestopping sealants.
- D. Section 07 95 13 - Expansion Joint Cover Assemblies: Sealants forming part of expansion joint cover assemblies.
- E. Section 09 21 16 - Gypsum Board Assemblies: Sealing acoustical and sound-rated walls and ceilings.
- F. Section 09 30 00 - Tiling: Sealant between tile and plumbing fixtures and at junctions with other materials and changes in plane.

**1.03 REFERENCE STANDARDS**

- A. ASTM C661 - Standard Test Method for Indentation Hardness of Elastomeric-Type Sealants by Means of a Durometer 2015 (Reapproved 2022).
- B. ASTM C794 - Standard Test Method for Adhesion-in-Peel of Elastomeric Joint Sealants 2018 (Reapproved 2022).
- C. ASTM C834 - Standard Specification for Latex Sealants 2017.
- D. ASTM C919 - Standard Practice for Use of Sealants in Acoustical Applications 2022.
- E. ASTM C920 - Standard Specification for Elastomeric Joint Sealants 2018.
- F. ASTM C1087 - Standard Test Method for Determining Compatibility of Liquid-Applied Sealants with Accessories Used in Structural Glazing Systems 2016.
- G. ASTM C1193 - Standard Guide for Use of Joint Sealants 2016.
- H. ASTM C1248 - Standard Test Method for Staining of Porous Substrate by Joint Sealants 2018.
- I. ASTM C1330 - Standard Specification for Cylindrical Sealant Backing for Use with Cold Liquid-Applied Sealants 2018.
- J. ASTM C1521 - Standard Practice for Evaluating Adhesion of Installed Weatherproofing Sealant Joints 2019 (Reapproved 2020).
- K. ASTM D2240 - Standard Test Method for Rubber Property--Durometer Hardness 2015 (Reapproved 2021).
- L. SCAQMD 1168 - Adhesive and Sealant Applications 1989, with Amendment (2017).
- M. UL 263 - Standard for Fire Tests of Building Construction and Materials Current Edition, Including All Revisions.

**1.04 SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data for Sealants: Submit manufacturer's technical data sheets for each product to be used, that includes the following.
  - 1. Physical characteristics, including movement capability, VOC content, hardness, cure time, and color availability.

2. List of backing materials approved for use with the specific product.
  3. Substrates that product is known to satisfactorily adhere to and with which it is compatible.
  4. Substrates the product should not be used on.
  5. Substrates for which use of primer is required.
  6. Substrates for which laboratory adhesion and/or compatibility testing is required.
  7. Installation instructions, including precautions, limitations, and recommended backing materials and tools.
  8. Sample product warranty.
  9. Certification by manufacturer indicating that product complies with specification requirements.
- C. Product Data for Accessory Products: Submit manufacturer's technical data sheet for each product to be used, including physical characteristics, installation instructions, and recommended tools.
- D. Color Cards for Selection: Where sealant color is not specified, submit manufacturer's color cards showing standard colors available for selection.
- E. Samples for Verification: Where custom sealant color is specified, obtain directions from Architect and submit at least two physical samples for verification of color of each required sealant.
- F. Sustainable Design Documentation: For sealants and primers, submit VOC content and emissions documentation as specified in Section 01 61 16.
- G. Preconstruction Laboratory Test Reports: Submit at least four weeks prior to start of installation.
- H. Installation Plan: Submit at least four weeks prior to start of installation.
- I. Preinstallation Field Adhesion Test Plan: Submit at least two weeks prior to start of installation.
- J. Field Quality Control Plan: Submit at least two weeks prior to start of installation.
- K. Preinstallation Field Adhesion Test Reports: Submit filled out Preinstallation Field Adhesion Test Reports log within 10 days after completion of tests; include bagged test samples and photographic records.
- L. Installation Log: Submit filled out log for each length or instance of sealant installed.
- M. Field Quality Control Log: Submit filled out log for each length or instance of sealant installed, within 10 days after completion of inspections/tests; include bagged test samples and photographic records, if any.

#### **1.05 QUALITY ASSURANCE**

- A. Maintain one copy of each referenced document covering installation requirements on site.
- B. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.
- C. Installer Qualifications: Company specializing in performing the work of this section and with at least three years of documented experience.
- D. Testing Agency Qualifications: Independent firm specializing in performing testing and inspections of the type specified in this section.
- E. Preconstruction Laboratory Testing: Arrange for sealant manufacturer(s) to test each combination of sealant, substrate, backing, and accessories.
1. Adhesion Testing: In accordance with ASTM C794.
  2. Compatibility Testing: In accordance with ASTM C1087.
  3. Allow sufficient time for testing to avoid delaying the work.
  4. Deliver to manufacturer sufficient samples for testing.
  5. Report manufacturer's recommended corrective measures, if any, including primers or techniques not indicated in product data submittals.
  6. Testing is not required if sealant manufacturer provides data showing previous testing, not older than 24 months, that shows satisfactory adhesion, lack of staining, and compatibility.

- F. Installation Plan: Include schedule of sealed joints, including the following.
1. Installation Log Form: Include the following data fields, with known information filled out.
    - a. Unique identification of each length or instance of sealant installed.
    - b. Location on project.
    - c. Substrates.
    - d. Sealant used.
    - e. Date of installation.
    - f. Name of installer.
    - g. Actual joint width; provide space to indicate maximum and minimum width.
    - h. Actual joint depth to face of backing material at centerline of joint.
    - i. Air temperature.
- G. Preinstallation Field Adhesion Test Plan: Include destructive field adhesion testing of one sample of each combination of sealant type and substrate, except interior acrylic latex sealants, and include the following for each tested sample.
1. Identification of testing agency.
  2. Preinstallation Field Adhesion Test Log Form: Include the following data fields, with known information filled out.
    - a. Substrate; if more than one type of substrate is involved in a single joint, provide two entries on form, for testing each sealant substrate side separately.
    - b. Test date.
    - c. Location on project.
    - d. Sealant used.
    - e. Stated movement capability of sealant.
    - f. Test method used.
    - g. Date of installation of field sample to be tested.
    - h. Date of test.
    - i. Copy of test method documents.
    - j. Age of sealant upon date of testing.
    - k. Test results, modeled after the sample form in the test method document.
    - l. Indicate use of photographic record of test.
- H. Field Quality Control Plan:
1. Visual inspection of entire length of sealant joints.
  2. Non-destructive field adhesion testing of sealant joints, except interior acrylic latex sealants.
    - a. Test the entire length of every sealant joint.
  3. Field testing agency's qualifications.
  4. Field Quality Control Log Form: Show same data fields as on Preinstallation Field Adhesion Test Log, with known information filled out and lines for multiple tests per sealant/substrate combinations; include visual inspection and specified field testing; allow for possibility that more tests than minimum specified may be necessary.
- I. Field Adhesion Test Procedures:
1. Allow sealants to fully cure as recommended by manufacturer before testing.
  2. Have a copy of the test method document available during tests.
  3. Take photographs or make video records of each test, with joint identification provided in the photos/videos; for example, provide small erasable whiteboard positioned next to joint.
  4. Record the type of failure that occurred, other information required by test method, and the information required on the Field Quality Control Log.
  5. When performing destructive tests, also inspect the opened joint for proper installation characteristics recommended by manufacturer, and report any deficiencies.
  6. Deliver the samples removed during destructive tests in separate sealed plastic bags, identified with project, location, test date, and test results, to Owner.
  7. If any combination of sealant type and substrate does not show evidence of minimum adhesion or shows cohesion failure before minimum adhesion, report results to Architect.

- J. Non-Destructive Field Adhesion Test: Test for adhesion in accordance with ASTM C1521, using Nondestructive Continuous Method.
- K. Destructive Field Adhesion Test: Test for adhesion in accordance with ASTM C1521, using Destructive Tail Procedure.
  - 1. Sample: At least 18 inches (457 mm) long.
  - 2. Minimum Elongation Without Adhesive Failure: Consider the tail at rest, not under any elongation stress; multiply the stated movement capability of the sealant in percent by two; then multiply 1 inch (25.4 mm) by that percentage; if adhesion failure occurs before the "1 inch mark" is that distance from the substrate, the test has failed.
  - 3. If either adhesive or cohesive failure occurs prior to minimum elongation, take necessary measures to correct conditions and re-test; record each modification to products or installation procedures.

#### **1.06 WARRANTY**

- A. See Section 01 78 00 - Closeout Submittals, for additional warranty requirements.
- B. Correct defective work within a five year period after Date of Substantial Completion.
- C. Warranty: Include coverage for installed sealants and accessories that fail to achieve watertight seal, exhibit loss of adhesion or cohesion, or do not cure.

### **PART 2 PRODUCTS**

#### **201 MANUFACTURERS**

- A. Non-Sag Sealants: Permits application in joints on vertical surfaces without sagging or slumping.
  - 1. Dow Chemical Company: [consumer.dow.com/en-us/industry/ind-building-construction.html/#sle](http://consumer.dow.com/en-us/industry/ind-building-construction.html/#sle).
  - 2. Master Builders Solutions by BASF: [www.master-builders-solutions.basf.us/en-us/#sle](http://www.master-builders-solutions.basf.us/en-us/#sle).
  - 3. Momentive Performance Materials, Inc (formerly GE Silicones): [www.momentive.com/#sle](http://www.momentive.com/#sle).
  - 4. Pecora Corporation: [www.pecora.com/#sle](http://www.pecora.com/#sle).
  - 5. Sika Corporation: [www.usa-sika.com/#sle](http://www.usa-sika.com/#sle).
  - 6. W.R. Meadows, Inc: [www.wrmeadows.com/#sle](http://www.wrmeadows.com/#sle).
  - 7. Substitutions: See Section 01 60 00 - Product Requirements.

#### **202 JOINT SEALANT APPLICATIONS**

- A. Scope:
  - 1. Exterior Joints: Seal open joints, whether or not the joint is indicated on drawings, unless specifically indicated not to be sealed. Exterior joints to be sealed include, but are not limited to, the following items.
    - a. Wall expansion and control joints.
    - b. Joints between door, window, and other frames and adjacent construction.
    - c. Joints between different exposed materials.
    - d. Openings below ledge angles in masonry.
    - e. Other joints indicated below.
  - 2. Interior Joints: Do not seal interior joints unless specifically indicated to be sealed. Interior joints to be sealed include, but are not limited to, the following items.
    - a. Joints between door, window, and other frames and adjacent construction.
    - b. In sound-rated wall and ceiling assemblies, gaps at electrical outlets, wiring devices, piping, and other openings; between wall/ceiling and other construction; and other flanking sound paths.
    - c. Other joints indicated below.
  - 3. Do not seal the following types of joints.
    - a. Intentional weepholes in masonry.
    - b. Joints indicated to be treated with manufactured expansion joint cover or some other type of sealing device.

- c. Joints where sealant is specified to be provided by manufacturer of product to be sealed.
  - d. Joints where installation of sealant is specified in another section.
  - e. Joints between suspended panel ceilings/grid and walls.
- B. Interior Joints: Use non-sag polyurethane sealant, unless otherwise indicated.
- 1. Wall and Ceiling Joints in Wet Areas: Non-sag polyurethane sealant for continuous liquid immersion.
  - 2. In Sound-Rated Assemblies: Acrylic emulsion latex sealant.
- C. Interior Wet Areas: ; fixtures in wet areas include plumbing fixtures, food service equipment, countertops, cabinets, and other similar items.
- D. Sound-Rated Assemblies: Walls and ceilings identified as "STC-rated", "sound-rated", or "acoustical".

### 203 JOINT SEALANTS - GENERAL

- A. Sealants and Primers: Provide products with levels of volatile organic compound (VOC) content as indicated in Section 01 61 16.

### 204 NONSAG JOINT SEALANTS

- A. **TYPE 1A:** Non-Staining Silicone Sealant: ASTM C920, Grade NS, Uses M and A; not expected to withstand continuous water immersion or traffic.
- 1. Movement Capability: Plus and minus 50 percent, minimum.
  - 2. Non-Staining To Porous Stone: Non-staining to light-colored natural stone when tested in accordance with ASTM C1248.
  - 3. Dirt Pick-Up: Reduced dirt pick-up compared to other silicone sealants.
  - 4. Hardness Range: 15 to 35, Shore A, when tested in accordance with ASTM C661.
  - 5. Color: Match adjacent finished surfaces.
  - 6. Service Temperature Range: Minus 20 to 180 degrees F (Minus 29 to 82 degrees C).
  - 7. Manufacturers:
    - a. Dow Chemical Company; DOWSIL 795 Silicone Building Sealant: [consumer.dow.com/en-us/industry/ind-building-construction.html/#sle](http://consumer.dow.com/en-us/industry/ind-building-construction.html/#sle).
    - b. Pecora Corporation; Pecora 890 NST (Non-Staining Technology): [www.pecora.com/#sle](http://www.pecora.com/#sle).
    - c. Sika Corporation; Sikasil WS-290: [www.usa-sika.com/#sle](http://www.usa-sika.com/#sle).
    - d. Sika Corporation; Sikasil WS-295: [www.usa-sika.com/#sle](http://www.usa-sika.com/#sle).
- B. **TYPE 1B:** Mildew-Resistant Silicone Sealant: ASTM C920, Grade NS, Uses M and A; single component, mildew resistant; not expected to withstand continuous water immersion or traffic.
- 1. Color: White.
  - 2. Manufacturers:
    - a. Everkem Diversified Products, Inc; TruSil 100: [www.everkemproducts.com/#sle](http://www.everkemproducts.com/#sle).
    - b. Pecora Corporation; Pecora 898 NST (Non-Staining Technology): [www.pecora.com/#sle](http://www.pecora.com/#sle).
    - c. Sika Corporation; Sikasil GP: [www.usa-sika.com/#sle](http://www.usa-sika.com/#sle).
    - d. Substitutions: See Section 01 60 00 - Product Requirements.
- C. **TYPE 2A:** Polyurethane Sealant: ASTM C920, Grade NS, Uses M and A; single or multi-component; not expected to withstand continuous water immersion or traffic.
- 1. Movement Capability: Plus and minus 50 percent, minimum.
  - 2. Hardness Range: 20 to 35, Shore A, when tested in accordance with ASTM C661.
  - 3. Color: Match adjacent finished surfaces.
  - 4. Service Temperature Range: Minus 40 to 180 degrees F (Minus 40 to 82 degrees C).
  - 5. Manufacturers:
    - a. Sika Corporation; Sikaflex-1a: [www.usa-sika.com/#sle](http://www.usa-sika.com/#sle).
    - b. Sika Corporation; Sikaflex-15 LM: [www.usa-sika.com/#sle](http://www.usa-sika.com/#sle).
    - c. Tremco Commercial Sealants & Waterproofing; Dymonic 100: [www.tremcosealants.com/#sle](http://www.tremcosealants.com/#sle).

- d. W. R. Meadows, Inc; POURTHANE NS: [www.wrmeadows.com/#sle](http://www.wrmeadows.com/#sle).
  - e. Substitutions: See Section 01 60 00 - Product Requirements.
- D. **TYPE 2B:** Polyurethane Sealant for Continuous Water Immersion: ASTM C920, Grade NS, Uses M and A; single or multi-component; explicitly approved by manufacturer for continuous water immersion; suitable for traffic exposure when recessed below traffic surface.
- 1. Movement Capability: Plus and minus 35 percent, minimum.
  - 2. Hardness Range: 20 to 35, Shore A, when tested in accordance with ASTM C661.
  - 3. Color: Match adjacent finished surfaces.
  - 4. Service Temperature Range: Minus 40 to 180 degrees F (Minus 40 to 82 degrees C).
  - 5. Manufacturers:
    - a. Sika Corporation; Sikaflex-1a: [www.usa-sika.com/#sle](http://www.usa-sika.com/#sle).
    - b. Sika Corporation; Sikaflex-2c NS: [www.usa-sika.com/#sle](http://www.usa-sika.com/#sle).
    - c. Substitutions: See Section 01 60 00 - Product Requirements.
- E. **TYPE 2C:** Tamper-Resistant Polyurethane Sealant: ASTM C920, Grade NS, Uses M, G, and A; single or multi-component; not expected to withstand continuous water immersion or traffic.
- 1. Movement Capability: Plus and minus 12-1/2 percent, minimum.
  - 2. Hardness Range: 50 to 60, Shore A, when tested in accordance with ASTM C661.
  - 3. Color: Match adjacent finished surfaces.
  - 4. Service Temperature Range: Minus 40 to 180 degrees F (Minus 40 to 82 degrees C).
  - 5. Manufacturers:
    - a. Substitutions: See Section 01 60 00 - Product Requirements.
- F. Acrylic Emulsion Latex: Water-based; ASTM C834, single component, non-staining, non-bleeding, non-sagging; not intended for exterior use.

## 205 SELF-LEVELING SEALANTS

- A. **TYPE 2D:** Self-Leveling Silicone Sealant: ASTM C920, Grade P, Uses M and A; single or multicomponent, explicitly approved by manufacturer for traffic exposure when recessed below traffic surface; not expected to withstand continuous water immersion.
- 1. Movement Capability: Plus 100 percent, minus 50 percent, minimum.
  - 2. Hardness Range: 0 to 15, Shore A, when tested in accordance with ASTM C661.
  - 3. Color: To be selected by Architect from manufacturer's standard range.
  - 4. Service Temperature Range: Minus 40 to 180 degrees F (Minus 40 to 82 degrees C).
  - 5. Manufacturers:
    - a. Dow Chemical Company; DOWSIL SL Parking Structure Sealant: [consumer.dow.com/en-us/industry/ind-building-construction.html/#sle](http://consumer.dow.com/en-us/industry/ind-building-construction.html/#sle).
    - b. Sika Corporation; Sikasil 728RCS: [www.usa-sika.com/#sle](http://www.usa-sika.com/#sle).
    - c. Sika Corporation; Sikasil 728SL: [www.usa-sika.com/#sle](http://www.usa-sika.com/#sle).
    - d. Substitutions: See Section 01 60 00 - Product Requirements.
- B. **TYPE 4:** Semi-Self-Leveling Polyurethane Sealant: Intended for expansion joints in sidewalks, swimming pool decks, plazas, floors and other horizontal surfaces with up to 6 percent slope.
- 1. Composition: Single or multi-component.
  - 2. Durometer Hardness, Type A: 35 to 45, minimum, when tested in accordance with ASTM D2240.
  - 3. Color: To be selected by Architect from manufacturer's standard colors.
  - 4. Manufacturers:
    - a. Tremco Commercial Sealants & Waterproofing; Vulkem 45 SSL: [www.tremcosealants.com/#sle](http://www.tremcosealants.com/#sle).
    - b. Tremco Commercial Sealants & Waterproofing; Vulkem 445 SSL: [www.tremcosealants.com/#sle](http://www.tremcosealants.com/#sle).
    - c. Substitutions: See Section 01 60 00 - Product Requirements.

## 206 ACCESSORIES

- A. Backer Rod: Cylindrical cellular foam rod with surface that sealant will not adhere to, compatible with specific sealant used, and recommended by backing and sealant

manufacturers for specific application.

1. Type for Joints Not Subject to Pedestrian or Vehicular Traffic: ASTM C1330; Type O - Open Cell Polyurethane.
  2. Type for Joints Subject to Pedestrian or Vehicular Traffic: ASTM C1330; Type B - Bi-Cellular Polyethylene.
  3. Open Cell: 40 to 50 percent larger in diameter than joint width.
  4. Closed Cell and Bi-Cellular: 25 to 33 percent larger in diameter than joint width.
  5. Manufacturers:
    - a. ADFAST Corporation; ADSEAL BR-2600 (Backer Rod): [www.adfastcorp.com/#sle](http://www.adfastcorp.com/#sle).
    - b. Substitutions: See Section 01 60 00 - Product Requirements.
- B. Backing Tape: Self-adhesive polyethylene tape with surface that sealant will not adhere to and recommended by tape and sealant manufacturers for specific application.
- C. Masking Tape: Self-adhesive, nonabsorbent, non-staining, removable without adhesive residue, and compatible with surfaces adjacent to joints and sealants.
- D. Joint Cleaner: Non-corrosive and non-staining type, type recommended by sealant manufacturer; compatible with joint forming materials.
- E. Primers: Type recommended by sealant manufacturer to suit application; non-staining.

### **PART 3 EXECUTION**

#### **301 EXAMINATION**

- A. Verify that joints are ready to receive work.
- B. Verify that backing materials are compatible with sealants.
- C. Verify that backer rods are of the correct size.
- D. Preinstallation Adhesion Testing: Install a sample for each test location indicated in the test plan.
  1. Test each sample as specified in PART 1 under QUALITY ASSURANCE article.
  2. Notify Architect of date and time that tests will be performed, at least seven days in advance.
  3. Record each test on Preinstallation Adhesion Test Log as indicated.
  4. If any sample fails, review products and installation procedures, consult manufacturer, or take whatever other measures are necessary to ensure adhesion; re-test in a different location; if unable to obtain satisfactory adhesion, report to Architect.
  5. After completion of tests, remove remaining sample material and prepare joint for new sealant installation.

#### **302 PREPARATION**

- A. Remove loose materials and foreign matter that could impair adhesion of sealant.
- B. Clean joints, and prime as necessary, in accordance with manufacturer's instructions.
- C. Perform preparation in accordance with manufacturer's instructions and ASTM C1193.
- D. Mask elements and surfaces adjacent to joints from damage and disfigurement due to sealant work; be aware that sealant drips and smears may not be completely removable.
- E. Concrete Floor Joints That Will Be Exposed in Completed Work: Test joint filler in inconspicuous area to verify that it does not stain or discolor slab.

#### **303 INSTALLATION**

- A. Perform work in accordance with sealant manufacturer's requirements for preparation of surfaces and material installation instructions.
- B. Perform installation in accordance with ASTM C1193.
- C. Perform acoustical sealant application work in accordance with ASTM C919.
- D. Measure joint dimensions and size joint backers to achieve width-to-depth ratio, neck dimension, and surface bond area as recommended by manufacturer, except where specific

dimensions are indicated.

- E. Measure joint dimensions and size joint backers to achieve the following, unless otherwise indicated:
  - 1. Width/depth ratio of 2:1.
  - 2. Neck dimension no greater than 1/3 of the joint width.
  - 3. Surface bond area on each side not less than 75 percent of joint width.
- F. Install bond breaker backing tape where backer rod cannot be used.
- G. Install sealant free of air pockets, foreign embedded matter, ridges, and sags, and without getting sealant on adjacent surfaces.
- H. Do not install sealant when ambient temperature is outside manufacturer's recommended temperature range, or will be outside that range during the entire curing period, unless manufacturer's approval is obtained and instructions are followed.
- I. Nonsag Sealants: Tool surface concave, unless otherwise indicated; remove masking tape immediately after tooling sealant surface.

**304 FIELD QUALITY CONTROL**

- A. Perform field quality control inspection/testing as specified in PART 1 under QUALITY ASSURANCE article.
- B. Non-Destructive Adhesion Testing: If there are any failures in first 100 linear feet (30 linear m), notify Architect immediately.
- C. Remove and replace failed portions of sealants using same materials and procedures as indicated for original installation.

**END OF SECTION 07 92 00**

**SECTION 08 11 13  
HOLLOW METAL DOORS AND FRAMES**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Non-fire-rated hollow metal doors and frames.
- B. Hollow metal frames for wood doors.
- C. Fire-rated hollow metal doors and frames.
- D. Thermally insulated hollow metal doors with frames.
- E. Hurricane-resistant hollow metal doors and frames.
- F. Tornado-resistant hollow metal doors and frames.
- G. Hollow metal borrowed lites glazing frames.

**1.02 RELATED REQUIREMENTS**

- A. Section 08 71 00 - Door Hardware.
- B. Section 08 80 00 - Glazing: Glass for doors and borrowed lites.
- C. Section 09 91 13 - Exterior Painting: Field painting.
- D. Section 09 91 23 - Interior Painting: Field painting.

**1.03 ABBREVIATIONS AND ACRONYMS**

- A. ANSI: American National Standards Institute.
- B. ASCE: American Society of Civil Engineers.
- C. NFPA: National Fire Protection Association.
- D. SDI: Steel Door Institute.
- E. UL: Underwriters Laboratories.

**1.04 REFERENCE STANDARDS**

- A. ADA Standards - 2010 ADA Standards for Accessible Design 2010.
- B. ANSI/SDI A250.3 - Test Procedure and Acceptance Criteria for Factory Applied Finish Coatings for Steel Doors and Frames 2019.
- C. ANSI/SDI A250.4 - Test Procedure and Acceptance Criteria for Physical Endurance for Steel Doors, Frames and Frame Anchors 2018.
- D. ANSI/SDI A250.6 - Recommended Practice for Hardware Reinforcing on Standard Steel Doors and Frames 2020.
- E. ANSI/SDI A250.8 - Specifications for Standard Steel Doors and Frames (SDI-100) 2017.
- F. ANSI/SDI A250.10 - Test Procedure and Acceptance Criteria for Prime Painted Steel Surfaces for Steel Doors and Frames 2020.
- G. ASCE 7 - Minimum Design Loads and Associated Criteria for Buildings and Other Structures Most Recent Edition Cited by Referring Code or Reference Standard.
- H. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process 2020.
- I. ASTM A1008/A1008M - Standard Specification for Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, Required Hardness, Solution Hardened, and Bake Hardenable 2021a.
- J. ASTM A1011/A1011M - Standard Specification for Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, and Ultra-High Strength 2018a.
- K. ASTM C143/C143M - Standard Test Method for Slump of Hydraulic-Cement Concrete 2020.

- L. ASTM C476 - Standard Specification for Grout for Masonry 2020.
- M. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials 2022.
- N. ASTM E330/E330M - Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference 2014 (Reapproved 2021).
- O. ASTM E413 - Classification for Rating Sound Insulation 2022.
- P. ASTM F2247 - Standard Test Method for Metal Doors Used in Blast Resistant Applications (Equivalent Static Load Method) 2018.
- Q. BHMA A156.115 - Hardware Preparation in Steel Doors and Steel Frames 2016.
- R. FBC TAS 201 - Impact Test Procedures; Testing Application Standard 1994.
- S. FBC TAS 202 - Criteria for Testing Impact and Non-Impact Resistant Building Envelope Components Using Uniform Static Air Pressure; Testing Application Standard 1994.
- T. FBC TAS 203 - Criteria for Testing Products Subject To Cyclic Wind Pressure Loading; Testing Application Standard 1994.
- U. FEMA P-361 - Safe Rooms for Tornadoes and Hurricanes: Guidance for Community and Residential Safe Rooms 2021.
- V. FLA (PAD) - Florida Building Code Online - Product Approval Directory Current Edition.
- W. ICC 500 - ICC/NSSA Standard for the Design and Construction of Storm Shelters 2020.
- X. ICC A117.1 - Accessible and Usable Buildings and Facilities 2017.
- Y. ITS (DIR) - Directory of Listed Products Current Edition.
- Z. Miami (APD) - Approved Products Directory; Miami-Dade County Current Edition.
- AA. NAAMM HMMA 805 - Recommended Selection and Usage Guide for Hollow Metal Doors and Frames 2012.
- BB. NAAMM HMMA 830 - Hardware Selection for Hollow Metal Doors and Frames 2002.
- CC. NAAMM HMMA 831 - Hardware Locations for Hollow Metal Doors and Frames 2011.
- DD. NAAMM HMMA 840 - Guide Specifications For Receipt, Storage and Installation of Hollow Metal Doors and Frames 2017.
- EE. NAAMM HMMA 850 - Fire-Rated Hollow Metal Doors and Frames 2014.
- FF. NAAMM HMMA 860 - Guide Specifications for Hollow Metal Doors and Frames 2018.
- GG. NAAMM HMMA 861 - Guide Specifications for Commercial Hollow Metal Doors and Frames 2014.
- HH. NFPA 80 - Standard for Fire Doors and Other Opening Protectives 2022.
- II. NFPA 252 - Standard Methods of Fire Tests of Door Assemblies 2022.
- JJ. SDI 117 - Manufacturing Tolerances for Standard Steel Doors and Frames 2019.
- KK. UL (DIR) - Online Certifications Directory Current Edition.
- LL. UL 10C - Standard for Positive Pressure Fire Tests of Door Assemblies Current Edition, Including All Revisions.

#### **1.05 SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Materials and details of design and construction, hardware locations, reinforcement type and locations, anchorage and fastening methods, and finishes; and one copy of referenced standards/guidelines.
- C. Shop Drawings: Details of each opening, showing elevations, glazing, frame profiles, and any indicated finish requirements.

- D. Samples: Submit two samples of metal, 2 by 2 inches (51 by 51 mm) in size, showing factory finishes, colors, and surface texture.
- E. Design Submittals: Manufacturer to submit anchor design analysis calculations for blast-resistant doors signed and sealed by specialty design engineer experienced in this type of work and licensed in the State in which the Project is located.
- F. Installation Instructions: Manufacturer's published instructions, including any special installation instructions relating to this project.

#### **1.06 QUALITY ASSURANCE**

- A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section, with not less than three years documented experience.
- B. Manufacturer Qualifications: Provide hollow metal doors and frames from SDI Certified manufacturer: <https://steeldoor.org/sdi-certified/#sle>.
- C. Installer Qualifications: Company specializing in performing work of the type specified and with at least three years of documented experience.
- D. Maintain at project site copies of reference standards relating to installation of products specified.

#### **1.07 WARRANTY**

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace doors that fail in materials or workmanship within specified warranty period.
- B. Warranty includes installation and finishing that may be required due to repair or replacement of defective doors.

### **PART 2 PRODUCTS**

#### **201 MANUFACTURERS**

- A. Hollow Metal Doors and Frames:
  - 1. Ceco Door, an Assa Abloy Group company: [www.assaabloydss.com/#sle](http://www.assaabloydss.com/#sle).
  - 2. Curries, an Assa Abloy Group company: [www.assaabloydss.com/#sle](http://www.assaabloydss.com/#sle).
  - 3. Krieger Specialty Products: [www.kriegerproducts.com/#sle](http://www.kriegerproducts.com/#sle).
  - 4. Republic Doors, an Allegion brand: [www.republicdoor.com/#sle](http://www.republicdoor.com/#sle).
  - 5. Steelcraft, an Allegion brand: [www.allegion.com/#sle](http://www.allegion.com/#sle).
  - 6. Substitutions: See Section 01 60 00 - Product Requirements.
- B. Hurricane-Resistant and Tornado-Resistant Hollow Metal Doors and Frames:
  - 1. Krieger Specialty Products: [www.kriegerproducts.com/#sle](http://www.kriegerproducts.com/#sle).
  - 2. Megamet Industries, Inc; MegaStorm Hurricane and Tornado Doors: [www.megametusa.com/#sle](http://www.megametusa.com/#sle).
  - 3. Republic Doors, an Allegion brand: [www.republicdoor.com/#sle](http://www.republicdoor.com/#sle).
  - 4. Substitutions: See Section 01 60 00 - Product Requirements.

#### **202 PERFORMANCE REQUIREMENTS**

- A. Requirements for Hollow Metal Doors and Frames:
  - 1. Steel Sheet: Comply with one or more of the following requirements; galvanized steel complying with ASTM A653/A653M, cold-rolled steel complying with ASTM A1008/A1008M, or hot-rolled pickled and oiled (HRPO) steel complying with ASTM A1011/A1011M, commercial steel (CS) Type B, for each.
  - 2. Accessibility: Comply with ICC A117.1 and ADA Standards.
  - 3. Exterior Door Top Closures: Flush end closure channel, with top and door faces aligned.
  - 4. Door Edge Profile: Manufacturers standard for application indicated.
  - 5. Typical Door Face Sheets: Flush.
  - 6. Glazed Lights: Non-removable stops on non-secure side; sizes and configurations as indicated on drawings. Style: Manufacturers standard.
  - 7. Hardware Preparations, Selections and Locations: Comply with NAAMM HMMA 830 and NAAMM HMMA 831 or BHMA A156.115 and ANSI/SDI A250.8 (SDI-100) in accordance

- with specified requirements.
8. Zinc Coating for Typical Interior and/or Exterior Locations: Provide metal components zinc-coated (galvanized) and/or zinc-iron alloy-coated (galvannealed) by the hot-dip process in accordance with ASTM A653/A653M, with manufacturer's standard coating thickness, unless noted otherwise for specific hollow metal doors and frames.
    - a. Based on SDI Standards: Provide at least A40/ZF120 (galvannealed) when necessary, coating not required for typical interior door applications, and at least A60/ZF180 (galvannealed) for corrosive locations.
    - b. Based on NAAMM HMMA Custom Guidelines: Provide at least A25/ZF75 (galvannealed) for interior applications, and at least A60/ZF180 (galvannealed) or G60/Z180 (galvanized) for corrosive locations.
  - B. Hollow Metal Panels: Same construction, performance, and finish as doors.
  - C. Combined Requirements: If a particular door and frame unit is indicated to comply with more than one type of requirement, comply with the specified requirements for each type; for instance, an exterior door that is also indicated as being sound-rated must comply with the requirements specified for exterior doors and for sound-rated doors; where two requirements conflict, comply with the most stringent.

### 203 HOLLOW METAL DOORS

- A. Door Finish: Factory primed and field finished.
- B. Exterior Doors: Thermally insulated.
  1. Based on SDI Standards: ANSI/SDI A250.8 (SDI-100).
    - a. Level 1 - Standard-duty.
    - b. Physical Performance Level C, 250,000 cycles; in accordance with ANSI/SDI A250.4.
    - c. Model 1 - Full Flush.
    - d. Door Face Metal Thickness: 20 gauge, 0.032 inch (0.8 mm), minimum.
    - e. Zinc Coating: A60/ZF180 galvannealed coating; ASTM A653/A653M.
  2. Based on NAAMM HMMA Custom Guidelines:
    - a. Comply with guidelines of NAAMM HMMA 860 for Hollow Metal Doors and Frames.
    - b. Performance Level 1 - Light Duty, in accordance with NAAMM HMMA 805.
    - c. Physical Performance Level C, 250,000 cycles; in accordance with ANSI/SDI A250.4.
    - d. Door Face Metal Thickness: 14 gauge, 0.067 inch (1.7 mm), minimum.
    - e. Zinc Coating: G90/Z275 galvanized coating; ASTM A653/A653M.
  3. Door Core Material: Manufacturers standard core material/construction and in compliance with requirements.
    - a. Foam Plastic Insulation: Manufacturer's standard board insulation with maximum flame spread index (FSI) of 75, and maximum smoke developed index (SDI) of 450 in accordance with ASTM E84, and completely enclosed within interior of door.
  4. Door Thermal Resistance: R-Value of 6.0 minimum, for installed thickness of polystyrene.
  5. Door Thickness: 1-3/4 inches (44.5 mm), nominal.
  6. Top Closures for Outswinging Doors: Flush with top of faces and edges.
  7. Weatherstripping: Refer to Section 08 71 00.
- C. Interior Doors, Non-Fire-Rated:
  1. Based on SDI Standards: ANSI/SDI A250.8 (SDI-100).
    - a. Level 1 - Standard-duty.
    - b. Physical Performance Level C, 250,000 cycles; in accordance with ANSI/SDI A250.4.
    - c. Model 1 - Full Flush.
    - d. Door Face Metal Thickness: 16 gauge, 0.053 inch (1.3 mm), minimum.
    - e. Zinc Coating: A60/ZF180 galvannealed coating; ASTM A653/A653M.
  2. Based on NAAMM HMMA Custom Guidelines:
    - a. Comply with guidelines of NAAMM HMMA 860 for Hollow Metal Doors and Frames.
    - b. Performance Level 3 - Heavy Duty, in accordance with NAAMM HMMA 805.
    - c. Physical Performance Level B, 500,000 cycles; in accordance with ANSI/SDI A250.4.
    - d. Door Face Metal Thickness: 16 gauge, 0.053 inch (1.3 mm), minimum.

- e. Zinc Coating: G90/Z275 galvanized coating; ASTM A653/A653M.
  3. Door Core Material: Manufacturers standard core material/construction and in compliance with requirements.
  4. Door Thickness: 1-3/4 inches (44.5 mm), nominal.
  5. Door Face Sheets: Flush.
  6. Door Finish: Factory primed and field finished.
- D. Fire-Rated Doors:
1. Based on SDI Standards: ANSI/SDI A250.8 (SDI-100).
    - a. Level 1 - Standard-duty.
    - b. Physical Performance Level C, 250,000 cycles; in accordance with ANSI/SDI A250.4.
    - c. Model 1 - Full Flush.
    - d. Door Face Metal Thickness: 14 gauge, 0.067 inch (1.7 mm), minimum.
    - e. Zinc Coating: A60/ZF180 galvanized coating; ASTM A653/A653M.
  2. Based on NAAMM HMMA Custom Guidelines: Comply with NAAMM HMMA 850 requirements for fire-rated doors.
    - a. Comply with guidelines of NAAMM HMMA 860 for Hollow Metal Doors and Frames.
    - b. Performance Level 2 - Moderate Duty, in accordance with NAAMM HMMA 805.
    - c. Physical Performance Level C, 250,000 cycles; in accordance with ANSI/SDI A250.4.
    - d. Door Face Metal Thickness: 14 gauge, 0.067 inch (1.7 mm), minimum.
    - e. Zinc Coating: G90/Z275 galvanized coating; ASTM A653/A653M.
  3. Fire Rating: As indicated on Door Schedule, tested in accordance with UL 10C and NFPA 252 ("positive pressure fire tests").
  4. Provide units listed and labeled by UL (DIR) or ITS (DIR).
    - a. Attach fire rating label to each fire rated unit.
  5. Door Thickness: 1-3/4 inches (44.5 mm), nominal.
  6. Door Face Sheets: Flush.
  7. Door Finish: Factory primed and field finished.
- E. Hurricane-Resistant Doors:
1. Comply with Florida Building Code (FBC) test protocols for High Velocity Hurricane Zone (HVHZ) FBC TAS 201, FBC TAS 202 and FBC TAS 203.
  2. Design and size door and frame components to withstand the specified load requirements without damage or permanent set, when tested in accordance with ASTM E330/E330M.
    - a. Design Wind Loads: Comply with requirements of authorities having jurisdiction.
    - b. Wind-Borne Debris Resistance: Door and frame components shall have FLA (PAD) approval or Miami (APD) approval for Large and Small Missile impact and pressure cycling at design wind loads.
  3. Hurricane Shelter Application: Comply with ICC 500 standard.
    - a. Commercial: Designed and tested to comply with FEMA P-361 community shelter door assembly guidelines.
  4. Based on SDI Standards: ANSI/SDI A250.8 (SDI-100).
    - a. Level 3 - Extra Heavy-duty.
    - b. Physical Performance Level A, 1,000,000 cycles; in accordance with ANSI/SDI A250.4.
    - c. Model 1 - Full Flush.
    - d. Door Face Metal Thickness: 16 gauge, 0.053 inch (1.3 mm), minimum.
    - e. Zinc Coating: A60/ZF180 galvanized coating; ASTM A653/A653M.
  5. Based on NAAMM HMMA Custom Guidelines:
    - a. Comply with guidelines of NAAMM HMMA 860 for Hollow Metal Doors and Frames.
    - b. Performance Level 2 - Moderate Duty, in accordance with NAAMM HMMA 805.
    - c. Physical Performance Level C, 250,000 cycles; in accordance with ANSI/SDI A250.4.
    - d. Door Face Metal Thickness: 16 gauge, 0.053 inch (1.3 mm), minimum.
    - e. Zinc Coating: G90/Z275 galvanized coating; ASTM A653/A653M.
  6. Door Core Material: Manufacturers standard core material/construction and in compliance with requirements.

7. Door Thickness: 1-3/4 inches (44.5 mm), nominal.
8. Door Finish: Factory primed and field finished.
- F. Tornado-Resistant Doors:
  1. Design and size door and frame components to withstand the specified load requirements without damage or permanent set, when tested in accordance with ASTM E330/E330M.
    - a. Design Wind Loads: Comply with requirements of authorities having jurisdiction.
    - b. Wind-Borne Debris Resistance: Door and frame components shall have FLA (PAD) approval, Miami (APD) approval, or UL (DIR) approval for Large and Small Missile impact and pressure cycling at design wind loads.
  2. Tornado Shelter Application: Comply with ICC 500 standard.
    - a. Commercial: Designed and tested to comply with FEMA P-361 community shelter door assembly guidelines.
  3. Based on SDI Standards: ANSI/SDI A250.8 (SDI-100).
    - a. Level 3 - Extra Heavy-duty.
    - b. Physical Performance Level A, 1,000,000 cycles; in accordance with ANSI/SDI A250.4.
    - c. Model 1 - Full Flush.
    - d. Door Face Metal Thickness: 16 gauge, 0.053 inch (1.3 mm), minimum.

#### **204 HOLLOW METAL FRAMES**

- A. Comply with standards and/or custom guidelines as indicated for corresponding door in accordance with applicable door frame requirements.
- B. Frame Finish: Factory primed and field finished.
- C. Exterior Door Frames: Full profile/continuously welded type.
  1. Galvanizing: Components hot-dipped zinc-iron alloy-coated (galvannealed) in accordance with ASTM A653/A653M, with A40/ZF120 coating.
  2. Frame Finish: Factory primed and field finished.
  3. Weatherstripping: Separate, see Section 08 71 00.
- D. Interior Door Frames, Non-Fire Rated: Full profile/continuously welded type.
- E. Door Frames, Fire-Rated: Full profile/continuously welded type.
  1. Fire Rating: Same as door, labeled.
  2. Terminated Stops: Provide at interior doors; closed end stop terminated 6 inch (150 mm), maximum, above floor at 45 degree angle.
  3. Frame Metal Thickness: 16 gauge, 0.053 inch (1.3 mm), minimum.
  4. Frame Finish: Factory primed and field finished.
- F. Hurricane-Resistant Door Frames: With same hurricane resistance as door; face welded or full profile/continuously welded construction, ground smooth, fully prepared and reinforced for hardware installation.
  1. Frame Metal Thickness: 14 gauge, 0.067 inch (1.7 mm), minimum.
  2. Frame Finish: Factory primed and field finished.
- G. Tornado-Resistant Door Frames: With same tornado resistance as door; face welded or full profile/continuously welded construction, ground smooth, fully prepared and reinforced for hardware installation.
  1. Frame Metal Thickness: 14 gauge, 0.067 inch (1.7 mm), minimum.
  2. Frame Finish: Factory primed and field finished.
- H. Frames for Wood Doors: Comply with frame requirements in accordance with corresponding door.
- I. Mullions for Pairs of Doors: Fixed, with profile similar to jambs.
- J. Borrowed Lites Glazing Frames: Construction and face dimensions to match door frames, and as indicated on drawings.
- K. Transom Bars: Fixed, of profile same as jamb and head.

- L. Provide mortar guard boxes for hardware cut-outs in frames to be installed in masonry or to be grouted.
- M. Frames in Masonry Walls: Size to suit masonry coursing with head member 4 inches (102 mm) high to fill opening without cutting masonry units.
- N. Frames Wider than 48 inches (1219 mm): Reinforce with steel channel fitted tightly into frame head, flush with top.

## **205 FINISHES**

- A. Primer: Rust-inhibiting, complying with ANSI/SDI A250.10, door manufacturer's standard.
- B. Factory Finish: Complying with ANSI/SDI A250.3, manufacturer's standard coating.
  - 1. Color: As selected by Architect from manufacturer's standard range.
- C. Bituminous Coating: Cold-applied asphalt mastic, compounded for 15 mil, 0.015 inch (0.4 mm) dry film thickness (DFT) per coat; provide inert-type noncorrosive compound free of asbestos fibers, sulfur components, and other deleterious impurities.
  - 1. Fire-Rated Frames: Comply with fire rating requirements indicated.

## **206 ACCESSORIES**

- A. Louvers: Roll formed steel with overlapping frame; finish same as door components ; factory-installed.
  - 1. In Fire-Rated Doors: UL (DIR) or ITS (DIR) listed fusible link louver, same rating as door.
- B. Door Window Frames: Door window frames with glazing securely fastened within door opening.
  - 1. Size: 12 inch wide by 12 inch high (305 mm wide by 305 mm high).
  - 2. Frame Material: 16 Gage.
  - 3. Metal Finish: Beige polyester powder coating.
  - 4. Glazing: 1/4 inch (6.4 mm) thick, tempered glass, in compliance with requirements of authorities having jurisdiction.
- C. Glazing: As specified in Section 08 80 00, factory installed.
- D. Removable Stops: Formed sheet steel, shape as indicated on drawings, mitered corners; prepared for countersink style tamper proof screws.
- E. Astragals and Edges for Double Doors: Pairs of door astragals, and door edge sealing and protection devices.
  - 1. UL listed products in compliance with requirements of authorities having jurisdiction.
  - 2. Provide surface mounted astragal to cover or fill space for full door height between pair of doors or door and adjacent jamb.
  - 3. Astragal Type: Split, two parts, and with automatic locking, cutouts for other door hardware, and sealing gasket.
  - 4. Edge Type: Beveled edge
  - 5. Material: Galvanized steel.
  - 6. Metal Finish: Gray powder coating.
  - 7. Provide non-corroding fasteners at exterior locations.
  - 8. Manufacturers:
    - a. Substitutions: See Section 01 60 00 - Product Requirements.
- F. Astragals for Double Doors: Specified in Section 08 7100.
  - 1. Exterior Doors: Steel, Z-shaped.
  - 2. Fire-Rated Doors: Steel, shape as required for fire rating.
- G. Mechanical Fasteners for Concealed Metal-to-Metal Connections: Self-drilling, self-tapping, steel with electroplated zinc finish.
- H. Grout for Frames: Mortar grout complying with ASTM C476 with maximum slump of 4 inches (102 mm) as measured in accordance with ASTM C143/C143M for hand troweling in place; plaster grout and thinner pumpable grout are prohibited. Field apply bituminous coating (15 mil. Dry film Thkness) to backs of frames that will be filled with grout containing anti-freezing

agents\ (i.e. ALL exterior frames). The inside of all frames in exterior and masonry walls shall be fully grouted and **the insides of the frames shall be coated with a bituminous damproofing coating. Coating shall be furnished and field applied by the Contractor to a minimum of 60 mil thickness.**

- I. Silencers: Resilient rubber, fitted into drilled hole; provide three on strike side of single door, three on center mullion of pairs, and two on head of pairs without center mullions.

### **PART 3 EXECUTION**

#### **301 EXAMINATION**

- A. Verify existing conditions before starting work.
- B. Verify that opening sizes and tolerances are acceptable.
- C. Verify that finished walls are in plane to ensure proper door alignment.

#### **302 PREPARATION**

- A. Coat inside of frames to be installed in masonry or to be grouted, with bituminous coating, prior to installation.

#### **303 INSTALLATION**

- A. Install doors and frames in accordance with manufacturer's instructions and related requirements of specified door and frame standards or custom guidelines indicated.
- B. Install prefinished frames after painting and wall finishes are complete.
- C. Install fire rated units in accordance with NFPA 80.
- D. Coordinate frame anchor placement with wall construction.
- E. Grout frames in masonry construction, using hand trowel methods; brace frames so that pressure of grout before setting will not deform frames.
- F. Install door hardware as specified in Section 08 71 00.
- G. Touch up damaged factory finishes.

#### **304 TOLERANCES**

- A. Clearances Between Door and Frame: Comply with related requirements of specified frame standards or custom guidelines indicated in accordance with SDI 117 or NAAMM HMMA 861.
- B. Maximum Diagonal Distortion: 1/16 inch (1.6 mm) measured with straight edge, corner to corner.

#### **305 ADJUSTING**

- A. Adjust for smooth and balanced door movement.

**END OF SECTION 08 11 13**

**SECTION 08 14 16  
FLUSH WOOD DOORS**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Flush wood doors; flush and flush glazed configuration; .
- B. Transom panels.

**1.02 RELATED REQUIREMENTS**

- A. Section 06 20 00 - Finish Carpentry: Wood door frames.
- B. Section 08 11 13 - Hollow Metal Doors and Frames.
- C. Section 08 12 13 - Hollow Metal Frames.
- D. Section 08 71 00 - Door Hardware.
- E. Section 08 80 00 - Glazing.
- F. Section : Metal door louvers.
- G. Section 09 21 16 - Gypsum Board Assemblies: Bullet-resistant sheathing and wallboard for bullet-resistant partitions and walls.
- H. Section 09 91 23 - Interior Painting: Field finishing of doors.
- I. Section 09 93 00 - Staining and Transparent Finishing: Field finishing of doors.

**1.03 REFERENCE STANDARDS**

- A. 16 CFR 1201 - Safety Standard for Architectural Glazing Materials Current Edition.
- B. ANSI/SDI A250.4 - Test Procedure and Acceptance Criteria for Physical Endurance for Steel Doors, Frames and Frame Anchors 2018.
- C. ANSI/SDI A250.8 - Specifications for Standard Steel Doors and Frames (SDI-100) 2017.
- D. ASTM C1048 - Standard Specification for Heat-Strengthened and Fully Tempered Flat Glass 2018.
- E. ASTM C1172 - Standard Specification for Laminated Architectural Flat Glass 2019.
- F. ASTM E90 - Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements 2009 (Reapproved 2016).
- G. ASTM E413 - Classification for Rating Sound Insulation 2022.
- H. ASTM E2112 - Standard Practice for Installation of Exterior Windows, Doors and Skylights 2019c.
- I. AWI (QCP) - Quality Certification Program Current Edition.
- J. AWI/AWMAC/WI (AWS) - Architectural Woodwork Standards, 2nd Edition 2014, with Errata (2016).
- K. AWMAC/WI (NAAWS) - North American Architectural Woodwork Standards 2021, with Errata.
- L. BHMA A156.2 - Bored and Preassembled Locks and Latches 2017.
- M. NFPA 80 - Standard for Fire Doors and Other Opening Protectives 2022.
- N. NFPA 105 - Standard for Smoke Door Assemblies and Other Opening Protectives 2022.
- O. UL 10C - Standard for Positive Pressure Fire Tests of Door Assemblies Current Edition, Including All Revisions.
- P. UL 1784 - Standard for Air Leakage Tests of Door Assemblies Current Edition, Including All Revisions.

**1.04 SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements for submittal procedures.

- B. Product Data: Indicate door core materials and construction; veneer species, type and characteristics.
- C. Shop Drawings: Show doors and frames, elevations, sizes, types, swings, undercuts, beveling, blocking for hardware, factory machining, factory finishing, cutouts for glazing and other details.
  - 1. Provide information as required by AWI/AWMAC/WI (AWS) or AWMAC/WI (NAAWS).
- D. Samples: Submit two samples of door construction, in size cut from top corner of door.
- E. Samples: Submit two samples of door veneer, in size illustrating wood grain, stain color, and sheen.
- F. Certificate: Submit labels and certificates required by quality assurance and quality control programs.
- G. Test Reports: Show compliance with specified requirements for the following:
  - 1. Sound-retardant doors and frames; sealed panel tests are not acceptable.
- H. Manufacturer's Installation Instructions: Indicate special installation instructions.
- I. Manufacturer's qualification statement.
- J. Specimen warranty.
- K. Warranty, executed in Owner's name.

#### **1.05 QUALITY ASSURANCE**

- A. Maintain one copy of the specified door quality standard on site for review during installation and finishing.
- B. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section, with not less than three years of documented experience.
  - 1. Accredited participant in the specified certification program prior to the commencement of fabrication and throughout the duration of the project.
- C. Installer Qualifications: Company specializing in performing work of the type specified in this section, with not less than three years of documented experience.
- D. Woodwork Quality Assurance Program:
  - 1. Provide labels indicating that the installed work complies with AWI/AWMAC/WI (AWS) or AWMAC/WI (NAAWS) requirements for grade or grades specified.
  - 2. Provide designated labels on shop drawings as required by quality assurance program.
  - 3. Provide designated labels on installed products as required by quality assurance program.
  - 4. Submit documentation upon completion of installation that verifies this work is in compliance with specified requirements.

#### **1.06 DELIVERY, STORAGE, AND HANDLING**

- A. Package, deliver and store doors in accordance with specified quality standard.
- B. Accept doors on site in manufacturer's packaging, and inspect for damage.
- C. Protect doors with resilient packaging sealed with heat shrunk plastic; do not store in damp or wet areas or areas where sunlight might bleach veneer; seal top and bottom edges with tinted sealer if stored more than one week, and break seal on site to permit ventilation.

#### **1.07 WARRANTY**

- A. See Section 01 78 00 - Closeout Submittals for additional warranty requirements.
- B. Interior Doors: Provide manufacturer's warranty for the life of the installation.
- C. Include coverage for delamination of veneer, warping beyond specified installation tolerances, defective materials, and telegraphing core construction.

### **PART 2 PRODUCTS**

#### **201 MANUFACTURERS**

- A. Wood Veneer Faced Doors:
  - 1. Haley Brothers; [\_\_\_\_]: [www.haleybros.com/#sle](http://www.haleybros.com/#sle).

2. Masonite Architectural; Aspiro Select Wood Veneer Doors:  
[www.architectural.masonite.com/#sle](http://www.architectural.masonite.com/#sle).
3. VT Industries, Inc: [www.vtindustries.com/#sle](http://www.vtindustries.com/#sle).
4. Eggers Industries: [www.eggersindustries.com/#isle](http://www.eggersindustries.com/#isle).
5. Substitutions: See Section 01 60 00 - Product Requirements.

## 202 DOORS

- A. Doors: See drawings for locations and additional requirements.
  1. Quality Standard: Custom Grade, Heavy Duty performance, in accordance with AWI/AWMAC/WI (AWS) or AWMAC/WI (NAAWS), unless noted otherwise.
  2. Wood Veneer Faced Doors: 5-ply unless otherwise indicated.
- B. Exterior Doors: Flush solid core construction and water repellent treated.
  1. Thickness: 1-3/4 inches (44 mm), unless otherwise indicated.
  2. Facing: Wood veneer for field transparent finish as indicated on drawings.
- C. Interior Doors: 1-3/4 inches (44 mm) thick unless otherwise indicated; flush construction.
  1. Provide solid core doors at each location.
  2. Fire Rated Doors: Tested to ratings indicated on drawings in accordance with UL 10C - Positive Pressure; Underwriters Laboratories Inc (UL) or Intertek/Warnock Hersey (WHI) labeled without any visible seals when door is open.
  3. Smoke and Draft Control Doors (Indicated as "S" on Drawings): In addition to required fire rating, provide door assemblies tested in accordance with UL 1784 with maximum air leakage of 3.0 cfm per sq ft (0.01524 cu m/s/sq m) of door opening at 0.10 inch wg (24.9 Pa) pressure at both ambient and elevated temperatures for "S" label; if necessary, provide additional gasketing or edge sealing.
  4. Sound-Rated Doors: Minimum STC of 50, calculated in accordance with ASTM E413, tested in accordance with ASTM E90.
  5. Wood veneer facing for field transparent finish as indicated on drawings.

## 203 DOOR AND PANEL CORES

- A. Non-Rated Solid Core and 20 Minute Rated Doors: Type particleboard core (PC), plies and faces as indicated.
- B. Fire-Rated Doors: Mineral core type, with fire resistant composite core (FD), plies and faces as indicated above; with core blocking as required to provide adequate anchorage of hardware without through-bolting.
- C. Sound-Rated Doors: Equivalent to type, with particleboard core (PC) construction as required to achieve STC rating specified; plies and faces as indicated above.

## 204 DOOR FACINGS

- A. Veneer Facing for Transparent Finish: Red oak, veneer grade in accordance with quality standard indicated, plain sliced (flat cut), with book match between leaves of veneer, running match of spliced veneer leaves assembled on door or panel face.

## 205 DOOR CONSTRUCTION

- A. Fabricate doors in accordance with door quality standard specified.
- B. Cores Constructed with stiles and rails:
- C. At exterior doors, provide aluminum flashing at the top and bottom rail and the sill of glazed openings for full thickness and width of door.
- D. Glazed Openings: Non-removable stops on non-secure side; sizes and configurations as indicated on drawings.
- E. Factory machine doors for hardware other than surface-mounted hardware, in accordance with hardware requirements and dimensions.
- F. Factory fit doors for frame opening dimensions identified on shop drawings, with edge clearances in accordance with specified quality standard.

- G. Provide edge clearances in accordance with the quality standard specified.

### **206 FINISHES - WOOD VENEER DOORS**

- A. Finish work in accordance with AWI/AWMAC/WI (AWS) or AWMAC/WI (NAAWS), Section 5 - Finishing for grade specified and as follows:
1. Transparent:
    - a. System - 5, Varnish, Conversion.
    - b. Stain: As selected by Architect.
    - c. Sheen: Eggshell

### **207 ACCESSORIES**

- A. Hollow Metal Door Frames: See Section 08 11 13.
- B. Metal Louvers: See Section 08 1113.
- C. Metal Louvers:
  1. Material and Finish: Roll formed steel; .
- D. Glazed Openings:
  1. Heat-Strengthened and Fully Tempered Glass: ASTM C1048.
  2. Laminated Glass: Float glass laminated in accordance with ASTM C1172.
  3. Fire-Protection-Rated Glass: Safety Certification, 16 CFR 1201, Category II.
  4. Tint: Clear.
- E. Door Window Frames: Door window frames with glazing securely fastened within door opening.
  1. Size: 4" wide X 16" high
  2. Frame Material: 16 gage galv. steel.
  3. Glazing: 1/4 inch (6.4 mm) thick, tempered glass, in compliance with requirements of authorities having jurisdiction.
  4. Manufacturers:
    - a. All Metal Stamping: [www.allmetalstamping.com/#sle](http://www.allmetalstamping.com/#sle).
    - b. Substitutions: See Section 01 60 00 - Product Requirements.

## **PART 3 EXECUTION**

### **301 EXAMINATION**

- A. Verify existing conditions before starting work.
- B. Verify that opening sizes and tolerances are acceptable.
- C. Do not install doors in frame openings that are not plumb or are out-of-tolerance for size or alignment.

### **302 INSTALLATION**

- A. Install doors in accordance with manufacturer's instructions and specified quality standard.
  1. Install fire-rated doors in accordance with NFPA 80 requirements.
  2. Install smoke and draft control doors in accordance with NFPA 105 requirements.
  3. Install exterior doors in accordance with ASTM E2112.
- B. Factory-Finished Doors: Do not field cut or trim; if fit or clearance is not correct, replace door.
- C. Use machine tools to cut or drill for hardware.
- D. Coordinate installation of doors with installation of frames and hardware.
- E. Install door louvers plumb and level.

### **303 TOLERANCES**

- A. Comply with specified quality standard for fit and clearance tolerances.
- B. Comply with specified quality standard for telegraphing, warp, and squareness.

**END OF SECTION 08 14 16**

**SECTION 08 31 00  
ACCESS DOORS AND PANELS**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Wall mounted access units.
- B. Ceiling mounted access units.

**1.02 RELATED REQUIREMENTS**

- A. Section : Openings in masonry.
- B. Section : Openings in ceilings.
- C. Section 08 71 00 - Door Hardware: Mortise cylinder and core hardware.
- D. Section 09 91 13 - Exterior Painting: Field paint finish.
- E. Section 09 91 23 - Interior Painting: Field paint finish.
- F. Section 23 33 00 - Air Duct Accessories: Access doors in ductwork.

**1.03 REFERENCE STANDARDS**

- A. ADA Standards - 2010 ADA Standards for Accessible Design 2010.
- B. ASTM A500/A500M - Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes 2021a.
- C. ASTM A1008/A1008M - Standard Specification for Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, Required Hardness, Solution Hardened, and Bake Hardenable 2021a.
- D. ASTM B26/B26M - Standard Specification for Aluminum-Alloy Sand Castings 2018, with Editorial Revision.
- E. ASTM B211/B211M - Standard Specification for Aluminum and Aluminum-Alloy Rolled or Cold Finished Bar, Rod, and Wire 2019.

**1.04 SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Shop Drawings: Indicate exact position of each access door and/or panel unit.
- C. Manufacturer's Installation Instructions: Indicate installation requirements.
- D. Manufacturer's Qualification Statement.

**1.05 QUALITY ASSURANCE**

- A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.
- B. Installer Qualifications: Company specializing in performing work of the type specified and with at least three years documented experience.

**PART 2 PRODUCTS**

**2.01 ACCESS DOORS AND PANELS ASSEMBLIES**

- A. Wall-Mounted Units in Wet Areas:
  - 1. Location: As indicated on drawings.
  - 2. Panel Material: Steel, hot-dipped zinc, or zinc-aluminum-alloy coated.
  - 3. Size: 12 by 12 inches (305 by 305 mm).
  - 4. Door/Panel: Hinged, standard duty, with tool-operated spring or cam lock and no handle.
  - 5. Wall Mounting Criteria: Provide surface-mounted face frame and door surface flush with frame surface.
  - 6. Plaster Mounting Criteria: Provide drywall bead frame with door surface flush with wall surface.

7. Masonry Mounting Criteria: Provide surface-mounted frame with door surface flush with frame surface.
- B. Fire-Rated Wall-Mounted Units:
  1. Location: As indicated on drawings.
  2. Wall Fire-Rating: As indicated on drawings.
  3. Panel Material: Steel.
  4. Size: 12 by 12 inches (305 by 305 mm).
  5. Door/Panel: Insulated double-surface panel, with tool-operated spring or cam lock and no handle.
- C. Ceiling-Mounted Units with Return Air Grille:
  1. Location: As indicated on drawings.
  2. Size - Lay-In Grid Ceilings: To match module of ceiling grid.
  3. Size - Other Ceilings: 12 by 12 inches (305 by 305 mm).
  4. Door/Panel: Hinged, standard duty, with tool-operated spring or cam lock and no handle.

## **202 WALL AND CEILING MOUNTED ACCESS UNITS**

- A. Manufacturers:
  1. Activar Construction Products Group, Inc. - JL Industries: [www.activarcpg.com/#sle](http://www.activarcpg.com/#sle).
    - a. Multipurpose Access Panel: Activar/JL Industries TM.
    - b. Medium-Security (10 ga) Access Panel: Activar/JL Industries SP.
    - c. Insulated Fire-Rated Access Panel: Activar/JL Industries FD.
  2. ACUDOR Products Inc: [www.acudor.com/#sle](http://www.acudor.com/#sle).
  3. Babcock-Davis: [www.babcockdavis.com/#sle](http://www.babcockdavis.com/#sle).
  4. Milcor, Inc: [www.milcorinc.com/#sle](http://www.milcorinc.com/#sle).
  5. Nystrom, Inc: [www.nystrom.com/#sle](http://www.nystrom.com/#sle).

## **PART 3 EXECUTION**

### **301 EXAMINATION**

- A. Verify that rough openings are correctly sized and located.

### **302 PREPARATION**

### **303 INSTALLATION**

- A. Install units in accordance with manufacturer's instructions.
- B. Install frames plumb and level in openings, and secure units rigidly in place.
- C. Position units to provide convenient access to concealed equipment when necessary.

**END OF SECTION 08 31 00**

**SECTION 08 36 00**  
**SECTIONAL OVERHEAD DOORS**  
**MODEL 515 INSULATED SECTIONAL STEEL DOORS**

**PART 1 GENERAL**

**1.1 SECTION INCLUDES**

- A. Insulated Sectional Overhead Doors.
- B. Electric Operators and Controls.
- C. Operating Hardware, tracks, and support.

**1.2 RELATED SECTIONS**

- A. Section 03300 - Cast-In-Place Concrete.
- B. Section 04810 – Concrete Unit Masonry.
- C. Section 05500 - Metal Fabrications.
- D. Section 06114 – Wood Framing.
- E. Section 07900 - Joint Sealants.
- F. Section 08710 - Door Hardware.
- G. Section 09900 - Paints and Coatings.
- H. Section 11150 - Parking Control Equipment.
- I. Section 16130 - Raceway and Boxes.
- J. Section 16150 - Common Work Results for Electrical.

**1.3 REFERENCES**

- A. ANSI/DASMA 102 - American National Standard Specifications for Sectional Overhead Type Doors.

**1.4 DESIGN / PERFORMANCE REQUIREMENTS**

- A. Wiring Connections: Requirements for electrical characteristics.
  - 1. 115 volts, single phase, 60 Hz.
  - 2. 230 volts, single phase, 60 Hz.
  - 3. 230 volts, three phase, 60 Hz.
- B. Single-Source Responsibility: Provide doors, tracks, motors, and accessories from one manufacturer for each type of door. Provide secondary components from source acceptable to manufacturer of primary components.

**1.5 SUBMITTALS**

- A. Submit under provisions of Section 01300.
- B. Product Data: Manufacturer's data sheets on each product to be used, including:
  - 1. Preparation instructions and recommendations.
  - 2. Storage and handling requirements and recommendations.
  - 3. Installation methods.
- C. Shop Drawings: Indicate plans and elevations including opening dimensions and required tolerances, connection details, anchorage spacing, hardware locations, and installation details.
- D. Manufacturer's Certificates: Certify products meet or exceed specified requirements.
- E. Operation and Maintenance Data.

#### 1.6 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section with minimum five years documented experience.
- B. Installer Qualifications: Authorized representative of the manufacturer with minimum five years documented experience.
- C. Products Requiring Electrical Connection: Listed and classified by Underwriters Laboratories, Inc. acceptable to authority having jurisdiction as suitable for purpose specified.

#### 1.7 DELIVERY, STORAGE, AND HANDLING

- A. Store products in manufacturer's unopened labeled packaging until ready for installation.
- B. Protect materials from exposure to moisture until ready for installation.
- C. Store materials in a dry, ventilated weathertight location.

#### 1.8 PROJECT CONDITIONS

- A. Pre-Installation Conference: Convene a pre-installation conference just prior to commencement of field operations, to establish procedures to maintain optimum working conditions and to coordinate this work with related and adjacent work.

#### 1.9 WARRANTY

- A. Warranty: Manufacturer's limited door warranty for 10 year against delamination of polyurethane foam from steel face and all other components for 1 year.

### PART 2 PRODUCTS

#### 2.1 MANUFACTURERS

- A. Acceptable Manufacturer: Overhead Door Corporation, 2501 S. State Hwy. 121, Suite 200, Lewisville, TX 75067. ASD. Tel. Toll Free: (800) 275-3290. Phone: (469) 549-7100. Fax: (972) 906-1499. Web Site: [www.overheaddoor.com](http://www.overheaddoor.com). E-mail: [info@overheaddoor.com](mailto:info@overheaddoor.com).
- B. Clopay Garage Doors [www.clopaydoor.com](http://www.clopaydoor.com)
- C. Substitutions: Permitted with Architect's approval.

- D. Requests for substitutions will be considered in accordance with provisions of Section 01600.

## 2.2 INSULATED SECTIONAL OVERHEAD DOORS

- A. Insulated Steel Sectional Overhead Doors: Model 515 Thermacore Wind Load Insulated Steel Doors by Overhead Door Corporation. Units shall have the following characteristics:
1. Door Assembly: Metal/foam/metal sandwich panel construction, with hot melt thermal break.
    - a. Panel Thickness: 1-3/8 inches (34.92 mm).
    - b. Exterior Surface:
      - 1) Raised panel with non-repeating wood grain texture.
    - c. Exterior Steel: .015 inch (0.38 mm), hot-dipped galvanized.
    - d. Ends: Hot-dipped galvanized steel, full height with end caps.
      - 1) 16 gauge.
    - e. Spring Counterbalance: Sized to weight of the door, with a helically wound, oil tempered torsion spring mounted on a steel shaft; cable drum of die cast aluminum with high strength galvanized aircraft cable. Sized with a minimum 5 to 1 safety factor. (MFR. Recommendation)
      - 1) High cycle spring: 25,000 cycles.
      - 2) High cycle spring: 50,000 cycles.
      - 3) High cycle spring: 100,000 cycles.
    - f. Thermal Values: Tested installed assembly U-factor of 0.15 Btu/hr/SF degrees F; calculated section R-value of 12.12.
    - g. Air Infiltration: 0.23 cfm at 15 mph.
    - h. Sound transmission class 20 when tested in accordance with ASTM E 413.
    - i. Outdoor-indoor transmission class 20 when tested in accordance with ASTM E 1332.
    - j. Insulation: CFC-free and HCFC-free polyurethane, fully encapsulated.
      - 1) Insulated sections tested in accordance with ASTM E 84 and achieve a Flame spread Index of 10 or less, and a Smoke Developed Index of 210 or less.
      - 2) Insulation material tested in accordance with ASTM D 1929 and achieve a minimum Flash Ignition temperature of 734 degrees F, and a minimum Self Ignition temperature of 950 degrees F.
      - 3) Insulated sections shall meet all requirements of the UBC 17-5 corner burn.
    - k. Partial Glazing of Steel Panels:
      - 1) StyleLine Lite Colonial SSB.
    - l. Colonial Style SSB with High Impact Polymer Frame:
  2. Finish and Color:
    - a. Two coat baked-on polyester:
      - 1) Interior color, white.
      - 2) Exterior color, white.
  3. Hardware: Galvanized steel hinges and fixtures. Ball bearing rollers with hardened steel races.
  4. Lock:
    - a. Interior mounted slide lock.
    - b. Locking mechanism designed to maintain security for exterior while permitting break out when impacted from the inside.
  5. Weatherstripping:
    - a. Flexible bulb-type strip at bottom section.
    - b. Flexible Jamb seals.
    - c. Flexible Header seal.

6. Track: Provide track as recommended by manufacturer to suit loading required and clearances available.
  - a. Size:
    - 1) 2 inch (51 mm).
    - 2) 3 inch (76 mm).
  - b. Type:
    - 1) Standard lift.
  - c. Horizontal track shall be reinforced with continuous angle of adequate length and gauge to minimize deflection.
  - d. Vertical track shall be graduated to provide wedge type weathertight closing with continuous angle mounting for steel or wood jambs and shall be fully adjustable to seal door at jambs.
7. Electric Motor Operation: Provide UL listed electric operator, equal to Genie Commercial Operators, size and type as recommended by manufacturer to move door in either direction at not less than 2/3 foot nor more than 1 foot per second.
  - a. Heavy Duty
    - 1) Model GH – hoist
  - b. Entrapment Protection: Required for momentary contact, includes radio control operation.
    - 1) Pneumatic sensing edge up to 18 feet (5.5 m) wide. Constant contact only complying with UL 325/2010.
    - 2) Electric sensing edge monitored to meet UL 325/2010 equal to Miller Edge.
    - 3) Photoelectric sensors monitored to meet UL 325/2010.
  - c. Operator Controls:
    - 1) Push-button operated control stations with open, close, and stop buttons.
    - 2) Push-button and key operated control stations with open, close, and stop buttons.
    - 3) Surface mounting.
    - 4) Interior location.
  - d. Special Operation:
    - 1) Radio control operation.
    - 2) Photocell operation.
    - 3) Explosion and dust ignition proof control wiring.

### PART 3 EXECUTION

#### 3.1 EXAMINATION

- A. Do not begin installation until openings have been properly prepared.
- B. Verify wall openings are ready to receive work and opening dimensions and tolerances are within specified limits.
- C. Verify electric power is available and of correct characteristics.
- D. If preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

#### 3.2 PREPARATION

- A. Clean adjacent surfaces thoroughly prior to installation.

- B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

### 3.3 INSTALLATION

- A. Install overhead doors and track in accordance with approved shop drawings and the manufacturer's printed instructions.
- B. Coordinate installation with adjacent work to ensure proper clearances and allow for maintenance.
- C. Anchor assembly to wall construction and building framing without distortion or stress.
- D. Securely brace door tracks suspended from structure. Secure tracks to structural members only.
- E. Fit and align door assembly including hardware.
- F. Coordinate installation of electrical service. Complete power and control wiring from disconnect to unit components.

### 3.4 CLEANING AND ADJUSTING

- A. Adjust door assembly to smooth operation and in full contact with weatherstripping.
- B. Clean doors, frames, glass, and polycarbonate according to manufacturer's instructions.
- C. Remove temporary labels and visible markings. Do not remove polycarbonate care and maintenance label required to maintain warranty.

### 3.5 PROTECTION

- A. Do not permit construction traffic through overhead door openings after adjustment and cleaning.
- B. Protect installed products until completion of project.
- C. Touch-up, damaged coatings and finishes and repair minor damage before Substantial Completion.

**END OF SECTION**

**SECTION 08 41 26**  
**ALL-GLASS ENTRANCES AND STOREFRONTS**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. All-glass entrances.
- B. All-glass storefronts.

**1.02 RELATED REQUIREMENTS**

- A. Section 08 71 00 - Door Hardware.

**1.03 REFERENCE STANDARDS**

- A. ASTM A666 - Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar 2015.
- B. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes 2021.
- C. ASTM B221M - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes (Metric) 2021.
- D. ASTM C920 - Standard Specification for Elastomeric Joint Sealants 2018.
- E. ASTM C1036 - Standard Specification for Flat Glass 2021.
- F. ASTM C1048 - Standard Specification for Heat-Strengthened and Fully Tempered Flat Glass 2018.
- G. BHMA A156.3 - Exit Devices 2020.
- H. BHMA A156.13 - Mortise Locks & Latches Series 1000 2017.

**1.04 ADMINISTRATIVE REQUIREMENTS**

- A. Preinstallation Meeting: Convene at project site seven calendar days prior to scheduled beginning of construction activities of this section to review section requirements.
  - 1. Require attendance by representatives of installer and entities effected by adjacent or other work related to this section.

**1.05 SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Manufacturer's descriptive literature for each component in all-glass entrance assembly.
- C. Shop Drawings: Drawings showing layout, dimensions, identification of components, and interface with adjacent construction.
  - 1. Include field measurements of openings.
  - 2. Include elevations showing:
    - a. Appearance of all-glass entrance layouts.
    - b. Locations and identification of manufacturer-supplied door hardware and fittings.
    - c. Locations and sizes of cut-outs and drilled holes for other door hardware.
- D. Certificates: Contractor's certification that installer of entrance assemblies meets specified qualifications.
- E. Design Data: Design calculations, bearing seal and signature of structural engineer licensed to practice in the State in which the Project is located, documenting compliance of exterior assemblies with wind pressure criteria.
- F. Designer's Qualification Statement.
- G. Installer's Qualification Statement.

## 1.06 QUALITY ASSURANCE

- A. Designer Qualifications: Design under direct supervision of a Professional Engineer experienced in design of this type of work and licensed in the State in which the Project is located.
- B. Installer Qualifications: Minimum three years of experience installing entrance assemblies similar to those specified in this section.

## PART 2 PRODUCTS

### 201 MANUFACTURERS

- A. All-Glass Entrances and Storefronts:
  - 1. Basis of Design: YKK AP America Inc.; YHS 50 FS: [www.ykkap.com](http://www.ykkap.com)
  - 2. Kawneer Company, Inc/TRACO; [www.kawneer.com](http://www.kawneer.com)
  - 3. Trulite Glass & Aluminum Solutions, LLC: [www.trulite.com/#sle](http://www.trulite.com/#sle).
  - 4. Substitutions: See Section 01 60 00 - Product Requirements.
- B. Fittings and Hardware:
  - 1. Avanti Systems USA; Double Glazed Acoustic Swing Door Hardware: [www.avantisystemsusa.com/#sle](http://www.avantisystemsusa.com/#sle).
  - 2. DORMA USA, Inc: [www.dorma.com/#sle](http://www.dorma.com/#sle).
  - 3. Substitutions: See Section 01 60 00 - Product Requirements.

### 202 ALL-GLASS ENTRANCES AND STOREFRONTS ASSEMBLIES

- A. Entrances and Storefronts: Factory fabricated assemblies consisting of frameless glass panels fastened with metal structural fittings in configuration indicated on drawings.
  - 1. Operational Loads: Designed to withstand door operation under normal traffic without damage, racking, sagging, or deflection.
  - 2. Prepared for all specified hardware whether specified in this section or not.
  - 3. Finished metal surfaces protected with strippable film.
  - 4. Factory assembled to greatest extent practicable; may be disassembled to accommodate shipping constraints.

### 203 FITTINGS AND HARDWARE

- A. For each door, include weatherstripping, sill sweep strip, threshold, and other hardware required as a tested system for Florida Building Code FBC Pad Approval.
- B. Other Door Hardware: Coordinate as specified in Section 08 7100.
- C. Rail Style Fittings for Swinging Doors and Related Fixed Glazing:
  - 1. Top Rails: 5-7/16 inch (138 mm) high with matching end caps.
  - 2. Bottom Rails: 6 inch (152 mm) high with matching end caps.
  - 3. Sidelite Rails: Match door rail sightlines.
  - 4. Exposed Edge Profile: Square.
- D. Mortise Locksets for Glass Swinging Doors:
  - 1. Locking Functions: As defined in BHMA A156.13, and as follows:
    - a. Exit Only: F07 or F31, may have outside trim, may not be left unlocked.

### 204 MATERIALS

- A. Glass: See Architectural plans.
- B. Aluminum Components: Comply with ASTM B221 (ASTM B221M), Alloy 6063, Temper T5.
- C. Sealant: One-part silicone sealant, comply with ASTM C920, clear.

**205 ACCESSORIES**

- A. Exposed Fittings and Hardware: Extruded aluminum, clear anodized finish.

**PART 3 EXECUTION**

**301 EXAMINATION**

- A. Verify that openings are acceptable.
- B. Do not begin installation until substrates and openings have been properly prepared.
- C. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

**302 PREPARATION**

- A. Clean substrates thoroughly prior to installation.
- B. Prepare substrates using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

**303 INSTALLATION**

- A. Install in accordance with manufacturer's installation instructions.
- B. Tolerances:
  - 1. Horizontal Components and Sight Lines: Not more than 1/8 inch in 10 feet (3.2 mm in 3 m) variation from level, non-cumulative.
  - 2. Vertical Components and Sight Lines: Not more than 1/8 inch in 10 feet (3.2 mm in 3 m) variation from plumb, non-cumulative.
  - 3. Variation from Plane or Indicated Location: Not more than 1/16 inch (1.6 mm).
- C. Installation of door hardware not supplied by entrance/storefront manufacturer as specified in Section 08 71 00.

**304 ADJUSTING**

- A. Adjust doors to operate correctly, without binding to frame, sill, or adjacent doors.
- B. Adjust door hardware for smooth operation.

**305 CLEANING**

- A. Clean installed work to like-new condition.

**306 PROTECTION**

- A. Protect installed products until Date of Substantial Completion.
- B. Touch-up, repair or replace damaged products before Date of Substantial Completion.

**END OF SECTION 08 41 26**

**SECTION 08 51 13  
ALUMINUM WINDOWS**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Extruded aluminum windows with fixed sash, operating sash, and infill panels.
- B. Operating hardware.
- C. Insect screens.

**1.02 RELATED REQUIREMENTS**

- A. Section 07 25 00 - Weather Barriers: Sealing frame to water-resistive barrier installed on adjacent construction.

**1.03 REFERENCE STANDARDS**

- A. AAMA/WDMA/CSA 101/I.S.2/A440 - North American Fenestration Standard/Specification for Windows, Doors, and Skylights 2017.
- B. AAMA CW-10 - Care and Handling of Architectural Aluminum from Shop to Site 2015.
- C. AAMA 502 - Voluntary Specification for Field Testing of Newly Installed Fenestration Products 2021.
- D. AAMA 609 & 610 - Cleaning and Maintenance Guide for Architecturally Finished Aluminum (Combined Document) 2015.
- E. AAMA 611 - Voluntary Specification for Anodized Architectural Aluminum 2020.
- F. AAMA 1503 - Voluntary Test Method for Thermal Transmittance and Condensation Resistance of Windows, Doors and Glazed Wall Sections 2009.
- G. AAMA 2603 - Voluntary Specification, Performance Requirements and Test Procedures for Pigmented Organic Coatings on Aluminum Extrusions and Panels (with Coil Coating Appendix) 2021.
- H. ASCE 7 - Minimum Design Loads and Associated Criteria for Buildings and Other Structures Most Recent Edition Cited by Referring Code or Reference Standard.
- I. ASTM B209 - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate 2014.
- J. ASTM B209M - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate (Metric) 2014.
- K. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes 2021.
- L. ASTM B221M - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes (Metric) 2021.
- M. ASTM E90 - Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements 2009 (Reapproved 2016).
- N. ASTM E283/E283M - Standard Test Method for Determining Rate of Air Leakage Through Exterior Windows, Skylights, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen 2019.
- O. ASTM E331 - Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform Static Air Pressure Difference 2000 (Reapproved 2016).
- P. ASTM E783 - Standard Test Method for Field Measurement of Air Leakage Through Installed Exterior Windows and Doors 2002 (Reapproved 2018).
- Q. ASTM E1105 - Standard Test Method for Field Determination of Water Penetration of Installed Exterior Windows, Skylights, Doors, and Curtain Walls, by Uniform or Cyclic Static Air Pressure Difference 2015.
- R. ASTM E2112 - Standard Practice for Installation of Exterior Windows, Doors and Skylights 2019c.

- S. FLA (PAD) - Florida Building Code Online - Product Approval Directory Current Edition.

#### **1.04 ADMINISTRATIVE REQUIREMENTS**

- A. Preinstallation Meeting: Convene one week before starting work of this section.

#### **1.05 SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements for submittal procedures.
- B. Product Data: Include component dimensions, information on glass and glazing, internal drainage details, and descriptions of hardware and accessories.
- C. Shop Drawings: Indicate opening dimensions, elevations of different types, framed opening tolerances, anchorage locations, [\_\_\_\_], and installation requirements.
- D. Grade Substantiation: Prior to submitting shop drawings or starting fabrication, submit one of the following showing compliance with specified grade:
1. Evidence of AAMA Certification.
  2. Evidence of WDMA Certification.
  3. Evidence of CSA Certification.
  4. Test report(s) by independent testing agency itemizing compliance and acceptable to authorities having jurisdiction.

#### **1.06 QUALITY ASSURANCE**

- A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section with minimum three years of documented experience.

#### **1.07 DELIVERY, STORAGE, AND HANDLING**

- A. Comply with requirements of AAMA CW-10.
- B. Protect finished surfaces with wrapping paper or strippable coating during installation. Do not use adhesive papers or sprayed coatings that bond to substrate when exposed to sunlight or weather.

#### **1.08 WARRANTY**

- A. See Section 01 78 00 - Closeout Submittals for additional warranty requirements.
- B. Manufacturer Warranty: Provide 5-year manufacturer warranty against failure of glass seal on insulating glass units, including interpane dusting or misting. Include provision for replacement of failed units. Complete forms in Owner's name and register with manufacturer.
- C. Manufacturer Warranty: Provide 20-year manufacturer warranty against excessive degradation of exterior finish. Include provision for replacement of units with excessive fading, chalking, or flaking. Complete forms in Owner's name and register with manufacturer.

### **PART 2 PRODUCTS**

#### **201 MANUFACTURERS**

1. Basis of Design: Winco Window Company, Inc; Series 1450HR:  
[www.wincowindow.com](http://www.wincowindow.com)
- B. Other Acceptable - Aluminum Windows Manufacturers:
  1. Kawneer North America
  2. YKK AP America, Inc.
  3. PGT Windguard [www.peerlessproducts.com/#sle](http://www.peerlessproducts.com/#sle).
  4. TRACO: [www.traco.com/#sle](http://www.traco.com/#sle).

#### **202 BASIS OF DESIGN - AW PERFORMANCE CLASS WINDOWS**

- A. Grade: AAMA/WDMA/CSA 101/I.S.2/A440 having Performance Class of AW, and Performance Grade at least as high as specified design pressure.
- B. Fixed, Thermally-Broken:

- C. Projected, Face of Sash and Frame in Approximately Same Plane:
- D. Hung Windows, Vertically Sliding; with Matching Fixed Units:

### **203 ALUMINUM WINDOWS**

- A. Aluminum Windows: Extruded aluminum frame and sash, factory fabricated, factory finished, with operating hardware, related flashings, and anchorage and attachment devices.
  - 1. Frame Depth: 3-1/2 inch (89 mm).
  - 2. Fabrication: Joints and corners flush, hairline, and weatherproof, accurately fitted and secured; prepared to receive anchors; fasteners and attachments concealed from view; reinforced as required for operating hardware and imposed loads.
  - 3. Perimeter Clearance: Minimize space between framing members and adjacent construction while allowing expected movement.
  - 4. Movement: Accommodate movement between window and perimeter framing and deflection of lintel, without damage to components or deterioration of seals.
  - 5. System Internal Drainage: Drain to the exterior by means of a weep drainage network any water entering joints, condensation occurring in glazing channel, and migrating moisture occurring within system.
- B. Fixed, Non-Operable Type:
  - 1. Construction: Thermally broken.
  - 2. Glazing: Single; clear mfr. tinted impact; transparent.
  - 3. Exterior Finish: Class I natural anodized.
  - 4. Interior Finish: Class I natural anodized.
- C. Casement Type:
  - 1. Construction: Thermally broken.
  - 2. Glazing: Single; clear mfr. tinted impact; transparent.
  - 3. Exterior Finish: Class I natural anodized.
  - 4. Interior Finish: Class I natural anodized.

### **204 PERFORMANCE REQUIREMENTS**

- A. Grade: AAMA/WDMA/CSA 101/I.S.2/A440 requirements for specific window type:
  - 1. Performance Class (PC): R.
  - 2. Performance Grade (PG): 15, with minimum design pressure (DP) of 15.04 psf (720 Pa).
  - 3. Performance Grade (PG): Equivalent to or greater than specified design pressure.

### **205 HARDWARE**

- A. Sash lock: Lever handle with cam lock.

### **206 FINISHES**

- A. Class I Natural Anodized Finish: AAMA 611 AA-M12C22A41 Clear anodic coating not less than 0.7 mils (0.018 mm) thick.

## **PART 3 EXECUTION**

### **301 EXAMINATION**

- A. Verify that wall openings and adjoining water-resistive barrier materials are ready to receive aluminum windows; see Section 07 25 00.

### **302 PRIME WINDOW INSTALLATION**

- A. Install windows in accordance with manufacturer's instructions.
- B. Attach window frame and shims to perimeter opening to accommodate construction tolerances and other irregularities.
- C. Align window plumb and level, free of warp or twist. Maintain dimensional tolerances and alignment with adjacent work.
- D. Install sill and sill end angles.

- E. Provide thermal isolation where components penetrate or disrupt building insulation. Pack fibrous insulation in shim spaces at perimeter of assembly to maintain continuity of thermal barrier.
- F. Install operating hardware not pre-installed by manufacturer.

**END OF SECTION 08 51 13**

**SECTION 08 71 00  
FINISH HARDWARE**

**PART 1 – GENERAL**

**1.01 SECTION REQUIREMENTS**

- A. This section shall include all work necessary for furnishing all items of door hardware as required by design to provide a complete door hardware system as described below
- B. Related work specified elsewhere:
  - 1. Hollow metal doors and frames
  - 2. Aluminum doors and frames
  - 3. Wood doors
- C. Furnish labor and material to complete hardware work required by design, as specified herein, or as may be required by actual conditions of building or buildings.
- D. Shall include all necessary screws, bolts, expansion shields, and other devices, as necessary and as required for proper hardware application. The hardware supplier shall assume all responsibility for correct quantities.
- E. Hardware shall meet the requirements of Federal, State and Local codes having jurisdiction over the project, notwithstanding any real or apparent conflict therewith in these specifications.
- F. Fire-Rated Openings:
  - 1. Provide hardware for fire-rated openings in compliance with NFPA Standards No. 80 and NFPA Standards No. 101. This requirement takes precedence over other requirements for such hardware. Provide only hardware that has been tested and listed by UL for the types and sizes of doors required and complies with the requirements of the door and doorframe labels.
  - 2. Where panic exit devices are required on fire-rated doors, provide supplementary marking on door UL label indicating Fire Door to be equipped with fire exit hardware and provide UL label on exit device indicating "Fire Exit Hardware".
- G. Fasteners:
  - 1. Hardware shall conform to published templates generally prepared for machine screw installation.
  - 2. Each item shall come complete with all screws required for installation.
  - 3. Insofar as practical, furnished concealed type fasteners for hardware units that have exposed screws shall be furnished with Phillips flat head screws, finished to match adjacent hardware.
  - 4. Door closers and exit devices shall be installed on wood or composite fire doors with closed head through bolts (sex bolts). Use only self-tapping screws supplied by Manufacturer. Machine Screws are the preferred fastener.
  - 5. ALL HARDWARE INSTALLED ON WOOD OR COMPOSITE DOORS ARE TO BE THUR BOLTED ( SEXBOLT)

**1.02 QUALITY ASSURANCE**

- A. The supplier shall be a directly franchised distributor of the products to be furnished and have in their employ a certified Architectural Hardware Consultant (AHC). This person shall be available for consultation to the Architect, Owner and the General Contractor at reasonable times during the course of work.
- B. The finish hardware supplier shall prepare and submit six (6) copies of a complete hardware schedule identifying each door and each hardware set number, using the numbering system for door and hardware sets used in the Contract Documents. He shall submit the schedule for

review, make corrections as directed and resubmit the corrected schedule for final approval. Approval of schedule will not relieve Contractor of the responsibility for furnishing all necessary hardware, including the responsibility for furnishing correct quantities.

- C. No manufacturing orders shall be placed until detailed schedule has been submitted and written approval received from the Matlacha Pine Island Fire Control District.
- D. After hardware schedule has been approved, furnish templates to the parties involved for door frames and other work specified to be factory prepared for installing door hardware. Furnish templates in ample time to facilitate progress of work.
- E. Hardware supplier shall have an office and warehouse facilities to accommodate the materials used on the project.
- F. The hardware manufacturer's representatives shall conduct a pre-installation class and a post-installation inspection. The Contractor is to ensure proper installation and provide for any adjustments or replacements of hardware as required. No hardware shall be installed until pre-installation class is completed. Class must be scheduled with at least a 7 day advance notification.
- G. Keying Schedule to be coordinated with the Matlacha Pine Island Fire Control District.
- H. The Contractor, Architect, the Matlacha Pine Island Fire Control District representatives and the manufacturer's representative of the hardware used shall conduct an inspection of all installed hardware. A punch list of incomplete items shall be generated prior to final inspection. One week prior to Substantial Completion a reinspection shall be conducted to ensure all punch list items are complete.
- I. The finish hardware supplier shall provide hardware templates to the suppliers furnishing aluminum hollow metal or storefront flush doors and frames and aluminum storefront doors and frames. Hardware for aluminum doors of storefront doors SHALL NOT be furnished by the supplier of the aluminum or the storefront doors. The aluminum door or storefront door supplier shall install the hardware furnished under this finish hardware section. Hardware must be approved by Matlacha Pine Island Fire Control District before installation. Mid panel, concealed and surface mounted rod devices are not to be used unless specifically approved by Matlacha Pine Island Fire Control District.
- J. Adjust and check each operating item of Finish Hardware and each door to ensure proper operation or function of every opening. Replace Hardware units that cannot be adjusted to operate freely smoothly or as intended for proper application.
- K. One month prior to acceptance or occupancy of a space or area. Hardware manufacturer and hardware installer will review and provide documentation of hardware adjustment and repairs if needed. All opening shall be checked again one week before occupancy to ensure proper operation and completion.

### **1.03 DELIVERY, STORAGE, AND HANDLING**

- A. Wrap and protect finish hardware items for shipment. Deliver to manufacturing contractor hardware items required by them for their application; deliver balance of hardware to job; store in designated location. Each shall be clearly marked with its intended location.
- B. Hardware items shall be inventoried on receipt. Provide secure lock-up for door hardware delivered to project site. Lock-up to be an indoor, dry area.
- C. Tag each item or package separately with identification related to the final hardware schedule.

### **1.04 WARRANTY**

- A. The material furnished shall be warranted for one year after installation or longer as the individual manufacturer's warranty permits.
- B. The following hardware items shall have a written warranty signed by the manufacturer agreeing to promptly repair or replace defective items with no additional cost to the Owner:
  - 1. Overhead Door Closers: 10 years from date of Substantial Completion.
  - 2. Exit Devices: 5 years from date of Substantial Completion.
  - 3. Locks and Latches: 7 years from date of Substantial Completion.

## **PART 2 - PRODUCTS**

**2.01 ACCEPTABLE MANUFACTURERS**

- A. To the greatest extent possible, obtain each kind of hardware from only one manufacturer.
- B. All numbers and symbols used herein have been taken from the current catalogues of the following manufacturers.

PRODUCT	SPECIFIED MANUFACTURER	ACCEPTABLE SUBSTITUTE
Hinges	Ives	Hager
Locks & Latches	Schlage	None (Owner Preferred)
Cylinders, Keys, Keying	Schlage Everest Primus, Interior All Cross Keyed Cylinders	None (Owner Preferred)
Exit Devices	Von Duprin	None (Owner Preferred)
Door Closers	LCN	None (Owner Preferred)
OH Stops/holders	Glynn Johnson	Rixson
Wall Stops/Floor	Glynn Johnson	Rockwood, Ives
Stops, SURF. bolts, Kick Plates	Glynn Johnson	Hager, Ives
Threshold/Weatherstrip	National Guard	Pemko, Reese
Silencers	Glynn Johnson	Rockwood, Hager
Key Cabinet	Telkee	Key Control, Lund

No other manufacturer shall be specified unless prior approval given by the Architect of Record.

**2.02 FINISH OF HARDWARE:**

- A. Exterior Hinges shall be Stainless Steel (32D), Interior Hinges shall be Satin Chrome (26D). Door Closers shall be Aluminum. Locks shall be Satin Chrome (26D), Exit Devices to be Satin Chrome (26D). Overhead Holders shall be Satin Chrome (26D), Flat Goods shall be Satin Chrome (26D) or Stainless Steel (32D) and the Thresholds shall be Mill Finish Aluminum.

**2.03 HINGES AND PIVOTS:**

- A. Exterior butts shall be Stainless Steel. Exterior butts on all out swinging doors shall be furnished with non-removable pins (NRP). 5 Knuckle Ball Bearing.
- B. Interior butts shall be as listed.
- C. Doors 5' or less in height shall have two (2) butts. Furnish one (1) additional butt for each 2'6" in height or fraction thereof. Dutch door shall have two (2) butts per leaf.

**2.04 KEYING:**

- A. Exterior locks and all cross keyed cylinders and cylinders shall be 11 Pin Schlage Everest Primus Level 9. See Architecturals for all Interior doors.
- B. Keys and Cylinders to be stamped for identification (visual key control, VKC and concealed key control, CKC) from the factory. Keys are to be stamped "DO NOT DUPLICATE" as well. All RED KEYS are to be cut on Schlage Classic "E" Blanks.
- C. Supplier to meet with the Matlacha Pine Island Fire Control District representatives to finalize the keying requirements and submit six (6) copies of a keying schedule for approval. Permanent cylinders are not to be ordered until the key schedule has been approved.
- D. Hardware supplier to provide temporary cylinders or cores during the construction phase. The Contractor is to change out the temporary cylinders for the permanent cylinders. provide up to 50% increase in spring power. Closers shall be furnished with parallel arm mounted on all doors opening into corridors or other public spaces and shall be mounted to permit 180 degrees door swing wherever wall conditions permit. Furnish with non-hold open arms unless otherwise required by design.
- G. Exterior doors, stairwell exits, auditorium entrances and cafeteria entrance doors are to have the Advanced Variable Back check (AVB) feature.
- H. Door closer cylinders shall be of high strength cast iron construction to provide low wear operating capabilities of internal parts throughout the life of the installation. All door closers

shall be tested to ANSI/BHMA A156.4 test requirements by a BHMA certified testing laboratory. A written certification showing successful completion of a minimum of 10,000,000 cycles shall be provided.

- I. Door closers shall utilize temperature stable fluid capable of withstanding temperature ranges of 120 degrees Fahrenheit to -30 degrees Fahrenheit, without requiring seasonal adjustment of closer speed to properly close the door. Closers for fire-rated doors shall be provided with temperature stabilizing fluid that complies with the standards UBC 7- 2 (1997) and UL 10C.
- J. Door closers shall incorporate tamper resistant non-critical screw valves of V-slot design to reduce possible clogging from particles within the closer. Closers shall have separate and independent screw valve adjustments for latch speed, general speed, and hydraulic back check. Back check shall be properly located so as to effectively slow the swing of the door at a minimum of 10 degrees in advance of the dead stop location to protect the doorframe and hardware from damage. Pressure relief valves (PRV) are not acceptable.
  1. Acceptable substitutions:
    - a. None

### **PART 3 - EXECUTION**

#### **3.01 INSTALLATION:**

- A. All hardware shall be applied and installed in accordance with the Finish Hardware schedule. Care shall be exercised not to mark or damage adjacent work. Contractor to provide a secure lock-up for hardware delivered to the project but not yet installed. Control the handling and installation of hardware items that are not immediately replaceable, so that the completion of the work will not be delayed by hardware losses both before and after installation.
- B. Control the handling and installation of all hardware items so that the completion of the work will not be delayed by hardware losses either before or after installation.
- C. No hardware shall be installed until the hardware manufacturer's representatives have provided a pre-installation class. This is to ensure proper installation of the specified products.

#### **3.02 ADJUSTING AND CLEANING:**

- D. Contractor shall adjust all hardware in strict compliance with manufacturer's instructions. Prior to Substantial Completion Contractor shall clean and make any final adjustments to the finish hardware.

#### **3.03 PROTECTION:**

- E. Contractor shall protect exposed hardware installed on doors until Substantial Completion. The contractor shall protect the hardware, as it is stored on construction site in a covered and dry place.

#### **3.04 HARDWARE SCHEDULE:**

- A. Schedule is furnished as a guide to the design profession; do not consider it as inclusive. Should any particular door or item be omitted in any scheduled hardware group, provide door or item with hardware same as required for similar purposes. Quantities listed are for each pair of doors or for each single door.
- B. All Hardware shall meet DOE regulations, S-REF & ADA requirements. The contractor will be accountable for all incorrect specified hardware that is found to not meet these requirements. Also the replacement of all hardware that is not required in application or credit for such hardware.

**SEE ARCHITECTURAL DRAWINGS FOR HARDWARE SCHEDULE  
END OF SECTION 08 71 00**

**SECTION 08 80 00  
GLAZING**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Insulating glass units.
- B. Glazing units.
- C. Glazing compounds.

**1.02 RELATED REQUIREMENTS**

- A. Section 07 25 00 - Weather Barriers.
- B. Section 6585 - 6585.
- C. Section 07 92 00 - Joint Sealants: Sealants for other than glazing purposes.
- D. Section 08 11 13 - Hollow Metal Doors and Frames: Glazed lites in doors and borrowed lites.
- E. Section 08 12 13 - Hollow Metal Frames: Glazed borrowed lites.
- F. Section 08 14 16 - Flush Wood Doors: Glazed lites in doors.
- G. Section 08 36 13 - Sectional Doors: Glazed lites in doors.
- H. Section 08 41 26 - All-Glass Entrances and Storefronts: Glazing provided as part of entrance assembly.
- I. Section 08 42 29 - Automatic Entrances: Glazing provided as part of door assembly.
- J. Section 08 43 13 - Aluminum-Framed Storefronts: Glazing provided as part of storefront assembly.
- K. Section 08 51 13 - Aluminum Windows: Glazing provided by window manufacturer.
- L. Section 08 88 13 - Fire-Rated Glazing.

**1.03 REFERENCE STANDARDS**

- A. 16 CFR 1201 - Safety Standard for Architectural Glazing Materials Current Edition.
- B. ANSI Z97.1 - American National Standard for Safety Glazing Materials Used in Buildings - Safety Performance Specifications and Methods of Test 2015 (Reaffirmed 2020).
- C. ASCE 7 - Minimum Design Loads and Associated Criteria for Buildings and Other Structures Most Recent Edition Cited by Referring Code or Reference Standard.
- D. ASTM C864 - Standard Specification for Dense Elastomeric Compression Seal Gaskets, Setting Blocks, and Spacers 2005 (Reapproved 2019).
- E. ASTM C1036 - Standard Specification for Flat Glass 2021.
- F. ASTM C1048 - Standard Specification for Heat-Strengthened and Fully Tempered Flat Glass 2018.
- G. ASTM C1172 - Standard Specification for Laminated Architectural Flat Glass 2019.
- H. ASTM C1193 - Standard Guide for Use of Joint Sealants 2016.
- I. ASTM C1376 - Standard Specification for Pyrolytic and Vacuum Deposition Coatings on Flat Glass 2021a.
- J. ASTM E1300 - Standard Practice for Determining Load Resistance of Glass in Buildings 2016.
- K. ASTM E1996 - Standard Specification for Performance of Exterior Windows, Curtain Walls, Doors, and Impact Protective Systems Impacted by Windborne Debris in Hurricanes 2020.
- L. ASTM E2190 - Standard Specification for Insulating Glass Unit Performance and Evaluation 2019.
- M. GANA (GM) - GANA Glazing Manual 2008.
- N. GANA (SM) - GANA Sealant Manual 2008.

- O. GANA (LGRM) - Laminated Glazing Reference Manual 2009.
- P. IGMA TM-3000 - North American Glazing Guidelines for Sealed Insulating Glass Units for Commercial & Residential Use 1990 (2016).
- Q. NFRC 100 - Procedure for Determining Fenestration Product U-factors 2020.
- R. NFRC 200 - Procedure for Determining Fenestration Product Solar Heat Gain Coefficient and Visible Transmittance at Normal Incidence 2020.
- S. NFRC 300 - Test Method for Determining the Solar Optical Properties of Glazing Materials and Systems 2020.
- T. UL 752 - Standard for Bullet-Resisting Equipment Current Edition, Including All Revisions.
- U. UL 972 - Standard for Burglary Resisting Glazing Material Current Edition, Including All Revisions.

#### **1.04 ADMINISTRATIVE REQUIREMENTS**

- A. Preinstallation Meeting: Convene a preinstallation meeting one week before starting work of this section; require attendance by each of the affected installers.

#### **1.05 SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements for submittal procedures.
- B. Product Data on Glazing Types: Provide structural, physical and environmental characteristics, size limitations, special handling and installation requirements.
- C. Product Data on Glazing Compounds and Accessories: Provide chemical, functional, and environmental characteristics, limitations, special application requirements, and identify available colors.
- D. Samples: Submit two samples 12 by 12 inch (by 0.30 m x 0.30) in size of glass units.
- E. Certificate: Certify that products of this section meet or exceed specified requirements.
- F. Manufacturer's qualification statement.
- G. Installer's qualification statement.
- H. Warranty Documentation: Submit manufacturer warranty and ensure that forms have been completed in Owner's name and registered with manufacturer.

#### **1.06 QUALITY ASSURANCE**

- A. Perform Work in accordance with GANA (GM), GANA (SM), GANA (LGRM), IGMA TM-3000, and BB Tigres for glazing installation methods. Maintain one copy on site.
- B. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years of documented experience.
  - 1. Provide certified glass products through ANSI accredited certifications that include plant audits and independent laboratory performance testing.
    - a. Insulating Glass Certification Council (IGCC).
    - b. Safety Glazing Certification Council (SGCC).

#### **1.07 FIELD CONDITIONS**

- A. Do not install glazing when ambient temperature is less than 40 degrees F (4 degrees C).
- B. Maintain minimum ambient temperature before, during and 24 hours after installation of glazing compounds.

#### **1.08 WARRANTY**

- A. See Section 01 78 00 - Closeout Submittals for additional warranty requirements.
- B. Insulating Glass Units: Provide a five (5) year manufacturer warranty to include coverage for seal failure, interpane dusting or misting, including providing products to replace failed units.
- C. Laminated Glass: Provide a five (5) year manufacturer warranty to include coverage for delamination, including providing products to replace failed units.

## **PART 2 PRODUCTS**

### **201 MANUFACTURERS**

- A. Glass Fabricators:
  - 1. Trulite Glass & Aluminum Solutions, LLC: [www.trulite.com/#sle](http://www.trulite.com/#sle).
  - 2. Viracon, Inc: [www.viracon.com/#sle](http://www.viracon.com/#sle).
  - 3. Substitutions: See Section 01 60 00 - Product Requirements.
- B. Float Glass Manufacturers:
  - 1. AGC Glass North America, Inc: [www.agcglass.com/#sle](http://www.agcglass.com/#sle).
  - 2. Cardinal Glass Industries; [\_\_\_\_\_]: [www.cardinalcorp.com/#sle](http://www.cardinalcorp.com/#sle).
  - 3. Guardian Glass, LLC; [\_\_\_\_\_]: [www.guardianglass.com/#sle](http://www.guardianglass.com/#sle).
  - 4. Pilkington North America Inc: [www.pilkington.com/na/#sle](http://www.pilkington.com/na/#sle).
  - 5. Vitro Architectural Glass (formerly PPG Glass): [www.vitroglazings.com/#sle](http://www.vitroglazings.com/#sle).
  - 6. Substitutions: See Section 01 60 00 - Product Requirements.
- C. Laminated Glass Manufacturers:
  - 1. Cardinal Glass Industries: [www.cardinalcorp.com/#sle](http://www.cardinalcorp.com/#sle).
  - 2. Viracon, Architectural Glass segment of Apogee Enterprises, Inc: [www.viracon.com/#sle](http://www.viracon.com/#sle).
  - 3. Substitutions: See Section 01 60 00 - Product Requirements.

### **202 PERFORMANCE REQUIREMENTS - EXTERIOR GLAZING ASSEMBLIES**

- A. Provide type and thickness of exterior glazing assemblies to support assembly dead loads, and to withstand live loads caused by positive and negative wind pressure acting normal to plane of glass.
  - 1. Design Pressure: Calculated in accordance with ASCE 7.
  - 2. Comply with ASTM E1300 for design load resistance of glass type, thickness, dimensions, and maximum lateral deflection of supported glass.
  - 3. Provide glass edge support system sufficiently stiff to limit the lateral deflection of supported glass edges to less than 1/175 of their lengths under specified design load.
  - 4. Glass thicknesses listed are minimum.
- B. Weather-Resistive Barrier Seals: Provide completed assemblies that maintain continuity of building enclosure water-resistive barrier, vapor retarder, and/or air barrier.
  - 1. In conjunction with weather barrier related materials described in other sections, as follows:
  - 2. To utilize inner pane of multiple pane insulating glass units for continuity of vapor retarder and/or air barrier seal.
  - 3. To maintain a continuous vapor retarder and/or air barrier throughout glazed assembly from glass pane to heel bead of glazing sealant.
- C. Thermal and Optical Performance: Provide exterior glazing products with performance properties as indicated. Performance properties are in accordance with manufacturer's published data as determined with the following procedures and/or test methods:
  - 1. Center of Glass U-Value: Comply with NFRC 100 using Lawrence Berkeley National Laboratory (LBNL) WINDOW 6.3 computer program.
  - 2. Center of Glass Solar Heat Gain Coefficient (SHGC): Comply with NFRC 200 using Lawrence Berkeley National Laboratory (LBNL) WINDOW 6.3 computer program.
  - 3. Solar Optical Properties: Comply with NFRC 300 test method.

### **203 GLASS MATERIALS**

- A. Float Glass: Provide float glass based glazing unless otherwise indicated.
  - 1. Annealed Type: ASTM C1036, Type I - Transparent Flat, Class 1 - Clear, Quality - Q3.
  - 2. Kind HS - Heat-Strengthened Type: Complies with ASTM C1048.
  - 3. Kind FT - Fully Tempered Type: Complies with ASTM C1048.
  - 4. Fully Tempered Safety Glass: Complies with ANSI Z97.1 or 16 CFR 1201 criteria for safety glazing used in hazardous locations.

5. Impact Resistant Safety Glass: Complies with ANSI Z97.1 - Class B, or 16 CFR 1201 - Category I criteria.
- B. Laminated Glass: Float glass laminated in accordance with ASTM C1172.
  1. Laminated Safety Glass: Complies with ANSI Z97.1 - Class B or 16 CFR 1201 - Category I impact test requirements.
  2. Polyvinyl Butyral (PVB) Interlayer: 0.060 inch (1.524 mm) thick, minimum.

## 204 INSULATING GLASS UNITS

- A. Manufacturers:
  1. Glass: Any of the manufacturers specified for float glass.
  2. Pilkington North America Inc: [www.pilkington.com/na/#sle](http://www.pilkington.com/na/#sle). Pilkington North America Inc: [www.pilkington.com/na/#sle](http://www.pilkington.com/na/#sle).
  3. Viracon, Apogee Enterprises, Inc: [www.viracon.com/#sle](http://www.viracon.com/#sle).
  4. Vitro Architectural Glass (formerly PPG Glass): [www.vitroglazings.com/#sle](http://www.vitroglazings.com/#sle).
  5. Substitutions: See Section 01 60 00 - Product Requirements.
- B. Fabricator: Certified by glass manufacturer for type of glass, coating, and treatment involved and capable of providing specified warranty.
- C. Insulating Glass Units: Types as indicated.
  1. Durability: Certified by an independent testing agency to comply with ASTM E2190.
  2. Coated Glass: Comply with requirements of ASTM C1376 for pyrolytic (hard-coat) or magnetic sputter vapor deposition (soft-coat) type coatings on flat glass; coated vision glass, Kind CV; coated overhead glass, Kind CO; or coated spandrel glass, Kind CS.
  3. Spacer Color: Black.
  4. Edge Seal:
    - a. Dual-Sealed System: Provide polyisobutylene sealant as primary seal applied between spacer and glass panes, and silicone, polysulfide, or polyurethane sealant as secondary seal applied around perimeter.
    - b. Color: Gray.
  5. Purge interpane space with dry air, hermetically sealed.
- D. Type IG-1 - Insulating Glass Units: Vision glass, double glazed.
  1. Applications: Exterior glazing unless otherwise indicated.
  2. Space between lites filled with air.
  3. Outboard Lite: Annealed float glass, 1/4 inch (6.4 mm) thick, minimum.
    - a. Tint: Clear.
  4. Inboard Lite: Annealed float glass, 1/4 inch (6.4 mm) thick, minimum.
    - a. Tint: Clear.
  5. Total Thickness: 1 inch (25.4 mm).
  6. Thermal Transmittance (U-Value), Summer - Center of Glass: [\_\_\_\_], nominal.
- E. Type IG-5 - Insulating Glass Units: Safety glazing.
  1. Applications:
    - a. Glazed lites in exterior doors.
    - b. Glazed sidelights and panels next to doors.
    - c. Other locations required by applicable federal, state, and local codes and regulations.
    - d. Other locations indicated on drawings.
  2. Space between lites filled with air.
  3. Glass Type: Same as Type IG-1 except use fully tempered float glass for both outboard and inboard lites.
  4. Tint: Clear.
  5. Total Thickness: 1 inch (25.4 mm).
  6. Metal edge spacer.
  7. Thermal Transmittance (U-Value), Summer - Center of Glass: 0.47 , nominal.
  8. Visible Light Transmittance (VLT): 78 percent, nominal.
  9. Solar Heat Gain Coefficient (SHGC): 0.26, nominal.

## 205 BASIS OF DESIGN - INSULATING GLASS UNITS

- A. Basis of Design - Insulating Glass Units: Vision glazing, with low-e coating.
1. Applications: Exterior insulating glass glazing unless otherwise indicated.
  2. Space between lites filled with air.
  3. Total Thickness: 1 inch (25.4 mm).
  4. Thermal Transmittance (U-Value), Summer - Center of Glass: , nominal.
  5. Coated Glass: Comply with requirements of ASTM C1376 for pyrolytic (hard-coat) or magnetic sputter vapor deposition (soft-coat) type coatings on flat glass; coated vision glass, Kind CV; coated overhead glass, Kind CO; or coated spandrel glass, Kind CS.
  6. Spacer Color: Black.
  7. Edge Seal:
    - a. Dual-Sealed System: Provide polyisobutylene sealant as primary seal applied between spacer and glass panes, and silicone, polysulfide, or polyurethane sealant as secondary seal applied around perimeter.
    - b. Single-Sealed System: Provide silicone, polysulfide, or polyurethane sealant as seal applied around perimeter.
  8. Color: Black.
  9. Purge interpane space with dry air, hermetically sealed.
  10. Basis of Design - AGC Glass North America, Inc: [www.agcglass.com/#sle](http://www.agcglass.com/#sle).
    - a. Outboard Lite: Annealed float glass, 1/4 inch (6 mm) thick, minimum.

## 206 GLAZING UNITS

- A. Type G-1 - Monolithic Exterior Vision Glazing:
1. Applications: Exterior glazing unless otherwise indicated.
  2. Glass Type: Fully tempered float glass.
  3. Tint: Clear.
  4. Thickness: 1/4 inch (6.4 mm), nominal.
- B. Type G-2 - Monolithic Interior Vision Glazing:
1. Applications: Interior glazing unless otherwise indicated.
  2. Glass Type: Annealed float glass.
  3. Tint: Clear.
  4. Thickness: 1/4 inch (6.4 mm), nominal.
- C. Type G-3 - Monolithic Safety Glazing: Non-fire-rated.
1. Applications:
    - a. Glazed lites in doors, except fire doors.
    - b. Sliding glass doors.
    - c. Glazed sidelights to doors, except in fire-rated walls and partitions.
    - d. Glazed view windows and panels in partitions enclosing athletic activity rooms, except in fire-rated walls and partitions.
    - e. Other locations required by applicable federal, state, and local codes and regulations.
    - f. Other locations indicated on drawings.
  2. Glass Type: Fully tempered safety glass as specified.
  3. Tint: Clear.
  4. Thickness: 1/4 inch (6.4 mm), nominal.
- D. Type G-5 - Fire-Resistance-Rated Glazing: Type, thickness, and configuration of glazing that contains flame, smoke, and blocks radiant heat, as required to achieve indicated fire-rating period exceeding 45 minutes
1. Applications: Locations as indicated on drawings.
    - a. Glazing in fire-rated door assembly.
    - b. Glazing in fire-rated window assembly.
    - c. Glazing in sidelites, borrowed lites, and other glazed openings in fire-rated wall assemblies.

2. Provide products listed by ITS (DIR) or UL (DIR) and approved by authorities having jurisdiction.
  3. Safety Glazing Certification: 16 CFR 1201 Category II.
  4. Glazing Method: As required for fire rating.
  5. Fire-Rating Period: As indicated on drawings.
  6. Markings for Fire-Resistance-Rated Glazing Assemblies: Provide permanent markings on fire-resistance-rated glazing in compliance with ICC (IBC), local building code, and authorities having jurisdiction.
    - a. "W" - meets wall assembly criteria of ASTM E119 or UL 263 fire test standards.
    - b. "D" - meets fire door assembly criteria of NFPA 252, UL 10B, or UL 10C fire test standards.
    - c. "H" - meets fire door assembly hose stream test of NFPA 252, UL 10B, or UL 10C fire test standards.
    - d. "T" - meets temperature rise of not more than 450 degrees F above ambient at end of 30 minutes fire exposure in accordance with NFPA 252, UL 10B, or UL 10C fire test standards.
    - e. "XXX" - placeholder that represents fire-rating period, in minutes.
  7. Tint: Clear.
- E. Fire-Protection-Rated Glazing: Type, thickness, and configuration of glazing that contains flame, smoke, and does not block radiant heat, as required to achieve fire-doors indicated fire-rating period as indicated on drawings.
1. Applications:
    - a. Glazing in fire-rated door assembly.
    - b. Glazing in fire-rated window assembly.
    - c. Other locations as indicated on drawings.
  2. Provide products listed by ITS (DIR) or UL (DIR) and approved by authorities having jurisdiction.
  3. Safety Glazing Certification: 16 CFR 1201 Category II.
  4. Glazing Method: As required for fire rating.
  5. Fire-Rating Period: As indicated on drawings.
  6. Markings for Fire-Protection-Rated Glazing Assemblies: Provide permanent markings on fire-protection-rated glazing in compliance with ICC (IBC), local building code, and authorities having jurisdiction
    - a. "D" - meets fire door assembly criteria of NFPA 252, UL 10B, or UL 10C fire test standards.
    - b. "OH" - meets fire window assembly criteria including hose stream test of NFPA 257, or UL 9 fire test standards.
    - c. "H" - meets fire door assembly hose stream test of NFPA 252, UL 10B, or UL 10C fire tests standards.
    - d. "XXX" - placeholder that represents fire-rating period, in minutes.
  7. Thickness: As required to meet performance criteria.
  8. Outside Lite: Heat-strengthened glass.
  9. Interlayer, Outboard Side: Polyvinyl butyral (PVB); thickness as required to meet performance criteria.
  10. Middle Lite: Heat-strengthened glass.
  11. Interlayer, Inboard Side: Polyvinyl butyral (PVB); thickness as required to meet performance criteria.
  - 12.
- F. Type G-6 - Hurricane Impact Resistance Glazing: Laminated glass.
1. Applications: Exterior Locations and as indicated on drawings.
  2. Basis of Design: Viracon, Inc.; VLE1-39: [www.viracon.com](http://www.viracon.com)
  3. Thickness: 9/16 inch, minimum.
    - a. Comply with Product Approval of window and storefront manufacturer(s).
  4. Tint: Clear.

5. Low-E Coating: VLE-39
    - a. Tint: Clear
    - b. Outside Lite: Heat-strengthened glass.
  6. Interlayer: Polyvinyl butyral (PVB), thickness as required to meet performance criteria.
  7. Middle Lite: Annealed glass.
  8. Interlayer, Inboard Side: Polyvinyl butyral (PVB), thickness as required to meet performance criteria.
  9. Inside Lite: Heat-strengthened glass.
  10. Performance Criteria:
    - a. Hurricane Impact Resistance: Comply with ASTM E1996 windborne debris requirements for "Enhanced Protection" within Wind Zone 3.
  11. Visible Light Transmittance (VLT): 43 percent, nominal.
  12. Shading Coefficient: 0.30, nominal.
  13. Solar Heat Gain Coefficient (SHGC): 0.25 percent, nominal.
  14. Glazing Method: As required to meet performance criteria
- G. Type G-7- Enhanced Hurricane Impact Resistance Glazing: Laminated glass.  
Applications: All exterior glazing at Hurricane Shelter defined rooms.  
Basis of Design: Viracon, Inc.; VLE1-39: [www.viracon.com](http://www.viracon.com).  
Thickness: 9/16 inch, minimum.  
Comply with Product Approval of window and storefront manufacturer(s).  
Outside Lite: Heat-strengthened glass.
1. Low-E Coating: VLE-39
  2. Tint: Clear
  3. Interlayer: Polyvinyl butyral (PVB), thickness as required to meet performance criteria.
  4. Inside Lite: Heat-strengthened glass.
  5. Tint: Clear
  6. Visible Light Transmittance (VLT): 39 percent, nominal.
  7. Shading Coefficient: 0.35, nominal.
  8. Solar Heat Gain Coefficient (SHGC):0.30 percent, nominal.
  9. Visible Light Reflectance, Outside: 43 percent, nominal.
  10. Glazing Method: As required to meet performance criteria.
- H. Type G-8 - Wired Glass: Flat glass with embedded wire mesh.
1. Applications: Locations as indicated on drawings.
  2. Form: Form 1 - Wired glass, polished both sides; ASTM C1036.
  3. Mesh: M1 - Diamond; ASTM C1036.
  4. Tint: Clear, Class 1.
  5. Glass Type: Annealed.
  6. Thickness: 1/4 inch (6.4 mm), nominal.
  7. Glazing Method: Wet glazing method, compound and compound.

## **207 LAMINATED GLASS INTERLAYERS**

- A. Type LGI-5 - Safety and Security Polyvinyl Butyral (PVB) Interlayer for Laminated Glazing: Computer-based digital imaging system provided on PVB interlayer for placement within laminated glazing.

## **208 ACCESSORIES**

- A. Setting Blocks: Silicone, with 80 to 90 Shore A durometer hardness; ASTM C864 Option II. Length of 0.1 inch for each square foot (25 mm for each square meter) of glazing or minimum 4 inch (100 mm) by width of glazing rabbet space minus 1/16 inch (1.5 mm) by height to suit glazing method and pane weight and area.
- B. Spacer Shims: Neoprene, 50 to 60 Shore A durometer hardness; ASTM C864 Option II. Minimum 3 inch (75 mm) long by one half the height of the glazing stop by thickness to suit application, self adhesive on one face.

- C. Glazing Splines: Resilient silicone extruded shape to suit glazing channel retaining slot; ASTM C864 Option II; color black.
- D. Glazing Clips: Manufacturer's standard type.

### **PART 3 EXECUTION**

#### **301 INSTALLERS**

- A. Installer List:
  - 1. Substitution Limitations: Same as specified for products, see Section 01 60 00 - Product Requirements.

#### **302 VERIFICATION OF CONDITIONS**

- A. Verify that openings for glazing are correctly sized and within tolerances, including those for size, squareness, and offsets at corners.
- B. Verify that the minimum required face and edge clearances are being provided.
- C. Verify that surfaces of glazing channels or recesses are clean, free of obstructions that may impede moisture movement, weeps are clear, and support framing is ready to receive glazing system.

#### **303 INSTALLATION, GENERAL**

- A. Install glazing in compliance with written instructions of glass, gaskets, and other glazing material manufacturers, unless more stringent requirements are indicated, including those in glazing referenced standards.
- B. Install glazing sealants in accordance with ASTM C1193, GANA (SM), and manufacturer's instructions.
- C. Do not exceed edge pressures around perimeter of glass lites as stipulated by glass manufacturer.
- D. Set glass lites of system with uniform pattern, draw, bow, and similar characteristics.
- E. Set glass lites in proper orientation so that coatings face exterior or interior as indicated.

#### **304 CLEANING**

- A. Remove excess glazing materials from finish surfaces immediately after application using solvents or cleaners recommended by manufacturers.
- B. Remove nonpermanent labels immediately after glazing installation is complete.
- C. Clean glass and adjacent surfaces after sealants are fully cured.
- D. Clean glass on both exposed surfaces not more than 4 days prior to Date of Substantial Completion in accordance with glass manufacturer's written recommendations.

#### **305 PROTECTION**

- A. After installation, mark pane with an 'X' by using removable plastic tape or paste; do not mark heat absorbing or reflective glass units.
- B. Remove and replace glass that is damaged during construction period prior to Date of Substantial Completion.

**END OF SECTION 08 80 00**

**SECTION 08 83 00  
MIRRORS**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Glass mirrors.
  - 1. Annealed float glass.
  - 2. Tempered safety glass.

**1.02 RELATED REQUIREMENTS**

- A. Section 10 28 00 - Toilet, Bath, and Laundry Accessories: Metal mirror frames.

**1.03 REFERENCE STANDARDS**

- A. ASTM C1036 - Standard Specification for Flat Glass 2021.
- B. ASTM C1048 - Standard Specification for Heat-Strengthened and Fully Tempered Flat Glass 2018.
- C. ASTM C1193 - Standard Guide for Use of Joint Sealants 2016.
- D. ASTM C1503 - Standard Specification for Silvered Flat Glass Mirror 2018.
- E. GANA (GM) - GANA Glazing Manual 2008.
- F. GANA (SM) - GANA Sealant Manual 2008.

**1.04 SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data on Mirror Types: Submit structural, physical and environmental characteristics, size limitations, special handling and installation requirements.
- C. Warranty: Submit manufacturer warranty and ensure that forms have been completed in Owner's name and registered with manufacturer.

**1.05 QUALITY ASSURANCE**

- A. Perform Work in accordance with GANA (GM), GANA (SM), and vform for glazing installation methods.
- B. Fabricate, store, transport, receive, install, and clean mirrors in accordance with manufacturer's recommendations.

**1.06 FIELD CONDITIONS**

- A. Do not install mirrors when ambient temperature is less than 50 degrees F (10 degrees C).
- B. Maintain minimum ambient temperature before, during and 24 hours after installation of glazing compounds.

**1.07 WARRANTY**

- A. See Section 01 78 00 - Closeout Submittals, for additional warranty requirements.
- B. Provide five year manufacturer warranty for reflective coating on mirrors and replacement of same.

**PART 2 PRODUCTS**

**2.01 MANUFACTURERS**

- A. Mirrors:
  - 1. Bobrick: [www.bobrick.com](http://www.bobrick.com)
  - 2. Lenoir Mirror Co: [www.lenoirmirror.com/#sle](http://www.lenoirmirror.com/#sle).
  - 3. Trulite Glass and Aluminum Solutions: [www.trulite.com/#sle](http://www.trulite.com/#sle).
  - 4. Walker Glass Company Ltd; Walker Glass Mirrors: [www.walkerglass.com/#sle](http://www.walkerglass.com/#sle).
  - 5. Substitutions: See Section 01 60 00 - Product Requirements.

**202 MATERIALS**

- A. Mirror Design Criteria: Select materials and/or provide supports as required to limit mirror material deflection to  $1/200$ , or to the flexure limit of glass, with full recovery of glazing materials, whichever is less.
- B. Mirror Glass A: Clear, annealed float glass; ASTM C1036, with copper and silver coatings, and protective overcoating.
  - 1. Thickness: 1/4 inch (6.4 mm).
  - 2. Edges: Square and lapped.
  - 3. Size: As indicated on drawings.

**END OF SECTION 08 83 00**

## SECTION 08 91 00 LOUVERS

### PART 1 GENERAL

#### 1.01 SECTION INCLUDES

- A. Louvers, frames, and accessories.

#### 1.02 RELATED REQUIREMENTS

- A. Section 07 25 00 - Weather Barriers: Sealing frames to water-resistive barrier installed on adjacent construction.
- B. Section 07 62 00 - Sheet Metal Flashing and Trim.
- C. Section 08 44 13 - Glazed Aluminum Curtain Walls: Prepared openings for louvers.
- D. Section 23 31 00 - HVAC Ducts and Casings: Ductwork attachment to louvers.
- E. Section 23 37 00 - Air Outlets and Inlets: Louvered penthouse.

#### 1.03 REFERENCE STANDARDS

- A. AAMA 611 - Voluntary Specification for Anodized Architectural Aluminum 2020.
- B. AAMA 612 - Voluntary Specification, Performance Requirements, and Test Procedures for Combined Coatings of Anodic Oxide and Transparent Organic Coatings on Architectural Aluminum 2020, with Errata (2022).
- C. AMCA 500-L - Laboratory Methods of Testing Louvers for Rating 2012 (Reapproved 2015).
- D. AMCA 511 - Certified Ratings Program Product Rating Manual for Air Control Devices 2021.
- E. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process 2020.
- F. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes 2021.
- G. ASTM B221M - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes (Metric) 2021.
- H. FEMA P-361 - Safe Rooms for Tornadoes and Hurricanes: Guidance for Community and Residential Safe Rooms 2021.
- I. ICC 500 - ICC/NSSA Standard for the Design and Construction of Storm Shelters 2020.

#### 1.04 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements for submittal procedures.
- B. Product Data: Provide data describing design characteristics, maximum recommended air velocity, design free area, materials and finishes.
- C. Shop Drawings: Indicate louver layout plan and elevations, opening and clearance dimensions, and tolerances; head, jamb and sill details; blade configuration, screens, blank-off areas required, and frames.
- D. Samples: Submit two samples 2 by 2 inches (50 by 50 mm) in size illustrating finish and color of exterior and interior surfaces.
- E. Test Reports: Independent agency reports showing compliance with specified performance criteria.
- F. Maintenance Data: Include lubrication schedules, adjustment requirements.

#### 1.05 WARRANTY

- A. See Section 01 78 00 - Closeout Submittals for additional warranty requirements.
- B. Provide five year manufacturer's warranty against distortion, metal degradation, and connection failures of louver components.
  - 1. Finish: Include twenty year coverage against degradation of exterior finish.

## **PART 2 PRODUCTS**

### **201 MANUFACTURERS**

- A. Louvers:
1. Airline Louvers: [www.airlinelouvers.com/#sle](http://www.airlinelouvers.com/#sle).
  2. Airolite Company, LLC: [www.airolite.com/#sle](http://www.airolite.com/#sle).
  3. Construction Specialties, Inc; Acoustical Louver: [www.c-sgroup.com/#sle](http://www.c-sgroup.com/#sle).
  4. NCA, a brand of Metal Industries Inc: [www.ncamfg.com/#sle](http://www.ncamfg.com/#sle).
  5. Ruskin: [www.ruskin.com/#sle](http://www.ruskin.com/#sle).
  6. Greenheck: [www.greenheck.com](http://www.greenheck.com)

### **202 LOUVERS**

- A. Louvers: Factory fabricated and assembled, complete with frame, mullions, and accessories; AMCA Certified in accordance with AMCA 511.
1. Wind Load Resistance: Design to resist positive and negative wind load of 25 psf (of 1.2 kPa) without damage or permanent deformation.
  2. High-Velocity Wind Load Resistance: Design to comply with applicable requirements of ICC 500 and FEMA P-361, including resistance to horizontal debris impact.
  3. Intake Louvers: Design to allow maximum of 0.01 oz/sq ft (3.1 g/sq m) water penetration at calculated intake design velocity based on design air flow and actual free area, when tested in accordance with AMCA 500-L.
  4. Screens: Provide insect screens at intake louvers and bird screens at exhaust louvers.
- B. Louvers: Aluminum outer frames, louver end frames only, non-thermally broken, air ventilator with overlapping louvers.
1. Frame: extruded aluminum.
- C. Stationary Louvers: Horizontal blade, formed galvanized steel sheet construction, with intermediate mullions matching frame.
1. Free Area: 50 percent, minimum.
  2. Blades: V-shaped, sight-proof.
  3. Frame: 4 inches deep (100 mm deep), channel profile; corner joints mitered and , with continuous recessed caulking channel each side.
  4. Aluminum Thickness: Frame 12 gauge, 0.0808 inch (2.05 mm) minimum; blades 12 gauge, 0.0808 inch (2.05 mm) minimum.
  5. Steel Finish: Superior performing organic coating, finished after fabrication.

### **203 MATERIALS**

- A. Extruded Aluminum: ASTM B221 (ASTM B221M).
- B. Steel Sheet: Hot-dipped galvanized steel sheet, ASTM A653/A653M, with G90/Z275 coating.

### **204 FINISHES**

### **205 ACCESSORIES**

- A. Blank-Off Panels: Aluminum face and back sheets, polyisocyanurate foam core, 1-1/2 inch (38 mm) thick, painted black on exterior side; provide where duct connected to louver is smaller than louver frame, sealing off louver area outside duct.
- B. Screens: Frame of same material as louver, with reinforced corners; removable, screw attached; installed on inside face of louver frame.
- C. Bird Screen: Interwoven wire mesh of aluminum, 14 gauge, 0.0641 inch (1.63 mm) diameter wire, 1/2 inch (13 mm) open weave, diagonal design.
- D. Fasteners and Anchors: Stainless steel.
- E. Flashings: Of same material as louver frame, formed to required shape, single length in one piece per location.
- F. Head and Sill Flashings: See Section 07 62 00.
- G. Sealant for Setting Sills and Sill Flashing: Non-curing butyl type.

**PART 3 EXECUTION**

**301 EXAMINATION**

- A. Verify that prepared openings and flashings are ready to receive this work and opening dimensions are as indicated on shop drawings.

**302 INSTALLATION**

- A. Install louver assembly in accordance with manufacturer's instructions.
- B. Install louvers level and plumb.
- C. Install flashings and align louver assembly to ensure moisture shed from flashings and diversion of moisture to exterior.
- D. Secure louver frames in openings with concealed fasteners.
- E. Coordinate with installation of mechanical ductwork.

**303 CLEANING**

- A. Strip protective finish coverings.
- B. Clean surfaces and components.

**END OF SECTION 08 91 00**

**SECTION 09 21 16  
GYPSUM BOARD ASSEMBLIES**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Performance criteria for gypsum board assemblies.
- B. Metal stud wall framing.
- C. Metal channel ceiling framing.
- D. Resilient sound isolation clips.
- E. Acoustic insulation.
- F. Gypsum sheathing.
- G. Cementitious backing board.
- H. Gypsum wallboard.
- I. Joint treatment and accessories.
- J. Water-resistive barrier over exterior wall sheathing.
- K. Acoustic (sound-dampening) wall and ceiling board.
- L. Bullet resistant sheathing and wallboard.

**1.02 RELATED REQUIREMENTS**

- A. Section 06 10 00 - Rough Carpentry: Building framing and sheathing.
- B. Section 06 10 00 - Rough Carpentry: Wood blocking product and execution requirements.
- C. Section 07 84 00 - Firestopping: Top-of-wall assemblies at fire-resistance-rated walls.
- D. Section 07 92 00 - Joint Sealants: Sealing acoustical gaps in construction other than gypsum board or plaster work.
- E. Section 09 30 00 - Tiling: Tile backing board.
- F. Section 31 31 16 - Termite Control: Field-applied termiticide and mildewcide for metal framing.

**1.03 REFERENCE STANDARDS**

- A. AISI S100 - North American Specification for the Design of Cold-Formed Steel Structural Members 2016, with Supplement (2020).
- B. ANSI A108.11 - American National Standard Specifications for Interior Installation of Cementitious Backer Units 2018.
- C. ANSI A118.9 - American National Standard Specifications for Test Methods and Specifications for Cementitious Backer Units 2019.
- D. ASTM A36/A36M - Standard Specification for Carbon Structural Steel 2019.
- E. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process 2020.
- F. ASTM A1003/A1003M - Standard Specification for Steel Sheet, Carbon, Metallic- and Nonmetallic-Coated for Cold-Formed Framing Members 2015.
- G. ASTM C208 - Standard Specification for Cellulosic Fiber Insulating Board 2022.
- H. ASTM C475/C475M - Standard Specification for Joint Compound and Joint Tape for Finishing Gypsum Board 2017 (Reapproved 2022).
- I. ASTM C645 - Standard Specification for Nonstructural Steel Framing Members 2018.
- J. ASTM C665 - Standard Specification for Mineral-Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing 2017.
- K. ASTM C754 - Standard Specification for Installation of Steel Framing Members to Receive Screw-Attached Gypsum Panel Products 2020.

- L. ASTM C840 - Standard Specification for Application and Finishing of Gypsum Board 2020.
- M. ASTM C954 - Standard Specification for Steel Drill Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Steel Studs from 0.033 in. (0.84 mm) to 0.112 in. (2.84 mm) in Thickness 2022.
- N. ASTM C1002 - Standard Specification for Steel Self-Piercing Tapping Screws for Application of Gypsum Panel Products or Metal Plaster Bases to Wood Studs or Steel Studs 2022.
- O. ASTM C1047 - Standard Specification for Accessories for Gypsum Wallboard and Gypsum Veneer Base 2019.
- P. ASTM C1177/C1177M - Standard Specification for Glass Mat Gypsum Substrate for Use as Sheathing 2017.
- Q. ASTM C1178/C1178M - Standard Specification for Coated Glass Mat Water-Resistant Gypsum Backing Panel 2018.
- R. ASTM C1280 - Standard Specification for Application of Exterior Gypsum Panel Products for Use as Sheathing 2018.
- S. ASTM C1288 - Standard Specification for Fiber-Cement Interior Substrate Sheets 2017.
- T. ASTM C1325 - Standard Specification for Fiber-Mat Reinforced Cementitious Backer Units 2022.
- U. ASTM C1396/C1396M - Standard Specification for Gypsum Board 2017.
- V. ASTM C1629/C1629M - Standard Classification for Abuse-Resistant Nondecorated Interior Gypsum Panel Products and Fiber-Reinforced Cement Panels 2019.
- W. ASTM C1658/C1658M - Standard Specification for Glass Mat Gypsum Panels 2019, with Editorial Revision (2020).
- X. ASTM D3273 - Standard Test Method for Resistance to Growth of Mold on the Surface of Interior Coatings in an Environmental Chamber 2021.
- Y. ASTM E90 - Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements 2009 (Reapproved 2016).
- Z. ASTM E119 - Standard Test Methods for Fire Tests of Building Construction and Materials 2020.
- AA. ASTM E413 - Classification for Rating Sound Insulation 2022.
- BB. ASTM G21 - Standard Practice for Determining Resistance of Synthetic Polymeric Materials to Fungi 2015, with Editorial Revision (2021).
- CC. GA-216 - Application and Finishing of Gypsum Panel Products 2021.
- DD. GA-226 - Application of Gypsum Board to Form Curved Surfaces 2019.
- EE. GA-600 - Fire Resistance and Sound Control Design Manual 2021.
- FF. ICC (IBC) - International Building Code Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- GG. SMACNA (DCS) - HVAC Duct Construction Standards Metal and Flexible 2021.
- HH. UL (FRD) - Fire Resistance Directory Current Edition.
- II. UL 94 - Tests for Flammability of Plastic Materials for Parts in Devices and Appliances Current Edition, Including All Revisions.
- JJ. UL 723 - Standard for Test for Surface Burning Characteristics of Building Materials Current Edition, Including All Revisions.

#### **1.04 SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements for submittal procedures.
- B. Shop Drawings: Indicate special details associated with fireproofing and acoustic seals.

- C. Product Data: Provide data on metal framing, gypsum board, accessories, and joint finishing system.
- D. Product Data: Provide manufacturer's data on partition head to structure connectors, showing compliance with requirements.
- E. Samples: Submit two samples of predecorated gypsum board, 12 by 12 inches (300 by 300 mm) in size, illustrating finish color and texture.
- F. Samples: Submit two samples of gypsum board finished with proposed texture application, 12 by 12 inches (300 by 300 mm) in size, illustrating finish color and texture.
- G. Installer's Qualification Statement.

#### **1.05 QUALITY ASSURANCE**

- A. Installer Qualifications: Company specializing in performing gypsum board installation and finishing.

### **PART 2 PRODUCTS**

#### **201 GYPSUM BOARD ASSEMBLIES**

- A. Provide completed assemblies complying with ASTM C840 and GA-216.
  - 1. See PART 3 for finishing requirements.
- B. Interior Partitions, Indicated as Sound-Rated: Provide completed assemblies with the following characteristics:
  - 1. Acoustic Attenuation: STC of 45-49 calculated in accordance with ASTM E413, based on tests conducted in accordance with ASTM E90.
- C. Shaft Walls at HVAC Shafts: Provide completed assemblies with the following characteristics:
  - 1. Air Pressure Within Shaft: Sustained loads of 5 lbf/sq ft (0.24 kPa) with maximum mid-span deflection of L/240.
  - 2. Acoustic Attenuation: STC of 35-39 calculated in accordance with ASTM E413, based on tests conducted in accordance with ASTM E90.
- D. Shaft Walls at Elevator Shafts: Provide completed assemblies with the following characteristics:
  - 1. Air Pressure Within Shaft: Intermittent loads of 5 lbf/sq ft (0.24 kPa) with maximum mid-span deflection of L/240.
  - 2. Acoustic Attenuation: STC of 35-39 calculated in accordance with ASTM E413, based on tests conducted in accordance with ASTM E90.
- E. Fire-Resistance-Rated Assemblies: Provide completed assemblies with the following characteristics:
  - 1. Fire-Resistance-Rated Area Separation Walls: Comply with UL Assembly No.
  - 2. ICC IBC Item Numbers: Comply with applicable requirements of ICC IBC for the particular assembly.
  - 3. Gypsum Association File Numbers: Comply with requirements of GA-600 for the particular assembly.
  - 4. UL Assembly Numbers: Provide construction equivalent to that listed for the particular assembly in the current UL (FRD).

#### **202 METAL FRAMING MATERIALS**

- A. Manufacturers - Metal Framing, Connectors, and Accessories:
  - 1. ClarkDietrich: [www.clarkdietrich.com/#sle](http://www.clarkdietrich.com/#sle).
  - 2. Jaimes Industries: [www.jaimesind.com/#sle](http://www.jaimesind.com/#sle).
  - 3. Marino: [www.marinoware.com/#sle](http://www.marinoware.com/#sle).
  - 4. R-stud, LLC: [www.rstud.com/#sle](http://www.rstud.com/#sle).
  - 5. Phillips Manufacturing Co: [www.phillipsmfg.com/#sle](http://www.phillipsmfg.com/#sle).
  - 6. SCAFCO Corporation: [www.scafco.com/#sle](http://www.scafco.com/#sle).
  - 7. Substitutions: See Section 01 60 00 - Product Requirements.
- B. General Requirements:

1. Use studs, tracks, runners, and accessories formed from steel having a minimum G-90 galvanized coating.
  2. May use steel having a minimum G-40 galvanized coating for interior studs, channels, and accessories, which are not in contact or anchored to concrete or masonry.
- C. Non-structural Framing System Components: ASTM C645; galvanized sheet steel, of size and properties necessary to comply with ASTM C754 for the spacing indicated, with maximum deflection of wall framing of L/120 at 5 psf (L/120 at 240 Pa).
1. Studs: C-shaped with knurled or embossed faces.
    - a. Products:
      - 1) Super Stud Building Products, Inc; The EDGE: [www.buysuperstud.com/#sle](http://www.buysuperstud.com/#sle).
      - 2) Substitutions: See Section 01 60 00 - Product Requirements.
    2. Paired Studs for Sound-Rated Assemblies: Engineered single-piece assemblies comprised of paired studs coupled by sound isolators, designed to replace conventional side-by-side, parallel, double-wall partition framing.
      - a. Widths: As indicated on drawings.
      - b. Products:
        - 1) SCAFECO Corporation; SoundGuard Silent Steel Framing System: [www.scafco.com/#sle](http://www.scafco.com/#sle).
        - 2) Substitutions: See Section 01 60 00 - Product Requirements.
    3. Runners: U shaped, sized to match studs.
    4. Ceiling Channels: C-shaped.
    5. Furring Members: Hat-shaped sections, minimum depth of 7/8 inch (22 mm).
    6. Resilient Furring Channels: Single or double leg configuration; 1/2 inch (12 mm) channel depth.
      - a. Products:
        - 1) Same manufacturer as other framing materials.
        - 2) ClarkDietrich; RC Deluxe Resilient Channel: [www.clarkdietrich.com/#sle](http://www.clarkdietrich.com/#sle).
        - 3) Phillips Manufacturing Co; RC-2 Resilient Sound Channel: [www.phillipsmfg.com/#sle](http://www.phillipsmfg.com/#sle).
        - 4) Substitutions: See Section 01 60 00 - Product Requirements.
    7. Resilient Sound Isolation Clips: Steel resilient clips with molded rubber isolators, attaches to framing; improves noise isolation performance of wall and floor-ceiling assemblies.
      - a. Products:
        - 1) ClarkDietrich; Sound Clip (CDSC): [www.clarkdietrich.com/#sle](http://www.clarkdietrich.com/#sle).
        - 2) Keene Building Products; Cylent Assurance Clip: [www.keenebuilding.com/#sle](http://www.keenebuilding.com/#sle).
        - 3) Substitutions: See Section 01 60 00 - Product Requirements.
    8. Sill Plate Isolation Pads: Acoustical separation between sole plate and subfloor.
      - a. Products:
        - 1) AcoustiGuard – WILREP LTD; Iso-Sill Rubber Isolation Pad: [www.acoustiguard.com/#sle](http://www.acoustiguard.com/#sle).
        - 2) Substitutions: See Section 01 60 00 - Product Requirements.
  - D. Shaft Wall Studs and Accessories: ASTM C645; galvanized sheet steel, of size and properties necessary to comply with ASTM C754 and specified performance requirements.
    1. Products:
      - a. Same manufacturer as other framing materials.
  - E. Partition Head to Structure Connections: Provide mechanical anchorage devices that accommodate deflection using slotted holes, screws, and anti-friction bushings, preventing rotation of studs while maintaining structural performance of partition.
    1. Structural Performance: Maintain lateral load resistance and vertical movement capacity required by applicable code, when evaluated in accordance with AISI S100.
    2. Material: ASTM A653/A653M steel sheet, SS Grade 50/340, with G60/Z180 hot-dipped galvanized coating.
    3. Provide components UL-listed for use in UL-listed fire-resistance-rated head of partition joint systems indicated on drawings.

4. Provide mechanical anchorage devices as described above that accommodate deflection while maintaining the fire-resistance rating of the wall assembly.
  - a. Products:
    - 1) ClarkDietrich; BlazeFrame RipTrak: [www.clarkdietrich.com/#sle](http://www.clarkdietrich.com/#sle).
    - 2) FireTrak Corporation; Posi Klip: [www.fire-trak.com/#sle](http://www.fire-trak.com/#sle).
    - 3) Metal-Lite, Inc; The System: [www.metal-lite.net/#sle](http://www.metal-lite.net/#sle).
    - 4) Super Stud Building Products, Inc; Slotted Deflection Track: [www.buysuperstud.com/#sle](http://www.buysuperstud.com/#sle).
    - 5) Substitutions: See Section 01 60 00 - Product Requirements.
- F. Non-structural Framing Accessories:
  1. Ceiling Hangers: Type and size as specified in ASTM C754 for spacing required.
  2. Partial Height Wall Framing Support: Provides stud reinforcement and anchored connection to floor.
    - a. Materials: ASTM A36/A36M formed sheet steel support member with factory-welded ASTM A1003/A1003M steel plate base.
    - b. Products:
      - 1) ClarkDietrich; Pony Wall (PW): [www.clarkdietrich.com/#sle](http://www.clarkdietrich.com/#sle).
      - 2) Substitutions: See Section 01 60 00 - Product Requirements.
  3. Framing Connectors: ASTM A653/A653M G90 galvanized steel clips; secures cold rolled channel to wall studs for lateral bracing.
    - a. Products:
      - 1) ClarkDietrich; FastBridge Clip (FB33): [www.clarkdietrich.com/#sle](http://www.clarkdietrich.com/#sle).
      - 2) Substitutions: See Section 01 60 00 - Product Requirements.
- G. Grid Suspension Systems: Steel grid system of main tees and support bars connected to structure using hanging wire.
  1. Products:
    - a. USG Corporation; Drywall Suspension System: [www.usg.com/#sle](http://www.usg.com/#sle).
    - b. Substitutions: See Section 01 60 00 - Product Requirements.

## 203 BOARD MATERIALS

- A. Manufacturers - Gypsum-Based Board:
  1. American Gypsum Company: [www.americangypsum.com/#sle](http://www.americangypsum.com/#sle).
  2. CertainTeed Corporation: [www.certainteed.com/#sle](http://www.certainteed.com/#sle).
  3. Continental Building Products: [www.continental-bp.com/#sle](http://www.continental-bp.com/#sle).
  4. Georgia-Pacific Gypsum: [www.gpgypsum.com/#sle](http://www.gpgypsum.com/#sle).
  5. National Gypsum Company: [www.nationalgypsum.com/#sle](http://www.nationalgypsum.com/#sle).
  6. USG Corporation: [www.usg.com/#sle](http://www.usg.com/#sle).
  7. Substitutions: See Section 01 60 00 - Product Requirements.
- B. Gypsum Wallboard: Paper-faced gypsum panels as defined in ASTM C1396/C1396M; sizes to minimize joints in place; ends square cut.
  1. Application: Use for vertical surfaces and ceilings, unless otherwise indicated.
  2. Mold Resistance: Score of 10, when tested in accordance with ASTM D3273.
    - a. Mold-resistant board is required whenever board is being installed before the building is enclosed and conditioned.
    - b. Mold resistant board is required at all locations.
  3. At Assemblies Indicated with Fire-Resistance Rating: Use type required by indicated tested assembly; if no tested assembly is indicated, use Type X board, UL or WH listed.
  4. Thickness:
    - a. Vertical Surfaces: 5/8 inch (16 mm).
    - b. Ceilings: 5/8 inch (16 mm).
    - c. Multi-Layer Assemblies: Thicknesses as indicated on drawings.
  5. Mold Resistant Paper Faced Products:
    - a. American Gypsum Company; M-Bloc: [www.americangypsum.com/#sle](http://www.americangypsum.com/#sle).
    - b. American Gypsum Company; M-Bloc Type X: [www.americangypsum.com/#sle](http://www.americangypsum.com/#sle).

- c. American Gypsum Company; M-Bloc Type C: [www.americangypsum.com/#sle](http://www.americangypsum.com/#sle).
  - d. Continental Building Products; Mold Defense: [www.continental-bp.com/#sle](http://www.continental-bp.com/#sle).
  - e. Continental Building Products; Mold Defense Type X: [www.continental-bp.com/#sle](http://www.continental-bp.com/#sle).
  - f. Georgia-Pacific Gypsum; ToughRock Mold-Guard: [www.gpgypsum.com/#sle](http://www.gpgypsum.com/#sle).
  - g. Georgia-Pacific Gypsum; ToughRock Fireguard X Mold-Guard:  
[www.gpgypsum.com/#sle](http://www.gpgypsum.com/#sle).
  - h. National Gypsum Company; Gold Bond XP Gypsum Board:  
[www.nationalgypsum.com/#sle](http://www.nationalgypsum.com/#sle).
  - i. National Gypsum Company; Gold Bond 3/4" Ultra-Shield FS XP Gypsum Board:  
[www.nationalgypsum.com/#sle](http://www.nationalgypsum.com/#sle).
  - j. USG Corporation; USG Sheetrock Brand EcoSmart Panels Mold Tough Firecode X:  
[www.usg.com/#sle](http://www.usg.com/#sle).
  - k. Substitutions: See Section 01 60 00 - Product Requirements.
6. Glass Mat Faced Products:
- a. Continental Building Products; Weather Defense Platinum Interior: [www.continental-bp.com/#sle](http://www.continental-bp.com/#sle).
  - b. Continental Building Products; Weather Defense Platinum Interior Type X:  
[www.continental-bp.com/#sle](http://www.continental-bp.com/#sle).
  - c. Georgia-Pacific Gypsum; DensArmor Plus: [www.gpgypsum.com/#sle](http://www.gpgypsum.com/#sle).
  - d. Georgia-Pacific Gypsum; DensArmor Plus Fireguard C: [www.gpgypsum.com/#sle](http://www.gpgypsum.com/#sle).
  - e. National Gypsum Company; Gold Bond eXP Interior Extreme Gypsum Panel:  
[www.nationalgypsum.com/#sle](http://www.nationalgypsum.com/#sle).
  - f. National Gypsum Company; Gold Bond eXP Fire-Shield Interior Extreme Gypsum  
Panel: [www.nationalgypsum.com/#sle](http://www.nationalgypsum.com/#sle).
  - g. USG Corporation; USG Sheetrock Brand Glass-Mat Panels Mold Tough.
  - h. Substitutions: See Section 01 60 00 - Product Requirements.
- C. Abuse Resistant Wallboard:
- 1. Application: Lobbies, Corridors, Assembly areas, and where indicated in Drawings.
  - 2. Surface Abrasion: Level 2, minimum, when tested in accordance with ASTM C1629/C1629M.
  - 3. Indentation: Level 1, minimum, when tested in accordance with ASTM C1629/C1629M.
  - 4. Soft Body Impact: Level 1, minimum, when tested in accordance with ASTM C1629/C1629M.
  - 5. Mold Resistance: Score of 10, when tested in accordance with ASTM D3273.
  - 6. Glass Mat-Faced Type: Gypsum wallboard, as defined in ASTM C1658/C1658M.
  - 7. Type: Fire-resistance-rated Type X, UL or WH listed.
  - 8. Thickness: 5/8 inch (16 mm).
  - 9. Edges: Tapered.
  - 10. Paper-Faced Products:
    - a. American Gypsum Company; M-Bloc AR Type X: [www.americangypsum.com/#sle](http://www.americangypsum.com/#sle).
    - b. CertainTeed Corporation; Extreme Abuse Resistant Drywall with M2Tech:  
[www.certainteed.com/#sle](http://www.certainteed.com/#sle).
    - c. Georgia-Pacific Gypsum; ToughRock Fireguard X Mold Guard Abuse-Resistant:  
[www.gpgypsum.com/#sle](http://www.gpgypsum.com/#sle).
    - d. National Gypsum Company; Gold Bond Hi-Abuse XP Gypsum Board:  
[www.nationalgypsum.com/#sle](http://www.nationalgypsum.com/#sle).
    - e. USG Corporation; USG Sheetrock Brand Mold Tough AR Firecode X Panels:  
[www.usg.com/#sle](http://www.usg.com/#sle).
    - f. Substitutions: See Section 01 60 00 - Product Requirements.
- D. Impact Resistant Wallboard:
- 1. Application: High-traffic areas indicated.
  - 2. Surface Abrasion: Level 3, minimum, when tested in accordance with ASTM C1629/C1629M.
  - 3. Indentation: Level 1, minimum, when tested in accordance with ASTM C1629/C1629M.

4. Mold Resistance: Score of 10, when tested in accordance with ASTM D3273.
5. Type: Fire-resistance-rated Type X, UL or WH listed.
6. Thickness: 5/8 inch (16 mm).
7. Edges: Tapered.
8. Paper-Faced Products:
  - a. American Gypsum Company; M-Bloc IR Type X: [www.americangypsum.com/#sle](http://www.americangypsum.com/#sle).
  - b. CertainTeed Corporation; Extreme Impact Resistant Drywall with M2Tech: [www.certainteed.com/#sle](http://www.certainteed.com/#sle).
  - c. Continental Building Products; Protecta HIR 300 Type X with Mold Defense: [www.continental-bp.com/#sle](http://www.continental-bp.com/#sle).
  - d. National Gypsum Company; Gold Bond Hi-Impact XP Gypsum Board: [www.nationalgypsum.com/#sle](http://www.nationalgypsum.com/#sle).
  - e. USG Corporation; USG Sheetrock Brand Mold Tough VHI Firecode X Panels: [www.usg.com/#sle](http://www.usg.com/#sle).
  - f. Substitutions: See Section 01 60 00 - Product Requirements.
- E. Backing Board For Wet Areas: One of the following products:
  1. Application: Surfaces behind tile in ALL wet areas including tub and shower surrounds and shower ceilings, kitchen sinks backsplashes and surrounding areas.
  2. Mold Resistance: Score of 10, when tested in accordance with ASTM D3273.
  3. ANSI Cement-Based Board: Non-gypsum-based; aggregated Portland cement panels with glass fiber mesh embedded in front and back surfaces complying with ANSIA118.9 or ASTM C1325.
    - a. Thickness: 1/2 inch (12.7 mm).
    - b. Products:
      - 1) National Gypsum Company; PermaBase Cement Board: [www.nationalgypsum.com/#sle](http://www.nationalgypsum.com/#sle).
      - 2) USG Corporation: [www.usg.com/#sle](http://www.usg.com/#sle).
      - 3) Substitutions: See Section 01 60 00 - Product Requirements.
  4. ASTM Cement-Based Board: Non-gypsum-based, cementitious board complying with ASTM C1288.
    - a. Thickness: 1/2 inch (12.7 mm).
    - b. Products:
- F. Backing Board For Non-Wet Areas: Water-resistant gypsum backing board as defined in ASTM C1396/C1396M; sizes to minimum joints in place; ends square cut.
  1. Application: Vertical surfaces behind thinset tile, except in wet areas.
  2. Mold Resistance: Score of 10, when tested in accordance with ASTM D3273.
  3. At Assemblies Indicated with Fire-Resistance Rating: Use type required by indicated tested assembly; if no tested assembly is indicated, use Type X board, UL or WH listed.
  4. Type: Regular and Type X, in locations indicated.
  5. Type X Thickness: 5/8 inch (16 mm).
  6. Type C Thickness: 1/2 inch (13 mm).
  7. Regular Board Thickness: 1/2 inch (13 mm).
  8. Edges: Tapered.
  9. Products:
    - a. American Gypsum Company; M-Bloc: [www.americangypsum.com/#sle](http://www.americangypsum.com/#sle).
    - b. American Gypsum Company; M-Bloc Type X: [www.americangypsum.com/#sle](http://www.americangypsum.com/#sle).
    - c. Georgia-Pacific Gypsum; ToughRock Mold-Guard Gypsum Board: [www.gpgypsum.com/#sle](http://www.gpgypsum.com/#sle).
    - d. Georgia-Pacific Gypsum; DensArmor Plus: [www.gpgypsum.com/#sle](http://www.gpgypsum.com/#sle).
    - e. National Gypsum Company; Gold Bond XP Gypsum Board: [www.nationalgypsum.com/#sle](http://www.nationalgypsum.com/#sle).
    - f. Substitutions: See Section 01 60 00 - Product Requirements.
- G. Ceiling Board: Special sag resistant gypsum ceiling board as defined in ASTM C1396/C1396M; sizes to minimize joints in place; ends square cut.

1. Application: Ceilings, unless otherwise indicated.
  2. Thickness: 1/2 inch (13 mm).
  3. Edges: Tapered.
  4. Products:
    - a. CertainTeed Corporation; Interior Ceiling Drywall: [www.certainteed.com/#sle](http://www.certainteed.com/#sle).
    - b. Continental Building Products; Sagcheck: [www.continental-bp.com/#sle](http://www.continental-bp.com/#sle).
    - c. USG Corporation; 1/2 Inch Sheetrock Brand UltraLight Panels: [www.usg.com/#sle](http://www.usg.com/#sle).
    - d. Substitutions: See Section 01 60 00 - Product Requirements.
- H. Acoustical Sound Dampening Wall and Ceiling Board: Two layers of heavy paper-faced, high-density gypsum board separated by a viscoelastic polymer layer and capable of achieving STC rating of 50 or more in typical stud wall assemblies as calculated in accordance with ASTM E413 and when tested in accordance with ASTM E90.
1. Thickness: 1/2 inch (13 mm).
  2. Long Edges: Tapered.
  3. Mold Resistance: Score of 10, when tested in accordance with ASTM D3273.
  4. Products:
    - a. CertainTeed Corporation; SilentFX Quick Cut Gypsum Board: [www.certainteed.com/#sle](http://www.certainteed.com/#sle).
    - b. CertainTeed Corporation; SilentFX Quick Cut Type X Gypsum Board: [www.certainteed.com/#sle](http://www.certainteed.com/#sle).
    - c. National Gypsum Company; Gold Bond SoundBreak XP Gypsum Board: [www.nationalgypsum.com/#sle](http://www.nationalgypsum.com/#sle).
    - d. Substitutions: See Section 01 60 00 - Product Requirements.
- I. Acoustical Fiberboard: ASTM C208 cellulosic fiberboard without facing or coating; square edged.
1. Thickness: 1/2 inch (13 mm).
  2. In 1-Hour Fire-Resistance-Rated Partitions: UL listed for assembly used.
  3. Products:
    - a. Substitutions: See Section 01 60 00 - Product Requirements.
- J. Exterior Sheathing Board: Sizes to minimize joints in place; ends square cut.
1. Application: Exterior sheathing, unless otherwise indicated.
  2. Mold Resistance: Score of 10, when tested in accordance with ASTM D3273.
  3. Fungal Resistance: No fungal growth when tested in accordance with ASTM G21.
  4. Glass Mat Faced Sheathing: Glass mat faced gypsum substrate as defined in ASTM C1177/C1177M.
  5. Paper-Faced Sheathing: Gypsum sheathing board as defined in ASTM C1396/C1396M, moisture-resistant type with water repellent paper faces.
  6. At Assemblies Indicated with Fire-Resistance Rating: Use type required by indicated tested assembly; if no tested assembly is indicated, use Type X board, UL or WH listed.
  7. Core Type: Regular.
  8. Core Type: Regular and Type X, as indicated.
  9. Type X Thickness: 5/8 inch (16 mm).
  10. Regular Board Thickness: 1/2 inch (13 mm).
  11. Edges: Square.
  12. Glass Mat Faced Products:
    - a. American Gypsum Company; M-Glass Exterior Sheathing Type X: [www.americangypsum.com/#sle](http://www.americangypsum.com/#sle).
    - b. CertainTeed Corporation; GlasRoc 1/2" Exterior Sheathing: [www.certainteed.com/#sle](http://www.certainteed.com/#sle).
    - c. Continental Building Products; Weather Defense Platinum Exterior Sheathing Type X: [www.continental-bp.com/#sle](http://www.continental-bp.com/#sle).
    - d. Georgia-Pacific Gypsum; DensGlass Sheathing: [www.gpgypsum.com/#sle](http://www.gpgypsum.com/#sle).
    - e. USG Corporation; USG Securock Brand Ultralight Glass-Mat Sheathing: [www.usg.com/#sle](http://www.usg.com/#sle).

- f. USG Corporation; USG Securock Brand Ultralight Glass-Mat Sheathing Firecode X: [www.usg.com/#sle](http://www.usg.com/#sle).
  - g. Substitutions: See Section 01 60 00 - Product Requirements.
- K. Exterior Soffit Board: Exterior gypsum soffit board as defined in ASTM C1396/C1396M; sizes to minimize joints in place; ends square cut.
- 1. Application: Ceilings and soffits in protected exterior areas, unless otherwise indicated.
  - 2. At Assemblies Indicated with Fire-Resistance Rating: Use type required by indicated tested assembly; if no tested assembly is indicated, use Type X.
  - 3. Types: Regular and Type X, in locations indicated.
  - 4. Type X Thickness: 5/8 inch (16 mm).
  - 5. Type C Thickness: 5/8 inch (16 mm).
  - 6. Regular Type Thickness: 1/2 inch (13 mm).
  - 7. Edges: Tapered.
  - 8. Products:
    - a. American Gypsum Company; Exterior Soffit Gypsum Wallboard Type X: [www.americangypsum.com/#sle](http://www.americangypsum.com/#sle).
    - b. Continental Building Products; Soffitboard Type C: [www.continental-bp.com/#sle](http://www.continental-bp.com/#sle).
    - c. Continental Building Products; Soffitboard Type X.
    - d. Georgia-Pacific Gypsum; ToughRock Fireguard C SoffitBoard: [www.gpgypsum.com/#sle](http://www.gpgypsum.com/#sle).
    - e. Substitutions: See Section 01 60 00 - Product Requirements.
- L. Shaftwall and Coreboard: Type X; 1 inch (25 mm) thick by 24 inches (610 mm) wide, beveled long edges, ends square cut.
- 1. Paper-Faced Type: Gypsum shaftliner board or gypsum coreboard as defined ASTM C1396/C1396M; water-resistant faces.
  - 2. Glass Mat Faced Type: Glass mat shaftliner gypsum panel or glass mat coreboard gypsum panel as defined in ASTM C1658/C1658M.
  - 3. Mold Resistance: Score of 10, when tested in accordance with ASTM D3273.
  - 4. Paper-Faced Products:
    - a. American Gypsum Company; M-Bloc Shaft Liner: [www.americangypsum.com/#sle](http://www.americangypsum.com/#sle).
    - b. CertainTeed Corporation; M2Tech Type X Shaftliner: [www.certainteed.com/#sle](http://www.certainteed.com/#sle).
    - c. Georgia-Pacific Gypsum; ToughRock Shaftliner: [www.gpgypsum.com/#sle](http://www.gpgypsum.com/#sle).
    - d. National Gypsum Company; Gold Bond Fire-Shield Shaftliner XP: [www.nationalgypsum.com/#sle](http://www.nationalgypsum.com/#sle).
    - e. Substitutions: See Section 01 60 00 - Product Requirements.

## 204 GYPSUM WALLBOARD ACCESSORIES

- A. Acoustic Insulation: ASTM C665; preformed glass fiber, friction fit type, unfaced. Thickness: .
- B. Acoustical Shielding: Recycled ethylene vinyl acetate (EVA) sheet membrane; applied between studs and gypsum board.
- 1. Sound Transmission Class (STC): Minimum of 25, calculated in accordance with ASTM E413, based on tests conducted in accordance with ASTM E90.
  - 2. Fire Resistance: Where fire-resistance rating is specified for the wall in which the acoustical shielding membrane is mounted, provide assemblies that have been tested in accordance with ASTM E119 for the same rating as the wall.
  - 3. Products:
    - a. CertainTeed Corporation; Sustainable Insulation: [www.certainteed.com](http://www.certainteed.com).
    - b. Johns Manville; Sound Control Batt: [www.jm.com](http://www.jm.com).
- C. Acoustic Sealant: Acrylic emulsion latex or water-based elastomeric sealant; do not use solvent-based non-curing butyl sealant.
- 1. Products:
    - a. Franklin International, Inc; Titebond GREENchoice Professional Acoustical Smoke and Sound Sealant: [www.titebond.com/#sle](http://www.titebond.com/#sle).
    - b. Liquid Nails, a brand of PPG Architectural Coatings: [www.liquidnails.com/#sle](http://www.liquidnails.com/#sle).

- c. Specified Technologies Inc; Smoke N Sound Acoustical Sealant:  
[www.stifirestop.com/#sle](http://www.stifirestop.com/#sle).
  - d. Substitutions: See Section 01 60 00 - Product Requirements.
- D. Water-Resistive Barrier: As specified in Section 07 25 00.
- E. Finishing Accessories: ASTM C1047, extruded aluminum alloy (6063 T5) or galvanized steel sheet ASTM A924/A924M G90, unless noted otherwise.
- 1. Types: As detailed or required for finished appearance.
  - 2. Special Shapes: In addition to conventional corner bead and control joints, provide U-bead at exposed panel edges.
  - 3. Products:
    - a. Same manufacturer as framing materials.
- F. Beads, Joint Accessories, and Other Trim: ASTM C1047, rigid plastic, galvanized steel, or rolled zinc, unless noted otherwise.
- 1. Corner Beads: Low profile, for 90 degree outside corners.
    - a. Products:
      - 1) CertainTeed Corporation; No-Coat Drywall Corner: [www.certainteed.com/#sle](http://www.certainteed.com/#sle).
      - 2) ClarkDietrich; Strait-Flex Big-Stick: [www.clarkdietrich.com/#sle](http://www.clarkdietrich.com/#sle).
      - 3) Phillips Manufacturing Co; Everlast Corner Bead: [www.phillipsmfg.com/#sle](http://www.phillipsmfg.com/#sle).
      - 4) Substitutions: See Section 01 60 00 - Product Requirements.
    - 2. Expansion Joints:
      - a. Type: V-shaped PVC with tear away fins.
      - b. Type: V-shaped metal with factory-installed protective tape.
      - c. Type: Accordion profile with factory-installed protective tape.
      - d. Type: Off-angle inside corner expansion.
      - e. Products:
        - 1) Phillips Manufacturing Co; 093 Expansion Control Joint: [www.phillipsmfg.com/#sle](http://www.phillipsmfg.com/#sle).
        - 2) Substitutions: See Section 01 60 00 - Product Requirements.
- G. Joint Materials: ASTM C475/C475M and as recommended by gypsum board manufacturer for project conditions.
- 1. Paper Tape: 2 inch (50 mm) wide, creased paper tape for joints and corners, except as otherwise indicated.
  - 2. Products:
    - a. Continental Building Products: [www.continental-bp.com/#sle](http://www.continental-bp.com/#sle).
    - b. Substitutions: See Section 01 60 00 - Product Requirements.
  - 3. Joint Compound: Setting type, field-mixed.
- H. Finishing Compound: Surface coat and primer, takes the place of skim coating.
- 1. Products:
    - a. CertainTeed Corporation; Quick Prep Plus Interior Prep Coat: [www.certainteed.com/#sle](http://www.certainteed.com/#sle).
    - b. Substitutions: See Section 01 60 00 - Product Requirements.
- I. High Build Drywall Surfer: Vinyl acrylic latex-based coating for spray application, designed to take the place of skim coating and separate paint primer in achieving Level 5 finish.
- 1. Products:
    - a. CertainTeed Corporation; Level V Wall and Ceiling Primer/Surfer with M2Tech: [www.certainteed.com/#sle](http://www.certainteed.com/#sle).
    - b. USG Corporation; USG Sheetrock Brand Tuff-Hide Primer-Surfer: [www.usg.com/#sle](http://www.usg.com/#sle).
    - c. Substitutions: See Section 01 60 00 - Product Requirements.
- J. Screws for Fastening of Gypsum Panel Products to Cold-Formed Steel Studs Less than 0.033 inches (0.84 mm) in Thickness and Wood Members: ASTM C1002; self-piercing tapping screws, corrosion-resistant.

- K. Screws for Fastening of Gypsum Panel Products to Steel Members from 0.033 to 0.112 inch (0.84 to 2.84 mm) in Thickness: ASTM C954; steel drill screws, corrosion-resistant.

### **PART 3 EXECUTION**

#### **301 EXAMINATION**

- A. Verify that project conditions are appropriate for work of this section to commence.

#### **302 SHAFT WALL INSTALLATION**

- A. Shaft Wall Framing: Install in accordance with manufacturer's installation instructions.
  - 1. Fasten runners to structure with short leg to finished side, using appropriate power-driven fasteners at not more than 24 inches (600 mm) on center.
  - 2. Install studs at spacing required to meet performance requirements.
- B. Shaft Wall Liner: Cut panels to accurate dimensions and install sequentially between special friction studs.
  - 1. On walls over sixteen feet high, screw-attach studs to runners top and bottom.
  - 2. Seal perimeter of shaft wall and penetrations with acoustical sealant.

#### **303 FRAMING INSTALLATION**

- A. Metal Framing: Install in accordance with ASTM C754 and manufacturer's instructions.
- B. Suspended Ceilings and Soffits: Space framing and furring members as indicated.
  - 1. Laterally brace entire suspension system.
- C. Studs: Space studs at 16 inches on center (at 406 mm on center).
  - 1. Extend partition framing to structure where indicated and to ceiling in other locations.
  - 2. Partitions Terminating at Ceiling: Attach ceiling runner securely to ceiling track in accordance with manufacturer's instructions.
  - 3. Partitions Terminating at Structure: Attach extended leg top runner to structure, maintain clearance between top of studs and structure, and brace both flanges of studs with continuous bridging.
  - 4. Partitions Terminating at Structure: Attach top runner to structure, maintain clearance between top of studs and structure, and connect studs to track using specified mechanical devices in accordance with manufacturer's instructions; verify free movement of top of stud connections; do not leave studs unattached to track.
- D. Openings: Reinforce openings as required for weight of doors or operable panels, using not less than double studs at jambs.
- E. Acoustic Furring: Install resilient channels at maximum 24 inches (600 mm) on center. Locate joints over framing members.
- F. Resilient Sound Isolation Clips: Install resilient sound isolation clips, and where applicable, associated furring sections and channels, in accordance with clip manufacturer's written instructions.
- G. Furring for Fire-Resistance Ratings: Install as required for fire-resistance ratings indicated and to GA-600 requirements.
- H. Blocking: Install wood blocking for support of:
  - 1. Framed openings.
  - 2. Wall-mounted cabinets.
  - 3. Plumbing fixtures.
  - 4. Toilet partitions.
  - 5. Toilet accessories.
  - 6. Wall-mounted door hardware.

#### **304 ACOUSTIC ACCESSORIES INSTALLATION**

- A. Acoustic Insulation: Place tightly within spaces, around cut openings, behind and around electrical and mechanical items within partitions, and tight to items passing through partitions.

- B. Sound Isolation Tape: Apply to vertical studs and top and bottom tracks/runners in accordance with manufacturer's instructions.
- C. Acoustic Sealant: Install in accordance with manufacturer's instructions.
  - 1. Place one bead continuously on substrate before installation of perimeter framing members.
  - 2. Place continuous bead at perimeter of each layer of gypsum board.
  - 3. Seal around all penetrations by conduit, pipe, ducts, and rough-in boxes, except where firestopping is provided.
- D. Acoustical Shielding: Install in accordance with manufacturer's instructions for application between studs and gypsum board.

### 305 BOARD INSTALLATION

- A. Comply with ASTM C840, GA-216, and manufacturer's instructions. Install to minimize butt end joints, especially in highly visible locations.
- B. Single-Layer Nonrated: Install gypsum board in most economical direction, with ends and edges occurring over firm bearing.
  - 1. Exception: Tapered edges to receive joint treatment at right angles to framing.
- C. Double-Layer, Nonrated: Use gypsum board for first layer, placed parallel to framing or furring members, with ends and edges occurring over firm bearing. Use glass mat faced gypsum board at exterior walls and at other locations as indicated. Place second layer perpendicular to framing or furring members. Offset joints of second layer from joints of first layer.
- D. Fire-Resistance-Rated Construction: Install gypsum board in strict compliance with requirements of assembly listing.
- E. Exposed Gypsum Board in Interior Wet Areas: Seal joints, cut edges, and holes with water-resistant sealant.
- F. Exterior Sheathing: Comply with ASTM C1280. Install sheathing vertically, with edges butted tight and ends occurring over firm bearing.
  - 1. Seal joints, cut edges, and holes with water-resistant sealant.
  - 2. Paper-Faced Sheathing: Immediately after installation, protect from weather by application of water-resistive barrier.
- G. Exterior Soffits: Install exterior soffit board perpendicular to framing, with staggered end joints over framing members or other solid backing.
- H. Cementitious Backing Board: Install over steel framing members and plywood substrate where indicated, in accordance with ANSI A108.11 and manufacturer's instructions.
- I. Installation on Metal Framing: Use screws for attachment of gypsum board except face layer of nonrated double-layer assemblies, which may be installed by means of adhesive lamination.
- J. Curved Surfaces: Apply gypsum board to curved substrates in accordance with GA-226.

### 306 INSTALLATION OF TRIM AND ACCESSORIES

- A. Control Joints: Place control joints consistent with lines of building spaces and as indicated.
- B. Corner Beads: Install at external corners, using longest practical lengths.
- C. Edge Trim: Install at locations where gypsum board abuts dissimilar materials.

### 307 JOINT TREATMENT

- A. Paper Faced Gypsum Board: Use paper joint tape, embed with drying type joint compound and finish with drying type joint compound.
- B. Finish gypsum board in accordance with levels defined in ASTM C840, as follows:
  - 1. Level 5: Walls and ceilings to receive semi-gloss or gloss paint finish and other areas specifically indicated. **At all exposed areas that are painted.**
  - 2. Level 4: Walls and ceilings to receive paint finish or wall coverings, unless otherwise indicated.
  - 3. Level 3: Walls to receive textured wall finish.

4. Level 2: In utility areas, behind cabinetry, and on backing board to receive tile finish.
  5. Level 1: Fire-resistance-rated wall areas above finished ceilings, whether or not accessible in the completed construction.
- C. Tape, fill, and sand exposed joints, edges, and corners to produce smooth surface ready to receive finishes.
1. Feather coats of joint compound so that camber is maximum 1/32 inch (0.8 mm).
- D. Where Level 5 finish is indicated, spray apply high build drywall surfacer over entire surface after joints have been properly treated; achieve a flat and tool mark-free finish.
- E. Fill and finish joints and corners of cementitious backing board as recommended by manufacturer.

**308 TOLERANCES**

- A. Maximum Variation of Finished Gypsum Board Surface from True Flatness: 1/8 inch in 10 feet (3 mm in 3 m) in any direction.

**END OF SECTION 09 21 16**

**SECTION 09 24 00  
CEMENT PLASTERING**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Cement plastering.

**1.02 RELATED REQUIREMENTS**

- A. Section 05 40 00 - Cold-Formed Metal Framing: Structural metal framing for plaster.
- B. Section 06 10 00 - Rough Carpentry: Wood stud framing for plaster.
- C. Section 08 31 00 - Access Doors and Panels: Access panels.
- D. Section 09 21 16 - Gypsum Board Assemblies: Metal stud framing and furring for plaster.
- E. Section 09 22 36 - Lath: Lath, furring, beads, screeds, and joint accessories for plaster base.
- F. Section 09 91 13 - Exterior Painting.
- G. Section 09 91 23 - Interior Painting.

**1.03 REFERENCE STANDARDS**

- A. ASTM A641/A641M - Standard Specification for Zinc-Coated (Galvanized) Carbon Steel Wire 2019.
- B. ASTM A924/A924M - Standard Specification for General Requirements for Steel Sheet, Metallic-Coated by the Hot-Dip Process 2022.
- C. ASTM C150/C150M - Standard Specification for Portland Cement 2022.
- D. ASTM C897 - Standard Specification for Aggregate for Job-Mixed Portland Cement-Based Plasters 2015 (Reapproved 2020).
- E. ASTM C926 - Standard Specification for Application of Portland Cement-Based Plaster 2022.
- F. ASTM C932 - Standard Specification for Surface-Applied Bonding Compounds for Exterior Plastering 2006 (Reapproved 2019).
- G. ASTM E119 - Standard Test Methods for Fire Tests of Building Construction and Materials 2020.
- H. UL (FRD) - Fire Resistance Directory Current Edition.

**1.04 SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements for submittals procedures.
- B. Product Data: Provide data on plaster materials and trim accessories.

**1.05 QUALITY ASSURANCE**

- A. Installer Qualifications: Company specializing in performing the work of this section with minimum three years documented experience.

**PART 2 PRODUCTS**

**2.01 CEMENT PLASTER APPLICATIONS**

- A. Lath Plaster Base: Metal lath.
  - 1. Number of Coats: Three.
  - 2. Leveling Coat: Apply to a nominal thickness of 1/32 to 1/16 inch (0.79 to 1.6 mm).
- B. Solid Plaster Base: Concrete masonry.
  - 1. Plaster Type: Jobsite mixed plaster.
  - 2. Number of Coats: Three.
  - 3. First Coat: Apply to a nominal thickness of 1/4 inch (6 mm).
  - 4. Finish Coat: Apply to a nominal thickness of 1/8 inch (3 mm).

## **202 FACTORY PREPARED CEMENT PLASTER**

- A. Fire-Resistance Rating: Determined in accordance with test procedures in ASTM E119 and complying with the following:
- B. Exterior Portland cement plaster system made of scratch and brown base coat, leveling coat with reinforcing mesh, and acrylic finish coat; install in accordance with ASTM C926.
  - 1. Provide continuous exterior insulation as part of the system, by the same manufacturer.
  - 2. Provide weather resistive barrier as part of the system, by the same manufacturer.
  - 3. Manufacturer - Basis of Design:
    - a. LaHabra; FastWall 300: [www.lahabrastucco.com/#sle](http://www.lahabrastucco.com/#sle).

## **203 JOBSITE MIXED CEMENT PLASTER**

- A. Fire Resistance Rating: Determined in accordance with test procedures in ASTM E119 and complying with:
- B. Materials:
  - 1. Portland Cement: ASTM C150/C150M, Type I.
    - a. Finish Coat: White color.
  - 2. Sand: Clean, well graded, and complying with ASTM C897.
  - 3. Water: Clean, fresh, potable, and free of mineral or organic matter that could adversely affect plaster.
- C. Plaster Mixes: Proportioned in accordance with ASTM C926; parts by volume.

## **204 ACCESSORIES**

- A. Lath:
  - 1. Wire Size: 17 gauge, 0.453 inch (11.5 mm).
  - 2. Galvanized: ASTM A641/A641M.
  - 3. Opening Size: 1-1/2 by 1-1/2 inches (38.1 by 38.1 mm).
- B. Bonding Compound: Provide type recommended for bonding plaster to solid surfaces, complying with ASTM C932.
  - 1. Manufacturers:
    - a. Larsen Products Corp; Weldcrete: [www.larsenproducts.com/#sle](http://www.larsenproducts.com/#sle).
    - b. Substitutions: See Section 01 60 00 - Product Requirements.

## **PART 3 EXECUTION**

### **301 EXAMINATION**

- A. Verify existing conditions are acceptable prior to starting this work.
- B. Verify masonry joints are flush and surfaces are ready to receive work of this section, and that there are no existing bituminous or water repellent coatings on masonry surfaces.
- C. Verify concrete surfaces are flat, honeycombs are filled flush, and surfaces are ready to receive work of this section, and that there are no existing bituminous, water repellent, or form release agent coatings on concrete surfaces that may be detrimental to plaster bond.
- D. Verify lath is flat, secured to substrate, and joint and surface perimeter accessories are properly in place.

### **302 PREPARATION**

- A. Dampen masonry surfaces to reduce excessive suction.
- B. Clean concrete surfaces of foreign matter using approved acid solutions, solvents, or detergents, and then rinse surfaces thoroughly with clean water.
- C. Roughen smooth concrete surfaces and apply bonding compound in accordance with manufacturer's written installation instructions.

### **303 MIXING**

- A. Mix only as much plaster as can be used prior to initial set.

- B. Mix materials dry, to uniform color and consistency, before adding water.
- C. Protect mixtures from frost or freezing temperatures, contamination, and excessive evaporation.

**304 APPLICATION**

- A. Apply plaster in accordance with manufacturer's written instructions and comply with ASTM C926.
- B. Base Coats:
  - 1. Apply base coat(s) to fully embed lath and to specified thickness.
  - 2. Follow guidelines in ASTM C926 and manufacturer's written installation instructions for moist curing base coats and application of subsequent coats.
- C. Leveling Coat:
  - 1. Apply leveling coat to specified thickness.
- D. Finish Coats:
  - 1. Cement Plaster:
    - a. Apply with sufficient material and pressure to ensure complete coverage of base to specified thickness.
    - b. Apply desired surface texture while mix is still workable.
  - 2. Primer and Acrylic Coatings:
    - a. Remove surface contaminants such as dust and dirt without damaging substrate.
    - b. Apply primer in accordance with manufacturer's instructions.
    - c. Apply finish coating in number of coats and to thickness recommended by manufacturer.

**305 TOLERANCES**

- A. Maximum Variation from True Flatness: 1/4 inch in 10 feet (6 mm in 3 m).

**END OF SECTION 09 24 00**

**SECTION 09 30 00  
TILING**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Tile for floor applications.
- B. Tile for wall applications.
- C. Tile for shower receptors.
- D. Cementitious backer board as tile substrate.
- E. Coated glass mat backer board as tile substrate.
- F. Ceramic accessories.
- G. Ceramic trim.
- H. Non-ceramic trim.

**1.02 RELATED REQUIREMENTS**

- A. Section 07 92 00 - Joint Sealants: Sealing joints between tile work and adjacent construction and fixtures.
- B. Section 09 21 16 - Gypsum Board Assemblies: Tile backer board.
- C. Section 09 24 00 - Cement Plastering: Lath and Portland cement scratch coat, where required by the TCNA (HB) Method specified.

**1.03 REFERENCE STANDARDS**

- A. ANSI A108/A118/A136 - American National Standard Specifications for the Installation of Ceramic Tile (Compendium) 2019.
- B. ANSI A108.1a - American National Standard Specifications for Installation of Ceramic Tile in the Wet-Set Method, with Portland Cement Mortar 2017.
- C. ANSI A108.1b - American National Standard Specifications for Installation of Ceramic Tile on a Cured Portland Cement Mortar Setting Bed with Dry-Set or Latex-Portland Cement Mortar 2017.
- D. ANSI A108.1c - Contractor's Option: Installation of Ceramic Tile in the Wet-Set Method with Portland Cement Mortar or Installation of Ceramic Tile on a Cured Portland Cement Mortar Setting Bed with Dry-Set or Latex-Portland Cement Mortar 1999 (Reaffirmed 2021).
- E. ANSI A108.2 - American National Standard General Requirements: Materials, Environmental and Workmanship 2019.
- F. ANSI A108.4 - American National Standard Specifications for Installation of Ceramic Tile with Organic Adhesive or Water Cleanable Tile-Setting Epoxy Adhesive 2019.
- G. ANSI A108.5 - American National Standard Specifications for Installation of Ceramic Tile with Dry-Set Portland Cement Mortar or Latex-Portland Cement Mortar 2021.
- H. ANSI A108.6 - American National Standard Specifications for Installation of Ceramic Tile with Chemical Resistant, Water Cleanable Tile-Setting and -Grout Epoxy 1999 (Reaffirmed 2019).
- I. ANSI A108.8 - American National Standard Specifications for Installation of Ceramic Tile with Chemical Resistant Furan Resin Mortar and Grout 1999 (Reaffirmed 2019).
- J. ANSI A108.9 - American National Standard Specifications for Installation of Ceramic Tile with Modified Epoxy Emulsion Mortar/Grout 1999 (Reaffirmed 2019).
- K. ANSI A108.10 - American National Standard Specifications for Installation of Grout in Tilework 2017.
- L. ANSI A108.11 - American National Standard Specifications for Interior Installation of Cementitious Backer Units 2018.

- M. ANSI A108.12 - American National Standard for Installation of Ceramic Tile with EGP (Exterior Glue Plywood) Latex-Portland Cement Mortar 1999 (Reaffirmed 2019).
- N. ANSI A108.13 - American National Standard for Installation of Load Bearing, Bonded, Waterproof Membranes for Thin-Set Ceramic Tile and Dimension Stone 2005 (Reaffirmed 2021).
- O. ANSI A108.19 - American National Standard Specifications for Interior Installation of Gauged Porcelain Tiles and Gauged Porcelain Tile Panels/Slabs by the Thin-Bed Method Bonded with Modified Dry-Set Cement Mortar or Improved Modified Dry-Set Cement Mortar 2020.
- P. ANSI A118.3 - American National Standard Specifications for Chemical Resistant, Water Cleanable Tile-Setting and -Grouting Epoxy and Water Cleanable Tile-Setting Epoxy Adhesive 2021.
- Q. ANSI A118.4 - American National Standard Specifications for Modified Dry-Set Cement Mortar 2019.
- R. ANSI A118.7 - American National Standard Specifications for High Performance Cement Grouts for Tile Installation 2019.
- S. ANSI A118.9 - American National Standard Specifications for Test Methods and Specifications for Cementitious Backer Units 2019.
- T. ANSI A118.10 - American National Standard Specifications for Load Bearing, Bonded, Waterproof Membranes for Thin-Set Ceramic Tile and Dimension Stone 2014 (Reaffirmed 2019).
- U. ANSI A118.12 - American National Standard Specifications for Crack Isolation Membranes for Thin-Set Ceramic Tile and Dimension Stone Installation 2014 (Reaffirmed 2019).
- V. ANSI A118.13 - American National Standard Specification for Bonded Sound Reduction Membranes for Thin-Set Ceramic Tile Installation 2014 (Reaffirmed 2019).
- W. ANSI A118.15 - American National Standard Specifications for Improved Modified Dry-Set Cement Mortar 2019.
- X. ANSI A136.1 - American National Standard for Organic Adhesives for Installation of Ceramic Tile 2020.
- Y. ANSI A137.1 - American National Standard Specifications for Ceramic Tile 2022.
- Z. ANSI A137.3 - American National Standard Specifications for Gauged Porcelain Tile and Gauged Porcelain Tile Panels/Slabs 2021.
- AA. ASTM C150/C150M - Standard Specification for Portland Cement 2022.
- BB. ASTM C373 - Standard Test Methods for Determination of Water Absorption and Associated Properties by Vacuum Method for Pressed Ceramic Tiles and Glass Tiles and Boil Method for Extruded Ceramic Tiles and Non-tile Fired Ceramic Whiteware Products 2018.
- CC. ASTM E492 - Standard Test Method for Laboratory Measurement of Impact Sound Transmission Through Floor-Ceiling Assemblies Using the Tapping Machine 2009, with Editorial Revision (2016).
- DD. ASTM E2179 - Standard Test Method for Laboratory Measurement of the Effectiveness of Floor Coverings in Reducing Impact Sound Transmission Through Concrete Floors 2021.
- EE. ASTM F710 - Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring 2021.
- FF. ASTM F1869 - Standard Test Method for Measuring Moisture Vapor Emission Rate of Concrete Subfloor Using Anhydrous Calcium Chloride 2022.
- GG. ASTM F2170 - Standard Test Method for Determining Relative Humidity in Concrete Floor Slabs Using in situ Probes 2019a.
- HH. TCNA (HB) - Handbook for Ceramic, Glass, and Stone Tile Installation 2021.

#### **1.04 ADMINISTRATIVE REQUIREMENTS**

- A. Preinstallation Meeting: Convene a preinstallation meeting one week before starting work of this section; require attendance by affected installers.

#### **1.05 SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements for submittal procedures.
- B. Product Data: Provide manufacturers' data sheets on tile, mortar, grout, and accessories. Include instructions for using grouts and adhesives.
- C. Shop Drawings: Indicate tile layout, patterns, color arrangement, perimeter conditions, junctions with dissimilar materials, control and expansion joints, thresholds, ceramic accessories, and setting details.
- D. Samples: Mount tile and apply grout on two plywood panels, minimum 18 by 18 inches (457 by 457 mm) in size illustrating pattern, color variations, and grout joint size variations.
- E. Maintenance Data: Include recommended cleaning methods, cleaning materials, and stain removal methods.
- F. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
  - 1. See Section 01 60 00 - Product Requirements, for additional provisions.
  - 2. Extra Tile: 1 percent of each size, color, and surface finish combination.

#### **1.06 QUALITY ASSURANCE**

- A. Maintain one copy of and ANSI A108/A118/A136 and TCNA (HB) on site.
- B. Manufacturer Qualifications: Company specializing in manufacturing the types of products specified in this section, with minimum five years of documented experience.
- C. Installer Qualifications:
  - 1. Company specializing in performing tile installation, with minimum of five years of documented experience.
  - 2. Installer Certification:

#### **1.07 MOCK-UPS**

- A. See Section 01 40 00 - Quality Requirements for general requirements for mock-up.
- B. Construct tile mock-up where indicated on drawings, incorporating all components specified for the location.
  - 1. Minimum size of mock-up is indicated on drawings.

#### **1.08 DELIVERY, STORAGE, AND HANDLING**

- A. Protect adhesives from freezing or overheating in accordance with manufacturer's instructions.

#### **1.09 FIELD CONDITIONS**

- A. Do not install solvent-based products in an unventilated environment.
- B. Maintain ambient and substrate temperature above 50 degrees F (10 degrees C) and below 100 degrees F (38 degrees C) during installation and curing of setting materials.

### **PART 2 PRODUCTS**

#### **201 TILE**

- A. Manufacturers: All products by the same manufacturer.
  - 1. American Olean Corporation: [www.americanolean.com/#sle](http://www.americanolean.com/#sle).
  - 2. Dal-Tile Corporation: [www.daltile.com/#sle](http://www.daltile.com/#sle).
  - 3. Substitutions: See Section 01 60 00 - Product Requirements.
- B. Ceramic Mosaic Tile, Type [ ]: ANSI A137.1 standard grade.
  - 1. Moisture Absorption: 0 to 0.5 percent as tested in accordance with ASTM C373.
  - 2. Size: 1 by 1 inch (25 by 25 mm), nominal.
  - 3. Shape: Square.
  - 4. Edges: Square.

5. Surface Finish: Unglazed.
  6. Color(s): To be selected by Architect from manufacturer's standard range.
- C. Glazed Wall Tile: ANSI A137.1 standard grade.
1. Size: 4-1/4 by 4-1/4 inch (108 by 108 mm), nominal.
  2. Edges: Cushioned.
  3. Surface Finish: High gloss.
  4. Color(s): To be selected by Architect from manufacturer's standard range.
  5. Trim Units: Matching bead, bullnose, cove, and base shapes in sizes coordinated with field tile.
  6. Products:
- D. Porcelain Tile: ANSI A137.1 standard grade.
1. Moisture Absorption: 0 to 0.5 percent as tested in accordance with ASTM C373.
  2. Thickness: 3/8 inch (9.5 mm).
  3. Edges: Cushioned.
  4. Surface Finish: Unglazed.
  5. Trim Units: Matching bullnose, double bullnose, cove base, and cove shapes in sizes coordinated with field tile.
  6. Products:
    - a. Dal-Tile Corporation: [www.daltile.com/#sle](http://www.daltile.com/#sle).
    - b. Substitutions: See Section 01 60 00 - Product Requirements.
- E. Gauged Porcelain Tiles and Panels/Slabs, Type [\_\_\_\_\_]: ANSI A137.3 standard grade.
1. Moisture Absorption: 0 to 0.5 percent as tested in accordance with ASTM C373.
  2. Edges: Square.
  3. Surface Finish: Glossy.
  4. Color(s): To be selected by Architect from manufacturer's standard range.
  5. Pattern: Shown on drawings.
  6. Products:
    - a. Dal-Tile Corporation: [www.daltile.com/#sle](http://www.daltile.com/#sle).
    - b. Substitutions: See Section 01 60 00 - Product Requirements.

## 202 TRIM AND ACCESSORIES

- A. Ceramic Accessories: Glazed finish, same color and finish as adjacent field tile; same manufacturer as tile.
- B. Pre-Formed Accessories To Be Covered with Tile: High density expanded polystyrene with ANSI A118.10 waterproofing finish or membrane.
1. Products:
    - a. LATICRETE International, Inc; LATICRETE HYDRO BAN Pre-Sloped Shower Pan: [www.laticrete.com/#sle](http://www.laticrete.com/#sle).
- C. Ceramic Trim: Matching bullnose, double bullnose, cove base, and cove ceramic shapes in sizes coordinated with field tile.
1. Applications:
    - a. Open Edges: Bullnose.
    - b. Inside Corners: Jointed.
    - c. Floor to Wall Joints: Cove base.

2. Manufacturers: Same as for tile.
- D. Non-Ceramic Trim: Satin brass anodized extruded aluminum, style and dimensions to suit application, for setting using tile mortar or adhesive.
  1. Applications:
    - a. Open edges of wall tile.
    - b. Open edges of floor tile.
    - c. Wall corners, outside and inside.
    - d. Transition between floor finishes of different heights.
    - e. Thresholds at door openings.
    - f. Expansion and control joints, floor and wall.
    - g. Borders and other trim as indicated on drawings.
  2. Manufacturers:
    - a. Schluter-Systems: [www.schluter.com/#sle](http://www.schluter.com/#sle).
    - b. Substitutions: See Section 01 60 00 - Product Requirements.

### 203 SETTING MATERIALS

- A. Provide setting and grout materials from same manufacturer.
- B. Manufacturers:
  1. ARDEX Engineered Cements; [\_\_\_\_]: [www.ardexamericas.com/#sle](http://www.ardexamericas.com/#sle).
  2. Bostik Inc; [\_\_\_\_]: [www.bostik-us.com/#sle](http://www.bostik-us.com/#sle).
  3. H.B. Fuller Construction Products, Inc; [\_\_\_\_]: [www.tecspecialty.com/#sle](http://www.tecspecialty.com/#sle).
  4. LATICRETE International, Inc; [\_\_\_\_]: [www.laticrete.com/#sle](http://www.laticrete.com/#sle).
  5. Merkrete, by Parex USA, Inc; [\_\_\_\_]: [www.merkrete.com/#sle](http://www.merkrete.com/#sle).
  6. Substitutions: See Section 01 60 00 - Product Requirements.
- C. Latex-Portland Cement Mortar Bond Coat: ANSI A118.4.
  1. Applications: Use this type of bond coat where Large and Heavy Tile (LHT) mortar is indicated.
  2. Products:
    - a. LATICRETE International, Inc; 257 TITANIUM: [www.laticrete.com/#sle](http://www.laticrete.com/#sle).
    - b. Merkrete, by Parex USA, Inc; Merkrete 735 Premium Flex: [www.merkrete.com/#sle](http://www.merkrete.com/#sle).
    - c. Sika Corp; SikaTile 300 Set: [www.sika.com/#sle](http://www.sika.com/#sle).
    - d. Substitutions: See Section 01 60 00 - Product Requirements.
- D. Improved Latex-Portland Cement Mortar Bond Coat: ANSI A118.15.
  1. Applications: Use this type of bond coat where Large and Heavy Tile (LHT) mortar is indicated.
  2. Products:
    - a. ARDEX Engineered Cements; S 28: [www.ardexamericas.com/#sle](http://www.ardexamericas.com/#sle).
    - b. Custom Building Products; Complete Contact-LFT Premium Rapid Setting Large Format Tile Mortar, with Multi-Surface Bonding Primer: [www.custombuildingproducts.com/#sle](http://www.custombuildingproducts.com/#sle).
    - c. H.B. Fuller Construction Products, Inc; TEC 3N1 Performance Mortar: [www.tecspecialty.com/#sle](http://www.tecspecialty.com/#sle).
    - d. LATICRETE International, Inc; MULTIMAX LITE: [www.laticrete.com/#sle](http://www.laticrete.com/#sle).
    - e. Substitutions: See Section 01 60 00 - Product Requirements.
- E. Epoxy Adhesive and Mortar Bond Coat: ANSIA118.3.
  1. Applications: Where indicated on drawings.
  2. Products:
    - a. LATICRETE International, Inc; LATICRETE LATAPOXY 300 Adhesive: [www.laticrete.com/#sle](http://www.laticrete.com/#sle).
    - b. Merkrete, by Parex USA, Inc; Merkrete Pro Epoxy: [www.merkrete.com/#sle](http://www.merkrete.com/#sle).
    - c. Substitutions: See Section 01 60 00 - Product Requirements.
- F. Mortar Bed Materials: Pre-packaged mix of Portland cement, sand, latex additive, and water.
  1. Products:

- a. LATICRETE International, Inc; LATICRETE 3701 Fortified Mortar Bed: [www.laticrete.com/#sle](http://www.laticrete.com/#sle).
- b. Merkrete, by Parex USA, Inc; Merkrete Underlay C: [www.merkrete.com/#sle](http://www.merkrete.com/#sle).
- c. Substitutions: See Section 01 60 00 - Product Requirements.

#### **204 GROUTS**

- A. Provide setting and grout materials from same manufacturer.
- B. Manufacturers:
  1. Bostik Inc: [www.bostik-us.com/#sle](http://www.bostik-us.com/#sle).
  2. LATICRETE International, Inc; LATICRETE PERMACOLOR Grout: [www.laticrete.com/#sle](http://www.laticrete.com/#sle).
  3. Merkrete, by Parex USA, Inc; Merkrete Duracolor Non-Sanded Color Grout: [www.merkrete.com/#sle](http://www.merkrete.com/#sle).
- C. High Performance Polymer Modified Grout: ANSI A118.7 polymer modified cement grout.
  1. Applications: Use this type of grout where indicated and where no other type of grout is indicated.
  2. Use sanded grout for joints 1/8 inch (3.2 mm) wide and larger; use unsanded grout for joints less than 1/8 inch (3.2 mm) wide.
  3. Products:
    - a. ARDEX Engineered Cements; ARDEX FL: [www.ardexamericas.com/#sle](http://www.ardexamericas.com/#sle).
    - b. LATICRETE International, Inc; LATICRETE PERMACOLOR Grout: [www.laticrete.com/#sle](http://www.laticrete.com/#sle).
    - c. Merkrete, by Parex USA, Inc; Merkrete Pro Grout: [www.merkrete.com/#sle](http://www.merkrete.com/#sle).
    - d. Substitutions: See Section 01 60 00 - Product Requirements.
- D. Epoxy Grout: ANSI A118.3 chemical resistant and water-cleanable epoxy grout.
  1. Applications: Where indicated.
  2. Color(s): As selected by Architect from manufacturer's full line.
  3. Products:
    - a. ARDEX Engineered Cements; ARDEX WA: [www.ardexamericas.com/#sle](http://www.ardexamericas.com/#sle).
    - b. LATICRETE International, Inc; LATICRETE SPECTRALOCK PRO Premium Grout: [www.laticrete.com/#sle](http://www.laticrete.com/#sle).
    - c. Merkrete, by Parex USA, Inc; Merkrete Pro Epoxy: [www.merkrete.com/#sle](http://www.merkrete.com/#sle).
    - d. Substitutions: See Section 01 60 00 - Product Requirements.

#### **205 MAINTENANCE MATERIALS**

- A. Tile Sealant: Gunnable, silicone, siliconized acrylic, or urethane sealant; moisture and mildew resistant type.
  1. Applications: Between tile and plumbing fixtures.
  2. Color(s): As selected by Architect from manufacturer's full line.
  3. Products:
    - a. ARDEX Engineered Cements; ARDEX SX: [www.ardexamericas.com/#sle](http://www.ardexamericas.com/#sle).
    - b. LATICRETE International, Inc; LATICRETE LATASIL: [www.laticrete.com/#sle](http://www.laticrete.com/#sle).
    - c. Merkrete, by Parex USA, Inc; Merkrete Colored Caulking: [www.merkrete.com/#sle](http://www.merkrete.com/#sle).
    - d. Substitutions: See Section 01 60 00 - Product Requirements.
- B. Grout Sealer: Liquid-applied, moisture and stain protection for existing or new Portland cement grout.
  1. Composition: Water-based colorless silicone.
  2. Color(s): As selected by Architect from manufacturer's full line.
  3. Products:
    - a. Merkrete, by Parex USA, Inc; Merkrete Revive: [www.merkrete.com/#sle](http://www.merkrete.com/#sle).
    - b. Substitutions: See Section 01 60 00 - Product Requirements.

## 206 ACCESSORY MATERIALS

- A. Concrete Floor Slab Crack Isolation Membrane: Material complying with ANSI A118.12; not intended as waterproofing.
  - 1. Crack Resistance: No failure at 1/8 inch (3.2 mm) gap, minimum.
  - 2. Fluid or Trowel Applied Type:
    - a. Material: Synthetic rubber or Acrylic.
    - b. Thickness: 20 mils (0.5 mm), maximum.
    - c. Products:
      - 1) LATICRETE International, Inc; LATICRETE Blue 92 Anti-Fracture Membrane: [www.laticrete.com/#sle](http://www.laticrete.com/#sle).
      - 2) Merkrete, by Parex USA, Inc; Merkrete Fracture Guard: [www.merkrete.com/#sle](http://www.merkrete.com/#sle).
      - 3) Substitutions: See Section 01 60 00 - Product Requirements.
- B. Waterproofing Membrane at Floors: Specifically designed for bonding to cementitious substrate under thick mortar bed or thin-set tile; complying with ANSI A118.10.
  - 1. Crack Resistance: No failure at 1/16 inch (1.6 mm) gap, minimum; comply with ANSI A118.12.
  - 2. Fluid or Trowel Applied Type:
    - a. Products:
      - 1) ARDEX Engineered Cements; ARDEX 8+9: [www.ardexamericas.com/#sle](http://www.ardexamericas.com/#sle).
      - 2) LATICRETE International, Inc; LATICRETE HYDRO BAN: [www.laticrete.com/#sle](http://www.laticrete.com/#sle).
      - 3) Merkrete, by Parex USA, Inc; Merkrete Hydro Guard 1: [www.merkrete.com/#sle](http://www.merkrete.com/#sle).
      - 4) Substitutions: See Section 01 60 00 - Product Requirements.
- C. Waterproofing Membrane at Showers and Tiled Tubs: Specifically designed for bonding to cementitious substrate under thick mortar bed or thin-set tile; complying with ANSI A118.10.
  - 1. Fluid or Trowel Applied Type:
    - a. Material: Synthetic rubber.
    - b. Material: Acrylic.
    - c. Thickness: 25 mils (0.6 mm), minimum, dry film thickness.
    - d. Products:
      - 1) LATICRETE International, Inc; LATICRETE HYDRO BAN: [www.laticrete.com/#sle](http://www.laticrete.com/#sle).
      - 2) Merkrete, by Parex USA, Inc; Merkrete Hydro Guard 2000: [www.merkrete.com/#sle](http://www.merkrete.com/#sle).
      - 3) Substitutions: See Section 01 60 00 - Product Requirements.
- D. Cleavage Membrane Under Thick Mortar Bed:
  - 1. Material: 4 mil (0.1 mm) thick polyethylene film.
  - 2. Products:
    - a. Substitutions: See Section 01 60 00 - Product Requirements.
- E. Reinforcing Mesh: 2 by 2 inch (51 by 51 mm) size weave of 16/16 wire size; welded fabric, galvanized.
- F. Membrane at Walls:
  - 1. Material: No. 15 (6.9 kg) asphalt saturated felt.
- G. Underlayment at Floors: Specifically designed for bonding to thin-set setting mortar; not primarily a waterproofing material and having the following characteristics:
  - 1. Sound Reduction: Comply with ANSI A118.13 bonded membrane, ASTM E492, and ASTM E2179.
  - 2. Crack Resistance: No failure at 1/16 inch (1.6 mm) gap, minimum; comply with ANSI A118.12.
  - 3. Water Resistance: Comply with ANSI A118.10, bonded waterproofing.

4. Uncoupling Function: Allow for separation between membrane and the mortar adhering tile to the membrane when subjected to excessive substrate movement.
  5. Type: Fluid or Trowel Applied.
    - a. Products:
      - 1) LATICRETE International, Inc; LATICRETE 125 Sound and Crack Adhesive: [www.laticrete.com/#sle](http://www.laticrete.com/#sle).
      - 2) Merkrete, by Parex USA, Inc; Merkrete Fracture Guard: [www.merkrete.com/#sle](http://www.merkrete.com/#sle).
      - 3) Substitutions: See Section 01 60 00 - Product Requirements.
  6. Type: Thin-Set Mortar Adhered Sheet.
    - a. Products:
      - 1) ARDEX Engineered Cements; ARDEX UI 740 Flexbone: [www.ardexamericas.com/#sle](http://www.ardexamericas.com/#sle).
      - 2) LATICRETE International, Inc; LATICRETE STRATA MAT: [www.laticrete.com/#sle](http://www.laticrete.com/#sle).
      - 3) Proflex Products, Inc; RCU-250 - Composite Sound Abatement Membrane: [www.proflex.us/#sle](http://www.proflex.us/#sle).
      - 4) Substitutions: See Section 01 60 00 - Product Requirements.
  7. Type: Peel-and-Stick Sheet.
    - a. Products:
      1. Products:
        - a. Substitutions: See Section 01 60 00 - Product Requirements.
- H. Backer Board: Cementitious type complying with ANSI A118.9; high density, glass fiber reinforced, 7/16 inch (11 mm) thick; 2 inch (51 mm) wide coated glass fiber tape for joints and corners.

### **PART 3 EXECUTION**

#### **301 EXAMINATION**

- A. Verify that subfloor surfaces are smooth and flat within the tolerances specified for that type of work and are ready to receive tile.
- B. Verify that wall surfaces are smooth and flat within the tolerances specified for that type of work, are dust-free, and are ready to receive tile.
- C. Verify that subfloor surfaces are dust free and free of substances that could impair bonding of setting materials to subfloor surfaces.
- D. Cementitious Subfloor Surfaces: Verify that substrates are ready for tiling installation by testing for moisture and alkalinity (pH).
  1. Obtain instructions if test results are not within limits recommended by tiling material manufacturer and setting material manufacturer.

#### **302 PREPARATION**

- A. Protect surrounding work from damage.
- B. Vacuum clean surfaces and damp clean.
- C. Seal substrate surface cracks with filler. Level existing substrate surfaces to acceptable flatness tolerances.
- D. Install backer board in accordance with ANSI A108.11 and board manufacturer's instructions. Tape joints and corners, cover with skim coat of setting material to a feather edge.

#### **303 INSTALLATION - GENERAL**

- A. Install tile, thresholds, and stair treads and grout in accordance with applicable requirements of ANSI A108.1a through ANSI A108.19, manufacturer's instructions, and TCNA (HB) recommendations.
- B. Lay tile to pattern indicated. Do not interrupt tile pattern through openings.

- C. Cut and fit tile to penetrations through tile, leaving sealant joint space. Form corners and bases neatly. Align floor joints.
- D. Place tile joints uniform in width, subject to variance in tolerance allowed in tile size. Make grout joints without voids, cracks, excess mortar or excess grout, or too little grout.
- E. Form internal angles square and external angles bullnosed.
- F. Install ceramic accessories rigidly in prepared openings.
- G. Install non-ceramic trim in accordance with manufacturer's instructions.
- H. Sound tile after setting. Replace hollow sounding units.
- I. Keep control and expansion joints free of mortar, grout, and adhesive.
- J. Prior to grouting, allow installation to completely cure; minimum of 48 hours.
- K. Grout tile joints unless otherwise indicated. Use standard grout unless otherwise indicated.
- L. At changes in plane and tile-to-tile control joints, use tile sealant instead of grout, with either bond breaker tape or backer rod as appropriate to prevent three-sided bonding.

**304 INSTALLATION - FLOORS - THIN-SET METHODS**

- A. Over exterior concrete substrates, install in accordance with TCNA (HB) Method F102, with standard grout.
- B. Over interior concrete substrates, install in accordance with TCNA (HB) Method F113, dry-set or latex-Portland cement bond coat, with standard grout, unless otherwise indicated.
  - 1. Use uncoupling membrane under all tile unless other underlayment is indicated.
- C. Over wood substrates, install in accordance with TCNA (HB) Method F142, with standard grout, unless otherwise indicated.
- D. Install tile-to-tile floor movement joints in accordance with TCNA (HB) Method EJ171F.

**305 INSTALLATION - FLOORS - MORTAR BED METHODS**

- A. Over exterior concrete substrates, install in accordance with TCNA (HB) Method F101, bonded, with standard grout.
- B. Over interior concrete substrates, install in accordance with TCNA (HB) Method F111, with cleavage membrane, unless otherwise indicated.
  - 1. Where waterproofing membrane is indicated, with standard grout or no mention of grout type, install in accordance with TCNA (HB) Method F121.
- C. Over wood substrates, install in accordance with TCNA (HB) Method F141, with standard grout, unless otherwise indicated.
- D. Cleavage Membrane: Lap edges and ends.
- E. Mortar Bed Thickness: 5/8 inch (15.9 mm), unless otherwise indicated.

**306 INSTALLATION - WALL TILE**

- A. On exterior walls install in accordance with TCNA (HB) Method W244, thin-set over cementitious backer units, with waterproofing membrane.

**307 CLEANING**

- A. Clean tile and grout surfaces.

**308 PROTECTION**

- A. Do not permit traffic over finished floor surface for 4 days after installation.

**END OF SECTION 09 30 00**

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**SECTION 09 51 00  
ACOUSTICAL CEILINGS**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Suspended metal grid ceiling system.
- B. Acoustical units.

**1.02 RELATED REQUIREMENTS**

- A. Section 01 61 16 - Volatile Organic Compound (VOC) Content Restrictions.
- B. Section 03 30 00 - Cast-in-Place Concrete: Placement of special anchors or inserts for suspension system.
- C. Section 07 21 00 - Thermal Insulation: Acoustical insulation.
- D. Section 08 31 00 - Access Doors and Panels: Access panels.

**1.03 REFERENCE STANDARDS**

- A. ASCE 7 - Minimum Design Loads and Associated Criteria for Buildings and Other Structures Most Recent Edition Cited by Referring Code or Reference Standard.
- B. ASTM A666 - Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar 2015.
- C. ASTM B209/B209M - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate 2021a.
- D. ASTM C423 - Standard Test Method for Sound Absorption and Sound Absorption Coefficients by the Reverberation Room Method 2022.
- E. ASTM C635/C635M - Standard Specification for Manufacture, Performance, and Testing of Metal Suspension Systems for Acoustical Tile and Lay-in Panel Ceilings 2022.
- F. ASTM E119 - Standard Test Methods for Fire Tests of Building Construction and Materials 2020.
- G. ASTM E1264 - Standard Classification for Acoustical Ceiling Products 2022.

**1.04 ADMINISTRATIVE REQUIREMENTS**

- A. Sequence work to ensure acoustical ceilings are not installed until building is enclosed, sufficient heat is provided, dust generating activities have terminated, and overhead work is completed, tested, and approved.
- B. Do not install acoustical units until after interior wet work is dry.

**1.05 SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Shop Drawings: Indicate grid layout and related dimensioning.
- C. Samples: Submit two samples in size illustrating material and finish of acoustical units.

**1.06 QUALITY ASSURANCE**

- A. Designer Qualifications for Seismic Design: Perform under direct supervision of a Professional Structural Engineer experienced in design of this work and licensed at the State in which the Project is located.
- B. Acoustical Unit Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.

**PART 2 PRODUCTS**

**2.01 MANUFACTURERS**

- A. Acoustic Tiles/Panels:
  - 1. Armstrong World Industries, Inc [www.armstrongceilings.com/#sle](http://www.armstrongceilings.com/#sle).

2. CertainTeed Corporation: [www.certainteed.com/#sle](http://www.certainteed.com/#sle).
  3. USG Corporation: [www.usg.com/ceilings/#sle](http://www.usg.com/ceilings/#sle).
  4. Rockfon, LLC: [www.rockfon.com/#sle](http://www.rockfon.com/#sle).
  5. Substitutions: See Section 01 60 00 - Product Requirements.
- B. Wood Veneer Acoustic Panels:
1. Hunter Douglas Architectural; Natura: [www.hunterdouglasarchitectural.com/#sle](http://www.hunterdouglasarchitectural.com/#sle).
  2. Substitutions: See Section 01 60 00 - Product Requirements.
- C. Suspension Systems:
1. Same as for acoustical units.
  2. Armstrong World Industries, Inc: [www.armstrongceilings.com/#sle](http://www.armstrongceilings.com/#sle).
  3. CertainTeed Corporation: [www.certainteed.com/#sle](http://www.certainteed.com/#sle).
  4. Hunter Douglas Architectural: [www.hunterdouglasarchitectural.com/#sle](http://www.hunterdouglasarchitectural.com/#sle).
  5. Rockfon, LLC: [www.rockfon.com/#sle](http://www.rockfon.com/#sle).
  6. USG Corporation: [www.usg.com/ceilings/#sle](http://www.usg.com/ceilings/#sle).
  7. Substitutions: See Section 01 60 00 - Product Requirements.

## 202 PERFORMANCE REQUIREMENTS

- A. Fire-Resistance Rating: Determined in accordance with test procedures in ASTM E119 and complying with the following:
1. UL (FRD) Assembly Design No. .

## 203 ACOUSTICAL UNITS

- A. Acoustical Units - General: ASTM E1264, Class A.
1. VOC Content: As specified in Section 01 61 16.
- B. Acoustical Tiles: Painted mineral fiber, with the following characteristics:
1. Classification: ASTM E1264 Type III.
    - a. Form: 1, nodular.
    - b. Pattern: "A" - perforated, regularly spaced large holes.
  2. Size: 24 by 24 inches (610 by 610 mm).
  3. Thickness: 3/4 inch (19 mm).
  4. Light Reflectance: 0.88 percent, determined in accordance with ASTM E1264.
  5. NRC Range: 0.95, determined in accordance with ASTM E1264.
  6. Edge Type: Beveled tegular
  7. Color: White.

Suspension System: Exposed grid.

8. Suspension System: Concealed.
  9. Products:
    - a. Armstrong World Industries, Inc; Ultima: [www.armstrongceilings.com/#sle](http://www.armstrongceilings.com/#sle).
    - b. Armstrong World Industries, Inc; Dune: [www.armstrongceilings.com/#sle](http://www.armstrongceilings.com/#sle).
    - c. Substitutions: See Section 01 60 00 - Product Requirements.
- C. Acoustical Panels: Painted mineral fiber, with the following characteristics:
1. Classification: ASTM E1264 Type III.
    - a. Pattern: "A" - perforated, regularly spaced large holes.
  2. Size: 24 by 24 inches (610 by 610 mm).
  3. Thickness: 3/4 inch (19 mm).
  4. NRC Range:, determined in accordance with ASTM E1264.
  5. Panel Edge: Beveled Tegular
  6. Color: White.
  7. Suspension System: Exposed grid.
- D. Acoustical Panels: Mineral fiber with membrane-faced overlay, with the following characteristics:

1. Application(s): .
  2. Classification: ASTM E1264 Type IV.
    - a. Pattern: "E" - lightly textured.
  3. Size: 24 by 24 inches (610 by 610 mm).
  4. Thickness: 3/4 inch (19 mm).
  5. Panel Edge: Reveal.
  6. Suspension System: Exposed grid.
  7. Products:
    - a. Armstrong World Industries, Inc; Calla: [www.armstrongceilings.com/#sle](http://www.armstrongceilings.com/#sle).
    - b. Armstrong World Industries, Inc; Ultima: [www.armstrongceilings.com/#sle](http://www.armstrongceilings.com/#sle).
    - c. Substitutions: See Section 01 60 00 - Product Requirements.
- E. Acoustical Panels: Mineral fiber with membrane-faced overlay, with the following characteristics:
1. Classification: ASTM E1264 Type IV.
    - a. Form: 1, nodular.
    - b. Pattern: "E" - lightly textured.
  2. Size: 24 by 24 inches (610 by 610 mm).
  3. Thickness: 3/4 inch (19 mm).
  4. Panel Edge: Beveled Tegular
  5. Suspension System: Exposed grid.
- F. Acoustical Panels: Type 3, Mineral fiber with scrubbable finish, with the following characteristics:
1. Application(s): Kitchen
  2. Classification: ASTM E1264 Type IX.
  3. Size: 24 by 24 inches (610 by 610 mm).
  4. Thickness: 3/4 inch (19 mm).
  5. Light Reflectance: 0.89 percent, determined in accordance with ASTM E1264.
  6. NRC Range: 0.95 percent, determined in accordance with ASTM E1264.
  7. Panel Edge: Beveled Tegular
  8. Suspension System Type [\_\_\_\_\_]: Exposed grid.

## **204 SUSPENSION SYSTEM(S)**

- A. Metal Suspension Systems - General: Complying with ASTM C635/C635M; die cut and interlocking components, with perimeter moldings, hold down clips, stabilizer bars, clips, and splices as required.
1. Materials:
    - a. Aluminum Grid: Aluminum sheet, ASTM B209/B209M.
- B. Exposed Suspension System: Hot-dipped galvanized steel grid with aluminum cap.
1. Structural Classification: Intermediate-duty, when tested in accordance with ASTM C635/C635M.
  2. Products:

## **PART 3 EXECUTION**

### **301 EXAMINATION**

- A. Verify existing conditions before starting work.
- B. Verify that layout of hangers will not interfere with other work.

### **302 PREPARATION**

- A. Install after major above-ceiling work is complete.
- B. Coordinate the location of hangers with other work.

### **303 INSTALLATION - SUSPENSION SYSTEM**

- A. Rigidly secure system, including integral mechanical and electrical components, for maximum deflection of 1:360.

- B. Locate system on room axis according to reflected plan.
- C. Suspension System, Non-Seismic: Hang suspension system independent of walls, columns, ducts, pipes and conduit. Where carrying members are spliced, avoid visible displacement of face plane of adjacent members.
- D. Where ducts or other equipment prevent the regular spacing of hangers, reinforce the nearest affected hangers and related carrying channels to span the extra distance.
- E. Do not support components on main runners or cross runners if weight causes total dead load to exceed deflection capability.
- F. Support fixture loads using supplementary hangers located within 6 inches (152 mm) of each corner, or support components independently.
- G. Do not eccentrically load system or induce rotation of runners.

**304 INSTALLATION - ACOUSTICAL UNITS**

- A. Install acoustical units in accordance with manufacturer's instructions.
- B. Fit acoustical units in place, free from damaged edges or other defects detrimental to appearance and function.
- C. Lay directional patterned units with pattern parallel to longest room axis.
- D. Fit border trim neatly against abutting surfaces.
- E. Install acoustical units level, in uniform plane, and free from twist, warp, and dents.
- F. Cutting Acoustical Units:
  - 1. Cut to fit irregular grid and perimeter edge trim.
  - 2. Make field cut edges of same profile as factory edges.
  - 3. Double cut and field paint exposed reveal edges.
- G. Where round obstructions occur, provide preformed closures to match perimeter molding.
- H. Lay acoustical insulation for a distance of 48 inches (1219 mm) either side of acoustical partitions as indicated.

**305 TOLERANCES**

- A. Maximum Variation from Flat and Level Surface: 1/8 inch in 10 feet (3 mm in 3 m).
- B. Maximum Variation from Plumb of Grid Members Caused by Eccentric Loads: 2 degrees.

**END OF SECTION 09 51 00**

**SECTION 09 68 13  
TILE CARPETING**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Carpet tile, fully adhered.
- B. Removal of existing carpet tile.
- C. Matching roll carpet for direct glue installation on base, stairs, and [\_\_\_\_\_].

**1.02 RELATED REQUIREMENTS**

- A. Section 01 61 16 - Volatile Organic Compound (VOC) Content Restrictions.
- B. Section 01 74 19 - Construction Waste Management and Disposal: Reclamation/Recycling of .
- C. Section 03 30 00 - Cast-in-Place Concrete: Restrictions on curing compounds for concrete slabs and floors to receive adhesive-applied flooring.
- D. Section 09 05 61 - Common Work Results for Flooring Preparation: Removal of existing floor coverings, cleaning, and preparation.

**1.03 REFERENCE STANDARDS**

- A. ASTM D2859 - Standard Test Method for Ignition Characteristics of Finished Textile Floor Covering Materials 2016 (Reapproved 2021).
- B. ASTM E648 - Standard Test Method for Critical Radiant Flux of Floor-Covering Systems Using a Radiant Heat Energy Source 2019a, with Editorial Revision (2020).
- C. ASTM F710 - Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring 2021.
- D. ASTM F1869 - Standard Test Method for Measuring Moisture Vapor Emission Rate of Concrete Subfloor Using Anhydrous Calcium Chloride 2022.
- E. ASTM F2170 - Standard Test Method for Determining Relative Humidity in Concrete Floor Slabs Using in situ Probes 2019a.
- F. CRI 104 - Standard for Installation of Commercial Carpet 2015.
- G. CRI (GLP) - Green Label Plus Testing Program - Certified Products Current Edition.
- H. NFPA 253 - Standard Method of Test for Critical Radiant Flux of Floor Covering Systems Using a Radiant Heat Energy Source 2023.

**1.04 SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data on specified products, describing physical and performance characteristics; sizes, patterns, colors available, and method of installation.
- C. Shop Drawings: Indicate layout of joints.
- D. Samples: Submit two carpet tiles illustrating color and pattern design for each carpet color selected.
- E. Manufacturer's Installation Instructions: Indicate .
- F. Concrete Subfloor Test Report: Submit a copy of the moisture and alkalinity (pH) test reports.
- G. Manufacturer's Qualification Statement.
- H. Installer's Qualification Statement.
- I. Maintenance Data: Include maintenance procedures, recommended maintenance materials, and suggested schedule for cleaning.
- J. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
  - 1. See Section 01 60 00 - Product Requirements, for additional provisions.

2. Extra Carpet Tiles: Quantity equal to 5 percent of total installed of each color and pattern installed.

### **105 QUALITY ASSURANCE**

- A. Manufacturer Qualifications: Company specializing in manufacturing specified carpet tile with minimum three years documented experience.
- B. Installer Qualifications: Company specializing in installing carpet tile with minimum three years documented experience and approved by carpet tile manufacturer.
- C. Testing Agency Qualifications: Independent firm specializing in performing testing and inspections of the type specified in this section.

## **PART 2 PRODUCTS**

### **201 MANUFACTURERS**

- A. Tile Carpeting:
  1. Interface, Inc: [www.interface.com/#sle](http://www.interface.com/#sle).
  2. Milliken & Company: [www.milliken.com/#sle](http://www.milliken.com/#sle).
  3. Partcraft Address: PO Box 2128 Dalton, GA 800.241.4014
  4. .

### **202 MATERIALS**

- A. Tile Carpeting: Tufted, 100% solution dyed, manufactured in one color dye lot.
  1. Tile Size: 18 by 18 inch (450 by 450 mm), nominal.
  2. Thickness: .229 inch, min.
  3. Color: per Drawings.
  4. Pattern: per Drawings
  5. Critical Radiant Flux: Minimum of 0.22 watts/sq cm, when tested in accordance with ASTM E648 or NFPA 253.
  6. Surface Flammability Ignition: Pass ASTM D2859 (the "pill test").
  7. VOC Content: Comply with Section 01 61 16.
  8. VOC Content: Provide CRI (GLP) certified product; in lieu of labeling, independent test report showing compliance is acceptable.
  9. Gauge: 1.5" min.
  10. Stitches: 9 per inch min.
  11. Tufted Pile Weight: 22 oz., per sq. yd..
  12. Primary Backing Material: Polypropylene.
  13. Secondary Backing Material: EcoFlex NXT or equal
- B. Roll Carpet: Same manufacturer, type, color and pattern, and face fiber characteristics as carpet tile, [ ] feet ([ ] m) wide, manufactured in same color dye lot as tile.

### **203 ACCESSORIES**

- A. Subfloor Filler: White premix latex; type recommended by flooring material manufacturer.
- B. Base Cap: [ ] type, [ ] finish, [ ] color.
- C. Edge Strips: Embossed aluminum.
- D. Stair Nosing: Rubber type, square nose, ribbed top surface, one piece per stair tread width.
- E. Adhesives:
  1. Compatible with materials being adhered; maximum VOC content as specified in Section 01 61 16.
  2. Compatible with materials being adhered; maximum VOC content of 50 g/L; CRI (GLP) certified; in lieu of labeled product, independent test report showing compliance is acceptable.
- F. Carpet Tile Adhesive: Recommended by carpet tile manufacturer; releasable type.

- G. Carpet Tile Adhesive:
  - 1. Products:
    - a. Stauf USA, LLC; D737 High-Tack: [www.staufusa.com/#sle](http://www.staufusa.com/#sle).

### **PART 3 EXECUTION**

#### **301 EXAMINATION**

- A. Verify that subfloor surfaces are smooth and flat within tolerances specified for that type of work and are ready to receive carpet tile.
- B. Verify that wall surfaces are smooth and flat within the tolerances specified for that type of work, are dust-free, and are ready to receive carpet tile.
- C. Verify that subfloor surfaces are dust-free and free of substances that could impair bonding of adhesive materials to subfloor surfaces.
- D. Cementitious Subfloor Surfaces: Verify that substrates are ready for flooring installation by testing for moisture and alkalinity (pH).
  - 1. Test in accordance with Section 09 05 61.
  - 2. Test as Follows:
    - a. Alkalinity (pH): ASTM F710.
    - b. Internal Relative Humidity: ASTM F2170.
    - c. Moisture Vapor Emission: ASTM F1869.
  - 3. Conduct tests by an independent testing agency acceptable to Owner.
    - a. Acceptable Testing Agencies:
      - 1) Independent Floor Testing and Inspection, Inc. (IFTI): [www.ifti.com/#sle](http://www.ifti.com/#sle).
      - 2) Other testing agency approved by Owner.
  - 4. Obtain instructions if test results are not within limits recommended by flooring material manufacturer and adhesive materials manufacturer.

#### **302 PREPARATION**

- A. Remove existing carpet tile.
- B. Prepare floor substrates for installation of flooring in accordance with Section 09 05 61.
- C. Prepare floor substrates as recommended by flooring and adhesive manufacturers.**
- D. Remove subfloor ridges and bumps. Fill minor or local low spots, cracks, joints, holes, and other defects with subfloor filler.
- E. Apply, trowel, and float filler to achieve smooth, flat, hard surface. Prohibit traffic until filler is cured.
- F. Vacuum clean substrate.

#### **303 INSTALLATION**

- A. Starting installation constitutes acceptance of subfloor conditions.
- B. Install carpet tile in accordance with manufacturer's instructions.
- C. Blend carpet from different cartons to ensure minimal variation in color match.
- D. Cut carpet tile clean. Fit carpet tight to intersection with vertical surfaces without gaps.
- E. Lay carpet tile in square pattern, with pile direction parallel to next unit, set parallel to building lines.
- F. Locate change of color or pattern between rooms under door centerline.
- G. Fully adhere carpet tile to substrate.
- H. Adhere carpet tile to substrate along centerline of rooms, at perimeter of rooms, where tiles are cut, and at 15 foot (4.5 m) intervals throughout rooms. Lay remainder of tile dry over substrate.
- I. Adhere carpet tile as base finish up vertical surfaces to form base. Terminate top of base with cap strip.
- J. Trim carpet tile neatly at walls and around interruptions.
- K. Complete installation of edge strips, concealing exposed edges.

**3.04 INSTALLATION ON STAIRS**

- A. Use one piece of carpet for each tread and the riser below. Apply seam adhesive to all cut edges.
- B. Lay carpet with pile direction in the length of the stair.
- C. Adhere carpet tight to stair treads and risers.

**3.05 CLEANING**

- A. Remove excess adhesive without damage, from floor, base, and wall surfaces.
- B. Clean and vacuum carpet surfaces.

**END OF SECTION 09 68 13**

**SECTION 09 90 01  
PAINTING - NEW CONSTRUCTION  
SEE ARCHITECTURAL SHEET A-6.2**

**SECTION 096700  
FLUID-APPLIED FLOORING (EPOXY)**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Fluid-applied flooring.

**1.02 RELATED REQUIREMENTS**

- A. Section 079200 - Joint Sealants: Sealing joints between fluid-applied flooring and adjacent construction and fixtures.
- B. Section 090561 - Common Work Results for Flooring Preparation: Removal of existing floor coverings, cleaning, and preparation.
- C. Section 090561 - Common Work Results for Flooring Preparation: Concrete slab moisture and alkalinity testing and remediation procedures.

**1.03 REFERENCE STANDARDS**

- A. ASTM D638 - Standard Test Method for Tensile Properties of Plastics; 2022.
- B. ASTM D695 - Standard Test Method for Compressive Properties of Rigid Plastics; 2023.
- C. ASTM D905 - Standard Test Method for Strength Properties of Adhesive Bonds in Shear by Compression Loading; 2008 (Reapproved 2021).
- D. ASTM D4060 - Standard Test Method for Abrasion Resistance of Organic Coatings by the Taber Abraser; 2019.
- E. ASTM E96/E96M - Standard Test Methods for Gravimetric Determination of Water Vapor Transmission Rate of Materials; 2023.
- F. ASTM F710 - Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring; 2022.
- G. ASTM F1869 - Standard Test Method for Measuring Moisture Vapor Emission Rate of Concrete Subfloor Using Anhydrous Calcium Chloride; 2023.
- H. ASTM F2170 - Standard Test Method for Determining Relative Humidity in Concrete Floor Slabs Using in situ Probes; 2019a.
- I. ICRI 310.2R - Selecting and Specifying Concrete Surface Preparation for Sealers, Coatings, Polymer Overlays, and Concrete Repair; 2013.

**1.04 QUALITY ASSURANCE**

- A. Applicator Qualifications: Company specializing in performing the work of this section.

**1.05 DELIVERY, STORAGE, AND HANDLING**

- A. Store resin materials in a dry, secure area.

**1.06 FIELD CONDITIONS**

- A. Maintain ambient temperature required by manufacturer 24 hours prior to, during, and 24 hours after installation of materials.

**PART 2 PRODUCTS**

**2.01 MANUFACTURERS**

- A. Fluid-Applied Flooring:
  - 1. Florida Paints and Coatings, LLC: [www.floridapaints.com/#sle](http://www.floridapaints.com/#sle). 78 3rd St.; Winter Garden, FL 34787; Tel: 407-986-1000; Fax: 407-264-8674; Email: request info ([info@floridapaints.com](mailto:info@floridapaints.com)).
  - 2. Substitutions: See Section 016000 - Product Requirements.

**3.01 FLUID-APPLIED FLOORING SYSTEMS**

- A. Fluid-Applied Flooring: Epoxy base coat(s), with broadcast aggregate. And Polyaspartic topcoat.
  - 1. Aggregate: Vinyl Flake.
  - 2. Topcoat: 2 Part Polyaspartic Coating

3. System Thickness: 1/8 inch (3.2 mm), nominal, dry film thickness (DFT).
4. Texture: Smooth.
5. Sheen: High gloss.
6. Color and Flake Size: As selected by Architect.
7. System Components:
  - a. Flo-Poxy Self-Leveling Epoxy Floor Coating\_FP5740/FP5745 (Part A Clear/Gray) + FP5750 (Part B)
  - b. Partial Broadcast of Flake
  - c. Flo-Spartic\_FP5760 2 Part Polyaspartic Coating

### **PART 3 EXECUTION**

#### **4.01 EXAMINATION**

- A. Verify that subfloor surfaces are smooth and flat within the tolerances specified for that type of work and are ready to receive flooring.
- B. Verify that wall surfaces are smooth and flat within the tolerances specified for that type of work, are dust-free, and are ready to receive flooring.
- C. Verify that subfloor surfaces are dust-free and free of substances that could impair bonding of materials to subfloor surfaces.
- D. Cementitious Subfloor Surfaces: Verify that substrates are ready for fluid-applied flooring installation by testing for moisture and alkalinity (pH).
  1. Test as Follows:
    - a. Alkalinity (pH): ASTM F710.
    - b. Internal Relative Humidity: ASTM F2170.
    - c. Moisture Vapor Emission : ASTM F1869.
  2. Obtain instructions if test results are not within limits recommended by fluid-applied flooring manufacturer.

#### **4.02 PREPARATION**

- A. Prepare concrete surfaces according to ICRI 310.2R, \_\_\_\_\_.
- B. Apply primer to surfaces required by flooring manufacturer.

#### **4.03 INSTALLATION - FLOORING**

- A. Apply in accordance with manufacturer's instructions.
- B. Apply each coat to minimum thickness required by manufacturer.
- C. Finish to smooth level surface.

**END OF SECTION**

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**SECTION 10 14 00  
SIGNAGE**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Room and door signs.
- B. Interior directional and informational signs.
- C. Emergency evacuation maps.
- D. Building identification signs.
- E. Plaque.

**1.02 RELATED REQUIREMENTS**

- A. Section 22 05 53 - Identification for Plumbing Piping and Equipment.
- B. Section 26 05 53 - Identification for Electrical Systems.

**1.03 REFERENCE STANDARDS**

- A. 36 CFR 1191 - Americans with Disabilities Act (ADA) Accessibility Guidelines for Buildings and Facilities; Architectural Barriers Act (ABA) Accessibility Guidelines current edition.
- B. ADA Standards - 2010 ADA Standards for Accessible Design 2010.
- C. ICC A117.1 - Accessible and Usable Buildings and Facilities 2017.

**1.04 SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Manufacturer's printed product literature for each type of sign, indicating sign styles, font, foreground and background colors, locations, overall dimensions of each sign.
- C. Signage Schedule: Provide information sufficient to completely define each sign for fabrication, including room number, room name, other text to be applied, sign and letter sizes, fonts, and colors.
  - 1. When room numbers to appear on signs differ from those on drawings, include the drawing room number on schedule.
  - 2. When content of signs is indicated to be determined later, request such information from Owner through Architect at least 2 months prior to start of fabrication; upon request, submit preliminary schedule.
  - 3. Submit for approval by Owner through Architect prior to fabrication.
- D. Samples: Submit two samples of each type of sign, of size similar to that required for project, illustrating sign style, font, and method of attachment.
- E. Selection Samples: Where colors are not specified, submit two sets of color selection charts or chips.
- F. Manufacturer's Qualification Statement.
- G. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
  - 1. See Section 01 60 00 - Product Requirements, for additional provisions.

**1.05 QUALITY ASSURANCE**

- A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years of documented experience.

**1.06 DELIVERY, STORAGE, AND HANDLING**

- A. Package signs as required to prevent damage before installation.
- B. Package room and door signs in sequential order of installation, labeled by floor or building.
- C. Store tape adhesive at normal room temperature.

## **1.07 WARRANTY**

- A. Manufacturer agrees to Repair and Replace signage components 5 years from date of substantial completion.
- B. Maintain this minimum temperature during and after installation of signs.

## **PART 2 PRODUCTS**

### **201 MANUFACTURERS**

- A. Flat Signs:
  - 1. Best Sign Systems, Inc; [\_\_\_\_]: [www.bestsigns.com/#sle](http://www.bestsigns.com/#sle).
  - 2. Cosco Industries (ADA signs); ADA Series 1: [www.coscoarchitecturalsigns.com/#sle](http://www.coscoarchitecturalsigns.com/#sle).
- B. Dimensional Letter Signs:
  - 1. Cosco Industries; Cast Aluminum: [www.coscoarchitecturalsigns.com/#sle](http://www.coscoarchitecturalsigns.com/#sle).
  - 2. Substitutions: See Section 01 60 00 - Product Requirements.
- C. Plaques:
  - 1. Cosco Industries; Cast Aluminum: [www.coscoarchitecturalsigns.com/#sle](http://www.coscoarchitecturalsigns.com/#sle).
- D. Photoluminescent Exit Signs:
  - 1. Ecoglo, Inc; EX - Standard Series Photoluminescent Exit Signs: [www.ecoglo.us/#sle](http://www.ecoglo.us/#sle).
  - 2. Safe-T-Nose, LLC; EUL50 Photoluminescent Exit Sign: [www.safetnose.com/#sle](http://www.safetnose.com/#sle).

### **202 SIGNAGE APPLICATIONS**

- A. Accessibility Compliance: Signs are required to comply with ADA Standards and ICC A117.1, unless otherwise indicated; in the event of conflicting requirements, comply with the most comprehensive and specific requirements.
- B. Room and Door Signs: Provide a sign for every doorway, whether it has a door or not, not including corridors, lobbies, and similar open areas.
  - 1. Sign Type: Flat signs with engraved panel media as specified.
  - 2. Provide "tactile" signage, with letters raised minimum 1/32 inch (0.8 mm) and Grade II braille.
  - 3. Character Height: 1 inch (25 mm).
  - 4. Sign Height: 2 inches (50 mm), unless otherwise indicated.
  - 5. Office Doors: Identify with room numbers to be determined later, not the numbers indicated on drawings; in addition, provide "window" section for replaceable occupant name.
  - 6. Conference and Meeting Rooms: Identify with room numbers to be determined later, not the numbers indicated on drawings; in addition, provide "window" section with sliding "In Use/Vacant" indicator.
  - 7. Service Rooms: Identify with room names and numbers to be determined later, not those indicated on drawings.
  - 8. Rest Rooms: Identify with pictograms, the names "MEN" and "WOMEN", room numbers to be determined later, and braille.
- C. Interior Directional and Informational Signs:
  - 1. Sign Type: Same as room and door signs.
- D. Emergency Evacuation Maps:
  - 1. Allow for one map per elevator lobby.
  - 2. Map content to be provided by Owner.
  - 3. Use clear plastic panel silk-screened on reverse, in brushed aluminum frame, screw-mounted.
- E. Building Identification Signs:
  - 1. Use individual metal letters.
  - 2. Mount on outside wall in location indicated on drawings.
- F. Other Dimensional Letter Signs: Wall-mounted.
  - 1. Exterior: Allow for total of 50 letters, 6 inches (150 mm) high, metal.

2. Interior: Allow for total of 50 letters, 6 inches (150 mm) high, metal.

G. Plaque: See Allowance for details.

### **203 SIGN TYPES**

- A. Flat Signs: Signage media without frame.
1. Edges: Square.
  2. Corners: Square.
  3. Wall Mounting of One-Sided Signs: Tape adhesive.
  4. Wall and Ceiling Mounting of Two-Sided Signs: Aluminum wall bracket, powder coated, color selected from manufacturer's standard colors, attached with screws in predrilled mounting holes, set in clear silicone sealant.
- B. Color and Font: Unless otherwise indicated:
1. Character Font: Helvetica, Arial, or other sans serif font.
  2. Character Case: Upper and lower case (title case).
  3. Background Color: Clear.
  4. Character Color: Contrasting color.

### **204 TACTILE SIGNAGE MEDIA**

- A. Engraved Panels: Laminated colored plastic; engraved through face to expose core as background color:
1. Total Thickness: 1/16 inch (1.6 mm).

### **205 NON-TACTILE SIGNAGE MEDIA**

- A. Silk Screened Plastic Panels: Letters and graphics silk screened onto reverse side of plastic surface:
1. Sign Color: Clear.
  2. Total Thickness: 1/8 inch (3 mm).

### **206 PLAQUES**

- A. Metal Plaques:
1. Metal: Aluminum casting.
  2. Text and Typeface:
    - a. Character Font: Helvetica, Arial, or other sans serif font.
    - b. Character Case: Upper and lower case (title case).
    - c. Character Color: Contrast with background color.
  3. Border Style: As indicated on drawings.
  4. Background Texture: Ripple.
  5. Surface Finish: Brushed, satin.
  6. Painted Background Color: Light oxide stain.

### **207 DIMENSIONAL LETTERS**

- A. Metal Letters:
1. Metal: Aluminum casting.
  2. Metal Thickness: 1/8 inch minimum (3 mm).
  3. Text and Typeface:
    - a. Character Font: Helvetica, Arial, or other sans serif font.
  4. Finish: Brushed, satin.
  5. Mounting: Tape adhesive.

### **208 ACCESSORIES**

- A. Concealed Screws: Stainless steel, galvanized steel, chrome plated, or other non-corroding metal.
- B. Exposed Screws: Stainless steel.
- C. Tape Adhesive: Double sided tape, permanent adhesive.

**PART 3 EXECUTION**

**301 EXAMINATION**

- A. Verify that substrate surfaces are ready to receive work.

**302 INSTALLATION**

- A. Install in accordance with manufacturer's instructions.
- B. Install neatly, with horizontal edges level.
- C. Locate signs and mount at heights indicated on drawings and in accordance with ADA Standards and ICC A117.1.
- D. Protect from damage until Date of Substantial Completion; repair or replace damaged items.

**END OF SECTION 10 14 00**

**TOILET, BATH, AND LAUNDRY ACCESSORIES**  
**SECTION 10 28 00**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Commercial toilet accessories.
- B. Commercial shower and bath accessories.
- C. Institutional ligature-resistant toilet accessories.
- D. Under-lavatory pipe supply covers.
- E. Electric hand/hair dryers.
- F. Diaper changing stations.
- G. Utility room accessories.

**1.02 RELATED REQUIREMENTS**

- A. Section 10 21 13.19 - Plastic Toilet Compartments.
- B. Section 22 40 00 - Plumbing Fixtures: Under-lavatory pipe and supply covers.

**1.03 REFERENCE STANDARDS**

- A. ADA Standards - 2010 ADA Standards for Accessible Design 2010.
- B. ASME A112.18.9 - Protectors/Insulators for Exposed Waste and Supplies on Accessible Fixtures 2011 (Reaffirmed 2022).
- C. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products 2017.
- D. ASTM A269/A269M - Standard Specification for Seamless and Welded Austenitic Stainless Steel Tubing for General Service 2015a (Reapproved 2019).
- E. ASTM A666 - Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar 2015.
- F. ASTM B456 - Standard Specification for Electrodeposited Coatings of Copper Plus Nickel Plus Chromium and Nickel Plus Chromium 2017.
- G. ASTM C1036 - Standard Specification for Flat Glass 2021.
- H. ASTM C1048 - Standard Specification for Heat-Strengthened and Fully Tempered Flat Glass 2018.
- I. ASTM C1503 - Standard Specification for Silvered Flat Glass Mirror 2018.
- J. ASTM G21 - Standard Practice for Determining Resistance of Synthetic Polymeric Materials to Fungi 2015, with Editorial Revision (2021).

**1.04 ADMINISTRATIVE REQUIREMENTS**

- A. Coordinate the work with the placement of internal wall reinforcement, concealed ceiling supports, and reinforcement of toilet partitions to receive anchor attachments.

**1.05 SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Submit data on accessories describing size, finish, details of function, and attachment methods.
- C. Manufacturer's Installation Instructions: Indicate special procedures and conditions requiring special attention.

## **PART 2 PRODUCTS**

### **201 MANUFACTURERS**

- A. Commercial Toilet, Shower, and Bath Accessories:
  - 1. American Specialties, Inc: [www.americanspecialties.com/#sle](http://www.americanspecialties.com/#sle).
  - 2. Acorn Engineering Co.
  - 3. Bradley Corporation: [www.bradleycorp.com/#sle](http://www.bradleycorp.com/#sle).
  - 4. Bobrick Washroom Equipment, Inc.
  - 5. Georgia-Pacific Professional: [www.blue-connect.com/#sle](http://www.blue-connect.com/#sle).
  - 6. Substitutions: Section 01 60 00 - Product Requirements.
- B. Healthcare Accessories:
  - 1. American Specialties, Inc: [www.americanspecialties.com/#sle](http://www.americanspecialties.com/#sle).
  - 2. Bowman Manufacturing Company, Inc: [www.bowmandispensers.com/#sle](http://www.bowmandispensers.com/#sle).
  - 3. Substitutions: Section 01 60 00 - Product Requirements.
- C. Under-Lavatory Pipe Supply Covers:
  - 1. Plumberex Specialty Products, Inc: [www.plumberex.com/#sle](http://www.plumberex.com/#sle).
  - 2. Substitutions: Section 01 60 00 - Product Requirements.
- D. Electric Hand/Hair Dryers:
  - 1. American Specialties, Inc: [www.americanspecialties.com/#sle](http://www.americanspecialties.com/#sle).
  - 2. Excel Dryer: [www.exceldryer.com/#sle](http://www.exceldryer.com/#sle).
- E. Diaper Changing Stations:
  - 1. American Specialties, Inc: [www.americanspecialties.com/#sle](http://www.americanspecialties.com/#sle).
  - 2. Substitutions: 01 60 00 - Product Requirements.

### **202 MATERIALS**

- A. Accessories - General: Shop assembled, free of dents and scratches and packaged complete with anchors and fittings, steel anchor plates, adapters, and anchor components for installation.
  - 1. Grind welded joints smooth.
  - 2. Fabricate units made of metal sheet of seamless sheets with flat surfaces.
- B. Keys: Provide keys for each accessory to Owner; master key lockable accessories.
- C. Stainless Steel Sheet: ASTM A666, Type 304.
- D. Stainless Steel Tubing: ASTM A269/A269M, Grade TP304 or TP316.
- E. Mirror Glass: Annealed float glass, ASTM C1036 Type I, Class 1, Quality Q2, with silvering, protective and physical characteristics complying with ASTM C1503.
- F. Mirror Glass: Tempered safety glass, ASTM C1048; and ASTM C1036 Type I, Class 1, Quality Q2, with silvering as required.
- G. Adhesive: Two component epoxy type, waterproof.
- H. Fasteners, Screws, and Bolts: Stainless Steel; tamper-proof; security type.
- I. Expansion Shields: Fiber, lead, or rubber as recommended by accessory manufacturer for component and substrate.

### **203 FINISHES**

- A. Stainless Steel: Satin finish, unless otherwise noted.
- B. Chrome/Nickel Plating: ASTM B456, SC 2, polished finish, unless otherwise noted.
- C. Powder-Coated Steel: Clean, degrease, and neutralize. Follow immediately with a phosphatizing treatment, prime coat, and two finish coats of powder coat enamel.

## 204 COMMERCIAL TOILET ACCESSORIES

- A. Toilet Paper Dispenser: Single roll, surface mounted bracket type, stainless steel, spindleless type for tension spring delivery designed to prevent theft of tissue roll.
- B. Toilet Paper Dispenser: Surface Mounted, stainless steel unit with pivot hinge, tumbler lock.
  - 1. Products:
    - a. American Specialties, Inc: [www.americanspecialties.com/#sle](http://www.americanspecialties.com/#sle).
- C. Paper Towel Dispenser: Folded paper type, stainless steel, surface mounted, with viewing slots on sides as refill indicator and tumbler lock.
  - 1. Capacity: 525 minimum.
  - 2. Products:
    - a. American Specialties, Inc: Model 0210, [www.americanspecialties.com/#sle](http://www.americanspecialties.com/#sle).
    - b. Substitutions: Not permitted.
- D. Waste Receptacle: Stainless steel, freestanding style with swing top.
  - 1. Liner: Removable seamless stainless steel receptacle.
  - 2. Minimum capacity: 12 Gallons.
  - 3. Products:
    - a. American Specialties, Inc: [www.americanspecialties.com/#sle](http://www.americanspecialties.com/#sle).
    - b. Bobrick Washroom Equipment, Inc.
    - c. Substitutions: Section 01 60 00 - Product Requirements.
- E. Soap Dispenser: Liquid soap dispenser, surface-mounted on wall, with polyethylene container concealed below deck; piston and 4 inch (100 mm) spout of stainless steel with bright polished finish; chrome-plated deck escutcheon.
  - 1. Minimum Capacity: 1,000 ml
  - 2. Products:
    - a. Global Industrial Company, Inc. [ww.ajw.com/#sle](http://ww.ajw.com/#sle).
- F. Mirrors: Stainless steel framed, 1/4 inch (6 mm) thick annealed float glass; ASTM C1036.
  - 1. Frame: 0.05 inch (1.3 mm) angle shapes, with mitered and welded and ground corners, and tamperproof hanging system; satin finish.
  - 2. Adjustable Tilt Mirrors: Stainless steel piano hinge full width of base and elbow hinges at sides of mirror, for minimum tilt forward from top of 6 inches (150 mm).
  - 3. Shelf: Stainless steel; gauge and finish to match mirror frame, turned down edges, welded to frame; 5 inches (125 mm) deep, full width of mirror.
- G. Grab Bars: Stainless steel, smooth surface.
  - 1. Standard Duty Grab Bars:
    - a. Push/Pull Point Load: 250 pound-force (1112 N), minimum.
    - b. Dimensions: 1-1/4 inch (32 mm) outside diameter, minimum 0.05 inch (1.3 mm) wall thickness, exposed flange mounting, 1-1/2 inch (38 mm) clearance between wall and inside of grab bar.
    - c. Length and Configuration: As indicated on drawings.
    - d. Products:
      - 1) American Specialties, Inc: [www.americanspecialties.com/#sle](http://www.americanspecialties.com/#sle).
      - 2) Seachrome Corporation: [www.seachrome.com/#sle](http://www.seachrome.com/#sle).
      - 3) Standard Metal Hardware Manufacturing, Ltd; Grab Bars: [www.smhardware.com/#sle](http://www.smhardware.com/#sle).

2. Heavy Duty Grab Bars: Floor supports are acceptable if necessary to achieve load rating.
  - a. Push/Pull Point Load: Minimum 1000 pound-force (4448.2 N), minimum.
  - b. Dimensions: 1-1/2 inch (38 mm) outside diameter, minimum 0.125 inch (3.17 mm) wall thickness, exposed flange mounting, 1-1/2 inch (38 mm) clearance between wall and inside of grab bar.
  - c. Length and Configuration: As indicated on drawings.
  - d. Products:
- H. Combination Sanitary Napkin/Tampon Dispenser with Disposal: Stainless steel, surface-mounted.
  1. Door: Seamless 0.05 inch (1.3 mm) door with returned edges and tumbler lock.
  2. Cabinet: Fully welded, 0.03 inch (0.8 mm) thick sheet.
  3. Operation: 25 cent coin required to operate dispenser. Provide locked coin box, separately keyed.
  4. Identify dispensers slots without using brand names.
  5. Minimum capacity: 15 napkins and 20 tampons.

## **205 INSTITUTIONAL SECURITY AND LIGATURE-RESISTANT TOILET AND BATH ACCESSORIES**

- A. Toilet Paper Holder: Single roll, recessed unit with beveled wall flange, satin finish stainless steel, spring-loaded spindle button type for standard toilet paper rolls. Install with tamper-resistant screws.
  1. Auto-release pins: Tested to hold a minimum of 20 pounds (9 kg) and release at 40 pounds (18 kg) or greater.
- B. Paper Towel Holder: Folded paper type, single bay, satin finish stainless steel, surface-mounted, with open bays as refill indicators. Install with tamper-resistant screws.
  1. Capacity: 525 minimum per bay.
- C. Grab Bars: Type 304 stainless steel, smooth surface with closure plate.
  1. Standard Duty Grab Bars:
    - a. Push/Pull Point Load: 250 pound-force (1112 N), minimum.
    - b. Dimensions: 1-1/2 inch (38 mm) outside diameter, minimum 0.05 inch (1.3 mm) wall thickness, 1-1/2 inch (38 mm) clearance between wall and inside of grab bar; 14 gauge stainless steel "L" shaped closure plate with wall mounting flange welded to bottom of tube to prevent ligature. Install grab bar and closure plate with tamper-resistant screws through grab bar circular mounting flange and wall flange of flat closure.
    - c. Finish: Satin.
    - d. Length and Configuration: As indicated on drawings.

## **206 COMMERCIAL SHOWER AND BATH ACCESSORIES**

- A. Shower Curtain Rod: Stainless steel tube, 1 inch (25 mm) outside diameter, 0.04 inch (1.0 mm) wall thickness, satin-finished, with 3 inch (75 mm) outside diameter, minimum 0.04 inch (1.0 mm) thick satin-finished stainless steel flanges, for installation with exposed fasteners.
  1. Products:
    - a. American Specialties, Inc: [www.americanspecialties.com/#sle](http://www.americanspecialties.com/#sle).
    - b. Substitutions: Section 01 60 00 - Product Requirements.
- B. Shower Curtain:
  1. Material: Opaque vinyl, 0.008 inch (0.2 mm) thick, matte finish, with antibacterial treatment, flameproof and stain-resistant.
  2. Size: 36 by 72 inches (914 by 1830 mm), hemmed edges.
  3. Grommets: Stainless steel; pierced through top hem on 6 inch (150 mm) centers.
  4. Color: White.
  5. Shower Curtain Hooks: Chrome-plated or stainless steel spring wire designed for snap closure.
- C. Folding Shower Seat: Wall-mounted surface; welded tubular seat frame, structural support members, swing-down legs, hinges, and mechanical fasteners of Type 304 stainless steel, L-

shaped, right hand seat.

1. Seat: One-piece, pan-type, 0.05 inch (1.3 mm) stainless steel sheet, Type 304. Weld seams and grind smooth.
2. Size: ADA Standards compliant.
3. Products:
  - a. Seachrome Corporation; Accessibility Seats- L-Shaped Transfer with Swing-down Legs, Reversible: [www.seachrome.com/#sle](http://www.seachrome.com/#sle).
- D. Wall-Mounted Soap Dish: Heavy duty, seamless stainless steel, surface-mounted with drain holes, without grab bar, satin finish; with concealed mechanical fastening suitable for substrate and backplate.

### **207 UNDER-LAVATORY PIPE AND SUPPLY COVERS**

- A. Under-Lavatory Pipe and Supply Covers:
  1. Insulate exposed drainage piping, including hot, cold, and tempered water supplies under lavatories or sinks to comply with ADA Standards.

### **208 UTILITY ROOM ACCESSORIES**

- A. Mop and Broom Holder: 0.05 inch (1.3 mm) thick stainless steel, Type 304, hat-shaped channel.
  1. Holders: Three spring-loaded rubber cam holders.
  2. Length: 36 inches (900 mm).
  3. Length: Manufacturer's standard length for number of holders.
  4. Products:
    - a. American Specialties, Inc: [www.americanspecialties.com/#sle](http://www.americanspecialties.com/#sle).
    - b. Bobrick Corporation
- B. Combination Utility Shelf/Mop and Broom Holder: 0.05 inch (1.3 mm) thick stainless steel, Type 304, with 1/2 inch (12 mm) returned edges, 0.06 inch (1.6 mm) steel wall brackets.
  1. Drying rod: Stainless steel, 1/4 inch (6 mm) diameter.
  2. Hooks: Two, 0.06 inch (1.6 mm) stainless steel rag hooks at shelf front.
  3. Mop/broom holders: Three spring-loaded rubber cam holders at shelf front.
  4. Length: 36 inches (900 mm).
  5. Length: Manufacturer's standard length for number of holders/hooks.
  6. Products:
    - a. American Specialties, Inc: [www.americanspecialties.com/#sle](http://www.americanspecialties.com/#sle).
    - b. Substitutions: 01 60 00 - Product Requirements.

## **PART 3 EXECUTION**

### **301 EXAMINATION**

- A. Verify existing conditions before starting work.
- B. Verify exact location of accessories for installation.
- C. For electrically-operated accessories, verify that electrical power connections are ready and in the correct locations.
- D. See Rough Carpentry for installation of blocking, reinforcing plates, and concealed anchors in walls and ceilings.

### **302 PREPARATION**

- A. Deliver inserts and rough-in frames to site for timely installation.
- B. Provide templates and rough-in measurements as required.

### **303 INSTALLATION**

- A. Install accessories in accordance with manufacturers' instructions in locations indicated on drawings.
- B. Install plumb and level, securely and rigidly anchored to substrate.
- C. Mounting Heights: As required by accessibility regulations, unless otherwise indicated.

1. Grab Bars: As indicated on drawings.
2. Mirrors: , measured from floor to bottom of mirrored surface.
3. Electric Hand Dryers: Measured from floor to bottom of nozzle:
  - a. Men: 44 inches (1110 mm).
  - b. Women: 42 inches (1060 mm).
  - c. Teenager: 41 inches (1035 mm).
  - d. Child: 32 inches (810 mm).
  - e. Handicap: 36 inches (910 mm).

**304 PROTECTION**

- A. Protect installed accessories from damage due to subsequent construction operations.

**END OF SECTION 10 28 00**

**SECTION 10 44 00  
FIRE PROTECTION SPECIALTIES**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Fire extinguishers.
- B. Self-service reloadable fire extinguishers.
- C. Fire blankets.
- D. Fire extinguisher cabinets.
- E. Accessories.

**1.02 RELATED REQUIREMENTS**

- A. Section 06 10 00 - Rough Carpentry: Wood blocking product and execution requirements.
- B. Section 09 91 23 - Interior Painting: Field paint finish.

**1.03 REFERENCE STANDARDS**

- A. ASTM E814 - Standard Test Method for Fire Tests of Penetration Firestop Systems 2013a (Reapproved 2017).
- B. NFPA 10 - Standard for Portable Fire Extinguishers 2022.

**1.04 SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide extinguisher operational features.

**1.05 FIELD CONDITIONS**

- A. Do not install extinguishers when ambient temperature may cause freezing of extinguisher ingredients.

**PART 2 PRODUCTS**

**2.01 MANUFACTURERS**

- A. Fire Extinguishers:
  - 1. Activar Construction Products Group, Inc. - JL Industries; Cosmic Extinguisher - Multipurpose Chemical: [www.activarcpg.com/#sle](http://www.activarcpg.com/#sle).
  - 2. Potter-Roemer; [\_\_\_\_\_]: [www.potterroemer.com/#sle](http://www.potterroemer.com/#sle).
  - 3. Larson Manufacturing
  - 4. Substitutions: See Section 01 60 00 - Product Requirements.
- B. Fire Extinguisher Cabinets and Accessories:
  - 1. Activar Construction Products Group, Inc. - JL Industries; Ambassador Series: [www.activarcpg.com/#sle](http://www.activarcpg.com/#sle).
  - 2. Larsen's Manufacturing Co; [\_\_\_\_\_]: [www.larsensmfg.com/#sle](http://www.larsensmfg.com/#sle).
  - 3. Potter-Roemer; [\_\_\_\_\_]: [www.potterroemer.com/#sle](http://www.potterroemer.com/#sle).

**2.02 FIRE EXTINGUISHERS**

- A. Fire Extinguishers - General: Comply with product requirements of NFPA 10 and applicable codes, whichever is more stringent.
- B. Multipurpose Dry Chemical Type Fire Extinguishers: Carbon steel tank, with pressure gauge.
  - 1. Class: A:B:C type.
  - 2. Temperature range: Minus 40 degrees F (Minus 40 degrees C) to [\_\_\_\_] degrees F ([\_\_\_\_] degrees C).

**2.03 SELF-SERVICE RELOADABLE FIRE EXTINGUISHERS**

- A. Self-Service Reloadable Fire Extinguishers - General: Comply with product requirements of NFPA 10 and applicable codes, whichever is more stringent.

- B. Multipurpose Monoammonium Phosphate Dry Chemical Type Fire Extinguishers: Polymeric body, including discharge head, carbon dioxide cartridge, extinguisher agent cartridge and valve assembly.
  - 1. Temperature range: Minus 40 degrees F (Minus 40 degrees C) to 120 degrees F (49 degrees C).

#### **204 FIRE EXTINGUISHER CABINETS**

- A. Fire Rating: Listed and labeled in accordance with ASTM E814 requirements for fire resistance rating of walls where being installed.
- B. Cabinet Construction: Non-fire rated.
  - 1. Formed aluminum.
- C. Fire Rated Cabinet Construction: One-hour fire rated.
- D. Cabinet Configuration: Recessed type.
  - 1. Size to accommodate accessories.
- E. Door: 0.036 inch (0.9 mm) metal thickness, reinforced for flatness and rigidity with nylon catch. Hinge doors for 180 degree opening with two butt hinges.
- F. Door Glazing: Float glass, clear, 1/8 inch (3 mm) thick, and set in resilient channel glazing gasket.

#### **205 ACCESSORIES**

- A. Fire Blanket: Fire retardant treated wool; red, 62 by 84 inch (1575 by 2135 mm) size.
- B. Extinguisher Brackets: Formed steel, chrome-plated.
- C. Cabinet Signage: [\_\_\_\_\_].
- D. Lettering: FIRE EXTINGUISHER decal, or vinyl self-adhering, pre-spaced black lettering in accordance with authorities having jurisdiction (AHJ).

### **PART 3 EXECUTION**

#### **301 EXAMINATION**

- A. Verify existing conditions before starting work.
- B. Verify rough openings for cabinet are correctly sized and located.

#### **302 INSTALLATION**

- A. Install in accordance with manufacturer's instructions.

#### **303 MAINTENANCE**

- A. Provide a separate maintenance contract for specified maintenance service.
- B. Provide a separate maintenance contract for the service and maintenance of for 5 years from Date of Substantial Completion.

#### **304 MAINTENANCE - SELF-SERVICE FIRE EXTINGUISHERS**

- A. Monthly Inspections: Inspect self-service fire extinguishers on monthly basis in accordance with manufacturer's instructions, and requirements of the authorities having jurisdiction (AHJ).
- B. Annual Inspections: Inspect self-service fire extinguishers on annual basis in accordance with manufacturer's instructions, and requirements of the authorities having jurisdiction (AHJ).
- C. Inspection Certification Tag: Provide new tag indicating acceptable condition of fire extinguisher, date of inspection, and name of self-service inspector for each inspection.

#### **305 SCHEDULES**

- A. Corridors: Water Type, Class 2-A, 2 1/2 gallon (11 L) capacity, polished chrome finish, placed in 12 inch (300 mm) wide by 30 inch (760 mm) high by 10 inch (250 mm) deep recessed polished stainless steel cabinet; locate two per floor.

**END OF SECTION 10 44 00**