City of
SPARTANBURG
CONSTRUCTION PROJECT MANAGEMEN
TELEPHONE: 864-562-4398
FAX: 864-562-4443

Addendum # 2

Project: Henry Street City Office Renovation

Clarification:
The bid date has been extended one (1) week to March 22, 2016 at 3:00 pm. Location is the same as RFP states.

Henry Street City Offices Renovation

305 West Henry Street

Spartanburg, South Carolina

Issue Date: February 28, 2016

City of SPARTANBURG south carolina

Henry Street City Office Renovation

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09651	Resilient Flooring
096513	Resilient Base and Accessories

Division 10 Specialties

102113	Toilet Compartments

Division 11 Equipment
Not Used

Division 12 Furnishings
Not Used

Division 13 Special Construction
Not Used

Division 14 Conveying Equipment
Not Used

Division21 Fire Suppression
Not Used

Division 22 Plumbing

221113	Facility Water Distribution
221313	Facility Sanitary Sewer

Division 23 Heating Ventilation and Air Conditioning
See Drawing Notes

Division 24 Electrical
See Electrical Drawings

Division 31 Earthwork
Not Used

Division 32 Exterior Improvements
Not Used

Division 33 Utilities
Not Used

SECTION 01010 – SUMMARY OF WORK

Project Description:

The overall project consist of additions office space at the city facility on Henry Street, but not limited to, the following:

Site Work: Non in this phase

Foundation System: Non in this phase

Exterior Wall System: Steel framing, steel siding panels, roll up coil doors, and 3'0" X 7'0" steel door and frame. Repair of existing sheet metal damage.

Interior Wall Systems: Masonry and stud wall with drywall components.

Roof System: Non in this phase

Structural System: Masonry per structural design.

Floor System: Concrete existing bottom floor. Flooring for second floor shall be installed per structural design.

Door System: Steel doors and frames

Finish Systems: Ceiling: Drywall and paint.
Flooring: VCT and "Johnsonite 4" Rubber Cove Base",
Walls: Painted CMU and drywall.

Mechanical Systems: Owner will provided HVAC equipment in Phase 2 but contractor to coordinate with city staff during framing process.

Electrical: Interior and Exterior general wiring for lights and outlets.

Lighting: Fluorescent per electrical design.

Contractor Use of Premises: Limit use of the premises to construction activities in areas indicated.

Keep Driveways and Entrances: clear at all times. Do not use these areas for parking or storage of material.

Henry Street City Offices Renovation

305 West Henry Street

Spartanburg, South Carolina

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City of SPARTANBURG south carolina

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SECTION 012500 - SUBSTITUTION PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section includes administrative and procedural requirements for substitutions.

B. Related Sections:
1. Divisions 02 through 49 Sections for specific requirements and limitations for substitutions.

1.3 DEFINITIONS

A. Substitutions: Changes in products, materials, equipment, and methods of construction from those required by the Contract Documents and proposed by Contractor.

1. Substitutions for Cause: Changes proposed by Contractor that are required due to changed Project conditions, such as unavailability of product, regulatory changes, or unavailability of required warranty terms.
2. Substitutions for Convenience: Changes proposed by Contractor or Owner that are not required in order to meet other Project requirements but may offer advantage to Contractor or Owner.

1.4 SUBMITTALS

A. Substitution Requests: Submit three copies of each request for consideration. Identify product or fabrication or installation method to be replaced. Include Specification Section number and title and Drawing numbers and titles.
1. Documentation: Show compliance with requirements for substitutions and the following, as applicable:

a. Statement indicating why specified product or fabrication or installation cannot be provided, if applicable.
b. Coordination information, including a list of changes or modifications needed to other parts of the Work and to construction performed by Owner and separate contractors, that will be necessary to accommodate proposed substitution.
c. Detailed comparison of significant qualities of proposed substitution with those of the Work specified. Include annotated copy of applicable specification section. Significant qualities may include attributes such as performance, weight, size, durability, visual effect, sustainable design characteristics, warranties, and specific features and requirements indicated. Indicate deviations, if any, from the Work specified.

d. Product Data, including drawings and descriptions of products and fabrication and installation procedures.
e. Samples, where applicable or requested.
f. Certificates and qualification data, where applicable or requested.
g. List of similar installations for completed projects with project names and addresses and names and addresses of architects and owners.
h. Material test reports from a qualified testing agency indicating and interpreting test results for compliance with requirements indicated.
i. Research reports evidencing compliance with building code in effect for Project.
j. Detailed comparison of Contractor's construction schedule using proposed substitution with products specified for the Work, including effect on the overall Contract Time. If specified product or method of construction cannot be provided within the Contract Time, include letter from manufacturer, on manufacturer's letterhead, stating date of receipt of purchase order, lack of availability, or delays in delivery.
k. Cost information, including a proposal of change, if any, in the Contract Sum.
l. Contractor's certification that proposed substitution complies with requirements in the Contract Documents except as indicated in substitution request, is compatible with related materials, and is appropriate for applications indicated.
m. Contractor's waiver of rights to additional payment or time that may subsequently become necessary because of failure of proposed substitution to produce indicated results.

2. Architect's Action: If necessary, Architect will request additional information or documentation for evaluation within seven days of receipt of a request for substitution. Architect will notify Contractor of acceptance or rejection of proposed substitution within 15 days of receipt of request, or seven days of receipt of additional information or documentation, whichever is later.

a. Forms of Acceptance: Change Order, Construction Change Directive, or Architect's Supplemental Instructions for minor changes in the Work.
b. Use product specified if Architect does not issue a decision on use of a proposed substitution within time allocated.

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

1.5 PROCEDURES

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

PART 2 - PRODUCTS

2.1 SUBSTITUTIONS

A. Substitutions for Cause: Submit requests for substitution immediately upon discovery of need for change, but not later than 15 days prior to time required for preparation and review of related submittals.

1. Conditions: Architect will consider Contractor's request for substitution when the following conditions are satisfied. If the following conditions are not satisfied, ~~Architect~~ will return requests without action, except to record noncompliance with these requirements:

   a. Requested substitution is consistent with the Contract Documents and will produce indicated results.
   b. Substitution request is fully documented and properly submitted.
   c. Requested substitution will not adversely affect Contractor's construction schedule.
   d. Requested substitution has received necessary approvals of authorities having jurisdiction.
   e. Requested substitution is compatible with other portions of the Work.
   f. Requested substitution has been coordinated with other portions of the Work.
   g. Requested substitution provides specified warranty.
   h. If requested substitution involves more than one contractor, requested substitution has been coordinated with other portions of the Work, is uniform and consistent, is compatible with other products, and is acceptable to all contractors involved.

B. Substitutions for Convenience: Not allowed, unless otherwise indicated.

PART 3 - EXECUTION (Not Used)

END OF SECTION 012500

SECTION 013300 - SUBMITTAL PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section includes requirements for the submittal schedule and administrative and procedural requirements for submitting Shop Drawings, Product Data, Samples, and other submittals.

B. Related Sections:

1. Division 01 Section "Operation and Maintenance Data" for submitting operation and maintenance manuals.

2. Division 01 Section "Project Record Documents" for submitting record Drawings, record Specifications, and record Product Data.

1.3 DEFINITIONS

A. Action Submittals: Written and graphic information and physical samples that require Architect's responsive action. Action submittals are those submittals indicated in individual Specification Sections as action submittals.

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

C. File Transfer Protocol (FTP): Communications protocol that enables transfer of files to and from another computer over a network and that serves as the basis for standard Internet protocols. An FTP site is a portion of a network located outside of network firewalls within which internal and external users are able to access files.

D. Portable Document Format (PDF): An open standard file format licensed by Adobe Systems used for representing documents in a device-independent and display resolution-independent fixed-layout document format.

1.4 ACTION SUBMITTALS

A. Submittal Schedule: Submit a schedule of submittals, arranged in chronological order by dates required by construction schedule. Include time required for review, ordering, manufacturing, fabrication, and delivery when establishing dates. Include additional time required for making corrections or modifications to submittals noted by the ~~Architect~~ and Construction Manager and additional time for handling and reviewing submittals required by those corrections.

1. Coordinate submittal schedule with list of subcontracts, the schedule of values, and Contractor's construction schedule.

2. Initial Submittal: Submit concurrently with start-up construction schedule. Include submittals required during the first 60 days of construction. List those submittals required to maintain orderly progress of the Work and those required early because of long lead time for manufacture or fabrication.

3. Final Submittal: Submit concurrently with the first complete submittal of Contractor's construction schedule.

   a. Submit revised submittal schedule to reflect changes in current status and timing for submittals.

4. Format: Arrange the following information in a tabular format:
   a. Scheduled date for first submittal.
   b. Specification Section number and title.
   c. Submittal category: Action, informational.
   d. Name of subcontractor.
   e. Description of the Work covered.
   f. Scheduled date for Architect's and Construction Manager's] final release or approval.
   g. Scheduled dates for purchasing.
   h. Scheduled dates for installation.
   i. Activity or event number.

1.5 SUBMITTAL ADMINISTRATIVE REQUIREMENTS

A. ~~Architect~~'s Digital Data Files: Electronic copies of CAD Drawings of the Contract Drawings will be provided by Architect for Contractor's use in preparing submittals.

1. Architect will furnish Contractor one set of digital data drawing files of the Contract Drawings for use in preparing Shop Drawings and Project record drawings.

   a. Architect makes no representations as to the accuracy or completeness of digital data drawing files as they relate to the Contract Drawings.
   b. Digital Drawing Software Program: The Contract Drawings are available in AutoCAD 2010 (or saved down 2007).
   c. Contractor shall execute a data licensing agreement in the form of an Agreement form acceptable to the Owner and Architect.

B. Coordination: Coordinate preparation and processing of submittals with performance of construction activities.

1. Coordinate each submittal with fabrication, purchasing, testing, delivery, other submittals, and related activities that require sequential activity.

2. Submit all submittal items required for each Specification Section concurrently unless partial submittals for portions of the Work are indicated on approved submittal schedule.

3. Submit action submittals and informational submittals required by the same Specification Section as separate packages under separate transmittals.

4. Coordinate transmittal of different types of submittals for related parts of the Work so processing will not be delayed because of need to review submittals concurrently for coordination.

a. Architect reserves the right to withhold action on a submittal requiring coordination with other submittals until related submittals are received.

Owner

C. Processing Time: Allow time for submittal review, including time for resubmittals, as follows. Time for review shall commence on ~~Architect's~~ receipt of submittal. No extension of the Contract Time will be authorized because of failure to transmit submittals enough in advance of the Work to permit processing, including resubmittals.

1. Initial Review: Allow 15 days for initial review of each submittal. Allow additional time if coordination with subsequent submittals is required. ~~Architect~~ will advise Contractor when a submittal being processed must be delayed for coordination. Owner

2. Intermediate Review: If intermediate submittal is necessary, process it in same manner as initial submittal.

3. Resubmittal Review: Allow 15 days for review of each resubmittal.

4. Sequential Review: Where sequential review of submittals by Architect's consultants, Owner, or other parties is indicated, allow 21 days for initial review of each submittal.

5. Concurrent Consultant Review: Where the Contract Documents indicate that submittals may be transmitted simultaneously to ~~Architect~~ and to Architect's consultants, allow 15 days for review of each submittal. Submittal will be returned to Architect before being returned to Contractor.

D. Identification and Information: Place a permanent label or title block on each paper copy submittal item for identification.

1. Indicate name of firm or entity that prepared each submittal on label or title block.

2. Provide a space approximately 6 by 8 inches on label or beside title block to record Contractor's review and approval markings and action taken by Architect.

3. Include the following information for processing and recording action taken:

a. Project name.
b. Date. Owner
c. Name of ~~Architect~~.
d. Name of Construction Manager.
e. Name of Contractor.
f. Name of subcontractor.
g. Name of supplier.
h. Name of manufacturer.
i. Submittal number or other unique identifier, including revision identifier.

1) Submittal number shall use Specification Section number followed by a decimal point and then a sequential number (e.g., 061000.01). Resubmittals shall include an alphabetic suffix after another decimal point (e.g., 061000.01.A).

j. Number and title of appropriate Specification Section.
k. Drawing number and detail references, as appropriate.
l. Location(s) where product is to be installed, as appropriate.
m. Other necessary identification.

E. Identification and Information: Identify and incorporate information in each electronic submittal file as follows:

1. Assemble complete submittal package into a single indexed file with links enabling navigation to each item.

2. Name file with submittal number or other unique identifier, including revision identifier.

   a. File name shall use project identifier and Specification Section number followed by a decimal point and then a sequential number (e.g., LNHS-061000.01). Resubmittals shall include an alphabetic suffix after another decimal point (e.g., LNHS-061000.01.A).

3. Provide means for insertion to permanently record Contractor's review and approval markings and action taken by ~~Architect~~ Owner.

4. Include the following information on an inserted cover sheet:

   a. Project name.
   b. Date.
   c. Name and address of ~~Architect~~ Owner.
   d. Name of Contractor.
   e. Name of firm or entity that prepared submittal.
   f. Name of subcontractor.
   g. Name of supplier.
   h. Name of manufacturer.
   i. Number and title of appropriate Specification Section.
   j. Drawing number and detail references, as appropriate.
   k. Location(s) where product is to be installed, as appropriate.
   l. Related physical samples submitted directly.
   m. Other necessary identification.

5. Include the following information as keywords in the electronic file metadata:

   a. Project name.
   b. Number and title of appropriate Specification Section.
   c. Manufacturer name.
   d. Product name.

F. Options: Identify options requiring selection by the Architect.

G. Deviations: Identify deviations from the Contract Documents on submittals.

H. Additional Paper Copies: Unless additional copies are required for final submittal, and unless Architect observes noncompliance with provisions in the Contract Documents, initial submittal may serve as final submittal.

1. Submit one copy of submittal to concurrent reviewer in addition to specified number of copies to ~~Architect~~ Owner.

I. Transmittal: Assemble each submittal individually and appropriately for transmittal and handling. Transmit each submittal using a transmittal form. ~~Architect~~ Owner will discard submittals received from sources other than Contractor.

1. Transmittal Form: Provide locations on form for the following information:

    a. Project name.
    b. Date.
    c. Destination (To:).
    d. Source (From:).
    e. Names of subcontractor, manufacturer, and supplier.
    f. Category and type of submittal.
    g. Submittal purpose and description.
    h. Specification Section number and title.
    i. Indication of full or partial submittal.
    j. Drawing number and detail references, as appropriate.
    k. Transmittal number, numbered consecutively.
    l. Submittal and transmittal distribution record.
    m. Remarks.
    n. Signature of transmitter.

2. On an attached separate sheet, prepared on Contractor's letterhead, record relevant information, requests for data, revisions other than those requested by Architect[on previous submittals, and deviations from requirements in the Contract Documents, including minor variations and limitations. Include same identification information as related submittal.

J. Resubmittals: Make resubmittals in same form and number of copies as initial submittal.

1. Note date and content of previous submittal.
2. Note date and content of revision in label or title block and clearly indicate extent of revision.
3. Resubmit submittals until they are marked with approval notation from Architect's stamp.

K. Distribution: Furnish copies of final submittals to manufacturers, subcontractors, suppliers, fabricators, and installers, authorities having jurisdiction, and others as necessary for performance of construction activities. Show distribution on transmittal forms.

L. Use for Construction: Use only final submittals that are marked with approval notation from Architect's action stamp.

PART 2 - PRODUCTS

2.1 SUBMITTAL PROCEDURES

A. General Submittal Procedure Requirements: Prepare and submit submittals required by individual Specification Sections. Types of submittals are indicated in individual Specification Sections.

1. Submit electronic submittals via email as PDF electronic files.
    a. ~~Architect~~ will return annotated file. Annotate and retain one copy of file as an electronic Project record document file.

2. Action Submittals: Submit three paper copies of each submittal, unless otherwise indicated. Architect will return two copies.

3. Informational Submittals: Submit two paper copies of each submittal, unless otherwise indicated. ~~Architect~~ will not return copies.
4. Closeout Submittals and Maintenance Material Submittals: Comply with requirements specified in Division 01 Section "Operation and Maintenance Data."

5. Certificates and Certifications Submittals: Provide a statement that includes signature of entity responsible for preparing certification. Certificates and certifications shall be signed by an officer or other individual authorized to sign documents on behalf of that entity.
   a. Provide a digital signature with digital certificate on electronically-submitted certificates and certifications where indicated.
   b. Provide a notarized statement on original paper copy certificates and certifications where indicated

B. Product Data: Collect information into a single submittal for each element of construction and type of product or equipment.

1. If information must be specially prepared for submittal because standard published data are not suitable for use, submit as Shop Drawings, not as Product Data.

2. Mark each copy of each submittal to show which products and options are applicable.

3. Include the following information, as applicable:
   a. Manufacturer's catalog cuts.
   b. Manufacturer's product specifications.
   c. Standard color charts.
   d. Statement of compliance with specified referenced standards.
   e. Testing by recognized testing agency.
   f. Application of testing agency labels and seals.
   g. Notation of coordination requirements.
   h. Availability and delivery time information.

4. For equipment, include the following in addition to the above, as applicable:
   a. Wiring diagrams showing factory-installed wiring.
   b. Printed performance curves.
   c. Operational range diagrams.
   d. Clearances required to other construction, if not indicated on accompanying Shop Drawings.

5. Submit Product Data before or concurrent with Samples.

6. Submit Product Data in the following format:
   a. PDF electronic file or; Three paper copies of Product Data, unless otherwise indicated. Architect will return two copies

C. Shop Drawings: Prepare Project-specific information, drawn accurately to scale. Do not base Shop Drawings on reproductions of the Contract Documents or standard printed data, unless submittal based upon ~~Architect~~'s digital data drawing files is otherwise permitted.

1. Preparation: Fully illustrate requirements in the Contract Documents. Include the following information, as applicable:
   a. Identification of products.
   b. Schedules.
   c. Compliance with specified standards.

d. Notation of coordination requirements.
e. Notation of dimensions established by field measurement.
f. Relationship and attachment to adjoining construction clearly indicated.
g. Seal and signature of professional engineer if specified.

2. Sheet Size: Except for templates, patterns, and similar full-size drawings, submit Shop Drawings on sheets at least 8-1/2 by 11 inches but no larger than 30 by 42 inches.

3. Submit Shop Drawings in the following format:

a. PDF electronic file or;
b. Three opaque copies of each submittal. ~~Architect~~ will retain two copies; remainder will be returned

D. Samples: Submit Samples for review of kind, color, pattern, and texture for a check of these characteristics with other elements and for a comparison of these characteristics between submittal and actual component as delivered and installed.

1. Transmit Samples that contain multiple, related components such as accessories together in one submittal package.

2. Identification: Attach label on unexposed side of Samples that includes the following:
a. Generic description of Sample.
b. Product name and name of manufacturer.
c. Sample source.
d. Number and title of applicable Specification Section.

3. Disposition: Maintain sets of approved Samples at Project site, available for quality-control comparisons throughout the course of construction activity. Sample sets may be used to determine final acceptance of construction associated with each set.
a. Samples that may be incorporated into the Work are indicated in individual Specification Sections. Such Samples must be in an undamaged condition at time of use.
b. Samples not incorporated into the Work, or otherwise designated as Owner's property, are the property of Contractor.

4. Samples for Initial Selection: Submit manufacturer's color charts consisting of units or sections of units showing the full range of colors, textures, and patterns available.
a. Number of Samples: Submit one full set(s) of available choices where color, pattern, texture, or similar characteristics are required to be selected from manufacturer's product line. Architect, will return submittal with options selected.

5. Samples for Verification: Submit full-size units or Samples of size indicated, prepared from same material to be used for the Work, cured and finished in manner specified, and physically identical with material or product proposed for use, and that show full range of color and texture variations expected. Samples include, but are not limited to, the following: partial sections of manufactured or fabricated components; small cuts or containers of materials; complete units of repetitively used materials; swatches showing color, texture, and pattern; color range sets; and components used for independent testing and inspection.
a. Number of Samples: Submit three sets of Samples. Architect will retain two Sample sets; remainder will be returned. Mark up and retain one returned Sample set as a Project record sample.

1) Submit a single Sample where assembly details, workmanship, fabrication techniques, connections, operation, and other similar characteristics are to be demonstrated.
2) If variation in color, pattern, texture, or other characteristic is inherent in material or product represented by a Sample, submit at least sets of paired units that show approximate limits of variations.

E. Product Schedule: As required in individual Specification Sections, prepare a written summary indicating types of products required for the Work and their intended location. Include the following information in tabular form:

1. Type of product. Include unique identifier for each product.

2. Manufacturer and product name, and model number if applicable.

3. Number and name of room or space.

4. Location within room or space.

5. Submit product schedule in the following format:
   a. PDF electronic file or;
   b. Three paper copies of product schedule or list, unless otherwise indicated. ~~Architect~~ will return two copies.

F. Contractor's Construction Schedule: Comply with requirements specified in Division 01 Section "Construction Progress Documentation."

G. Application for Payment: Comply with requirements specified in Division 01 Section "Payment Procedures."

H. Schedule of Values: Comply with requirements specified in Division 01 Section "Payment Procedures."

I. Subcontract List: Prepare a written summary identifying individuals or firms proposed for each portion of the Work, including those who are to furnish products or equipment fabricated to a special design. Include the following information in tabular form:

1. Name, address, and telephone number of entity performing subcontract or supplying products.
2. Number and title of related Specification Section(s) covered by subcontract.
3. Drawing number and detail references, as appropriate, covered by subcontract.
4. Submit subcontract list in the following format:
   a. PDF electronic file.
   b. Number of Copies: Three paper copies of subcontractor list, unless otherwise indicated. ~~Architect,~~ will return two copies.

J. Qualification Data: Prepare written information that demonstrates capabilities and experience of firm or person. Include lists of completed projects with project names and addresses, contact information of architects and owners, and other information specified.

K. Welding Certificates: Prepare written certification that welding procedures and personnel comply with requirements in the Contract Documents. Submit record of Welding Procedure Specification and Procedure Qualification Record on American Welding Society (AWS) forms. Include names of firms and personnel certified.

L. Installer Certificates: Where required in the Contract Documents, submit written statements on manufacturer's letterhead certifying that Installer complies with requirements in the Contract Documents and, where required, is authorized by manufacturer for this specific Project.

M. Manufacturer Certificates: Where required in the Contract Documents, submit written statements on manufacturer's letterhead certifying that manufacturer complies with requirements in the Contract Documents. Include evidence of manufacturing experience where required.

N. Product Certificates: Where required in the Contract Documents, submit written statements on manufacturer's letterhead certifying that product complies with requirements in the Contract Documents.

O. Material Certificates: Where required in the Contract Documents, submit written statements on manufacturer's letterhead certifying that material complies with requirements in the Contract Documents.

P. Product Test Reports: Where required in the Contract Documents, submit written reports indicating current product produced by manufacturer complies with requirements in the Contract Documents. Base reports on evaluation of tests performed by manufacturer and witnessed by a qualified testing agency, or on comprehensive tests performed by a qualified testing agency.

Q. Field Test Reports: Submit reports indicating and interpreting results of field tests performed either during installation of product or after product is installed in its final location, for compliance with requirements in the Contract Documents.

R. Maintenance Data: Comply with requirements specified in Division 01 Section "Operation and Maintenance Data."

2.2 DELEGATED-DESIGN SERVICES

A. Performance and Design Criteria: Where professional design services or certifications by a design professional are specifically required of Contractor by the Contract Documents, provide products and systems complying with specific performance and design criteria indicated.
1. If criteria indicated are not sufficient to perform services or certification required, submit a written request for additional information to Architect.

PART 3 - EXECUTION

3.1 CONTRACTOR'S REVIEW

A. Action and Informational Submittals: Review each submittal and check for coordination with other Work of the Contract and for compliance with the Contract Documents. Note corrections and field dimensions. Mark with approval stamp before submitting to Architect.

B. Project Closeout and Maintenance/Material Submittals: Refer to requirements in Division 01 Section "Closeout Procedures."

C. Approval Stamp: Stamp each submittal with a uniform, approval stamp. Include Project name and location, submittal number, Specification Section title and number, name of reviewer, date of Contractor's approval, and statement certifying that submittal has been reviewed, checked, and approved for compliance with the Contract Documents.

3.2 Owner's Actions

A. General: ~~Architect~~ Owner will not review submittals that do not bear Contractor's approval stamp and will return them without action.

B. Action Submittals: ~~Architect~~ Owner will review each submittal, make marks to indicate corrections or modifications required, and return it. Architect will stamp each submittal with an action stamp and will mark stamp appropriately to indicate action.

C. Informational Submittals: ~~Architect~~ Owner will review each submittal and will not return it, or will return it if it does not comply with requirements. ~~Architect~~ Owner will forward each submittal to appropriate party.

D. Partial submittals prepared for a portion of the Work will be reviewed when use of partial submittals has received prior approval from Architect.

E. Incomplete submittals are not acceptable, will be considered nonresponsive, and will be returned without review.

F. Submittals not required by the Contract Documents may not be reviewed and may be discarded.

END OF SECTION 013300

SECTION 042000 - UNIT MASONRY ASSEMBLIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes unit masonry assemblies consisting of the following:
   1. Concrete masonry units (CMUs).
   2. Pre-faced concrete masonry units.
   3. Concrete brick.
   4. Face brick.
   5. Building (common) brick.
   6. Mortar and grout.
   7. Reinforcing steel.
   8. Masonry joint reinforcement.
   9. Ties and anchors.
   10. Embedded flashing.
   11. Miscellaneous masonry accessories.

B. Related Sections include the following:
   1. Division 7 Section "Bituminous Dampproofing" for dampproofing applied to cavity face of backup wythes of cavity walls.
   2. Division 7 Section "Sheet Metal Flashing and Trim" for exposed sheet metal flashing.
   3. Division 7 Section "Joint Sealants" for sealing control and expansion joints in unit masonry.
   4. Division 7 Section "Thermal and Barrier Wall System".

C. Products furnished, but not installed, under this Section include the following:
   1. Dovetail slots for masonry anchors, installed under Division 3 Section "Cast-in-Place Concrete."
   2. Anchor sections of adjustable masonry anchors for connecting to structural frame, installed under Division 5 Section "Structural Steel."

D. Products installed, but not furnished, under this Section include the following:
   1. Steel lintels and shelf angles for unit masonry, furnished under Division 5 Section "Metal Fabrications."
   2. Manufactured reglets in masonry joints for metal flashing, furnished under Division 7 Section "Sheet Metal Flashing and Trim."

1.3 DEFINITIONS

A. Reinforced Masonry: Masonry containing reinforcing steel in grouted cells.

1.4 PERFORMANCE REQUIREMENTS

A. Provide structural unit masonry that develops plan indicated net-area compressive strengths (f'm) at 28 days.
B. Determine net-area compressive strength (f'm) of masonry from average net-area compressive strengths of masonry units and mortar types (unit-strength method) according to Tables 1 and 2 in ACI 530.1/ASCE 6/TMS 602.
C. Determine net-area compressive strength (f'm) of masonry by testing masonry prisms according to ASTM C 1314.

1.5 SUBMITTALS

A. Product Data: For each type of product indicated.
B. Shop Drawings: For the following:
    1. Masonry Units: Show sizes, profiles, coursing, and locations of special shapes.
    2. Reinforcing Steel: Detail bending and placement of unit masonry reinforcing bars. Comply with ACI 315, "Details and Detailing of Concrete Reinforcement." Show elevations of reinforced walls.
    3. Fabricated Flashing: Detail corner units, end-dam units, and other special applications.
C. Samples for Initial Selection: For the following:
    1. Ground faced concrete masonry units, in the form of small-scale units.
    2. Face brick, in the form of straps of five or more bricks.
    3. Colored mortar.
    4. Weep holes/vents.
D. Samples for Verification: For each type and color of the following:
    1. Exposed concrete masonry units.
    2. Ground faced concrete masonry units.
    3. Face brick, in the form of straps of five or more bricks.
    4. Special brick shapes.
    5. Pigmented and colored-aggregate mortar. Make Samples using same sand and mortar ingredients to be used on Project. Label Samples to indicate types and amounts of pigments used.
    6. Weep holes/vents.
    7. Accessories embedded in masonry.
E. List of Materials Used in Constructing Mockups: List generic product names together with manufacturers, manufacturers' product names, model numbers, lot numbers, batch numbers, source of supply, and other information as required to identify materials used. Include mix proportions for mortar and grout and source of aggregates.
    1. Submittal is for information only. Neither receipt of list nor approval of mockup constitutes approval of deviations from the Contract Documents unless such deviations are specifically brought to the attention of Architect and approved in writing.
F. Qualification Data: For testing agency.
G. Material Certificates: Include statements of material properties indicating compliance with requirements including compliance with standards and type designations within standards. Provide for each type and size of the following:

1. Masonry units.
    a. Include material test reports substantiating compliance with requirements.
    b. For bricks, include size-variation data verifying that actual range of sizes falls within specified tolerances.
    c. For exposed brick, include material test report for efflorescence according to ASTM C 67.
    d. For masonry units used in structural masonry, include data and calculations establishing average net-area compressive strength of units.
2. Cementitious materials. Include brand, type, and name of manufacturer.
3. Preblended, dry mortar mixes. Include description of type and proportions of ingredients.
4. Grout mixes. Include description of type and proportions of ingredients.
5. Reinforcing bars.
6. Joint reinforcement.
7. Anchors, ties, and metal accessories.

H. Mix Designs: For each type of mortar and grout. Include description of type and proportions of ingredients.
    1. Include test reports, per ASTM C 780, for mortar mixes required to comply with property specification.
    2. Include test reports, per ASTM C 1019, for grout mixes required to comply with compressive strength requirement.

i. Statement of Compressive Strength of Masonry: For each combination of masonry unit type and mortar type, provide statement of average net-area compressive strength of masonry units, mortar type, and resulting net-area compressive strength of masonry determined according to Tables 1 and 2 in ACI 530.1/ASCE 6/TMS 602 .

J. Cold-Weather Procedures: Detailed description of methods, materials, and equipment to be used to comply with cold-weather requirements.

1.6 QUALITY ASSURANCE

A. Testing Agency Qualifications: An independent agency qualified according to ASTM C 1093 for testing indicated, as documented according to ASTM E 548.

B. Source Limitations for Masonry Units: Obtain exposed masonry units of a uniform texture and color, or a uniform blend within the ranges accepted for these characteristics, through one source from a single manufacturer for each product required.

C. Source Limitations for Mortar Materials: Obtain mortar ingredients of a uniform quality, including color for exposed masonry, from a single manufacturer for each cementitious component and from one source or producer for each aggregate.

D. Preconstruction Testing Service: Owner will engage a qualified independent testing agency to perform preconstruction testing indicated below. Payment

for these services will be made by Owner or from the Testing and Inspecting Allowance, as authorized by Change Orders]. Retesting of materials that fail to meet specified requirements shall be done at Contractor's expense.

1. Clay Masonry Unit Test: For each type of unit required, per ASTM C 67.
2. Concrete Masonry Unit Test: For each type of unit required, per ASTM C 140.
3. Mortar Test (Property Specification): For each mix required, per ASTM C 780].
4. Grout Test (Compressive Strength): For each mix required, per ASTM C 1019.
5. Prism Test: For each type of construction required, per ASTM C 1314.

E. Mockups: Build mockup to verify selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.

1. Build mockups typical exterior wall in sizes approximately 48 inches (1200 mm) long by 48 inches (1200 mm) high by full thickness, including face and backup wythes and accessories.
   a. Include a sealant-filled joint at least 16 inches (400 mm) long in exterior wall mockup.
   b. Include lower corner of window opening at upper corner of exterior wall mockup. Make opening approximately 12 inches (300 mm) wide by 16 inches (400 mm) high.
   c. Include through-wall flashing installed for a 24-inch (600-mm) length in corner of exterior wall mockup approximately 16 inches (400 mm) down from top of mockup, with a 12-inch (300-mm) length of flashing left exposed to view (omit masonry above half of flashing).
   d. Include metal studs, exterior insulation, veneer anchors, flashing, and weep holes in exterior masonry-veneer wall mockup.
2. Clean one-half of exposed faces of mockups with masonry cleaner as indicated.
3. Protect accepted mockups from the elements with weather-resistant membrane.
4. Approval of mockups is for color, texture, and blending of masonry units; relationship of mortar and sealant colors to masonry unit colors; tooling of joints; and aesthetic qualities of workmanship.
   a. Approval of mockups is also for other material and construction qualities specifically approved by Architect in writing.
   b. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless such deviations are specifically approved by Architect in writing.
5. Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

F. Preinstallation Conference: Conduct conference at Project site.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Store masonry units on elevated platforms in a dry location. If units are not stored in an enclosed location, cover tops and sides of stacks with waterproof sheeting, securely tied. If units become wet, do not install until they are dry.

B. Store cementitious materials on elevated platforms, under cover, and in a dry location. Do not use cementitious materials that have become damp.

C. Store aggregates where grading and other required characteristics can be maintained and contamination avoided.

D. Deliver preblended, dry mortar mix in moisture-resistant containers designed for lifting and emptying into dispensing silo. Store preblended, dry mortar mix in delivery containers on elevated platforms, under cover, and in a dry location or in a metal dispensing silo with weatherproof cover.

E. Store masonry accessories, including metal items, to prevent corrosion and accumulation of dirt and oil.

1.8 PROJECT CONDITIONS

A. Protection of Masonry: During construction, cover tops of walls, projections, and sills with waterproof sheeting at end of each day's work. Cover partially completed masonry when construction is not in progress.

1. Extend cover a minimum of 24 inches (600 mm) down both sides and hold cover securely in place.
2. Where 1 wythe of multiwythe masonry walls is completed in advance of other wythes, secure cover a minimum of 24 inches (600 mm) down face next to unconstructed wythe and hold cover in place.

B. Do not apply uniform floor or roof loads for at least 12 hours and concentrated loads for at least 3 days after building masonry walls or columns.

C. Stain Prevention: Prevent grout, mortar, and soil from staining the face of masonry to be left exposed or painted. Immediately remove grout, mortar, and soil that come in contact with such masonry.

1. Protect base of walls from rain-splashed mud and from mortar splatter by spreading coverings on ground and over wall surface.
2. Protect sills, ledges, and projections from mortar droppings.
3. Protect surfaces of window and door frames, as well as similar products with painted and integral finishes, from mortar droppings.
4. Turn scaffold boards near the wall on edge at the end of each day to prevent rain from splashing mortar and dirt onto completed masonry.

D. Cold-Weather Requirements: Do not use frozen materials or materials mixed or coated with ice or frost. Do not build on frozen substrates. Remove and replace unit masonry damaged by frost or by freezing conditions. Comply with cold-weather construction requirements contained in ACI 530.1/ASCE 6/TMS 602.

1. Cold-Weather Cleaning: Use liquid cleaning methods only when air temperature is 40 deg F (4 deg C) and above and will remain so until masonry has dried, but not less than 7 days after completing cleaning.

E. Hot-Weather Requirements: Comply with hot-weather construction requirements contained in ACI 530.1/ASCE 6/TMS 602.

PART 2 - PRODUCTS
2.1 MANUFACTURERS
A. In other Part 2 articles where titles below introduce lists, the following requirements apply to product selection:
1. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, products specified.
2. Products: Subject to compliance with requirements, provide one of the products specified.
3. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, manufacturers specified.
4. Manufacturers: Subject to compliance with requirements, provide products by one of the manufacturers specified.
2.2 MASONRY UNITS, GENERAL
A. Defective Units: Referenced masonry unit standards may allow a certain percentage of units to exceed tolerances and to contain chips, cracks, or other defects exceeding limits stated in the standard. Do not uses units where such defects, including dimensions that vary from specified dimensions by more than stated tolerances, will be exposed in the completed Work or will impair the quality of completed masonry.
2.3 CONCRETE MASONRY UNITS (CMUs)
A. Shapes: Provide shapes indicated and as follows:
1. Provide special shapes for lintels, corners, jambs, sashes, movement joints, headers, bonding, and other special conditions.
2. Provide square-edged units for outside corners, unless otherwise indicated.
B. Integral Water Repellent: Provide units made with integral water repellent for exposed units.
1. Integral Water Repellent: Liquid polymeric, integral water-repellent admixture that does not reduce flexural bond strength. Units made with integral water repellent, when tested as a wall assembly made with mortar containing integral water-repellent manufacturer's mortar additive according to ASTM E 514, with test period extended to 24 hours, show no visible water or leaks on the back of test specimen.

a. Available Products:
1) Addiment Incorporated; Block Plus W-10.
2) Grace Construction Products, a unit of W. R. Grace & Co. - Conn.; Dry-Block.
3) Master Builders, Inc.; Rheopel.
C. Concrete Masonry Units: ASTM C 90
1. Unit Compressive Strength: Provide units with minimum average net-area compressive strength of 1900 psi (13.1 MPa)
2. Weight Classification: Normal weight
3. Size (Width): Manufactured to dimensions 3/8 inch less than nominal dimensions.
4. Size (Width): Manufactured to the following dimensions:
a. 4 inches nominal; 3-5/8 inches actual
b. 8 inches nominal; 7-5/8 inches actual
c. 12 inches nominal; 11-5/8 inches actual
5. Exposed Faces: Provide color and texture matching the range represented by Architect's sample.
D. Concrete Building Brick: ASTM C 55

1. Unit Compressive Strength: Provide units with minimum average net-area compressive strength of 2500 psi (17.3 MPa)
2. Weight Classification: Normal weight
3. Size (Actual Dimensions): 3-5/8 inches (92 mm) wide by 2-1/4 inches (57 mm) high by 7-5/8 inches (194 mm) long.
4. Size (Actual Dimensions): 90 mm wide by 57 mm high by 190 mm long.
E. Pre-faced CMUs: Lightweight hollow concrete units complying with ASTM C 90, with manufacturer's standard smooth resinous facing complying with ASTM C 744.
1. Unit Compressive Strength: Provide units with minimum average net-area compressive strength of 2800 psi (19.3 MPa).
2. Size: Manufactured to dimensions specified in "CMUs" Paragraph but with pre-faced surfaces having 1/16-inch- (1.5-mm-) wide returns of facing to create 1/4-inch- (6.5-mm-) wide mortar joints with modular coursing.
Colors and Patterns: Match Architect's samples.
2.4 BRICK
A. General: Provide shapes indicated and as follows:
1. For ends of sills and caps and for similar applications that would otherwise expose unfinished brick surfaces, provide units without cores or frogs and with exposed surfaces finished.
2. Provide special shapes for applications where stretcher units cannot accommodate special conditions, including those at corners, movement joints, bond beams, sashes, and lintels.
3. Provide special shapes for applications requiring brick of size, form, color, and texture on exposed surfaces that cannot be produced by sawing.

4. Provide special shapes for applications where shapes produced by sawing would result in sawed surfaces being exposed to view.
B. Face Brick: ASTM C 216, Grade SW FBS
1. Unit Compressive Strength: Provide units with minimum average net-area compressive strength of 4400 psi (30.3 MPa).
2. Initial Rate of Absorption: Less than 30 g/30 sq. in. (30 g/194 sq. cm) per minute when tested per ASTM C 67.
3. Efflorescence: Provide brick that has been tested according to ASTM C 67 and is rated "not effloresced."
4. Surface Coating: Brick with colors or textures produced by application of coatings shall withstand 50 cycles of freezing and thawing per ASTM C 67 with no observable difference in the applied finish when viewed from 10 feet (3 m) or shall have a history of successful use in Project's area.
5. Size (Actual Dimensions): 3-5/8 inches (92 mm) wide by 2-1/4 inches (57 mm) high by 7-5/8 inches (194 mm) long.
6. Application: Use where brick is exposed, unless otherwise indicated.
7. Color and Texture: As selected by Architect.
C. Building (Common) Brick: ASTM C 62, Grade SW.
1. Unit Compressive Strength: Provide units with minimum average net-area compressive strength of 4400 psi (30.3 MPa)
2. Size: Match size of face brick.
3. Size (Actual Dimensions): 3-5/8 inches (92 mm) wide by 2-1/4 inches (57 mm) high by 7-5/8 inches (194 mm) long.

4. Application: Use where brick is indicated for concealed locations. Face brick complying with requirements for grade, compressive strength, and size indicated for building brick may be substituted for building brick.

2.5 MORTAR AND GROUT MATERIALS

A. Portland Cement: ASTM C 150, Type I or II, except Type III may be used for cold-weather construction. Provide natural color or white cement as required to produce mortar color indicated.

B. Hydrated Lime: ASTM C 207, Type S.

C. Portland Cement-Lime Mix: Packaged blend of portland cement complying with ASTM C 150, Type I or Type III, and hydrated lime complying with ASTM C 207, Type S.

D. Masonry Cement: ASTM C 91.

1. Available Products:

a. Capital Materials Corporation; Flamingo Color Masonry Cement.

b. Essroc, Italcementi Group; Brixment or Velvet.

c. Holcim (US) Inc.; Mortamix Masonry Cement Rainbow Mortamix Custom Buff Masonry Cement White Mortamix Masonry Cement.

d. Lafarge North America Inc.; Magnolia Masonry Cement Lafarge Masonry Cement Florida Super Masonry Trinity Super White Masonry Type S Trinity White Masonry Type N.

e. Lehigh Cement Company; Lehigh Masonry Cement, Lehigh White Masonry Cement.

f. National Cement Company, Inc.; Coosa Masonry Cement.

E. Mortar Cement: ASTM C 1329

1. Available Products:

a. Lafarge North America Inc.; Lafarge Mortar Cement or Magnolia Superbond Mortar Cement.

F. Mortar Pigments: Natural and synthetic iron oxides and chromium oxides, compounded for use in mortar mixes. Use only pigments with a record of satisfactory performance in masonry mortar.

1. Products:

a. Bayer Corporation, Industrial Chemicals Div.; Bayferrox Iron Oxide Pigments.

b. Davis Colors; True Tone Mortar Colors.

c. Solomon Grind-Chem Services, Inc.; SGS Mortar Colors.

G. Colored Cement Product: Packaged blend made from portland cement and lime masonry cement or mortar cement and mortar pigments, all complying with specified requirements, and containing no other ingredients.

1. Formulate blend as required to produce color indicated or, if not indicated, as selected from manufacturer's standard colors.

2. Pigments shall not exceed 10 percent of portland cement by weight.

3. Pigments shall not exceed 5 percent of masonry cement or mortar cement by weight.

4. Available Products:

a. Colored Portland Cement-Lime Mix:

1) Capital Materials Corporation; Riverton Portland Cement Lime Custom Color.

2) Holcim (US) Inc.; Rainbow Mortamix Custom Color Cement/Lime.

3) Lafarge North America Inc.; Eaglebond.

4) Lehigh Cement Company; Lehigh Custom Color Portland/Lime Cement.

b. Colored Masonry Cement:

1) Capital Materials Corporation; Flamingo Color Masonry Cement.

2) Essroc, Italcementi Group; Brixment-in-Color.
3) Holcim (US) Inc.; Rainbow Mortamix Custom Color Masonry Cement.
4) Lafarge North America Inc.; Florida Custom Color Masonry or Magnolia Masonry Cement.
5) Lehigh Cement Company; Lehigh Custom Color Masonry Cement.
6) National Cement Company, Inc.; Coosa Masonry Cement.
c. Colored Mortar Cement:

1) Lafarge North America Inc.; Magnolia Superbond Mortar Cement.
H. Aggregate for Mortar: ASTM C 144.
1. For mortar that is exposed to view, use washed aggregate consisting of natural sand or crushed stone.
2. For joints less than 1/4 inch (6.5 mm) thick, use aggregate graded with 100 percent passing the No. 16 (1.18-mm) sieve.
3. White-Mortar Aggregates: Natural white sand or crushed white stone.
4. Colored-Mortar Aggregates: Natural sand or crushed stone of color necessary to produce required mortar color.
I. Aggregate for Grout: ASTM C 404.
J. Cold-Weather Admixture: Nonchloride, noncorrosive, accelerating admixture complying with ASTM C 494/C 494M, Type C, and recommended by manufacturer for use in masonry mortar of composition indicated.
1. Available Products:
a. Addiment Incorporated; Mortar Kick.
b. Euclid Chemical Company (The); Accelguard 80.
c. Grace Construction Products, a unit of W. R. Grace & Co. - Conn.; Morset.
d. Sonneborn, Div. of ChemRex; Trimix-NCA.
K. Water-Repellent Admixture: Liquid water-repellent mortar admixture intended for use with concrete masonry units, containing integral water repellent by same manufacturer.
1. Available Products:
a. Addiment Incorporated; Mortar Tite.
b. Grace Construction Products, a unit of W. R. Grace & Co. - Conn.; Dry-Block Mortar Admixture.
c. Master Builders, Inc.; Color Cure Mortar Admix or Rheomix Rheopel.
L. Water: Potable.
2.6 REINFORCEMENT
A. Uncoated Steel Reinforcing Bars: ASTM A 615/A 615M or ASTM A 996/A 996M, Grade 60 (Grade 420).
B. Masonry Joint Reinforcement, General: ASTM A 951.
1. Interior Walls: Mill- galvanized, carbon steel.
2. Exterior Walls: Hot-dip galvanized, carbon steel.
3. Wire Size for Side Rods: W1.7 or 0.148-inch (3.8-mm) diameter.
4. Wire Size for Cross Rods: W1.7 or 0.148-inch (3.8-mm) [diameter.
5. Wire Size for Veneer Ties: [W1.7 or 0.148-inch (3.8-mm)] diameter.
6. Spacing of Cross Rods, Tabs, and Cross Ties: Not more than 16 inches (407 mm) on center.
7. Provide in lengths of not less than 10 feet (3 m), with prefabricated corner and tee units.

C. Masonry Joint Reinforcement for Single-Wythe Masonry: Either ladder or truss type with single pair of side rods.

D. Masonry Joint Reinforcement for Multiwythe Masonry:
1. Ladder type with 1 side rod at each face shell of hollow masonry units more than 4 inches (100 mm) in width, plus 1 side rod at each wythe of masonry 4 inches (100 mm) or less in width.
2. Adjustable (two-piece) type, either ladder or truss design, with one side rod at each face shell of backing wythe and with separate ties that extend into facing wythe. Ties have two hooks that engage eyes or slots in reinforcement and resist movement perpendicular to wall. Ties extend at least halfway through facing wythe but with at least 5/8-inch (16-mm) cover on outside face. Ties have hooks or clips to engage a continuous horizontal wire in the facing wythe.
E. Masonry Joint Reinforcement for Veneers Anchored with Seismic Masonry-Veneer Anchors: Single 0.188-inch- (4.8-mm-) diameter, hot-dip galvanized, carbon stainless-steel continuous wire.
2.7 TIES AND ANCHORS
A. Materials: Provide ties and anchors specified in subsequent paragraphs that are made from materials that comply with eight subparagraphs below, unless otherwise indicated.
1. Hot-Dip Galvanized, Carbon-Steel Wire: ASTM A 82; with ASTM A 153/A 153M, Class B-2 coating.
2. Steel Sheet, Galvanized after Fabrication: ASTM A 1008/A 1008M, Commercial Steel, hot-dip galvanized after fabrication to comply with ASTM A 153/A 153M.
3. Steel Plates, Shapes, and Bars: ASTM A 36/A 36M.
B. Corrugated Metal Ties: Metal strips not less than 7/8 inch (22 mm) wide with corrugations having a wavelength of 0.3 to 0.5 inch (7.6 to 12.7 mm) and an amplitude of 0.06 to 0.10 inch (1.5 to 2.5 mm) made from steel sheet, galvanized after fabrication not less than 0.053 inch (1.3 mm) 0.097 inch (2.5 mm) thick. Ties made from galvanized steel sheet may be used in interior walls, unless otherwise indicated.
C. Wire Ties, General: Unless otherwise indicated, size wire ties to extend at least halfway through veneer but with at least 5/8-inch (16-mm) cover on outside face. Outer ends of wires are bent 90 degrees and extend 2 inches (50 mm) parallel to face of veneer.
D. Individual Wire Ties: Rectangular units with closed ends and not less than 4 inches (100 mm) wide.
1. Z-shaped ties with ends bent 90 degrees to provide hooks not less than 2 inches (50 mm) long may be used for masonry constructed from solid units or hollow units laid with cells horizontal.
2. Where wythes do not align or are of different materials, use adjustable ties with pintle-and-eye connections having a maximum adjustment of 1-1/4 inches (32 mm).
3. Wire: Fabricate from 1/4-inch- (6.4-mm-) diameter, hot-dip galvanized steel stainless-steel wire. Mill-galvanized wire ties may be used in interior walls, unless otherwise indicated.

E. Adjustable Anchors for Connecting to Structure: Provide anchors that allow vertical or horizontal adjustment but resist tension and compression forces perpendicular to plane of wall.
1. Anchor Section for Welding to Steel Frame: Crimped 1/4-inch- (6.4-mm-) diameter, hot-dip galvanized steel wire. Mill-galvanized wire may be used at interior walls, unless otherwise indicated.
2. Tie Section for Steel Frame: Triangular-shaped wire tie, sized to extend within 1 inch (25 mm) of masonry face, made from 0.25-inch- (6.4-mm-) diameter, hot-dip galvanized steel stainless-steel wire. Mill-galvanized wire may be used at interior walls, unless otherwise indicated.
F. Partition Top anchors: 0.097-inch- (2.5-mm-) thick metal plate with 3/8-inch- (10-mm-) diameter metal rod 6 inches (150 mm) long welded to plate and with closed-end plastic tube

fitted over rod that allows rod to move in and out of tube. Fabricate from steel, hot-dip galvanized after fabrication.
G. Rigid Anchors: Fabricate from steel bars 1-1/2 inches (38 mm) wide by 1/4 inch (6.4 mm) thick by 24 inches (600 mm) long, with ends turned up 2 inches (50 mm) or with cross pins, unless otherwise indicated bent to configuration indicated.
1. Corrosion Protection: Hot-dip galvanized to comply with ASTM A 153/A 153M.
H. Adjustable Masonry-Veneer Anchors
1. General: Provide anchors that allow vertical adjustment but resist tension and compression forces perpendicular to plane of wall, for attachment and as follows:
a. Structural Performance Characteristics: Capable of withstanding a 100-lbf (445-N) load in both tension and compression without deforming or developing play in excess of 0.05 inch (1.3 mm).
2. Contractor's Option: Unless otherwise indicated, provide any of the following types of anchors:
3. Screw-Attached, Masonry-Veneer Anchors: Units consisting of a wire tie and a metal anchor section.
a. Anchor Section: Rib-stiffened, sheet metal plate with screw holes top and bottom, 2-3/4 inches (70 mm) wide by 3 inches (75 mm) high; with projecting tabs having slotted holes for inserting vertical legs of wire tie specially formed to fit anchor section.
b. Anchor Section: Sheet metal plate, 1-1/4 inches (32 mm) wide by 6 inches (150 mm) long, with screw holes top and bottom and with raised rib-stiffened strap, 5/8 inch (16 mm) wide by 3-5/8 inches (92 mm) long, stamped into center to provide a slot between strap and plate for inserting wire tie.
c. Anchor Section: Gasketed sheet metal plate, 1-1/4 inches (32 mm) wide by 6 inches (150 mm) long, with screw holes top and bottom; top and bottom ends bent to form pronged legs of length to match thickness of insulation or sheathing; and raised rib-stiffened strap, 5/8 inch (16 mm) wide by 6 inches (150 mm) long, stamped into center to provide a slot between strap and plate for inserting wire tie. Provide anchor manufacturer's standard, self-adhering, modified bituminous gaskets manufactured to fit behind anchor plate and extend beyond pronged legs.
d. Anchor Section: Zinc-alloy barrel section with flanged head with eye and corrosion-resistant, self-drilling screw. Eye designed to receive wire tie and to

serve as head for drilling fastener into framing. Barrel length to suit sheathing thickness, allowing screw to seat directly against framing with flanged head covering hole in sheathing.
e. Fabricate sheet metal anchor sections and other sheet metal parts from 0.097-inch- (2.5-mm-) thick, steel sheet, galvanized after fabrication.
f. Wire Ties: Triangular-, rectangular-, or T-shaped wire ties fabricated from 0.25-inch- (6.4-mm-) diameter, hot-dip galvanized steel stainless-steel wire.
g. Available Products:
1) Dayton Superior Corporation, Dur-O-Wal Division; D/A 213 or D/A 210 with D/A 700-708.
2) Heckmann Building Products Inc.; 315-D with 316 or Pos-I-Tie.
3) Hohmann & Barnard, Inc.; DW-10 DW-10HS or DW-10-X.
4) Wire-Bond; 1004, Type III or RJ-711.
4. Slip-in, Masonry-Veneer Anchors: Units consisting of a wire tie section and an anchor section designed to interlock with metal studs and be slipped into place as sheathing is installed.

a. Wire-Type Anchor: Bent wire anchor section with an eye to receive the wire tie. Wire tie has a vertical leg that slips into the eye of anchor section and allows vertical adjustment. Both sections are made from 3/16-inch (4.8-mm), hot-dip galvanized wire.
b. Strap-and-Wire Type Anchor: Flat metal strap with notch to interlock with flange of metal stud and two holes for inserting vertical legs of wire tie specially formed to fit anchor section. Strap is made from 0.067-inch- (1.7-mm-) thick, steel sheet, galvanized after fabrication; anchor wire tie is made from 3/16-inch (4.8-mm), hot-dip galvanized wire.
c. Available Products:
1) BLOK-LOK Limited; STUD-LOK.
2) Hohmann & Barnard, Inc.; AA308.
5. Seismic Masonry-Veneer Anchors: Units consisting of a metal anchor section and a connector section designed to engage a continuous wire embedded in the veneer mortar joint.
a. Anchor Section: Rib-stiffened, sheet metal plate with screw holes top and bottom, 2-3/4 inches (70 mm) wide by 3 inches (75 mm) high; with projecting tabs having slotted holes for inserting vertical leg of connector section.
b. Connector Section: Rib-stiffened, sheet metal bent plate with down-turned leg designed to fit in anchor section slot and with integral tabs designed to engage continuous wire. Size connector to extend at least halfway through veneer but with at least 5/8-inch (16-mm) cover on outside face.
c. Anchor Section: Rib-stiffened, sheet metal plate with screw holes top and bottom, 2-3/4 inches (70 mm) wide by 3 inches (75 mm) high; with projecting tabs having slotted holes for inserting vertical legs of wire tie specially formed to fit anchor section. Size wire tie to extend at least 1-1/2 inches (38 mm) into veneer but with at least 5/8-inch (16-mm) cover on outside face.
d. Connector Section: Sheet metal clip welded to wire tie with integral tabs designed to engage continuous wire.
e. Anchor Section: Gasketed sheet metal plate, 1-1/4 inches (32 mm) wide by 6 inches (150 mm) long, with screw holes top and bottom; top and bottom ends bent

to form pronged legs to bridge insulation or sheathing and contact studs; and raised rib-stiffened strap, 5/8 inch (16 mm) wide by 6 inches (150 mm) long, stamped into center to provide a slot between strap and plate for inserting wire tie. Provide anchor manufacturer's standard, self-adhering, modified bituminous gaskets manufactured to fit behind anchor plate and extend beyond pronged legs.
f. Connector Section: Triangular wire tie and rigid PVC extrusion with snap-in grooves for inserting continuous wire. Size wire tie to extend at least halfway through veneer but with at least 5/8-inch (16-mm) cover on outside face.
g. Fabricate sheet metal anchor sections and other sheet metal parts from 0.097-inch- (2.5-mm-) thick, steel sheet, galvanized after fabrication.
h. Fabricate wire connector sections from 0.25-inch- (6.4-mm-) diameter, [hot-dip galvanized, carbon -steel wire.
i. Available Products:
1) Dayton Superior Corporation, Dur-O-Wal Division; D/A 213S.
2) Hohmann & Barnard, Inc.; DW-10-X-Seismiclip.
3) Wire-Bond; RJ-711 with Wire-Bond clip.
6. Polymer-Coated, Steel Drill Screws for Steel Studs: ASTM C 954 except manufactured with hex washer head and neoprene washer, No. 10 (4.8-mm) diameter by length required to penetrate

steel stud flange with not less than 3 exposed threads, and with organic polymer coating with salt-spray resistance to red rust of more than 800 hours per ASTM B 117.
a. Available Products:
1) ITW Buildex; Teks Maxiseal with Climaseal finish.
2) Textron Inc., Textron Fastening Systems; Elco Dril-Flex with Stalgard finish.
7. Stainless-Steel Drill Screws for Steel Studs: Proprietary fastener consisting of carbon-steel drill point and 300 Series stainless-steel shank, complying with ASTM C 954 except manufactured with hex washer head and neoprene washer, No. 10 (4.8-mm) diameter by length required to penetrate steel stud flange with not less than three exposed threads.
a. Available Products:
1) Dayton Superior Corporation, Dur-O-Wal Division; Stainless Steel SX Fastener.
2) ITW Buildex; Scots long life Teks.
2.8 MISCELLANEOUS ANCHORS
A. Anchor Bolts: Headed or steel bolts complying with ASTM A 307, Grade A (ASTM F 568M, Property Class 4.6); with ASTM A 563 (ASTM A 563M) hex nuts and, where indicated, flat washers; hot-dip galvanized to comply with ASTM A 153/A 153M, Class C; of dimensions indicated.
B. Postinstalled Anchors: Provide chemical or torque-controlled expansion anchors, with capability to sustain, without failure, a load equal to six times the load imposed when installed in solid or grouted unit masonry and equal to four times the load imposed when installed in concrete, as determined by testing per ASTM E 488 conducted by a qualified independent testing agency

1. Corrosion Protection: Carbon-steel components zinc plated to comply with ASTM B 633, Class Fe/Zn 5 (5 microns) for Class SC 1 service condition (mild).
2. Corrosion Protection: Stainless-steel components complying with ASTM F 593 and ASTM F 594, Alloy Group 1 or 2 (ASTM F 738M and ASTM F 836M, Alloy Group 1 or 4) for bolts and nuts; ASTM A 666 or ASTM A 276, Type 304 or 316, for anchors.
2.9 EMBEDDED FLASHING MATERIALS
A. General: Coordinate flashing with Division 7 Section "Thermal and Barrier Wall System.
B. Metal Flashing: Provide metal flashing, where flashing is exposed or partly exposed and where indicated, complying with SMACNA's "Architectural Sheet Metal Manual Division 7 Section "Sheet Metal Flashing and Trim" and as follows:
1. Stainless Steel: ASTM A 240/A 240M, Type 304, 0.016 inch (0.4 mm) thick.
2. Fabricate continuous flashings in sections 96 inches (2400 mm) long minimum, but not exceeding 12 feet (3.6 m). Provide splice plates at joints of formed, smooth metal flashing.
3. Fabricate through-wall flashing with snaplock receiver on exterior face where indicated to receive counterflashing.
4. Fabricate through-wall flashing with drip edge where , unless otherwise indicated. Fabricate by extending flashing 1/2 inch (13 mm) out from wall, with outer edge bent down 30 degrees and hemmed.
5. Fabricate through-wall flashing with sealant stop where , unless otherwise] indicated. Fabricate by bending metal back on itself 3/4 inch (19 mm) at exterior face of wall and down into joint 3/8 inch (10 mm) to form a stop for retaining sealant backer rod.
6. Fabricate metal drip edges and sealant stops for ribbed metal flashing from plain metal flashing of same metal as ribbed flashing and extending at least 3 inches (75 mm) into wall with

hemmed inner edge to receive ribbed flashing and form a hooked seam. Form hem on upper surface of metal so that completed seam will shed water.
7. Metal Drip Edges: Fabricate from stainless steel. Extend at least 3 inches (75 mm) into wall and 1/2 inch (13 mm) out from wall, with outer edge bent down 30 degrees and hemmed.
8. Metal Flashing Terminations: Fabricate from stainless steel. Extend at least 3 inches (75 mm) into wall and out to exterior face of wall. At exterior face of wall, bend metal back on itself for 3/4 inch (19 mm) and down into joint 3/8 inch (10 mm) to form a stop for retaining sealant backer rod.
9. Metal Expansion-Joint Strips: Fabricate from stainless steel copper to shapes indicated.
C. Flexible Flashing: For flashing not exposed to the exterior, use one of the following, unless otherwise indicated:
1. Copper-Laminated Flashing: 5-oz./sq. ft. (1.5-kg/sq. m) copper sheet bonded with asphalt between 2 layers of glass-fiber cloth. Use only where flashing is fully concealed in masonry.
a. Available Products:
1) Advanced Building Products Inc.; Copper Fabric Flashing.
2) AFCO Products Inc.; Copper Fabric.
3) Hohmann & Barnard, Inc.; H & B C-Fab Flashing.
4) Phoenix Building Products; Type FCC-Fabric Covered Copper..

5) Polytite Manufacturing Corp.; Copper Fabric Flashing.
6) Sandell Manufacturing Co., Inc.; Copper Fabric Flashing.
7) York Manufacturing, Inc.; York Copper Fabric Flashing.
2. Asphalt-Coated Copper Flashing: 5-oz./sq. ft. (1.5-kg/sq. m) 7-oz./sq. ft. (2-kg/sq. m) copper sheet coated with flexible asphalt. Use only where flashing is fully concealed in masonry.
a. Available Products:
1) Advanced Building Products Inc.; Cop-R-Cote.
2) AFCO Products Inc.; Cop-A-Cote.
3) Hohmann & Barnard, Inc.; H & B C-Coat Flashing.
4) Phoenix Building Products; Type ACC-Asphalt Bituminous Coated.
5) Polytite Manufacturing Corp.; Coated Copper Flashing.
6) Sandell Manufacturing Co., Inc.; Coated Copper Flashing.
7) York Manufacturing, Inc.; Copperseal.
3. Rubberized-Asphalt Flashing: Composite flashing product consisting of a pliable, adhesive rubberized-asphalt compound, bonded to a high-density, cross-laminated polyethylene film to produce an overall thickness of not less than 0.040 inch (1.0 mm).
a. Available Products:
1) Advanced Building Products Inc.; Peel-N-Seal.
2) Carlisle Coatings & Waterproofing; CCW-705-TWF Thru-Wall Flashing.
3) Dayton Superior Corporation, Dur-O-Wal Division; Dur-O-Barrier-44.
4) Grace Construction Products, a unit of W. R. Grace & Co. - Conn.; Perm-A-Barrier Wall Flashing.
5) Heckmann Building Products Inc.; No. 82 Rubberized-Asphalt Thru-Wall Flashing.
6) Hohmann & Barnard, Inc.; Textroflash.
7) Polyguard Products, Inc.; Polyguard 300.
8) Polytite Manufacturing Corp.; Poly-Barrier Self-Adhering Wall Flashing.
9) Williams Products, Inc.; Everlastic MF-40.

4. Elastomeric Thermoplastic Flashing: Composite flashing product consisting of a polyester-reinforced ethylene interpolymer alloy as follows:
a. Monolithic Sheet: Elastomeric thermoplastic flashing, 0.040 inch (1.0 mm) thick.
b. Self-Adhesive Sheet: Elastomeric thermoplastic flashing, 0.025 inch (0.6 mm) thick, with a 0.015-inch- (0.4-mm-) thick coating of rubberized-asphalt adhesive.
c. Self-Adhesive Sheet with Drip Edge: Elastomeric thermoplastic flashing, 0.025 inch (0.6 mm) thick, with a 0.015-inch- (0.4-mm-) thick coating of rubberized-asphalt adhesive. Where flashing extends to face of masonry, rubberized-asphalt coating is held back approximately 1-1/2 inches (38 mm) from edge.
d. Accessories: Provide preformed corners, end dams, other special shapes, and seaming materials produced by flashing manufacturer.
e. Available Products:
1) Hyload, Inc.; Hyload Cloaked Flashing System.

D. Solder and Sealants for Sheet Metal Flashings: As specified in Division 7 Section "Sheet Metal Flashing and Trim."
1. Solder for Stainless Steel: ASTM B 32, Grade Sn60, with acid flux of type recommended by stainless-steel sheet manufacturer.
2. Solder for Copper: ASTM B 32, Grade Sn50, 50 percent tin and 50 percent lead.
3. Elastomeric Sealant: ASTM C 920, chemically curing urethane or polysulfide or silicone sealant; of type, grade, class, and use classifications required to seal joints in sheet metal flashing and trim and remain watertight.
E. Adhesives, Primers, and Seam Tapes for Flashings: Flashing manufacturer's standard products or products recommended by flashing manufacturer for bonding flashing sheets to each other and to substrates.
2.10 MISCELLANEOUS MASONRY ACCESSORIES
A. Compressible Filler: Premolded filler strips complying with ASTM D 1056, Grade 2A1; compressible up to 35 percent; of width and thickness indicated; formulated from neoprene urethane or PVC.
B. Preformed Control-Joint Gaskets: Made from styrene-butadiene-rubber compound, complying with ASTM D 2000, Designation M2AA-805 or PVC, complying with ASTM D 2287, Type PVC-65406 and designed to fit standard sash block and to maintain lateral stability in masonry wall; size and configuration as indicated.
C. Bond-Breaker Strips: Asphalt-saturated, organic roofing felt complying with ASTM D 226, Type I (No. 15 asphalt felt).
D. Weep/Vent Products: Use one of the following, unless otherwise indicated:
1. Cellular Plastic Weep/Vent: One-piece, flexible extrusion made from UV-resistant polypropylene copolymer, full height and width of head joint and depth 1/8 inch (3 mm) less than depth of outer wythe, in color selected from manufacturer's standard.
a. Available Products:
1) Advanced Building Products Inc.; Mortar Maze weep vent.
2) Dayton Superior Corporation, Dur-O-Wal Division; Cell Vents.
3) Heckmann Building Products Inc.; No. 85 Cell Vent.
4) Hohmann & Barnard, Inc.; Quadro-Vent.
5) Wire-Bond; Cell Vent.
E. Cavity Drainage Material: Free-draining mesh, made from polymer strands that will not degrade within the wall cavity.

1. Provide one of the following configurations:
a. Strips, full-depth of cavity and 10 inches (250 mm) wide, with dovetail shaped notches 7 inches (175 mm) deep that prevent mesh from being clogged with mortar droppings.

b. Strips, not less than 3/4 inch (19 mm) 1-1/2 inches (38 mm) thick and 10 inches (250 mm) wide, with dimpled surface designed to catch mortar droppings and prevent weep holes from being clogged with mortar.
c. Sheets or strips full depth of cavity and installed to full height of cavity.
d. Sheets or strips not less than 1 inch (25 mm) thick and installed to full height of cavity with additional strips 4 inches (100 mm) high at weep holes and thick enough to fill entire depth of cavity and prevent weep holes from being clogged with mortar.
2. Available Products:
a. Advanced Building Products Inc.; Mortar Break Mortar Break II.
b. Archovations, Inc.; CavClear Masonry Mat.
c. Dayton Superior Corporation, Dur-O-Wal Division; Polytite MortarStop.
d. Mortar Net USA, Ltd.; Mortar Net.
2.11 CAVITY-WALL INSULATION
A. See Division 7 Section "Thermal and Barrier Wall System".
2.12 MASONRY CLEANERS
A. Proprietary Acidic Cleaner: Manufacturer's standard-strength cleaner designed for removing mortar/grout stains, efflorescence, and other new construction stains from new masonry without discoloring or damaging masonry surfaces. Use product expressly approved for intended use by cleaner manufacturer and manufacturer of masonry units being cleaned.
1. Available Manufacturers:
a. Diedrich Technologies, Inc.
b. EaCo Chem, Inc.
c. ProSoCo, Inc.
2.13 MORTAR AND GROUT MIXES
A. General: Do not use admixtures, including pigments, air-entraining agents, accelerators, retarders, water-repellent agents, antifreeze compounds, or other admixtures, unless otherwise indicated.
1. Do not use calcium chloride in mortar or grout.
2. Limit cementitious materials in mortar to portland cement, mortar cement, and lime.
3. Limit cementitious materials in mortar for exterior and reinforced masonry to portland cement, mortar cement, and lime.
4. Add cold-weather admixture (if used) at same rate for all mortar that will be exposed to view, regardless of weather conditions, to ensure that mortar color is consistent.
B. Preblended, Dry Mortar Mix: Furnish dry mortar ingredients in form of a preblended mix. Measure quantities by weight to ensure accurate proportions, and thoroughly blend ingredients before delivering to Project site.

C. Mortar for Unit Masonry: Comply with ASTM C 270 BIA Technical Notes 8A, Proportion Specification. Provide the following types of mortar for applications stated unless another type is indicated or needed to provide required compressive strength of masonry.

D. Mortar for Unit Masonry: Comply with ASTM C 270 BIA Technical Notes 8A, Property Specification. Provide the following types of mortar for applications stated unless another type is indicated.
1. For masonry below grade or in contact with earth, use Type M
2. For reinforced masonry, use Type S.
3. For mortar parge coats, use Type S or N.
4. For exterior, above-grade, load-bearing and non-load-bearing walls and parapet walls; for interior load-bearing walls; for interior non-load-bearing partitions; and for other applications where another type is not indicated, use Type N.
5. For interior non-load-bearing partitions, Type O may be used instead of Type N.
E. Pigmented Mortar: Use colored cement product or select and proportion pigments with other ingredients to produce color required. Do not add pigments to colored cement products.
1. Pigments shall not exceed 10 percent of portland cement by weight.
2. Pigments shall not exceed 5 percent of masonry cement or mortar cement by weight.
3. Mix to match Architect's sample.
F. Colored-Aggregate Mortar: Produce required mortar color by using colored aggregates and natural color or white cement as necessary to produce required mortar color.
1. Mix to match Architect's sample.
G. Grout for Unit Masonry: Comply with ASTM C 476.
1. Use grout of type indicated or, if not otherwise indicated, of type (fine or coarse) that will comply with Table 1.15.1 in ACI 530.1/ASCE 6/TMS 602 for dimensions of grout spaces and pour height.
2. Provide grout with a slump of 8 to 11 inches (200 to 280 mm) as measured according to ASTM C 143/C 143M.
H. Epoxy Pointing Mortar: Mix epoxy pointing mortar to comply with mortar manufacturer's written instructions.
2.14 SOURCE QUALITY CONTROL
A. Owner will engage a qualified independent testing agency to perform source quality-control testing indicated below:
1. Payment for these services will be made by Owner or from Testing and Inspecting Allowance, as authorized by Change Orders.
2. Retesting of materials failing to comply with specified requirements shall be done at Contractor's expense.
B. Clay Masonry Unit Test: For each type of unit furnished, per ASTM C 67.
C. Concrete Masonry Unit Test: For each type of unit furnished, per ASTM C 140.

PART 3 - EXECUTION
3.1 EXAMINATION
A. Examine conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of work.
1. For the record, prepare written report, endorsed by Installer, listing conditions detrimental to performance of work.
2. Verify that foundations are within tolerances specified.
3. Verify that reinforcing dowels are properly placed.
B. Before installation, examine rough-in and built-in construction for piping systems to verify actual locations of piping connections.
C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION, GENERAL

A. Thickness: Build cavity and composite walls and other masonry construction to full thickness shown. Build single-wythe walls to actual widths of masonry units, using units of widths indicated.

B. Build chases and recesses to accommodate items specified in this and other Sections.

C. Leave openings for equipment to be installed before completing masonry. After installing equipment, complete masonry to match the construction immediately adjacent to opening.

D. Use full-size units without cutting if possible. If cutting is required to provide a continuous pattern or to fit adjoining construction, cut units with motor-driven saws; provide clean, sharp, unchipped edges. Allow units to dry before laying unless wetting of units is specified. Install cut units with cut surfaces and, where possible, cut edges concealed.

E. Select and arrange units for exposed unit masonry to produce a uniform blend of colors and textures.

1. Mix units from several pallets or cubes as they are placed.

F. Wetting of Brick: Wet brick before laying if initial rate of absorption exceeds 30 g/30 sq. in. (30 g/194 sq. cm) per minute when tested per ASTM C 67. Allow units to absorb water so they are damp but not wet at time of laying.

G. Comply with construction tolerances in ACI 530.1/ASCE 6/TMS 602 and with the following:

1. For conspicuous vertical lines, such as external corners, door jambs, reveals, and expansion and control joints, do not vary from plumb by more than 1/8 inch in 10 feet (3 mm in 3 m), 1/4 inch in 20 feet (6 mm in 6 m), or 1/2 inch (12 mm) maximum.

2. For vertical alignment of exposed head joints, do not vary from plumb by more than 1/4 inch in 10 feet (6 mm in 3 m), or 1/2 inch (12 mm) maximum.

3. For conspicuous horizontal lines, such as lintels, sills, parapets, and reveals, do not vary from level by more than 1/8 inch in 10 feet (3 mm in 3 m), 1/4 inch in 20 feet (6 mm in 6 m), or 1/2 inch (12 mm) maximum.

4. For exposed bed joints, do not vary from thickness indicated by more than plus or minus 1/8 inch (3 mm), with a maximum thickness limited to 1/2 inch (12 mm). Do not vary from bed-joint thickness of adjacent courses by more than 1/8 inch (3 mm).

5. For exposed head joints, do not vary from thickness indicated by more than plus or minus 1/8 inch (3 mm). Do not vary from adjacent bed-joint and head-joint thicknesses by more than 1/8 inch (3 mm).

6. For faces of adjacent exposed masonry units, do not vary from flush alignment by more than 1/16 inch (1.5 mm) except due to warpage of masonry units within tolerances specified for warpage of units.

7. For exposed bed joints and head joints of stacked bond, do not vary from a straight line by more than 1/16 inch (1.5 mm) from one masonry unit to the next.

3.3 LAYING MASONRY WALLS

A. Lay out walls in advance for accurate spacing of surface bond patterns with uniform joint thicknesses and for accurate location of openings, movement-type joints, returns, and offsets. Avoid using less-than-half-size units, particularly at corners, jambs, and, where possible, at other locations.

B. Bond Pattern for Exposed Masonry: Unless otherwise indicated, lay exposed masonry in common bond; do not use units with less than nominal 4-inch (100-mm) horizontal face dimensions at corners or jambs.

C. Lay concealed masonry with all units in a wythe in common bond or bonded by lapping not less 4-inches (100-mm). Bond and interlock each course of each wythe at corners. Do not use units with less than nominal 4-inch (100-mm) horizontal face dimensions at corners or jambs.
D. Stopping and Resuming Work: Stop work by racking back units in each course from those in course below; do not tooth. When resuming work, clean masonry surfaces that are to receive mortar, remove loose masonry units and mortar, and wet brick if required before laying fresh masonry.
E. Built-in Work: As construction progresses, build in items specified in this and other Sections. Fill in solidly with masonry around built-in items.
F. Fill space between steel frames and masonry solidly with mortar, unless otherwise indicated.
G. Where built-in items are to be embedded in cores of hollow masonry units, place a layer of metal lath, wire mesh, or plastic mesh in the joint below and rod mortar or grout into core.
H. Fill cores in hollow concrete masonry units with grout 24 inches (600 mm) under bearing plates, beams, lintels, posts, and similar items, unless otherwise indicated.

3.4 MORTAR BEDDING AND JOINTING

A. Lay hollow brick and concrete masonry units as follows:
1. With face shells fully bedded in mortar and with head joints of depth equal to bed joints.

2. With webs fully bedded in mortar in all courses of piers, columns, and pilasters.
3. With webs fully bedded in mortar in grouted masonry, including starting course on footings.
4. With entire units, including areas under cells, fully bedded in mortar at starting course on footings where cells are not grouted.
B. Lay solid masonry units with completely filled bed and head joints; butter ends with sufficient mortar to fill head joints and shove into place. Do not deeply furrow bed joints or slush head joints.
C. Tool exposed joints slightly concave when thumbprint hard, using a jointer larger than joint thickness, unless otherwise indicated.
1. For glazed masonry units, use a nonmetallic jointer 3/4 inch (19 mm) or more in width.
D. Cut joints flush for masonry walls to receive plaster or other direct-applied finishes (other than paint), unless otherwise indicated.

3.5 COMPOSITE MASONRY

A. Bond wythes of composite masonry together using bonding system indicated on Drawings.
B. Collar Joints: Solidly fill collar joints by parging face of first wythe that is laid and shoving units of other wythe into place.
C. Corners: Provide interlocking masonry unit bond in each wythe and course at corners, unless otherwise indicated.
1. Provide continuity with masonry joint reinforcement at corners by using prefabricated L-shaped units as well as masonry bonding.
D. Intersecting and Abutting Walls: Unless vertical expansion or control joints are shown at juncture, bond walls together as follows:
1. Provide individual metal ties not more than 16 inches (406 mm) o.c.
2. Provide continuity with masonry joint reinforcement by using prefabricated T-shaped units.
3. Provide rigid metal anchors not more than 24 inches (610 mm) o.c. If used with hollow masonry units, embed ends in mortar-filled cores.

3.6 CAVITY WALLS

A. Bond wythes of cavity walls together using bonding system indicated on Drawings.

B. Keep cavities clean of mortar droppings and other materials during construction. Bevel beds away from cavity, to minimize mortar protrusions into cavity. Do not attempt to trowel or remove mortar fins protruding into cavity.
C. Parge cavity face of backup wythe in a single coat approximately 3/8 inch (10 mm) thick. Trowel face of parge coat smooth.

D. Coat cavity face of backup wythe to comply with Division 7 Section "Bituminous Dampproofing."
3.7 MASONRY JOINT REINFORCEMENT
A. General: Install entire length of longitudinal side rods in mortar with a minimum cover of 5/8 inch (16 mm) on exterior side of walls, 1/2 inch (13 mm) elsewhere. Lap reinforcement a minimum of 6 inches (150 mm).
1. Space reinforcement not more than 16 inches (406 mm) o.c.
2. Space reinforcement not more than 8 inches (203 mm) o.c. in foundation walls and parapet walls.
3. Provide reinforcement not more than 8 inches (203 mm) above and below wall openings and extending 12 inches (305 mm) beyond openings.
a. Reinforcement above is in addition to continuous reinforcement.
B. Interrupt joint reinforcement at control and expansion joints, unless otherwise indicated.
C. Provide continuity at wall intersections by using prefabricated T-shaped units.
D. Provide continuity at corners by using prefabricated L-shaped units.
E. Cut and bend reinforcing units as directed by manufacturer for continuity at[corners,] returns, offsets, column fireproofing, pipe enclosures, and other special conditions.
3.8 ANCHORING MASONRY TO STRUCTURAL MEMBERS
A. Anchor masonry to structural members where masonry abuts or faces structural members to comply with the following:
1. Provide an open space not less than 1 inch (25 mm) in width between masonry and structural member, unless otherwise indicated. Keep open space free of mortar and other rigid materials.
2. Anchor masonry to structural members with anchors embedded in masonry joints and attached to structure.
3. Space anchors as indicated, but not more than 24 inches (610 mm) o.c. vertically and 36 inches (915 mm) o.c. horizontally.
3.9 ANCHORING MASONRY VENEERS
A. Anchor masonry veneers to wall framing with seismic masonry-veneer anchors to comply with the following requirements:
1. Fasten screw-attached and seismic anchors through insulation to wall framing and with metal fasteners of type indicated. Use two fasteners unless anchor design only uses one fastener.
2. Insert slip-in anchors in metal studs as insulation is installed. Provide one anchor at each stud in each horizontal joint between boards.
3. Locate anchor sections to allow maximum vertical differential movement of ties up and down.

4. Space anchors as indicated, but not more than 18 inches (458 mm) o.c. vertically and 24 inches (610 mm) o.c. horizontally, with not less than 1 anchor for each 2 sq. ft. (0.2 sq. m) of wall area. Install additional anchors within 12 inches (305 mm) of openings and at intervals, not exceeding 8 inches (203 mm), around perimeter.
5. Space anchors as indicated, but not more than 16 inches (406 mm) o.c. vertically and [24 inches (610 mm) o.c. horizontally with not less than 1 anchor for each [2.67 sq. ft. (0.25 sq. m)

of wall area. Install additional anchors within 12 inches (305 mm) of openings and at intervals, not exceeding 36 inches (914 mm), around perimeter.

3.10 CONTROL AND EXPANSION JOINTS

A. General: Install control and expansion joint materials in unit masonry as masonry progresses. Do not allow materials to span control and expansion joints without provision to allow for in-plane wall or partition movement.

B. Form control joints in concrete masonry using one of the following methods:

1. Fit bond-breaker strips into hollow contour in ends of concrete masonry units on one side of control joint. Fill resultant core with grout and rake out joints in exposed faces for application of sealant.
2. Install preformed control-joint gaskets designed to fit standard sash block.
3. Install interlocking units designed for control joints. Install bond-breaker strips at joint. Keep head joints free and clear of mortar or rake out joint for application of sealant.
4. Install temporary foam-plastic filler in head joints and remove filler when unit masonry is complete for application of sealant.

C. Form expansion joints in brick made from clay or shale as follows:

1. Build flanges of metal expansion strips into masonry. Lap each joint 4 inches (100 mm) in direction of water flow. Seal joints below grade and at junctures with horizontal expansion joints if any.
2. Build flanges of factory-fabricated, expansion-joint units into masonry.
3. Build in compressible joint fillers where indicated.
4. Form open joint full depth of brick wythe and of width indicated, but not less than 1/2 inch (13 mm)] for installation of sealant and backer rod specified in Division 7 Section "Joint Sealants."

D. Provide horizontal, pressure-relieving joints by either leaving an air space or inserting a compressible filler of width required for installing sealant and backer rod specified in Division 7 Section "Joint Sealants," but not less than 3/8 inch (10 mm)

1. Locate horizontal, pressure-relieving joints beneath shelf angles supporting masonry.

3.11 LINTELS

A. Install steel lintels where indicated.

B. Provide concrete or masonry lintels where shown and where openings of more than 12 inches (305 mm) for brick-size units and 24 inches (610 mm) for block-size units are shown without structural steel or other supporting lintels.

C. Provide minimum bearing of 8 inches (200 mm) at each jamb, unless otherwise indicated.

3.12 FLASHING, WEEP HOLES, CAVITY DRAINAGE, AND VENTS

A. General: Install embedded flashing and weep holes in masonry at shelf angles, lintels, ledges, other obstructions to downward flow of water in wall, and where indicated. Install vents at shelf angles, ledges, and other obstructions to upward flow of air in cavities, and where indicated.

B. Install flashing as follows, unless otherwise indicated:

1. Prepare masonry surfaces so they are smooth and free from projections that could puncture flashing. Where flashing is within mortar joint, place through-wall flashing on sloping bed of mortar and cover with mortar. Before covering with mortar, seal penetrations in flashing with adhesive, sealant, or tape as recommended by flashing manufacturer.
2. At masonry-veneer walls, extend flashing through veneer, across air space behind veneer, and up face of sheathing at least 8 inches (200 mm); with upper edge tucked under building paper or building wrap, lapping at least 4 inches (100 mm).

3. At lintels and shelf angles, extend flashing a minimum of 6 inches (150 mm) into masonry at each end. At heads and sills, extend flashing 6 inches (150 mm) at ends and turn up not less than 2 inches (50 mm) to form end dams.
4. Interlock end joints of ribbed sheet metal flashing by overlapping ribs not less than 1-1/2 inches (38 mm) or as recommended by flashing manufacturer, and seal lap with elastomeric sealant complying with requirements in Division 7 Section "Joint Sealants" for application indicated.
5. Install metal drip edges and sealant stops with ribbed sheet metal flashing by interlocking hemmed edges to form hooked seam. Seal seam with elastomeric sealant complying with requirements in Division 7 Section "Joint Sealants" for application indicated.
6. Install metal drip edges beneath flexible flashing at exterior face of wall. Stop flexible flashing 1/2 inch (13 mm) back from outside face of wall and adhere flexible flashing to top of metal drip edge.
7. Install metal flashing termination beneath flexible flashing at exterior face of wall. Stop flexible flashing 1/2 inch (13 mm) back from outside face of wall and adhere flexible flashing to top of metal flashing termination.
8. Cut flexible flashing off flush with face of wall after masonry wall construction is completed.
C. Install single-wythe CMU flashing system in bed joints of CMU walls where indicated to comply with manufacturer's written instructions. Install CMU cell pans with upturned edges located below face shells and webs of CMUs above and with weep spouts aligned with face of wall. Install CMU web covers so that they cover upturned edges of CMU cell pans at CMU webs and extend from face shell to face shell.
D. Install reglets and nailers for flashing and other related construction where they are shown to be built into masonry.
E. Install weep holes in head joints in exterior wythes of first course of masonry immediately above embedded flashing and as follows:
1. Use specified weep/vent products or open head joints to form weep holes.
2. Use wicking material to form weep holes above flashing under brick sills. Turn wicking down at lip of sill to be as inconspicuous as possible.

3. Space weep holes 24 inches (600 mm) o.c., unless otherwise indicated.
4. Space weep holes formed from plastic tubing or 16 inches (400 mm) o.c.
5. Cover cavity side of weep holes with plastic insect screening at cavities insulated with loose-fill insulation.
6. Trim wicking material flush with outside face of wall after mortar has set.
F. Place pea gravel in cavities as soon as practical to a height equal to height of first course above top of flashing, but not less than 2 inches (50 mm), to maintain drainage.
1. Fill cavities full height by placing pea gravel in cavities as masonry is laid so that at any point masonry does not extend more than 24 inches (600 mm) above top of pea gravel.
G. Place cavity drainage material in cavities to comply with configuration requirements for cavity drainage material in Part 2 "Miscellaneous Masonry Accessories" Article.
H. Install vents in head joints in exterior wythes at spacing indicated. Use specified weep/vent products or open head joints to form vents.
1. Close cavities off vertically and horizontally with blocking in manner indicated. Install through-wall flashing and weep holes above horizontal blocking.
3.13 REINFORCED UNIT MASONRY INSTALLATION

A. Temporary Formwork and Shores: Construct formwork and shores as needed to support reinforced masonry elements during construction.
1. Construct formwork to provide shape, line, and dimensions of completed masonry as indicated. Make forms sufficiently tight to prevent leakage of mortar and grout. Brace, tie, and support forms to maintain position and shape during construction and curing of reinforced masonry.
2. Do not remove forms and shores until reinforced masonry members have hardened sufficiently to carry their own weight and other temporary loads that may be placed on them during construction.
B. Placing Reinforcement: Comply with requirements in ACI 530.1/ASCE 6/TMS 602
1. Comply with requirements in ACI 530.1/ASCE 6/TMS 602 for cleanouts and for grout placement, including minimum grout space and maximum pour height.
2. Limit height of vertical grout pours to not more than 60 inches (1520 mm)
3.14 FIELD QUALITY CONTROL
A. Inspectors: Owner will engage qualified independent inspectors to perform inspections and prepare reports. Allow inspectors access to scaffolding and work areas, as needed to perform inspections.
1. Place grout only after inspectors have verified compliance of grout spaces and grades, sizes, and locations of reinforcement.

B. Testing Agency: Owner will engage a qualified independent testing and inspecting agency to perform field tests and inspections indicated below and prepare test reports:
1. Payment for these services will be made by Owner or from Testing and Inspecting Allowance, as authorized by Change Orders.
2. Retesting of materials failing to comply with specified requirements shall be done at Contractor's expense.
C. Testing Frequency: One set of tests for each 5000 sq. ft. (465 sq. m) of wall area or portion thereof.
D. Clay Masonry Unit Test: For each type of unit provided, per ASTM C 67.
E. Concrete Masonry Unit Test: For each type of unit provided, per ASTM C 140.
F. Mortar Test (Property Specification): For each mix provided, per ASTM C 780. Test mortar for mortar air content and compressive strength.
G. Grout Test (Compressive Strength): For each mix provided, per ASTM C 1019.
H. Prism Test: For each type of construction provided, per ASTM C 1314 at 7 days and at 28 days.
3.15 PARGING
A. Parge exterior faces of below-grade masonry walls, where indicated, in 2 uniform coats to a total thickness of 3/4 inch (19 mm). Dampen wall before applying first coat and scarify first coat to ensure full bond to subsequent coat.
B. Use a steel-trowel finish to produce a smooth, flat, dense surface with a maximum surface variation of 1/8 inch per foot (3 mm per 300 mm). Form a wash at top of parging and a cove at bottom.
C. Damp-cure parging for at least 24 hours and protect parging until cured.
3.16 REPAIRING, POINTING, AND CLEANING

A. Remove and replace masonry units that are loose, chipped, broken, stained, or otherwise damaged or that do not match adjoining units. Install new units to match adjoining units; install in fresh mortar, pointed to eliminate evidence of replacement.
B. Pointing: During the tooling of joints, enlarge voids and holes, except weep holes, and completely fill with mortar. Point up joints, including corners, openings, and adjacent construction, to provide a neat, uniform appearance. Prepare joints for sealant application, where indicated.
C. In-Progress Cleaning: Clean unit masonry as work progresses by dry brushing to remove mortar fins and smears before tooling joints.
D. Final Cleaning: After mortar is thoroughly set and cured, clean exposed masonry as follows:

1. Remove large mortar particles by hand with wooden paddles and nonmetallic scrape hoes or chisels.
2. Test cleaning methods on sample wall panel; leave one-half of panel un-cleaned for comparison purposes.
3. Protect adjacent non-masonry surfaces from contact with cleaner by covering them with liquid strippable masking agent or polyethylene film and waterproof masking tape.
4. Wet wall surfaces with water before applying cleaners; remove cleaners promptly by rinsing surfaces thoroughly with clear water.
5. Clean brick by bucket-and-brush hand-cleaning method described in BIA Technical Notes 20.
6. Clean masonry with a proprietary acidic cleaner applied according to manufacturer's written instructions.
7. Clean concrete masonry by cleaning method indicated in NCMA TEK 8-2A applicable to type of stain on exposed surfaces.

3.17 MASONRY WASTE DISPOSAL

A. Salvageable Materials: Unless otherwise indicated, excess masonry materials are Contractor's property. At completion of unit masonry work, remove from Project site.
B. Waste Disposal as Fill Material: Dispose of clean masonry waste, including excess or soil-contaminated sand, waste mortar, and broken masonry units, by crushing and mixing with fill material as fill is placed.
1. Crush masonry waste to less than 4 inches (100 mm) in each dimension.
2. Mix masonry waste with at least two parts of specified fill material for each part of masonry waste.
3. Do not dispose of masonry waste as fill within 18 inches (450 mm) of finished grade.
C. Excess Masonry Waste: Remove excess clean masonry waste that cannot be used as fill, as described above, and other masonry waste, and legally dispose of off Owner's property.

END OF SECTION 042000

SECTION 05400 - COLD-FORMED METAL FRAMING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes the following:

1. Exterior load-bearing steel-stud walls.
2. Interior load-bearing steel-stud walls.
3. Exterior nonload-bearing steel-stud curtainwall.
4. Steel joists.
5. Steel trusses.
6. Exterior sheathing and air-infiltration barriers.

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

1. Division 5 Section "Metal Fabrications" for masonry shelf angles and connections.
2. Division 9 Section "Gypsum Board Assemblies" for gypsum board and nonload-bearing metal-stud framing and ceiling-suspension assemblies.
3.. Division 9 Section "Gypsum Sheathing" for gypsum sheathing applied to exterior steel framing.
4. Division 9 Section "Gypsum Board Shaft-Wall Assemblies" for gypsum board and nonload-bearing metal-stud framing assemblies.

1.2 PERFORMANCE REQUIREMENTS

A. AISI "Specifications": Calculate structural characteristics of cold-formed metal framing according to AISI's "Specification for the Design of Cold-Formed Steel Structural Members" and the following:

B. AISI "Specifications": Calculate structural characteristics of cold-formed metal framing according to AISI's "Load and Resistance Factor Design Specification for Cold-Formed Steel Structural Members" and the following:

1. Center for Cold-Formed Steel Structures (CCFSS) Technical Bulletin, Vol. 2, No. 1, February 1993 "AISI Specification Provisions for Screw Connections."

C. Structural Performance: Engineer, fabricate and erect cold-formed metal framing with the following minimum physical and structural properties:

1. Physical and Structural Properties: As indicated.

D. Structural Performance: Engineer, fabricate, and erect cold-formed metal framing to withstand design loads within limits and under conditions required.

1. Design Loads: As indicated.
2. Design framing systems to withstand design loads without deflections greater than the following:

a. Exterior Load-Bearing Walls: Lateral deflection of 1/240 of the wall height.
b. Exterior Load-Bearing Walls: Lateral deflection of 1/360 of the wall height.
c. Exterior Load-Bearing Walls: Lateral deflection of 1/600 of the wall height.
d Interior Load-Bearing Walls: Lateral deflection of 1/240 of the wall height.
e. Interior Load-Bearing Walls: Lateral deflection of 1/360 of the wall height.
f. Exterior Nonload-Bearing Curtainwall: Lateral deflection of 1/240 of the wall height.
g. Exterior Nonload-Bearing Curtainwall: Lateral deflection of 1/360 of the wall height.
h. Exterior Nonload-Bearing Curtainwall: Lateral deflection of 1/600 of the wall height.
i. Exterior Nonload-Bearing Curtainwall: Lateral deflection of 1/720 of the wall height.
j. Floor Joists: Vertical deflection of 1/240 of the span.
k. Floor Joists: Vertical deflection of 1/360 of the span.
l. Roof Trusses: Vertical deflection of 1/240 of the span.
m. Roof Trusses: Vertical deflection of 1/360 of the span.

3. Design framing systems to provide for movement of framing members without damage or overstressing, sheathing failure, connection failure, undue strain on fasteners and anchors, or other detrimental effects when subject to a maximum ambient temperature change (range) of 120 deg F (67 deg C).
4. Design framing system to accommodate deflection of primary building structure and construction tolerances, and to maintain clearances at openings.

E. Design exterior nonload-bearing curtainwall framing to accommodate lateral deflection without regard to contribution of sheathing materials.

F. Engineering Responsibility: Engage a fabricator who assumes undivided responsibility for engineering cold-formed metal framing by employing a qualified professional engineer to prepare design calculations, shop drawings, and other structural data.

1.3 SUBMITTALS

A. General: Submit each item in this Article according to the Conditions of the Contract and Division 1 Specification Sections.

B. Product data for each type of cold-formed metal framing, accessory, and product specified.

C. Shop drawings showing layout, spacings, sizes, thicknesses, and types of cold-formed metal framing, fabrication, fastening and anchorage details, including mechanical fasteners. Show reinforcing channels, opening framing, supplemental framing, strapping, bracing, bridging, splices, accessories, connection details, and attachments to other units of Work.

1. For cold-formed metal framing indicated to comply with certain design loadings, include structural analysis data sealed and signed by the qualified professional engineer who was responsible for its preparation.

D. Mill certificates signed by manufacturers of cold-formed metal framing certifying that their products comply with requirements, including uncoated steel thickness, yield strength, tensile strength, total elongation, and galvanized-coating thickness.

1. In lieu of mill certificates, submit test reports from a qualified independent testing agency evidencing compliance with requirements.

E. Welder certificates signed by Contractor certifying that welders comply with requirements specified under the "Quality Assurance" Article.

F. Qualification data for firms and persons specified in the "Quality Assurance" Article to demonstrate their capabilities and experience. Include lists of completed projects with project names and addresses, names and addresses of architects and owners, and other information specified.

J. Product test reports from a qualified independent testing agency evidencing compliance with requirements of the following based on comprehensive testing:

1. Expansion anchors.

2. Powder-actuated anchors.
3. Mechanical fasteners.

K. Research reports or evaluation reports of the model code organization acceptable to authorities having jurisdiction that evidence cold-formed metal framing's compliance with building code in effect for Project.

1.4 QUALITY ASSURANCE

A. Installer Qualifications: Engage an experienced Installer who has completed cold-formed metal framing similar in material, design, and extent to that indicated for this Project and with a record of successful in-service performance.

B. Testing Agency Qualifications: To qualify for acceptance, an independent testing agency must demonstrate to Architect's satisfaction, based on evaluation of agency-submitted criteria conforming to ASTM E 699, that it has the experience and capability to satisfactorily conduct the testing indicated without delaying the Work.

C. Welding Standards: Comply with applicable provisions of AWS D1.1 "Structural Welding Code--Steel" and AWS D1.3 "Structural Welding Code--Sheet Steel."

1. Certify that each welder has satisfactorily passed AWS qualification tests for welding processes involved and, if pertinent, has undergone recertification.

D. Fire-Test-Response Characteristics: Where fire-resistance-rated assemblies are indicated, provide cold-formed metal framing identical to that tested as part of an assembly for fire resistance per ASTM E 119 by an independent testing and inspecting agency acceptable to authorities having jurisdiction.

1. Fire-Resistance Ratings: As indicated by design designations listed in UL "Fire Resistance Directory," or by Warnock Hersey or another testing and inspecting agency acceptable to authorities having jurisdiction.

E. Professional Engineer Qualifications: A professional engineer legally authorized to practice in the jurisdiction where Project is located and experienced in providing engineering services of the kind indicated that have resulted in the installation of cold-formed metal framing similar to this Project in material, design, and extent and that have a record of successful in-service performance.

F. Preinstallation Conference: Conduct conference at Project site to comply with requirements of Division 1 Section "Project Meetings."

1.5 DELIVERY, STORAGE, AND HANDLING

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

B. Store cold-formed metal framing, protect with a waterproof covering, and ventilate to avoid condensation.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering cold-formed metal framing that may be incorporated in the Work include, but are not limited to, the following:

B. Manufacturers: Subject to compliance with requirements, provide cold-formed metal framing by one of the following:

1. Alabama Metal Industries Corp.
2. American Studco, Inc.
3. Angeles Metal Systems.
4. California Metal Systems, Inc.
5. Clark-Cincinnati, Inc.
6. Consolidated Fabricators Corp.
7. Consolidated Systems, Inc.
8. Dale//Incor Industries of Florida.
9. Dale Industries, Inc.
10. Design Shapes in Steel.
11. Dietrich Industries, Inc.
12. Incor Plant Dale Industries.
13. Knorr Steel Framing Systems.
14. MarinoWare; Div. of Ware Industries, Inc.
15. Studco of Hawaii, Inc.
16. Super Stud Building Products, Inc.
17. Unimast, Inc.
18. United Construction Supply.
19. United States Steel.
20. Western Metal Lath Co.

2,2 MATERIALS

A. Galvanized-Steel Sheet: ASTM A 446 (ASTM A 446M), zinc coated according to ASTM A 525 (ASTM A 525M), and as follows:

1. Coating Designation: G 60 (Z 180).
2. Coating Designation: G 90 (Z 275).

3. Grade: Grade A, 33,000 psi (230 MPa) minimum yield strength, 20 percent elongation.
4. Grade: Grade B, 37,000 psi (255 MPa) minimum yield strength, 18 percent elongation.
5. Grade: Grade C, 40,000 psi (275 MPa) minimum yield strength, 16 percent elongation.
6. Grade: Grade D, 50,000 psi (345 MPa) minimum yield strength, 12 percent elongation.
7. Grade: As required by structural performance.

B. Prime-Painted Steel Sheet: ASTM A 570 (ASTM A 570M) or ASTM A 611, cleaned, pretreated, and primed with manufacturer's baked-on, lead- and chromate-free, rust-inhibitive primer conforming to the performance requirements of FS TT-P-664.

1. Grade: Grade 33 or Grade C, 33,000 psi (230 MPa) minimum yield strength.
2. Grade: Grade 40 or Grade D, 40,000 psi (275 MPa) minimum yield strength.
3. Grade: As required by structural performance.

C. Aluminum-Zinc-Alloy-Coated Steel Sheet: ASTM A 792 (ASTM A 792M), aluminum-zinc-alloy-coated, structural quality.

1. Coating Designation: AZ 50 (AZ 150).
2. Coating Designation: AZ 55 (AZ 165).
3. Coating Designation: AZ 60 (AZ 180).
4. Grade: Grade 33, 33,000 psi (Grade 230, 230 MPa) minimum yield strength, 20 percent elongation.
5. Grade: Grade 37, 37,000 psi (Grade 255, 255 MPa) minimum yield strength, 18 percent elongation.
6. Grade: Grade 40, 40,000 psi (Grade 275, 275 MPa) minimum yield strength, 16 percent elongation.
7. Grade: Grade 50, 50,000 psi (Grade 345, 345 MPa) minimum yield strength, 12 percent elongation.
8. Grade: As required by structural performance.

2.2 WALL FRAMING

A. Steel Studs: Manufacturer's standard C-shaped steel studs of web depths indicated, with lipped flanges, and complying with the following:

1. Design Uncoated-Steel Thickness: 0.0358 inch (0.91 mm).
2. Design Uncoated-Steel Thickness: 0.0474 inch (1.20 mm).
3. Design Uncoated-Steel Thickness: 0.0598 inch (1.52 mm).

4. Design Uncoated-Steel Thickness: 0.0747 inch (1.90 mm).
5. Design Uncoated-Steel Thickness: 0.1046 inch (2.66 mm).
6. Flange Width: 1-3/8 inches (35 mm).
7. Flange Width: 1-5/8 inches (41 mm).
8. Flange Width: 2 inches (51 mm).
9. Flange Width: 2-1/2 inches (63 mm).
10. Web: Punched.
11. Web: Unpunched.

B. Steel Track: Manufacturer's standard U-shaped steel track, unpunched, of web depths indicated, with straight flanges, and complying with the following:

1. Design Uncoated-Steel Thickness: 0.0358 inch (0.91 mm).
2. Design Uncoated-Steel Thickness: 0.0474 inch (1.20 mm).
3. Design Uncoated-Steel Thickness: 0.0598 inch (1.52 mm).
4. Design Uncoated-Steel Thickness: 0.0747 inch (1.90 mm).
5. Design Uncoated-Steel Thickness: 0.1046 inch (2.66 mm).
6. Design Uncoated-Steel Thickness: Matching steel studs.
7. Flange Width: Manufacturers standard deep flange where indicated, standard flange elsewhere.

2.3 JOIST FRAMING

A. Steel Joists: Manufacturer's standard C-shaped steel joists, unpunched, of web depths indicated, with lipped flanges, and complying with the following:

1. Design Uncoated-Steel Thickness: 0.0358 inch (0.91 mm).
2. Design Uncoated-Steel Thickness: 0.0474 inch (1.20 mm).
3. Design Uncoated-Steel Thickness: 0.0598 inch (1.52 mm).
4. Design Uncoated-Steel Thickness: 0.0747 inch (1.90 mm).
5. Design Uncoated-Steel Thickness: 0.1046 inch (2.66 mm).
6. Flange Width: 1-5/8 inches (41 mm) minimum.
7. Flange Width: 2 inches (51 mm).
8. Flange Width: 2-1/2 inches (63 mm).

B. Steel Joist Track: Manufacturer's standard U-shaped steel joist track, unpunched, of web depths indicated, with straight flanges, and complying with the following:

1. Design Uncoated-Steel Thickness: 0.0358 inch (0.91 mm).
2. Design Uncoated-Steel Thickness: 0.0474 inch (1.20 mm).
3. Design Uncoated-Steel Thickness: 0.0598 inch (1.52 mm).
4. Design Uncoated-Steel Thickness: 0.0747 inch (1.90 mm).
5. Design Uncoated-Steel Thickness: 0.1046 inch (2.66 mm).
6. Design Uncoated-Steel Thickness: Matching steel joists.
7. Flange Width: 1-5/8 inches (41 mm) minimum.

8. Flange Width: 2 inches (51 mm).
9. Flange Width: 2-1/2 inches (63 mm).

2.4 FRAMING ACCESSORIES

A. Fabricate steel-framing accessories of the same material and finish used for framing members, with a minimum yield strength of 33,000 psi (230 MPa).

B. Provide accessories of manufacturer's standard thickness and configuration, unless otherwise indicated, as follows:

1. Supplementary framing.
2. Bracing, bridging, and solid blocking.
3. Web stiffeners.
4. Gusset plates.
5. Deflection track and vertical slide clips.
6. Stud kickers and girts.
7. Joist hangers and end closures.
8. Reinforcement plates.

2.5 ANCHORS, CLIPS, AND FASTENERS

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

B. Cast-in-Place Anchor Bolts and Studs: ASTM A 307, Grade A (ASTM F 568, Property Class 4.6); carbon-steel hex-head bolts and studs; carbon-steel nuts; and flat, unhardened-steel washers. Zinc coated by the hot-dip process according to ASTM A 153.

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

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

E. Mechanical Fasteners: Corrosion-resistant coated, self-drilling, self-threading steel drill screws.

1. Head Type: Low-profile head beneath sheathing, manufacturer's standard

elsewhere.

F. Welding Electrodes: Comply with AWS standards.

2.6 MISCELLANEOUS MATERIALS

A. Galvanizing Repair Paint: SSPC-Paint 20 or DOD-P-21035, with dry film containing a minimum of 94 percent zinc dust by weight.

B. Cement Grout: Portland cement, ASTM C 150, Type I; and clean, natural sand, ASTM C 404. Mix at ratio of 1 part cement to 2-1/2 parts sand, by volume, with minimum water required for placement and hydration.

C. Nonmetallic, Nonshrink Grout: Premixed, nonmetallic, noncorrosive, nonstaining grout containing selected silica sands, portland cement, shrinkage-compensating agents, plasticizing and water-reducing agents, complying with ASTM C 1107, with fluid consistency and a 30-minute working time.

D. Thermal Insulation: ASTM C 665, Type I, unfaced mineral-fiber blankets produced by combining glass or slag fibers with thermosetting resins.

2.7 GYPSUM SHEATHING

A. Sheathing: Comply with requirements of Division 7 Section "Exterior Insulation and Finish Systems--Class PB."

B. Sheathing: Comply with requirements of Division 9 Section "Gypsum Sheathing."

C. Gypsum Sheathing Board with Water-Resistant Core: Gypsum sheathing board consisting of noncombustible gypsum core incorporating a water-resistant material surfaced on face, back, and long edges with water-repellent paper bonded to the core. Comply with ASTM C 79 and requirements indicated below:

1. Type: Regular.
2. Type: Type X.
3. Edge and End Configuration: V-shaped, tongue-and-groove long edges; square ends.
4. Edge and End Configuration: Square.
5. Thickness: 1/2 inch (12.7 mm).
6. Thickness: 5/8 inch (16 mm).

D. Glass-Mat Gypsum Board: Gypsum board designed as an exterior substrate for a weather barrier, consisting of a noncombustible water-resistant core, essentially

gypsum, surfaced with glass mats on face and back, partially or completely embedded in core, and with unsurfaced square edges. Comply with ASTM C 1177 and requirements indicated below:

1. Type: Regular.
2. Type: Type X.
3. Thickness: 1/2 inch (12.7 mm).
4. Thickness: 5/8 inch (16 mm).

E. Available Products: Subject to compliance with requirements, gypsum sheathing boards that may be incorporated in the Work include, but are not limited to, the following:

F. Products: Subject to compliance with requirements, provide one of the following:

1. Gypsum Sheathing Board with Water-Resistant Core, Regular Type:
   a. Gyproc Gypsum Sheathing; Domtar Gypsum Co.
   b. G-P Gypsum Sheathing; Georgia-Pacific Corp.
   c. Gold Bond Jumbo Gypsum Sheathing; National Gypsum Co., Gold Bond Building Products Div.
   d. Gold Bond Regular Gypsum Sheathing; National Gypsum Co., Gold Bond Building Products Div.
   e. USG Gypsum Sheathing; United States Gypsum Co.

2. Gypsum Sheathing Board with Water-Resistant Core, Type X:

   a. Gyproc Fireguard Sheathing; Domtar Gypsum Co.
   b. G-P Firestop Sheathing; Georgia-Pacific Corp.
   c. Gold Bond Fire Shield Jumbo Sheathing; National Gypsum Co., Gold Bond Building Products Div.
   d. USG Firecode Type X Gypsum Sheathing; United States Gypsum Co.

3. Glass-Mat Gypsum Board, Regular Type:

   a. Dens-Glass Gold Exterior Sheathing; Georgia-Pacific Corp.

4. Glass-Mat Gypsum Board, Type X:

a. Dens-Glass Gold Firestop; Georgia-Pacific Corp.

G. Sheathing Fasteners: ASTM C 954, steel drill screws, Type S-12 fluted tip, a minimum of 1-1/4 inches (32 mm) long, with organic-polymer coating or other corrosion-protective coating.

2.8 TAPES AND SEALANT

A. Sheathing Tape: Tape specifically designed and manufactured to seal joints in gypsum sheathing against water and air infiltration, formulated with an adhesive that permanently bonds to gypsum sheathing substrates, and as indicated below:

1. Linerless, polypropylene sheathing tape, 0.0027 inch (0.07 mm) thick, 2-1/2 inches (63 mm) wide, composed of oriented polypropylene backing coated with permanent acrylic adhesive formulated to adhere to gypsum sheathing surfaces.
2. Polyethylene tape, 0.025 inch (0.63 mm) thick, 3 inches (76 mm) wide, composed of polyethylene backing coated with synthetic-rubber-based adhesive.
3. Self-adhering, glass-fiber tape, 2 inches (51 mm) wide, 10-by-10 or 10-by-20 threads per inch (25.4 mm), of type recommended by tape manufacturer to use with siliconized emulsion sealant in sealing joints and fasteners for gypsum sheathing, and with a history of successful in-service use.
4. Available Products: Subject to compliance with requirements, sheathing tapes that may be incorporated in the Work include, but are not limited to, the following:
5. Products: Subject to compliance with requirements, provide one of the following:

    a. No. 8086 Contractor Sheathing Tape; 3M Construction Markets.
    b. Perma-Tite Tape--PGM 207A; PermaGlass-Mesh, Inc.
    c. POLYKEN 612 Seam Seal Tape; Polyken Technologies.
    d. Quik-Tape; Quik-Tape, Inc.

B. Silicone Emulsion Sealant: Product complying with ASTM C 834, compatible with sealant tape and gypsum sheathing, recommended by manufacturers of both sheathing and tape for use with glass-fiber sheathing tape and for covering exposed fasteners.

1. Product: Subject to compliance with requirements, provide Elmer's Siliconized Acrylic Latex Caulk; Borden, Inc.

2.9 AIR-INFILTRATION BARRIER

A. Provide one of the following products:

B. Provide the following product:

1. n/a
2. Polyethylene sheet, 0.0061 inch (0.15 mm) thick, formed by spinning continuous strands of fine, high-density polyethylene interconnected fibers and bonding them together by heat and pressure; incorporating an additive to

provide ultralight resistance for up to 120 days; with a water-vapor transmission rate equaling 669 g in 24 hours through 1 sq. m of surface per ASTM E 96 procedure B and flame-spread and smoke-developed ratings of 0 and 25, respectively, per ASTM E 84.

3. Laminated polyethylene sheet, 0.003 inch (0.08 mm) thick, consisting of 2 plies of microperforated, cross-laminated polyethylene sheets, with a water-vapor transmission rate equaling 87.2 perms (5000 SI perms).
4. Polypropylene sheet, 0.0095 inch (0.24 mm) thick, consisting of spun-bonded polypropylene substrate with a polypropylene coating attached directly to 1 side; with a water-vapor transmission rate equaling 117 g in 24 hours through 1 sq. m of surface per ASTM E 96 procedure B and flame-spread and smoke-developed ratings of 0 and 15, respectively, per ASTM E 84.
5. Woven polyolefin sheet, 0.005 inch (0.13 mm) thick, with a water-vapor transmission rate equaling 65 g in 24 hours through 1 sq. m of surface per ASTM E 96 procedure A and a flame-spread rating not exceeding 25 per ASTM E 84.

C. Available Products: Subject to compliance with requirements, air-infiltration barriers that may be incorporated in the Work include, but are not limited to, the following:

D. Products: Subject to compliance with requirements, provide one of the following:

1. Tyvek Housewrap; DuPont Company, Fibers Department.
2. Rufco-Wrap; Raven Industries, Inc.
3. Typar HouseWrap; Reemay, Inc.
4. Barricade Building Wrap; Simplex Products.

2.10 FABRICATION

A. Fabricate cold-formed metal framing and accessories plumb, square, true to line, and with connections securely fastened, according to manufacturer's recommendations and the requirements of this Section.

1. Fabricate framing assemblies in jig templates.
2. Cut framing members by sawing or shearing; do not torch cut.
3. Fasten cold-formed metal framing members by welding. Wire tying of framing members is not permitted.
4. Fasten cold-formed metal framing members by welding or screw fastening, as standard with fabricator. Wire tying of framing members is not permitted.

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

welding work.

b. Locate mechanical fasteners and install according to cold-framed metal framing manufacturer's instructions with screw penetrating joined members by not less than 3 exposed screw threads.

5. Fasten other materials to cold-formed metal framing by welding, bolting, or screw fastening, according to manufacturer's recommendations.

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

C. Fabrication Tolerances: Fabricate assemblies to a maximum allowable tolerance variation from plumb, level, and true to line of 1/8 inch in 10 feet (1:960) and as follows:

1. Spacing: Space individual framing members no more than plus or minus 1/8 inch (3 mm) from plan location. Cumulative error shall not exceed minimum fastening requirements of sheathing or other finishing materials.
2. Squareness: Fabricate each cold-formed metal framing assembly to a maximum out-of-square tolerance of 1/8 inch (3 mm).

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine supporting substrates and abutting structural framing for compliance with requirements, including installation tolerances and other conditions affecting performance of cold-formed metal framing. Do not proceed with installation until unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Before sprayed-on fireproofing is applied, attach continuous angles, supplementary framing, or tracks to structural members indicated to receive sprayed-on fireproofing.

B. After sprayed-on fireproofing has been applied, remove only as much fireproofing as needed to complete installation of cold-formed framing without reducing thickness of fireproofing below that required to obtain fire-resistance rating indicated. Protect remaining fireproofing from damage.

C. Grout bearing surfaces uniform and level to ensure full contact of bearing flanges or track webs on supporting concrete or masonry construction.

3.1 INSTALLATION, GENERAL

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

B. Install cold-formed metal framing and accessories plumb, square, true to line, and with connections securely fastened, according to manufacturer's recommendations and the requirements of this Section.

1. Cut framing members by sawing or shearing; do not torch cut.
2. Fasten cold-formed metal framing members by welding or screw fastening, as standard with fabricator. Wire tying of framing members is not permitted.

a. Comply with AWS requirements and procedures for welding, appearance and quality of welds, and methods used in correcting welding work.
b. Locate mechanical fasteners and install according to cold-framed metal framing manufacturer's instructions with screw penetrating joined members by not less than 3 exposed screw threads.

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

D. Provide temporary bracing and leave in place until framing is permanently stabilized.

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

F. Install insulation in built-up exterior framing members, such as headers, sills, boxed joists, and double studs, inaccessible upon completion of framing work.

G. Fasten reinforcement plate over web penetrations that exceed size of manufacturer's standard punched openings.

H. Erection Tolerances: Install cold-formed metal framing to a maximum allowable tolerance variation from plumb, level, and true to line of 1/8 inch in 10 feet (1:960) and as follows:

1. Space individual framing members no more than plus or minus 1/8 inch (3 mm) from plan location. Cumulative error shall not exceed minimum fastening requirements of sheathing or other finishing materials.

3.2 LOAD-BEARING WALL INSTALLATION

A. Install continuous top and bottom tracks sized to match studs. Align tracks accurately and securely anchor at corners and ends, and at spacings recommended by the manufacturer, but not greater than the following:

1. Spacing: 24 inches (610 mm) for nail or power-driven anchors.
2. Spacing: 32 inches (813 mm) for cast-in-place or expansion anchors.

B. Squarely seat studs against webs of top and bottom tracks. Fasten both flanges of studs to top and bottom track. Space studs as follows:

1. n/a
2. Stud Spacing: 16 inches (406 mm), or as indicated maximum 16" o.c.
3. n/a
4. n/a
5. n/a
6. n/a
7. n/a
8. n/a

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

D. Align studs vertically where wall-framing continuity is interrupted by floor framing. Where studs cannot be aligned, continuously reinforce track to transfer loads.

E. Align joists over studs. Where joists cannot be aligned, continuously reinforce track to transfer loads.

F. Anchor studs abutting structural columns or walls, including masonry walls, to supporting structure as indicated.

G. Install headers over wall openings wider than the stud spacing. Locate headers above openings as indicated. Fabricate headers of compound shapes indicated or required to transfer load to supporting studs, complete with clip-angle connectors, web stiffeners, or gusset plates.

1. Frame wall openings with not less than a double stud at each jamb of frame as indicated or required by manufacturer.
2. Install runner tracks and jack studs above and below wall openings. Anchor tracks to jamb studs with clip angles or by welding, and space jack studs same as full-height wall studs.

H. Install supplementary framing, blocking, and bracing in stud framing indicated to support fixtures, equipment, services, casework, heavy trim, furnishings, and similar work requiring attachment to framing.

1. Where type of supplementary support is not indicated, comply with stud manufacturer's recommendations and industry standards in each case, considering weight or load resulting from item supported.

I. Install horizontal bridging in stud system, spaced in rows not more than 48 inches (1219 mm) apart. Fasten at each stud intersection.

1. Bridging: Cold-rolled steel channel, clip angle fastened to webs of punched studs.
2. Bridging: Flat, steel-sheet straps of width and thickness indicated, fastened to stud flanges.
3. Bridging: Combination of flat, steel-sheet straps of width and thickness indicated and stud-track solid blocking of width and thickness matching studs. Fasten flat straps to stud flanges and secure solid blocking to stud webs or flanges.

J. Install steel-sheet diagonal bracing straps to both stud flanges, terminate at and fasten to reinforced top and bottom track. Fasten clip-angle connectors to multiple studs at ends of bracing and anchor to structure.

K. Install miscellaneous framing and connections, including supplementary framing, web stiffeners, clip angles, continuous angles, anchors, and fasteners, to provide a complete and stable wall-framing system.

3.3 NONLOAD-BEARING CURTAINWALL INSTALLATION

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

B. Squarely seat studs against webs of top and bottom tracks. Fasten both flanges of studs to top and bottom track, unless otherwise indicated. Space studs as follows:

1. n/a
2. Stud Spacing: 16 inches (406 mm), or as indicated maximum 16" o.c.
3. n/a
4. n/a
5. n/a
6. n/a
7. n/a
8. n/a

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

D. Isolate steel framing from building structure at locations indicated to prevent

transfer of vertical loads while providing lateral support.

1. Install deflection track and anchor to building structure.
2. Connect studs with vertical slide clips to continuous angles or supplementary framing anchored to building structure.

E. Install horizontal bridging in curtainwall studs, spaced in rows not more than 48 inches (1219 mm) apart. Fasten at each stud intersection.

1. Install additional row of horizontal bridging in curtainwall stud beneath deflection track when curtainwall studs are not fastened to an additional top track.
2. Bridging: Cold-rolled steel channel, clip angle fastened to webs of punched studs.
3. Bridging: Flat, steel-sheet straps of width and thickness indicated, fastened to stud flanges.
4. Bridging: Combination of flat, steel-sheet straps of width and thickness indicated and stud-track solid blocking of width and thickness matching studs. Fasten flat straps to stud flanges and secure solid blocking to stud webs or flanges.

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

3.4 FABRICATED WALL-PANEL INSTALLATION (N/A)

A. Install fabricated wall panels and securely anchor to supporting structure.

B. Erection Tolerances: Bolt or weld wall panels at horizontal and vertical junctures to produce flush, even, true-to-line joints.

1. Maximum variation in plane and true position between prefabricated assemblies should not exceed 1/16 inch (1.6 mm).

3.5 JOIST INSTALLATION

A. Install perimeter joist track sized to match joists. Align and securely anchor or fasten track to supporting structure at corners, ends, and spacings indicated or as recommended by the manufacturer.

B. Install joists bearing on supporting framing, level, straight, and plumb, adjust to final position, brace, and reinforce. Fasten joists to both flanges of joist track.

1. Install joists over supporting framing with a minimum end bearing of 1-1/2 inches (38 mm).
2. Reinforce ends of joists with web stiffeners, end clips, joist hangers, steel clip

angles, steel-stud sections, or as otherwise recommended by manufacturer.

C. Space joists not more than 2 inches (51 mm) from abutting walls, and as follows:

1. n/a
2. n/a
3. n/a
4. Joist Spacing: As indicated on plans.
5. n/a
6. n/a
7. n/a
8. n/a

D. Frame openings with built-up joist headers consisting of joist and joist track, nesting joists, or another combination of connected joists where indicated.

E. Install joist reinforcement at interior supports with single, short length of joist section located directly over interior support, with lapped joists of equal length to joist reinforcement, or by other method recommended by joist manufacturer.

1. Install web stiffeners to transfer axial loads of walls above.

F. Install bridging at each end of joists and at intervals indicated. Fasten bridging at each joist intersection as follows:

1. Bridging: Cold-rolled steel channel, fastened to bottom flange of joists.
2. Bridging: Flat, steel-sheet straps of width and thickness indicated, fastened to bottom flange of joists.
3. Bridging: Combination of flat, steel-sheet straps of width and thickness indicated and joist-track solid blocking of width and thickness indicated. Fasten flat straps to bottom flange of joists and secure solid blocking to joist webs.

G. Secure joists to load-bearing interior walls to prevent lateral movement of bottom flange.

H. Install miscellaneous joist framing and connections, including web stiffeners, closure pieces, clip angles, continuous angles, hold-down angles, anchors, and fasteners, to provide a complete and stable joist-framing assembly.

3.6 TRUSS INSTALLATION (N/A)

A. Install, bridge, and brace trusses according to manufacturer's recommendations and requirements of this Section.

B. Space trusses at centers indicated.

C. Space trusses as follows:

1. Truss Spacing: 16 inches (406 mm).
2. Truss Spacing: 24 inches (610 mm).
3. Truss Spacing: 32 inches (813 mm).
4. Truss Spacing: 400 mm.
5. Truss Spacing: 600 mm.
6. Truss Spacing: 800 mm.

D. Do not alter, cut, or remove framing members or connections of trusses.

E. Erect trusses with plane of truss webs plumb and parallel to each other, align, and accurately position at spacings indicated.

F. Erect trusses without damaging framing members or connections.

G. Align webs of bottom chords and load-bearing studs or continuously reinforce track to transfer loads to structure. Anchor trusses securely at all bearing points.

H. Install continuous bridging and permanently brace trusses.

3.7 GYPSUM SHEATHING INSTALLATION

A. General: Install gypsum sheathing board according to manufacturer's instructions and GA-253 "Application of Gypsum Sheathing."

B. Install tongue-and-groove gypsum sheathing horizontally with long edges at right angles to studs with V-grooved edge down and tongue edge up. Interlock tongue with groove to bring long edges in contact with edges of adjacent board without forcing. Abut ends of boards over centers of studs and stagger end joints. Fasten gypsum sheathing board to framing with self-drilling, bugle-head screws, as follows:

C. Install square end and edged sheathing vertically with long edges parallel to, and centered over, studs. Install solid blocking where end joints do not bear against framing sills or track. Fasten gypsum sheathing board to perimeter framing and to each stud with self-drilling, bugle-head screws, located a minimum of 3/8 inch (9.5 mm) from ends and edges of board units, as follows:

1. Space fasteners to comply with manufacturer's recommendations.
2. n/a
3. n/a

To meet all codes

3.8 TAPE AND SEALANT APPLICATION

A. Sheathing Tape: Apply sheathing tape to joints in sheathing; overlap tape by not less than the tape width at joint intersections.

1. For polyethylene tape, apply primer, specified by tape manufacturer, to sheathing surfaces. In addition, apply polyethylene tape, 2 inches (50 mm) square, to completely cover each exposed fastener.
2. For glass-fiber tape, apply approximately a 3/8-inch (9.5-mm) bead of siliconized emulsion sealant to tapes along joints and embed sealant into tapes along their entire surface with a trowel. In addition, apply sealant with a trowel to each exposed fastener so that fasteners are completely covered.

3.10 AIR-INFILTRATION BARRIER INSTALLATION

A. Cover sheathing with air-infiltration barrier as follows; see drawings:

1. Apply asphalt-saturated organic felt horizontally with 2-inch (51-mm) overlap and 6-inch (152-mm) endlap; fasten to sheathing with corrosion-resistant staples.
2. Apply plastic sheet according to manufacturer's printed recommendations with a 4-inch (102-mm) overlap.
3. Apply woven polyolefin sheet according to manufacturer's printed recommendations with a 4-inch (102-mm) overlap.

3.9 FIELD QUALITY CONTROL

A. Testing Agency: A qualified independent testing agency employed and paid by Owner will perform field quality-control testing.

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

C. Testing agency will report test results promptly and in writing to Contractor and Architect.

D. Remove and replace Work that does not comply with specified requirements.

E. Additional testing will be performed to determine compliance of corrected Work with specified requirements.

3.10 REPAIRS AND PROTECTION

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

B. Touchup Painting: Wire brush, clean, and paint scarred areas, welds, and rust spots on fabricated and installed prime-painted, cold-formed metal framing.

1. Touchup painted surfaces with same type of shop paint used on adjacent surfaces.

C. Protect gypsum sheathing that will be exposed to weather for more than one month as follows:

1. Protect cutouts, corners, and joints in the sheathing by filling with a flexible sealant or by applying tape recommended by sheathing manufacturer at the time sheathing is applied.

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

END OF SECTION 05400 COLD FORM METAL FRAMING

SECTION 061000 - ROUGH CARPENTRY

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes the following:
   1. Framing with dimension lumber.
   2. Wood blocking, cants, and nailers.
   3. Wood furring and grounds.
   4. Plywood backing panels.

1.2 SUBMITTALS

A. Product Data: For each type of process and factory-fabricated product.
   1. Include data for wood-preservative treatment from chemical treatment manufacturer and certification by treating plant that treated materials comply with requirements.

B. Material Certificates: For dimension lumber specified to comply with minimum allowable unit stresses. Indicate species and grade selected for each use and design values approved by the American Lumber Standards Committee Board of Review.

C. Research/Evaluation Reports: For the following, showing compliance with building code in effect for Project:
   1. Wood-preservative-treated wood.
   2. Power-driven fasteners.
   3. Powder-actuated fasteners.
   4. Expansion anchors.
   5. Metal framing anchors.

1.3 QUALITY ASSURANCE

A. Forest Certification: For the following wood products, provide materials produced from wood obtained from forests certified by an FSC-accredited certification body to comply with FSC STD-01-001, "FSC Principles and Criteria for Forest Stewardship":
   1. Dimension lumber framing.
   2. Miscellaneous lumber.

PART 2 - PRODUCTS

2.1 WOOD PRODUCTS, GENERAL

A. Lumber: DOC PS 20 and applicable rules of grading agencies indicated. If no grading agency is indicated, provide lumber that complies with the applicable rules of any rules-writing agency certified by the ALSC Board of Review. Provide lumber graded by an agency certified by the ALSC Board

of Review to inspect and grade lumber under the rules indicated.
1. Factory mark each piece of lumber with grade stamp of grading agency.
2. Provide dressed lumber, S4S, unless otherwise indicated.

2.2 WOOD-PRESERVATIVE-TREATED LUMBER

A. Preservative Treatment by Pressure Process: AWPA C2.
   1. Preservative Chemicals: Acceptable to authorities having jurisdiction.
B. Kiln-dry lumber after treatment to a maximum moisture content of 19 percent.
C. Mark lumber with treatment quality mark of an inspection agency approved by the ALSC Board of Review.
D. Application: Treat items indicated on Drawings, and the following:
   1. Wood cants, nailers, curbs, equipment support bases, blocking, stripping, and similar members in connection with roofing, flashing, vapor barriers, and waterproofing.
   2. Wood sills, sleepers, blocking, furring, stripping, and similar concealed members in contact with masonry or concrete.
   3. Wood framing and furring attached directly to the interior of below-grade exterior masonry or concrete walls.
   4. Wood framing members that are less than 18 inches above the ground in crawlspaces or unexcavated areas.
   5. Wood floor plates that are installed over concrete slabs-on-grade.

2.3 DIMENSION LUMBER FRAMING

A. Maximum Moisture Content: 19 percent.
B. Framing Other Than Non-Load-Bearing Interior Partitions: Construction or No. 2 grade and any of the following species:
   1. Wall Framing:
      a. Spruce-pine-fir; NeLMA, WCLIB, or WWPA.
   2. Ceiling joists:
      a. Southern yellow pine grade #2; SPIB

2.4 MISCELLANEOUS LUMBER

A. General: Provide miscellaneous lumber indicated and lumber for support or attachment of other construction, including the following:

   1. Blocking.
   2. Nailers.
   3. Cants.
   4. Furring.

B. For items of dimension lumber size, provide Construction or No. 2 grade lumber with 19 percent maximum moisture content of any species.

C. For concealed boards, provide lumber with 19 percent maximum moisture content and any of the following species and grades:

1. Mixed southern pine, No. 2 grade; SPIB.
2. Eastern softwoods, No. 2 Common grade; NeLMA.
3. Northern species, No. 2 Common grade; NLGA.
4. Western woods, Construction or No. 2 Common grade; WCLIB or WWPA.

2.5 PLYWOOD BACKING PANELS

A. Telephone and Electrical Equipment Backing Panels: DOC PS 1, not less than 3/4-inch nominal thickness.

2.6 FASTENERS

A. General: Provide fasteners of size and type indicated that comply with requirements specified.

1. Where rough carpentry is exposed to weather, in ground contact, pressure-preservative treated, or in area of high relative humidity, provide fasteners with hot-dip zinc coating complying with ASTM A 153/A 153M.

B. Power-Driven Fasteners: NES NER-272.

C. Bolts: Steel bolts complying with ASTM A 307, Grade A; with ASTM A 563 hex nuts and, where indicated, flat washers.

2.7 METAL FRAMING ANCHORS

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

C. Basis-of-Design Products: Subject to compliance with requirements, provide products indicated on Drawings or comparable products by one of the following:

1. Alpine Engineered Products, Inc.
2. Cleveland Steel Specialty Co.
3. Harlen Metal Products, Inc.
4. KC Metals Products, Inc.
5. Simpson Strong-Tie Co., Inc.
6. Southeastern Metals Manufacturing Co., Inc.

7. USP Structural Connectors.

D. Allowable Design Loads: Provide products with allowable design loads, as published by manufacturer that meet or exceed those of basis-of-design products. Manufacturer's published values shall be determined from empirical data or by rational engineering analysis and demonstrated by comprehensive testing performed by a qualified independent testing agency.

E. Galvanized Steel Sheet: Hot-dip, zinc-coated steel sheet complying with ASTM A 653/A 653M, G60 coating designation.

2.8 MISCELLANEOUS MATERIALS

A. Sill-Sealer Gaskets: Glass-fiber-resilient insulation, fabricated in strip form, for use as a sill sealer; 1-inch nominal thickness, compressible to 1/32 inch; selected from manufacturer's standard widths to suit width of sill members indicated.

B. Flexible Flashing: Self-adhesive, rubberized-asphalt compound, bonded to a high-density, polyethylene film to produce an overall thickness of not less than 0.025 inch.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Set rough carpentry to required levels and lines, with members plumb, true to line, cut, and fitted. Fit rough carpentry to other construction; scribe and cope as needed for accurate fit. Locate nailers, blocking, and similar supports to comply with requirements for attaching other construction.

B. Where wood-preservative-treated lumber is installed adjacent to metal decking, install continuous flexible flashing separator between wood and metal decking.

C. Framing Standard: Comply with AF&PA's "Details for Conventional Wood Frame Construction," unless otherwise indicated.

D. Metal Framing Anchors: Install metal framing to comply with manufacturer's written instructions.

E. Do not splice structural members between supports, unless otherwise indicated.

F. Comply with AWPA M4 for applying field treatment to cut surfaces of preservative-treated lumber.

G. Securely attach rough carpentry work to substrate by anchoring and fastening as indicated, complying with the following:

1. NES NER-272 for power-driven fasteners.
2. Table 2304.9.1, "Fastening Schedule," in ICC's International Building

Code.

3.2 PROTECTION

A. Protect wood that has been treated with inorganic boron (SBX) from weather. If, despite protection, inorganic boron-treated wood becomes wet, apply EPA-registered borate treatment. Apply borate solution by spraying to comply with EPA-registered label.

END OF SECTION 061000

SECTION 072100 - THERMAL INSULATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:
   1. Foam-plastic board insulation.
   2. Glass-fiber board insulation.
   3. Glass-fiber blanket insulation.

B. Related Sections:
   1. Division 06 Section "Sheathing" for foam-plastic board sheathing over wood or steel framing.
   2. Division 07 Section Exterior Insulation and Finish System (EIFS)" for insulation specified as part of these systems.

1.3 SUBMITTALS

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

B. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, for each product.

C. Research/Evaluation Reports: For foam-plastic insulation, from ICC-ES

1.4 QUALITY ASSURANCE

A. Surface-Burning Characteristics: As determined by testing identical products according to ASTM E 84 by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Protect insulation materials from physical damage and from deterioration due to moisture, soiling, and other sources. Store inside and in a dry location. Comply with manufacturer's written instructions for handling, storing, and protecting during installation.

B. Protect foam-plastic board insulation as follows.
   1. Do not expose to sunlight except to necessary extent for period of installation and concealment.

   2. Protect against ignition at all times. Do not deliver foam-plastic board

materials to Project site before installation time.

3. Quickly complete installation and concealment of foam-plastic board insulation in each area of construction.

PART 2 - PRODUCTS

2.1 FOAM-PLASTIC BOARD INSULATION

A. Extruded-Polystyrene Board Insulation: ASTM C 578, of type and minimum compressive strength indicated below, with maximum flame-spread and smoke-developed indexes of 75 and 450, respectively, per ASTM E 84.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
   a. DiversiFoam Products.
   b. Dow Chemical Company.
   c. Owens Corning.
   d. Pactiv Building Products.
2. Type IV, 25 psi (173 kPa).

B. Geotextile-Faced Wall Insulation Drainage Panels: Extruded-polystyrene board insulation complying with ASTM C 578, Type IV, 25-psi (173-kPa) minimum compressive strength; fabricated with tongue-and-groove edges and with one side having grooved drainage channels faced with nonwoven geotextile filter fabric.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following]:
   a. Owens Corning.

2.2 GLASS-FIBER BLANKET INSULATION

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. CertainTeed Corporation.
2. Guardian Building Products, Inc.
3. Johns Manville.
4. Knauf Insulation.
5. Owens Corning.

B. Foil-Faced, Glass-Fiber Blanket Insulation: ASTM C 665, Type III

(reflective faced), Class B (faced surface with a flame-propagation resistance of 0.12 W/sq. cm); Category 1 (membrane is a vapor barrier), faced with foil scrim, foil-scrim kraft, or foil-scrim polyethylene.

2.3 MINERAL-WOOL BLANKET INSULATION

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
   1. Fibrex Insulations Inc.
   2. Owens Corning.
   3. Roxul Inc.
   4. Thermafiber.

B. Unfaced, Mineral-Wool Blanket Insulation: ASTM C 665, Type I (blankets without membrane facing); consisting of fibers; with maximum flame-spread and smoke-developed indexes of 25 and 50, respectively, per ASTM E 84; passing ASTM E 136 for combustion characteristics.

PART 3 - EXECUTION

3.1 PREPARATION

A. Clean substrates of substances that are harmful to insulation or vapor retarders, including removing projections capable of puncturing vapor retarders, or that interfere with insulation attachment.

3.2 INSTALLATION, GENERAL

A. Comply with insulation manufacturer's written instructions applicable to products and applications indicated.

B. Install insulation that is undamaged, dry, and unsoiled and that has not been left exposed to ice, rain, or snow at any time.

C. Extend insulation to envelop entire area to be insulated. Cut and fit tightly around obstructions and fill voids with insulation. Remove projections that interfere with placement.

D. Provide sizes to fit applications indicated and selected from manufacturer's standard thicknesses, widths, and lengths. Apply single layer of insulation units to produce thickness indicated unless multiple layers are otherwise shown or required to make up total thickness.

3.3 INSTALLATION OF BELOW-GRADE INSULATION

A. On vertical footing and foundation wall surfaces, set insulation units using manufacturer's recommended adhesive according to manufacturer's written instructions.
   1. If not otherwise indicated, extend insulation a minimum of 24 inches

(610 mm)) below exterior grade line.

B. On horizontal surfaces under slabs, loosely lay insulation units according to manufacturer's written instructions. Stagger end joints and tightly abut insulation units.
   1. If not otherwise indicated, extend insulation a minimum of 24 inches (610 mm) in from exterior walls.

3.4 INSTALLATION OF INSULATION FOR FRAMED CONSTRUCTION

A. Apply insulation units to substrates by method indicated, complying with manufacturer's written instructions. If no specific method is indicated, bond units to substrate with adhesive or use mechanical anchorage to provide permanent placement and support of units.

3.5 INSTALLATION OF INSULATION IN CEILINGS FOR SOUND ATTENUATION

A. Where glass-fiber blankets are indicated for sound attenuation above ceilings, install blanket insulation over entire ceiling area in thicknesses indicated. Extend insulation 48 inches (1219 mm) up either side of partitions.

3.6 PROTECTION

A. Protect installed insulation and vapor retarders from damage due to harmful weather exposures, physical abuse, and other causes. Provide temporary coverings or enclosures where insulation is subject to abuse and cannot be concealed and protected by permanent construction immediately after installation.

END OF SECTION 072100

SECTION 079200 - JOINT SEALANTS

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes sealants for the following applications, including those specified by reference to this Section:

B. This Section includes sealants for the following applications:

1. Exterior joints in the following vertical surfaces and non-traffic horizontal surfaces:
   a. Control and expansion joints in cast-in-place concrete.
   b. Joints between architectural precast concrete units.
   c. Control and expansion joints in unit masonry.
   d. Joints in exterior insulation and finish systems.
   e. Joints between metal panels.
   f. Joints between different materials listed above.
   g. Perimeter joints between materials listed above and frames of doors and windows.
   h. Control and expansion joints in ceiling and overhead surfaces.
   i. Other joints as indicated.

2. Interior joints in the following vertical surfaces and horizontal non-traffic surfaces:
   a. Control and expansion joints on exposed interior surfaces of exterior walls.
   b. Perimeter joints of exterior openings where indicated.
   c. Tile control and expansion joints.
   d. Vertical control joints on exposed surfaces of interior unit masonry and concrete walls and partitions.
   e. Perimeter joints between interior wall surfaces and frames of interior doors, windows, and elevator entrances.
   f. Joints between plumbing fixtures and adjoining walls, floors, and counters.
   g. Other joints as indicated.

3. Interior joints in the following horizontal traffic surfaces:
   a. Control and expansion joints in cast-in-place concrete slabs.
   b. Control and expansion joints in tile flooring.
   c. Other joints as indicated.

C. Related Sections include the following:

1. Division 4 Section "Unit Masonry" for masonry control and expansion joint fillers.
2. Division 8 Section "Glazing" for glazing sealants.
3. Division 8 Section "Aluminum Storefronts and Entrances" other glazing sealants.
4. Division 9 Section "Gypsum Board" for sealing perimeter joints of gypsum board partitions to reduce sound transmission.
5. Division 9 Section "Acoustical Tile Ceilings" for sealing edge moldings at perimeters of acoustical ceilings.

1.3 PERFORMANCE REQUIREMENTS

A. Provide elastomeric joint sealants that establish and maintain watertight and airtight continuous joint seals without staining or deteriorating joint substrates.

B. Provide joint sealants for interior applications that establish and maintain airtight and water-resistant continuous joint seals without staining or deteriorating joint substrates.

1.4 SUBMITTALS

A. Product Data: For each joint-sealant product indicated.

B. Samples for Initial Selection: Manufacturer's color charts consisting of strips of cured sealants showing the full range of colors available for each product exposed to view.

C. Samples for Verification: For each type and color of joint sealant required. Install joint sealants in 1/2-inch- (13-mm-) wide joints formed between two 6-inch- (150-mm-) long strips of material matching the appearance of exposed surfaces adjacent to joint sealants.

D. Product Certificates: Signed by manufacturers of joint sealants certifying that products furnished comply with requirements and are suitable for the use indicated.

E. Qualification Data: For firms and persons specified in "Quality Assurance" Article to demonstrate their capabilities and experience. Include lists of completed projects with project names and addresses, names and addresses of architects and owners, and other information specified.

F. Compatibility and Adhesion Test Reports: From sealant manufacturer indicating the following:

1. Materials forming joint substrates and joint-sealant backings have been tested for compatibility and adhesion with joint sealants.
2. Interpretation of test results and written recommendations for primers and substrate preparation needed for adhesion.

G. Product Test Reports: From a qualified testing agency indicating sealants comply with requirements, based on comprehensive testing of current product formulations.

H. Warranties: Special warranties specified in this Section.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: An experienced installer who has specialized in installing joint sealants similar in material, design, and extent to those indicated for this Project and whose work has resulted in joint-sealant installations with a record of successful in-service performance.

B. Source Limitations: Obtain each type of joint sealant through one source from a single manufacturer.

C. Product Testing: Obtain test results for "Product Test Reports" Paragraph in "Submittals" Article from a qualified testing agency based on testing current sealant formulations within a 36-month period.
1. Testing Agency Qualifications: An independent testing agency qualified according to ASTM C 1021 to conduct the testing indicated, as documented according to ASTM E 548.
2. Test elastomeric joint sealants for compliance with requirements specified by reference to ASTM C 920, and where applicable, to other standard test methods.
3. Test other joint sealants for compliance with requirements indicated by referencing standard specifications and test methods.

D. Mockups: Before installing joint sealants, apply elastomeric sealants as follows to verify selections made under sample Submittals and to demonstrate aesthetic effects and qualities of materials and execution:

E. 1. Joints in mockups of assemblies specified in other Sections that are indicated to receive elastomeric joint sealants, which are specified by reference to this Section.

1.6 DELIVERY, STORAGE, AND HANDLING

A. . Deliver materials to Project site in original unopened containers or bundles with labels indicating manufacturer, product name and designation, color, expiration date, pot life, curing time, and mixing instructions for multi-component materials.

B. Store and handle materials in compliance with manufacturer's written instructions to prevent their deterioration or damage due to moisture, high or low temperatures, contaminants, or other causes.

1.7 PROJECT CONDITIONS

A. Environmental Limitations: Do not proceed with installation of joint sealants under the following conditions:
   1. When ambient and substrate temperature conditions are outside limits permitted by joint sealant manufacturer or are below 40 deg F (4.4 deg C).
   2. When joint substrates are wet.

B. Joint-Width Conditions: Do not proceed with installation of joint sealants where joint widths are less than those allowed by joint sealant manufacturer for applications indicated.

C. Joint-Substrate Conditions: Do not proceed with installation of joint sealants until contaminants capable of interfering with adhesion are removed from joint substrates.

1.8 WARRANTY

A. General Warranty: Special warranties specified in this Article shall not deprive Owner of other rights Owner may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by Contractor under requirements of the Contract Documents.

B. Special Installer's Warranty: Written warranty, signed by Installer agreeing to repair or replace elastomeric joint sealants that do not comply with performance and other requirements specified in this Section within specified warranty period.
   1. Warranty Period: Two years from date of Substantial Completion.

C. Special Manufacturer's Warranty: Written warranty, signed by elastomeric sealant manufacturer agreeing to furnish elastomeric joint sealants to repair or replace those that do not comply with performance and other requirements specified in this Section within specified warranty period.
   1. Warranty Period: 20 years from date of Substantial Completion.

D. Special warranties specified in this Article exclude deterioration or failure of elastomeric joint sealants from the following:

   1. Movement of the structure resulting in stresses on the sealant exceeding sealant manufacturer's written specifications for sealant elongation and compression caused by structural settlement or errors attributable to

design or construction.
2. Disintegration of joint substrates from natural causes exceeding design specifications.
3. Mechanical damage caused by individuals, tools, or other outside agents.
4. Changes in sealant appearance caused by accumulation of dirt or other atmospheric contaminants.

PART 2 - PRODUCTS

2.1 PRODUCTS AND MANUFACTURERS

A. Products: Subject to compliance with requirements, provide one of the products indicated for each type in the sealant schedules at the end of Part 3.

B. 2.2 MATERIALS, GENERAL A. Compatibility: Provide joint sealants, backings, and other related materials that are compatible with one another and with joint substrates under conditions of service and application, as demonstrated by sealant manufacturer based on testing and field experience.

C. Colors of Exposed Joint Sealants: As selected by Architect from manufacturer's full range for this characteristic.

2.3 ELASTOMERIC JOINT SEALANTS

A. Elastomeric Sealant Standard: Comply with ASTM C 920 and other requirements indicated for each liquid-applied chemically curing sealant in the Elastomeric Joint-Sealant Schedule at the end of Part 3, including those referencing ASTM C 920 classifications for type, grade, class, and uses.

B. B. Additional Movement Capability: Where additional movement capability is specified in the Elastomeric Joint-Sealant Schedule, provide products with the capability, when tested for adhesion and cohesion under maximum cyclic movement per ASTM C 719, to withstand the specified percentage change in the joint width existing at the time of installation and remain in compliance with other requirements of ASTM C 920 for uses indicated.

C. Stain-Test-Response Characteristics: Where elastomeric sealants are specified in the Elastomeric Joint-Sealant Schedule to be non-staining to porous substrates, provide products that have undergone testing according to ASTM C 1248 and have not stained porous joint substrates indicated for Project.

2.4 LATEX JOINT SEALANTS

A. Latex Sealant Standard: Comply with ASTM C 834 for each product of this description indicated in the Latex Joint-Sealant Schedule at the end of Part 3

2.5 JOINT-SEALANT BACKING

A. General: Provide sealant backings of material and type that are non-staining; are compatible with joint substrates, sealants, primers, and other joint fillers; and are approved for applications indicated by sealant manufacturer based on field experience and laboratory testing.

B. Cylindrical Sealant Backings: ASTM C 1330, of type indicated below and of size and density to control sealant depth and otherwise contribute to producing optimum sealant performance:
   1. Type C: Closed-cell material with a surface skin.
   2. Type: Any material indicated above.

C. Bond-Breaker Tape: Polyethylene tape or other plastic tape recommended by sealant manufacturer for preventing sealant from adhering to rigid, inflexible joint-filler materials or joint sur-faces at back of joint where such adhesion would result in sealant failure. Provide self-adhesive tape where applicable.

D. 2.6 MISCELLANEOUS MATERIALS

E.

F. A. Primer: Material recommended by joint sealant manufacturer where required for adhesion of sealant to joint substrates indicated, as determined from preconstruction joint-sealant-substrate tests and field tests.

G. B. Cleaners for Nonporous Surfaces: Chemical cleaners acceptable to manufacturers of sealants and sealant backing materials, free of oily residues or other substances capable of staining or harming joint substrates and adjacent nonporous surfaces in any way, and formulated to pro-mote optimum adhesion of sealants with joint substrates.

H. C. Masking Tape: Non-staining, nonabsorbent material compatible with joint sealants and surfaces adjacent to joints.

PART 3 – EXECUTION

3.1 EXAMINATION

A. Examine joints indicated to receive joint sealants, with Installer present, for compliance with requirements for joint configuration, installation tolerances, and other conditions affecting joint-sealant performance.

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

3.2 PREPARATION

A. Surface Cleaning of Joints: Clean out joints immediately before installing joint sealants to comply with joint sealant manufacturer's written instructions and the

following requirements:

1. Remove all foreign material from joint substrates that could interfere with adhesion of joint sealant, including dust, paints (except for permanent, protective coatings tested and approved for sealant adhesion and compatibility by sealant manufacturer), old joint sealants, oil, grease, waterproofing, water repellents, water, surface dirt, and frost.
2. Clean porous joint substrate surfaces by brushing, grinding, blast cleaning, mechanical abrading, or a combination of these methods to produce a clean, sound substrate capable of developing optimum bond with joint sealants. Remove loose particles remaining from above cleaning operations by vacuuming or blowing out joints with oil-free com-pressed air. Porous joint surfaces include the following:
   a. Concrete.
   b. Masonry.
   c. Unglazed surfaces of ceramic tile.
3. Remove laitance and form-release agents from concrete.
4. Clean nonporous surfaces with chemical cleaners or other means that do not stain, harm substrates, or leave residues capable of interfering with adhesion of joint sealants.
   a. Metal.
   b. Glass.
   c. Glazed surfaces of ceramic tile.

B. Joint Priming: Prime joint substrates where recommended in writing by joint sealant manufacturer, based on preconstruction joint-sealant-substrate tests or prior experience. Apply primer to comply with joint sealant manufacturer's written instructions. Confine primers to areas of joint-sealant bond; do not allow spillage or migration onto adjoining surfaces.

C. Masking Tape: Use masking tape where required to prevent contact of sealant with adjoining surfaces that otherwise would be permanently stained or damaged by such contact or by clean-ing methods required to remove sealant smears. Remove tape immediately after tooling with-out disturbing joint seal.

3.3 INSTALLATION OF JOINT SEALANTS

A. General: Comply with joint sealant manufacturer's written installation instructions for products and applications indicated, unless more stringent requirements apply.

B. Sealant Installation Standard: Comply with recommendations of ASTM C 1193 for use of joint sealants as applicable to materials, applications, and conditions indicated.

C. Install sealant backings of type indicated to support sealants during application and at position required to produce cross-sectional shapes and depths of installed sealants relative to joint widths that allow optimum sealant movement capability.
   1. Do not leave gaps between ends of sealant backings.

2. Do not stretch, twist, puncture, or tear sealant backings.
3. Remove absorbent sealant backings that have become wet before sealant application and replace them with dry materials.

D. Install bond-breaker tape behind sealants where sealant backings are not used between sealants and back of joints.

E. Install sealants by proven techniques to comply with the following and at the same time backings are installed:
1. Place sealants so they directly contact and fully wet joint substrates.
2. Completely fill recesses provided for each joint configuration.
3. Produce uniform, cross-sectional shapes and depths relative to joint widths that allow optimum sealant movement capability.

F. Tooling of Non-sag Sealants: Immediately after sealant application and before skinning or curing begins, tool sealants according to requirements specified below to form smooth, uniform beads of configuration indicated; to eliminate air pockets; and to ensure contact and adhesion of sealant with sides of joint.
1. Remove excess sealants from surfaces adjacent to joint.
2. Use tooling agents that are approved in writing by sealant manufacturer and that do not discolor sealants or adjacent surfaces.
3. Provide concave joint configuration per Figure 5A in ASTM C 1193, unless otherwise indicated.
a. Use masking tape to protect adjacent surfaces of recessed tooled joints.

3.4 CLEANING

A. Clean off excess sealants or sealant smears adjacent to joints as the Work progresses by methods and with cleaning materials approved in writing by manufacturers of joint sealants and of products in which joints occur.

3.5 FINAL FINISHING

A. Where sealants are installed against one or more painted surfaces, paint over installed sealant to match adjacent painted surface. Such locations include joints between hollow metal frames and surrounding walls and countertops or window stools and surrounding walls.

3.6 PROTECTION

A. Protect joint sealants during and after curing period from contact with contaminating substances and from damage resulting from construction operations or other causes so sealants are without deterioration or damage at time of Substantial Completion. If, despite such protection, damage

or deterioration occurs, cut out and remove damaged or deteriorated joint

sealants immediately so installations with repaired areas are indistinguishable from the original work.

3.7 ELASTOMERIC JOINT-SEALANT SCHEDULE

A. Multicomponent Non-sag Urethane Sealant: Where joint sealants of this type are indicated, pro-vide products complying with the following:
   1. Products: Provide one of the following:
      a. Chem-Calk 500; Bostik Inc.
      b. PSI-501/RC-2; Polymeric Systems, Inc.
      c. DYmeric; Tremco.
   2. Type and Grade: M (multicomponent) and NS (non-sag).
   3. Class: 25.
   4. Use Related to Exposure: NT (nontraffic).
   5. Uses Related to Joint Substrates: M, A, and, as applicable to joint substrates indicated, O.
      a. Use O Joint Substrates: Color anodic aluminum, galvanized steel, brick, limes-tone, and wood.
   6. Applications: Masonry to Masonry, Ferrous Metal or Aluminum to Masonry, EIFS to EIFS, Ferrous Metal or Aluminum to EIFS.

B. Mildew-Resistant Silicone Sealant: Where joint sealants of this type are indicated, provide products formulated with fungicide that are intended for sealing interior ceramic tile joints and other nonporous substrates that are subject to in-service exposures of high humidity and temperature extremes, and that comply with the following:
   1. Products: Provide one of the following:
      a. 786 Mildew Resistant; Dow Corning.
      b. Sanitary 1700; GE Silicones.
      c. NuFlex 302; NUCO Industries, Inc.
      d. 898 Silicone Sanitary Sealant; Pecora Corporation.
      e. PSI-611; Polymeric Systems, Inc.
      f. Tremsil 600 White; Tremco.
   2. Type and Grade: S (single component) and NS (non-sag).
   3. Class: 25.
   4. Use Related to Exposure: NT (nontraffic).
   5. Uses Related to Joint Substrates: G, A, and, as applicable to joint substrates indicated, O.
      a. Use O Joint Substrates: Ceramic tile.
   6. Applications: Interior Use Only: Plumbing Fixtures to other surfaces, Ceramic Tile.

3.8 LATEX JOINT-SEALANT SCHEDULE

A. Latex Sealant: Where joint sealants of this type are indicated, provide products

complying with the following:

1. Products: Provide one of the following:
   a. Chem-Calk 600; Bostik Inc.
   b. NuFlex 330; NUCO Industries, Inc.
   c. LC 160 All Purpose Acrylic Caulk; Ohio Sealants, Inc.
   d. AC-20; Pecora Corporation.
   e. PSI-701; Polymeric Systems, Inc.
   f. Sonolac; Sonneborn Building Products Div., ChemRex, Inc.
   g. Tremflex 834; Tremco.
2. Applications: Interior Use Only: Aluminum or Hollow Metal to Gypsum Board or to Ma-sonry, Interior Architectural Woodwork to Gypsum Board or to Masonry.

END OF SECTION 079200

SECTION 08110
STEEL DOORS & FRAMES

PART 1 GENERAL

1.01 SUMMARY

A. Section Includes: Steel doors and frames, including door louvers, transom panels and sidelights.

Specifier Note: Revise paragraph below to suit project requirements. Add section numbers and titles per CSI *MasterFormat* and specifier's practice.

B. Related Sections: Section(s) related to this section include:

1. Masonry: Division 4 Masonry Sections.
2. Sealants: Division 7 Joint Sealer Section.
3. Glass and Glazing: Division 8 Glass and Glazing Section.
4. Hardware: Division 8 Hardware Section.
5. Drywall Construction: Division 9 Wall Board Assemblies Sections.
6. Painting: Division 9 Painting Sections.

Specifier Note: Article below may be omitted when specifying manufacturer's proprietary products and recommended installation. Retain Reference Article when specifying products and installation by an industry reference standard. If retained, list standard(s) referenced in this section. Indicate issuing authority name, acronym, standard designation and title. Establish policy for indicating edition date of standard referenced. Conditions of the Contract or Division 1 References Section may establish the edition date of standards. This article does not require compliance with standards, but is merely a listing of references used. Article below should list only those industry standards referenced in this section.

1.02 REFERENCES

A. General: Standards listed by reference, including revisions by issuing authority, form a part of this specification section to the extent indicated. Standards listed are identified by issuing authority, authority abbreviation, designation number, title or other designation established by issuing authority. Standards subsequently referenced herein are referred to by issuing authority abbreviation and standard designation.

B. American Society for Testing and Materials (ASTM):

1. ASTM A366 Standard Specification for Commercial Steel (CS) Sheet, Carbon (0.15 Maximum Percent) Cold-Rolled.
2. ASTM A653 Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
3. ASTM A924 Standard Specification for General Requirements for Steel Sheet, Metallic-Coated by the Hot-Dip Process.
4. ASTM D610 Standard Test Method for Evaluating Degree of Rusting on Painted Steel Surfaces.
5. ASTM D714 Standard Test Method for Evaluating Degree of Blistering of Paints.
6. ASTM D1621 Standard Test Method for Compressive Properties of Rigid Cellular Plastics.
7. ASTM D1622 Standard Test Method for Apparent Density of Rigid Cellular Plastics.
8. ASTM D1623 Standard Test Method for Tensile and Tensile Adhesion Properties of Rigid Cellular Plastics.
9. ASTM D1654 Standard Test Method for Evaluation of Painted or Coated Specimens Subjected to Corrosive Environments.
10. ASTM D2126 Standard Test Method for Response of Rigid Cellular Plastics to Thermal and Humid Aging.
11. ASTM D2863 Standard Test Method for Measuring the Minimum Oxygen Concentration to Support Candle-Like Combustion of Plastics (Oxygen Index).

C. American National Standards Institute (ANSI):

1. ANSI/DHI A115.IG Installation Guide for Doors and Hardware.
2. ANSI/SDI Standard A224.1 Test Procedure and Acceptance Criteria for Prime Painted Steel Surfaces for Steel Doors & Frames.
3. ANSI A250.8 Standard Steel Door Frames.

D. Federal Specification (Fed Spec):

1. Fed Spec C578 Bead Fusion Test.

E. National Fire Protection Association (NFPA):

1. NFPA 80 Fire Doors and Windows.
2. NFPA 252 Fire Tests of Door Assemblies.

F. Underwriters Laboratories, Inc. (UL):

1. UL 10(b) and UL 10(c) Fire Tests of Door Assemblies.
2. UL Building Materials Directory.

G. Warnock Hersey, Inc. (WHI):

1. WHI Directory of Listed Products.
2. WHI Directory of Positive Pressure Rated Door assemblies and components.

Specifier Note: Article below should be restricted to statements describing design or performance requirements and functional (not dimensional) tolerances of a complete system. Limit descriptions to composite and operational properties to the extent necessary for linking multiple components of a system and interfacing with other systems.

1.03 SYSTEM DESCRIPTION

A. Performance Requirements: Provide metal doors and frames which have been manufactured, fabricated and installed to maintain performance criteria stated by manufacturer without defects, damage or failure.

Specifier Note: Article below includes submittal of relevant data to be furnished by Contractor before, during or after construction. Coordinate this article with Architect's and Contractor's duties and responsibilities in Conditions of the Contract and Division 1 Submittal Procedures Section.

1.04 SUBMITTALS

A. General: Submit listed submittals in accordance with Conditions of the Contract and Division 1 Submittal Procedures Section.

B. Product Data: Submit product data, including manufacturer's SPEC-DATA« product sheet, for specified products.

C. Shop Drawings: Submit shop drawings showing layout, profiles and product components, including anchorage, accessories and finish colors.

1. Indicate door type, frame, steel, core, material thickness, reinforcements, anchorages, exposed fasteners locations, openings (glazed, paneled or louvered) and hardware arrangement.
2. Include schedule identifying each unit, with door marks or numbers referencing numbering in schedules or drawings.

D. Samples: Submit selection and verification samples for finishes, colors and textures. Coordinate with Division 9 Painting Section for paint finishes.

E. Quality Assurance Submittals: Submit the following:

1. Certificates: Product certificates signed by manufacturer certifying that materials comply with specified performance characteristics and criteria and physical requirements.
2. Manufacturer's Instructions: Manufacturer's installation instructions.

Specifier Note: Coordinate paragraph below with Part 3 Field Quality Requirements Article herein. Retain or delete as applicable.

3. Manufacturer's Field Reports: Manufacturer's field reports specified herein.

F. Closeout Submittals: Submit the following:

1. Operation and Maintenance Data: Operation and maintenance data for installed products in accordance with Division 1 Closeout Submittals (Maintenance Data and Operation Data) Section. Include methods for maintaining installed products and precautions against cleaning materials and methods detrimental to finishes and performance.
2. Warranty: Warranty documents specified herein.

Specifier Note: Article below should include prerequisites, standards, limitations and criteria that establish an overall level of quality for products and workmanship for this section. Coordinate below article with Division 1 Quality Assurance Section.

1.05 QUALITY ASSURANCE

A. Installer Qualifications: Installer should be experienced in performing work of this section and should have specialized in the installation of work similar to that required for this project.

Specifier Note: Retain paragraph below to suit project requirements; otherwise, delete paragraph below.

1. Certificate: When requested, submit certificate indicating qualifications.

Specifier Note: Paragraph below should list obligations for compliance with specific code requirements particular to this section. General statements to comply with a particular code are typically addressed in Conditions of the Contract and Division 1 Regulatory Requirements Section. Repetitive statements should be avoided.

B. Regulatory Requirements: [Specify applicable requirements of regulatory agencies.].

Specifier Note: Installation must comply with the requirements of all applicable local, state and national code jurisdictions.

1. Labeled Door and Frame Construction: Where noted or required, provide Underwriters Laboratories, Inc., (UL) or Warnock Hersey Inc. (WHI) labels with appropriate fire resistance and temperature rise ratings for class of opening indicated. Construction

details and hardware applications authorized by testing or certification laboratories shall take precedence over project details or specifications.

Specifier Note: Retain paragraph below for erected assemblies (either onsite or offsite) required for review of construction, coordination of work of several sections, testing or observation of operation. Mock-ups, when accepted or approved, establish standards by which work will be judged. Coordinate below with Division 1 Quality Control (Mock-Up Requirements) Section.

C. Mock-Ups: Install at project site a job mock-up using acceptable products and manufacturer approved installation methods. Obtain Owner's and Architect's acceptance of finish color, texture, pattern and workmanship standards. Comply with Division 1 Quality Control (Mock-Up Requirements) Section.

Specifier Note: Edit paragraph below when specifying mock-up size.

1. Mock-Up Size: [Specify mock-up size.].
2. Maintenance: Maintain mock-up during construction for workmanship comparison; remove and legally dispose of mock-up if it is no longer required.
3. Incorporation: Mock-up shall be incorporated into final construction upon Owner's approval.

Specifier Note: Coordinate paragraph below with Division 1 Project Management and Coordination (Project Meetings) Section.

D. Preinstallation Meetings: Conduct preinstallation meeting to verify project requirements, substrate conditions, manufacturer's installation instructions and manufacturer's warranty requirements. Comply with Division 1 Project Management and Coordination (Project Meetings) Section.

Specifier Note: Article below should include special and unique requirements. Coordinate article below with Division 1 Product Requirements Section.

1.06 DELIVERY, STORAGE & HANDLING

A. General: Comply with Division 1 Product Requirements Sections, and with ANSI A250.8.

B. Ordering: Comply with manufacturer's ordering instructions and lead time requirements to avoid construction delays.

C. Delivery: Deliver materials in manufacturer's original, unopened, undamaged containers with identification labels intact.

1. Handle and store products according to Amweld recommendations published in technical materials. Leave product wrapped or otherwise protected and under clean, dry storage conditions until required.

D. Storage and Protection: Store materials protected from exposure to harmful weather conditions, at temperature and humidity conditions recommended by manufacturer.

1. Door Storage: Doors shall be protected at corners to prevent damage or marring of finish. Doors shall be stored in an upright position under cover on building site on wood sills or on floors in a manner that will prevent rust and damage. Avoid creating a humidity chamber by using a plastic or canvas shelter and not venting the area covered.
2. Frame Storage: Frames shall be stored in an upright position under cover on building site on wood sills or floors in a manner that will prevent rust and damage. Avoid creating a humidity chamber by using a plastic or canvas shelter and not venting the area covered.

1.07 PROJECT CONDITIONS

A. Field Measurements: Verify actual measurements/openings by field measurements before fabrication; show recorded measurements on shop drawings. Coordinate field measurements and fabrication schedule with construction progress to avoid construction delays.

Specifier Note: Coordinate article below with Conditions of the Contract and with Division 1 Closeout Submittals (Warranty) Section.

1.08 WARRANTY

A. Project Warranty: Refer to Conditions of the Contract for project warranty provisions.

B. Manufacturer's Warranty: Submit, for Owner's acceptance, manufacturer's standard warranty document executed by authorized company official. Manufacturer's warranty is in addition to, and not a limitation of, other rights Owner may have under Contract Documents.

Specifier Note: Coordinate paragraph below with manufacturer's warranty requirements Amweld offers an 18 month standard manufacturer's warranty.

1. Warranty Period: [Specify term.] years commencing on Date of Substantial Completion.

PART 2 PRODUCTS

Specifier Note: Retain article below for proprietary method specification. Add product attributes, performance characteristics, material standards and descriptions as applicable. Use of such phrases as "or equal" or "or approved equal" or similar phrases may cause ambiguity in specifications. Such phrases require verification (procedural, legal and regulatory) and assignment of responsibility for determining "or equal" products.

2.01 STEEL DOORS AND FRAMES

A. Manufacturer: Amweld Building Products LLC.

Specifier Note: Paragraph below is an addition to CSI *SectionFormat* and a supplement to MANU-SPEC. Retain or delete paragraph below per project requirements and specifier's practice.

1. Contact: 1500 Amweld Drive, Garrettsville, OH 44231; Telephone: (800) 248-6116, (330) 527-4385; Fax: (330) 527-5122; E-mail: marketing@amweld.com; website: www.amweld.com.

B. Proprietary Product(s)/System(s): Amweld Metal Doors and Frames.

1. Series 15LE & 17LE 1 3/4" (45 mm) Full Flush and Seamless Polystyrene Core Doors.
2. Series 25LE & 27LE 1 3/4" (45 mm) Full Flush and Seamless Galvanized Polystyrene Core Doors.
3. Series 61LE & 63LE 1 3/4" (45 mm) Full Flush and Seamless Embossed Panel Doors.
4. Series 51LE & 53LE 1 3/4" (45 mm) Full Flush and Seamless Acoustical Doors.
5. Series 21LE & 23LE 1 3/4" (45 mm) Full Flush and Seamless Replacement Doors.
6. Series 300 1 3/4" (45 mm) Extra Heavy-Duty Stile and Rail Doors.
7. Series 700 & 500 1 3/4" (45 mm) Steel Stiffened Seamless Handed and Non-Handed Doors.
8. Series 1538LE 1 3/4" (45 mm) Level 1 Bullet Resistant Doors.
9. Series 1544LE 1 3/4" (45 mm) Level 3 Bullet Resistant Doors.
10. Series 35LE & 37LE 1 3/4" (45 mm) & 1 3/8" (35 mm) Full Flush & Seamless 250° Temperature Rise Doors.
11. Series 400 1 3/4" (45 mm) Standard Inter-Lok Frames.
12. Series 800 1 3/4" (45 mm) Adjustable Steel Frames.
13. Series 2600 1 3/4" (45 mm) Slip-On Drywall Frames.
14. Series 4400 1 3/4" (45 mm) Double Egress Frames.
15. Series 3000 1 3/4" (45 mm) Thermal Break Frames.
16. Series 55LE, 56LE and 57LE Transom Panels.

C. Sizes:

1. Standard Door Sizes: As indicated on drawings.
   a. Width 2' (610 mm), 2' 4" (711 mm), 2' 6" (762 mm), 2' 8" (813 mm), 2' 10" (864 mm), 3' (914 mm), 3' 4" (1016 mm), 3' 6" (1067 mm), 3' 8" (1118 mm), 3' 10" (1168 mm) and 4' (1219 mm).
   b. Height 6' 8" (2032 mm), 7' (2134 mm), 7' 2" (2184 mm), 7' 10" (2388 mm), 8' (2438 mm), 8' 1" (2464 mm) to 10' (3048 mm).

D. Fire Rating:

Specifier Note: Doors that are in openings in walls separating buildings, or parts of buildings, into fire areas may be provided with a 3 hour label. These units are only available flush. Doors in openings in walls enclosing areas of vertical communication (i.e., stairwells) may be provided with a 1 1/2 hour label. These units are available flush or with V, N1, N2, S3H lites and louvers with fusible link. Doors in room and corridor partitions may be provided with a 3/4 hour label. These units are available in flush, G, N3, N4, N3H, N4H and LI designs. All standard units bear a nontemperature rise label. Consult manufacturer for fire resistance performance data and specific installation requirements of tested designs.

1. Provide doors and frames with UL or WHI listing (classification marks) where specified.

E. Sound Rating:

Specifier Note: Consult manufacturer for acoustic performance data and specific installation requirements. The proper function of acoustical doors relies on a combination of factors that are under the control of various firms, trades, specifiers, suppliers or designers. Without cooperation of all concerned, the installed opening may not function as intended. The most important factor influencing an acoustical door's function is correctly specifying the door capability for the job condition. Some doors, although rated higher in overall STC ratings, do not perform as well as lower rated doors in certain specific frequency ranges.

1. Provide sound transmission class of standard units tested as follows:
   a. 61LE Series 1 3/4" (45 mm) 18 Gauge Door: 31 STC.
   b. 15LE (17LE) Series 1 3/4" (45 mm) 20 Gauge Door: 32 STC.
   c. 15LE (17LE) Series 1 3/4" (45 mm) 18 Gauge Door: 33 STC.
   d. 15LE (17LE) Series 1 3/4" (45 mm) 16 Gauge Door: 35 STC.
2. Provide sound transmission class of SoundShield units tested as follows:
   a. 51LE (53LE) Series 1 3/4" (45 mm) 16 Gauge Door: 42 STC.

b. 51LE (53LE) Series 1 3/4" (45 mm) 16 Gauge Door: 45 STC.

F. Finishes:

1. Exposed surfaces on doors and frames shall be cleaned, treated with a 3 stage iron phosphate and given 1 shop coat of synthetic resin, rust-inhibitive alkyd enamel primer. Prime paint shall be tested at a recognized independent testing laboratory in accordance with ANSI/SDI Standard A250.10 and meet the acceptance criteria outlined in that document (120 salt spray hours, 240 humidity hours, etc.).

2. Colors: Finish doors with gray primer paint, ready for field painting.

Specifier Note: Edit article below to suit project requirements. If substitutions are permitted, edit text below. Add text to refer to Division 1 Project Requirements (Product Substitutions Procedures) Section.

2.02 PRODUCT SUBSTITUTIONS

A. Substitutions: No substitutions permitted.

2.03 MATERIALS

A. Steel Materials:

1. Cold-rolled Steel: Comply with ASTM A366 cold-rolled carbon steel sheet.

2. Galvanized Steel: Comply with ASTM A924 general requirements for steel sheet metallic coated by hot dip process (formerly ASTM A525).

B. Primer Materials: Comply with ANSI A250.10 test procedures and acceptance criteria for prime painted steel surfaces for steel doors and frames.

C. Painted Finish Material: Comply with ANSI A250.3 test procedures and acceptance criteria for factory applied finish for steel doors and frames.

D. Door Color Paint Material: Provide manufacturer's standard finish and color.

2.04 DOORS

Specifier Note: Amweld's 15LE Series SuperCore® door provides superior insulation values, even in sub-zero temperature ranges. The Apparent U-Values of the Amweld doors (Btu/(ft^2 × h × °F)) were as follows, with R-Factor shown in parentheses: 15LE Series 1 3/4" (45 mm) 20 gauge 0.28* (3.57) 0.24** (4.16); 15LE Series 1 3/4" (45 mm) 18 gauge 0.28* (3.57) 0.25** (4.00). Note that these ratings do not apply to panels but to operable steel door frame assemblies. *Apparent U-Factor corrected to a winter design with 15 mph (24 kph) winds outside. **Apparent U-Factor corrected to still air both sides. Test reports on physical and chemical properties are available to qualified design professionals upon request.

A. Series 15LE, 17LE SuperCore Doors, Standard Duty (20 gauge) 1 3/4" (45 mm), Heavy Duty (18 gauge) 1 3/4" (45 mm), and Extra Heavy Duty (16 gauge) 1 3/4" (45 mm), and maximum duty (14 gauge) 1 3/4" (45 mm): Fabricate from two sheets of 14, 16, 18 and 20 gauge steel (ASTM A366) with no visible seams on either face; 15LE Series feature no visible seams on the face or vertical edge; 17LE Series. Doors shall be joined at the edge with a continuous laser welded seam (laseredge) using no filler material to create a smooth, unbroken surface for an acceptable seam on the edge.

1. Tops and bottoms of door shall not be less than 18 gauge channels. Tops shall be flush. Bottoms shall have inverted channel.

2. Sound and cold retardation shall be ensured by bonding a nominal 1 lb density, procured rigid polystyrene foam core to the panels.

Specifier Note: 25LE - 27LE Doors, 400 Series Galvanized Frames: The zinc-coated steel available in 25LE - 27LE Series doors, and as an option, in the 400 Series product line, meets the following specification requirements. Door panels and door frame members are manufactured of hot dipped material in the 0.4 oz coating class conforming to ASTM Designations A924 and A653 (replaces A525 and A526, respectively) coating class A40. The material is treated in the mill to ensure superior prime paint adhesion. In addition, the galvanized doors and frames receive a coat of baked-on gray primer to ensure maximum adhesion of field applied finish paints. In the galvanized process, the resultant coating is a 100% zinc-iron alloy whose composition is approximately 10% iron, balance zinc.

B. Series 25LE - 27LE Galvanized Steel SuperCore Doors (Option): Manufacturer door panels from 14, 16, 18 and 20 gauge and end closures of ASTM A40 hot dip galvanized material in 0.4 oz coating class conforming to ASTM A924 and A653. Treat material in mill to ensure prime paint adhesion. Doors shall be joined at the edge with a continuous laser welded seam (laseredge) using no filler material to create a smooth, unbroken surface for an acceptable seam on the edge.

C. Series 61LE - 63LE Embossed Doors (Option): Manufactured door panels are from 16, 18 and 20 gauge steel with no visible seams on either face 61LE Series, or no visible seams on face or vertical edge 63LE Series. [Specify requirements; consult with manufacturer.] Doors shall be joined at the edge with a continuous laser welded seam (laseredge) using no filler material to create a smooth, unbroken surface for an acceptable seam on the edge.

1. Tops and bottoms of door shall be not less than 18 gauge channels. Tops shall be flush and closed. Bottoms shall have an inverted channel. Sound and cold retardation shall be ensured by bonding a nominal 1 lb density procured rigid polystyrene foam core to the panels.

Specifier Note: 500 Series Seamless 1 3/4" (45 mm) doors have each face formed of 18 or 16 gauge steel to present a smooth and unbroken surface on face and edge of door. The door faces are joined at the vertical edges by continuous weld extending the full height of the door. All such welds are ground, filled and dressed to provide a smooth, flat surface. Face sheets are stiffened by continuous vertical steel "HAT" shaped sections occupying

the full thickness of the interior space between door faces. The stiffeners are not less than 22 gauge spaced not more than 6" (152 mm) apart and securely attached to both face sheets with spot welds. Spaces between the stiffeners are sound deadened and insulated the full height of the door. The door edges are square with a nonhanded edge design to allow for easy change in handing with use of a handing plate.

Specifier Note: 700 Series Seamless 1 3/4" (45 mm) doors have each face formed of 18, 16 or 14 gauge steel to present a smooth and unbroken surface on face and edge of door. The door faces are joined at the vertical edges by continuous weld extending the full height of the door. All welds are ground, filled and dressed to provide a smooth, flat surface. Face sheets are stiffened by continuous vertical steel "HAT" shaped sections occupying the full thickness of the interior space between door faces. Spaces between the stiffeners are sound deadened and insulated the full height of the door with inorganic noncombustible batt material.

D. Series 500 - 700 Steel Stiffened Full Flush Seamless Doors: Fabricate 1 3/4" (45 mm) from 2 sheets of 18, 16, or 14 gauge steel (ASTM A366) or A40 galvanized steel. No visible seams shall occur on door faces or edges. Continuously weld door edges, fill and ground smooth. Internally reinforce doors with pairs of 22 gauge hat shaped steel stiffeners back to back, welded a maximum of 5" (127 mm) oc to door faces and spaced a maximum of 6" (152 mm) apart. At top and bottom of doors, provide 16 gauge channels spot welded to door faces. Insulate spaces between stiffeners with inorganic, noncombustible fiberglass insulation.

   1. Lock reinforcing shall be a minimum of 14 gauge for series 86 or 161 locks. Surface hardware reinforcing shall be 14 gauge. Closer reinforcing shall be 14 gauge on both faces of doors. Hinge mortises shall be reinforced with 7 gauge. 1 1/4" × 10" (32 × 254 mm) steel plates securely welded to edges and tapped for template hinges.

Specifier Note: 15LE Series and 25LE Series Full Flush 1 3/4" (45 mm) Doors have each face formed of 20, 18 or 16 gauge steel to present a smooth unbroken surface on faces of door. Visible seams are permitted at door edges. With 18 gauge steel channels forming the top and bottom end closures, the face panels are securely laser welded around their entire perimeters. Panels present a completely smooth and unbroken surface on faces at vertical edges of door where visible seams are permitted. 17LE Series seamless doors are similar in construction to full flush doors. Panels present smooth and unbroken surface on faces and vertical edges of door where no visible seams are permitted.

Specifier Note: Series 35LE - 37LE use the same construction detail as those used in the 15LE Series door. Instead of a rigid polystyrene core, a mineral board core is inserted. The result is a 2500 rated temperature rise door for maximum fire and heat performance that is usually used in stairwells in multilevel facilities.

E. Series 35LE - 37LE Temperature Rise Fire Doors 1 3/4" (45 mm): Provide door panels of 18 or 16 gauge bonded to a mineral board core when doors are required to meet codes with temperature rise limitations.

   1. Hardware Preparation: Doors shall be mortised, reinforced, drilled and tapped to receive specified mortise hardware and reinforced only for specified surface hardware. Drilling and tapping for surface hardware shall be done in the field. Hinge reinforcings shall be 10 gauge for 1 3/4" (45 mm) doors (6 gauge optional). Reinforcings for other surface and mortise hardware shall be 14 gauge minimum.

Specifier Note: Series 1 3/4" (45 mm) 300 Doors are of rigid rail-and-stile construction in flush panel design. Stiles and rails are 16 gauge steel, mitered, reinforced with channels, face welded and ground smooth at the corners. Panels are flat, 18 gauge steel, securely bonded by a thermosetting adhesive to Amweld's SuperCore.

F. Series 300 Extra Heavy Duty Stile and Rail Door 1 3/4" (45 mm): Provide rigid rail-and-stile design. Stiles and rails shall be of 16 gauge steel, face welded and ground smooth at corners. Panels shall be of flat 18 gauge steel, securely bonded by a thermosetting adhesive to Amweld's SuperCore, a nominal 1 lb (0.454 kg) density, odorless, rigid foam resistant to fungi, bacteria, moisture, mildew and rot.

   1. Hardware Preparation: Doors shall be mortised, reinforced, drilled and tapped to receive mortise hardware. Drilling and tapping for surface applied hardware shall be done in the field. Hinge reinforcings shall be 10 gauge, lock reinforcings of 14 gauge, and if required, closer reinforcings of 14 gauge. All locks require flat faces.

Specifier Note: Series 1 3/4" (45 mm) 1538L and Series 1 3/4" (45 mm) 1544L Security Doors are rigid Laser Edge construction in flush panel design with 14 gauge steel exterior security cover plate. Panels are flat 18 gauge steel, securely bonded by a thermosetting adhesive to Amweld's SuperCore. 1538L Series meets Level 1 UL Bullet Resistant Rating; and 1544L Series meets Level 3 UL Bullet Resistant Rating.

G. Series 1538L and Series 1544L 1 3/4" (45 mm) Heavy Duty Stile and Rail Security Doors: Provide security doors of rigid Laser Edge construction in flush panel design with 14 gauge steel exterior security cover plate (1538L Series) or with 14 gauge steel security plate on both interior or exterior (1544L Series). Panels shall be of flat 18 gauge steel, securely bonded by a thermosetting adhesive to Amweld's SuperCore, a nominal 1 lb density, odorless, rigid foam that is resistant to fungi, bacteria, moisture, mildew and rot.

   1. Lockset preparation shall provide for field installation of locksets manufactured in accordance with Fed. Spec. FF-H-106a Series 86 (Mortise). Lock front reinforcing shall be of 14 gauge and shall be pierced and tapped for mounting specified locksets. Mounting and function holes for surface applied escutcheons, cylinders, thumb piece and/or knobs shall be drilled in the field, unless specified otherwise. Provide doors requiring locksets with flat faces.
   2. Hinge mortises shall be reinforced with 10 gauge steel plates, welded in place and tapped for 5" (127 mm) template hinges.
   3. Door shall be handed right or left, determined by exterior placement of the 14 gauge security plate.
   4. When specified, closer reinforcing or exit device reinforcings shall be furnished. Reinforcing shall be drilled and tapped in the field.

H. Labeled Doors: Where noted, provide Underwriters Laboratories, Inc., (UL) or Warnock Hersey Inc. (WHI) labels with appropriate fire

resistance and temperature rise ratings for the class of opening indicated. Construction details and hardware applications authorized by labeling authorities shall take precedence over project details or specifications.

I. Hardware Locations: Unless otherwise specified, the location of locks, hinges, latches, push/pull plates and bars, exit devices, handle sets, closer reinforcings, roller latches and arm pulls shall conform to the recommendations of the Steel Door Institute.

J. Louvers: Provide factory installed insert type louvers with vision-proof inverted Y baffles. Louver blades shall be 18 gauge and frames shall be on 18 gauge welded steel construction.

Specifier Note: Glass lite doors are furnished with formed steel of the screw-in type. Muntin bars for multi-lite glazing are of the field applied type. Glazing arrangements accommodate 1/4" (6.4 mm) thick glass, supplied by others.

K. Glazing: Provide doors with formed steel kits of screw-in type, to permit selection of secure side in field. Glazing arrangements shall accommodate 1/4" (6.4 mm) thick glass.

L. Prime Painted Doors: Exposed surfaces shall be cleaned, treated with a Bonderite chemical and given 1 baked-on shop coat of EPA compliant gray synthetic primer.

Specifier Note: 300 Series Doors: The zinc finished steel available as a standard feature on the basic 300 Series doors meets the following specification requirements. Door stiles, rails and panels are electro zinc coated steel and phosphate and are treated at the mill to ensure superior prime paint adhesion. In addition, the 14 gauge security panel on the 1538L and 1544L Series is 0.4 oz hot dipped galvanized steel with specifications identical to the metal in 25LE and 27LE Series doors. Note that the reinforcements and other auxiliary pieces are not zinc coated because of the problems inherent with welding dissimilar gauge zinc coated materials. In addition, the electro zinc coated door receives a coat of gray baked-on primer to ensure a maximum adhesion of field applied finish paint.

M. Prepainted Doors: Doors shall be chemically cleaned and treated with a Bonderite chemical. Doors shall receive a heavy coat of electrostatically applied finish paint, baked on. Finish paint shall be a durable formulation, made specifically for Amweld. Hard film shall provide good resistance to both mar and abrasion tests. Weather and chemical resistance shall be a property of the finish.

Specifier Note: Series 55LE and Series 56LE Transom Panels have face panels of 18 gauge steel (16 gauge optional). Sixteen gauge steel channels form the end closures. Face panels are securely projection welded around the entire perimeter. Welding occurs 2" (51 mm) on center. The panels are securely bonded by a thermosetting adhesive to Amweld's SuperCore.

N. Transom Panels (Series 55LE, 56LE and 57LE): Provide face sheets of 18 gauge steel (16 gauge optional). Panels shall be reinforced with a core bonded to faces with a thermosetting adhesive. When specified, a horizontal 12 gauge flat strip astragal shall be factory installed on transom panel.

2.05 MANUFACTURED FRAME UNITS

A. Metal Door Frames: Fabricate from 16 or 14 gauge steel (ASTM A366) for 1 3/4" (45 mm) doors and 16 gauge for 1 3/8" (35 mm) doors. Frames shall be designed with integral stop and trim. Mitered corners shall be reinforced with 18 gauge channel shaped Inter-Lok reinforcements. Knocked-down frames shall have self-aligning tabs and slots for securely locked corners. [OPTION: 400 Series frame corners shall be mitered, arc welded and ground smooth per ANSI A250.8.]

B. Series 400 Frames: Equip frames with 1 welded in floor anchor in each jamb. Provide 3 field inserted steel lock-in or welded-in anchors (maximum of 24" (610 mm) oc) for each jamb. Anchors shall be type for particular construction involved (i.e., wood stud, masonry or steel stud).

C. Series 2600 Frames: Design frames for installation after wall is erected. Provide hinge and strike jambs with welded-in compression anchors which are to be screw adjusted after frame is installed to maintain a tight grip on wall and shall be equipped with welded-in sill anchors. Provide 16 gauge frames.

D. Series 800 Frames: Design frames for adjustment to existing stud wall construction. Equip headers at each miter joint with 18 gauge channel shaped reinforcings. Headers and jambs shall have mating tabs and slots for alignment of assembly. Corners shall present neat mitered joints. Provide 14 or 16 gauge frames.

E. Hardware Preparation: Frames shall be mortised, reinforced, drilled and tapped to receive specified mortise hardware and reinforced only for specified surface hardware. Drilling and tapping for surface hardware shall be done in the field. Plaster guards shall be installed on applicable hardware cutouts in 400 Series frames. Strike jambs shall be prepared for 3 rubber silencers.

F. Labeled Frames: When noted or required, provide for frame, windows and/or transoms and sidelights Underwriters Laboratories, Inc., (UL) or Warnock Hersey Inc. (WHI) labels for class of opening indicated. Construction details and hardware applications authorized by labeling authorities shall take precedence over project details or specifications.

G. Galvanized Option: Provide frame members of ASTM A40 hot dipped 16 or 14 gauge galvanized materials in 0.4 oz class conforming to ASTM A924 and A653. Treat materials in mill to ensure superior prime paint adhesion.

H. Prime Painted Frames: Exposed surfaces shall be cleaned, treated with Bonderite chemical and given 1 baked-on shop coat of EPA compliant gray synthetic primer.

I. Prepainted Frames: Frames shall be chemically cleaned and treated with a Bonderite chemical, plus a heavy coat of electrostatically applied baked on finish paint. Finish paint shall be a durable formulation, made specifically for Amweld. Hard film shall provide good resistance to both mar and abrasion tests. Weather and chemical resistance shall be a property of finish.

2.06 RELATED MATERIALS

A. Related Materials: Refer to other sections listed under Related Sections for related materials.

2.07 SOURCE QUALITY

A. Source Quality: Obtain metal door and frame products from a single manufacturer.

PART 3 EXECUTION

Specifier Note: Article below is an addition to the CSI *SectionFormat* and a supplement to MANU-SPEC. Revise article below to suit project requirements and specifier's practice.

3.01 MANUFACTURER'S INSTRUCTIONS

A. Compliance: Comply with manufacturer's product data, including product technical bulletins, product catalog installation instructions and product carton instructions for installation.

3.02 EXAMINATION

A. Site Verification of Conditions: Verify that substrate conditions, which have been previously installed under other sections, are acceptable for product installation in accordance with manufacturer's instructions.

1. Verify that door frame openings are installed plumb, true and level before beginning installation process. Select fasteners of adequate type, number and quality to perform the intended functions.

3.03 PREPARATION

A. Surface Preparation: [Specify applicable product preparation requirements.].

1. Preparation for Field Painting: Before application of finish coat of paint, surfaces must be dry and free of dirt, oil and dust. Finish coat shall be applied over a film that is intact. Scratches or bare edges shall be field primed with a rust inhibiting paint before top coating. Comply with instructions on finish coat application provided by paint manufacturer.

Specifier Note: Coordinate article below with manufacturer's recommended installation details and requirements.

3.04 INSTALLATION

Specifier Note: Refer to SDI publication, Installation Guide for Commercial Steel Doors and Frames and DHI's publication Installation Guide for detailed recommendations.

A. General:

1. Set frame product plumb, square, aligned and without twist at correct elevation.
2. Frame Installation: Install pressed steel frames. Installation shall be plumb, straight and true, rigidly secured in place, and properly braced. Comply with ANSI/DHI A115-IG installation guide.

B. Frame Installation Tolerances: Plumbness tolerance (measured through a line from intersecting corner of vertical members and the head to the floor) + 0.063" (1.6 mm).

1. Squareness tolerance (measured through a line 90 degrees from one jamb at upper corner of product, to opposite jamb): + 0.063" (1.6 mm).
2. Alignment tolerance (measured on jambs, through a horizontal line parallel to plane of wall): + 0.063" (1.6 mm).
3. Twist tolerance (measured at face corners of jambs, on parallel lines perpendicular to plane of wall) + 0.063" (1.6 mm).

C. Installation:

1. Secure anchorages and connections to adjacent construction.
2. Install hardware in accordance with manufacturers' templates and instructions.
3. Finish exposed field welds to present a smooth uniform surface. Touch up with a rust inhibitive primer.
4. Touch up exposed surfaces scratched or marred during shipment, installation or handling with a rust inhibitive primer.
5. Install glazing materials and door silencers.

Specifier Note: Coordinate paragraph below with manufacturer's installation instructions to avoid conflicts.

D. Installation Reference Standard(s): Install metal doors and frames in accordance with requirements of applicable reference standards.

1. Comply with Door and Hardware Institute (DHI) installation standards.
2. Comply with Steel Door Institute (SDI) installation and maintenance standards.
3. Comply with NFPA80 installation standards.

E. Fire Rated Construction: [Specify applicable label construction for product installation.].

1. Regulatory Requirements: Install fire labeled steel door and frame product in accordance with NFPA80, current edition, unless specified otherwise.

F. Related Products Installation: Refer to other sections listed under Related Sections for related products installation.

Specifier Note: Finish coat recommendations: Amweld's prime paint has been formulated to give the product maximum protection. It is important that compatible materials be used in the final or finished coat of paint. The painting contractor should test a small section of the door or frame if there is any doubt as to the composition of the finish coat. Recommended finish coat materials include Sherwin Williams SWP Alkyd House and Trim or equivalent, Sherwin Williams II Tile Clad Epoxy or equivalent, or Sherwin Williams Polane or equivalent. Certain finish coat materials are not recommended. Consult manufacturer.

Specifier Note: Repriming: When Fab-A-Frame type modifications of either the door or the frame indicate the need of repriming surfaces from which the Amweld factory primer has been removed, a general-purpose lead- and metal-free, water reducible, rust inhibitor primer should be used.

Specifier Note: Repainting: Should it become necessary to add a field coat of finished paint to a factory finished door or frame, first sand the door or frame for better adhesion and prime any bare metal. Due to the many types of paint available today, it is recommended that the customer test a small area with the coating before proceeding. Installation recommendations are available from the manufacturer.

Specifier Note: Coordinate article below with Division 1 Quality Assurance and Quality Control Sections.

3.05 FIELD QUALITY REQUIREMENTS

Specifier Note: Edit paragraph below. Establish number and duration of periodic site visits with Owner and manufacturer, and specify below. Consult with manufacturer for services required. Coordinate paragraph below with Division 1 Quality Assurance Section and Part 1 Quality Assurance Submittals herein. Delete if manufacturer's field service is not required.

A. Manufacturer's Field Services: Upon Owner's request, provide manufacturer's field service consisting of product use recommendations and periodic site visits for inspection of product installation in accordance with manufacturer's instructions.

1. Site Visits: [Specify number and duration of periodic site visits.].

Specifier Note: Coordinate article below with Division 1 Execution Requirements (Starting, Adjusting, Cleaning, and Protecting Installed Construction) Section.

3.06 ADJUSTING

A. Adjusting: Adjust hinge sets, locksets and other hardware. Lubricate using a suitable lubricant compatible with door and frame coatings.

Specifier Note: Coordinate article below with Division 1 Execution Requirements (Cleaning) Section.

3.07 CLEANING

A. Cleaning: Remove temporary coverings and protection of adjacent work areas. Repair or replace products that have been installed and are damaged. Clean installed products in accordance with manufacturer's instructions prior to Owner's acceptance. Remove construction debris from project site and legally dispose of debris.

3.08 PROTECTION

A. Protection: Protect installed product and finish surfaces from damage during construction.

Specifier Note: Retain article below to suit project requirements. CSI *PageFormat* allows for Schedules, Forms and Tables to be located at the end of a section. Article may be used to describe specific criteria requirements of similar products or equipment.

3.09 SCHEDULES

Specifier Note: Retain paragraph below to suit project requirements. Reference a schedule or include a schedule as an attachment that indicates where to locate products and equipment. Schedules: [Specify reference to applicable schedules.].

END OF SECTION

SECTION 08360

OVERHEAD DOORS

PART 1 GENERAL

1.1 SECTION INCLUDES
A. Sectional overhead doors of the following types:
1. Deep ribbed steel doors, non-insulated. (Model 524)
2. Electric door operators

1.2 RELATED SECTIONS
A. Section 05500 - Metal Fabrications: Steel channel opening frame.
B. Section 06100 - Rough Carpentry: Rough wood framing and blocking for door opening.
C. Section 08710 - Door Hardware: Lock cylinders.
D. Section 11150 - Parking Control Equipment: Remote door control.
E. Division 16 Sections: Electrical service and connections for powered operators.

1.3 REFERENCES
A. ASTM A 653/A 653M - Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
B. ASTM A 924/A 924M - Specification for General Requirements for Steel Sheet, Metallic-Coated by the Hot-Dip Process.
C. ASTM B 209/209M - Specification for Aluminum and Aluminum-Alloy Sheet and Plate.
D. ASTM B 221/221M - Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes.

1.4 SUBMITTALS
A. Submit under provisions of Section 01300.
B. 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.
4. Operation and maintenance data.
5. Nameplate data and ratings for motors.
C. Shop Drawings: Include opening dimensions and required tolerances, connection details, anchorage spacing, hardware locations, and installation details.
D. Selection Samples: For each finish specified, two complete sets of color chips representing manufacturer's full range of available colors and patterns.
E. Verification Samples: For each finish specified, two samples, minimum size 6 inches (150 mm) square, representing actual product, color, and patterns.

1.5 WIND PERFORMANCE REQUIREMENTS
A. Design doors to withstand positive and negative wind loads as calculated in accordance with applicable building code.
1. Design Wind Load: _____lb/sf (_____kPa).
2. Safety Factor: 1.5 times design wind load.

1.6 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the types of doors specified in this section, with not less than ten years of documented experience.

B. Installer Qualifications: Company specializing in installing the types of products specified in this section, with minimum of five years of documented experience, and approved by the door manufacturer.

1.7 WARRANTY

A. Finish Warranty: Provide manufacturer's standard finish warranty against rust through.

1. Warranty period: 10 years.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Acceptable Manufacturer:

Clopay Building Products Company

Overhead Door

Wayne Dalton

B. Substitutions: or Equal and approved

C. Requests for substitutions will be considered in accordance with provisions of Section 01600.

2.2 DEEP RIBBED STEEL DOORS, NON-INSULATED

A. Door Construction:

1. Panel Sections: 2 inches (52 mm) thick roll formed commercial quality steel panel sections, hot-dip galvanized per ASTM A 924/A 924M and ASTM A 653/A 653M, phosphatized and prepainted with primer and baked-on polyester topcoat. Panel faces reinforced with two 1/2 inch (13 mm) deep ribs on 8 inches (200 mm) centers, complemented by six 1/8 inch (3 mm) beads on 2 inches (50 mm) centers. Sections formed to create a weathertight tongue and groove meeting rail. Bottom panel section reinforced with continuous 0.050 inch (1.27 mm) aluminum astragal retainer with U-shaped flexible PVC astragal.
2. Door Stiles: Galvanized, primed, and polyester top-coated turn-down steel end stiles; wrap face of panel sections a full 1-3/8 inches (35 mm); 0.049 inch (1.25 mm) minimum thickness up to 14 ft, 2 inches (4.32 m), otherwise 0.61 inch (1.55 mm) thickness; engineered for easy hardware attachment through pre-punched holes.
3. Connections: Fasten panel sections and stiles with manufacturer's Tog-L-Loc joining system.

B. Heavy Duty Door

1. Maximum Door Size: 24 ft, 2 inches (8.0 m) wide by 20 ft (6.1 m) high.
2. Steel Skin Thickness: Minimum 0.022 inch (0.56 mm).
3. Windows: None.
4. Windows: 24 inches by 6 inches (150 mm by 610 mm) with polypropylene frame to match door color.
   a. Glazing: 1/8 inch (3 mm) DSB sheet glass glazing.
   b. Glazing: 1/8 inch (3 mm) tempered sheet glass glazing.
   c. Glazing: 1/8 inch (3 mm) acrylic glazing.
   d. Glazing: 1/8 inch (3 mm) clear polycarbonate glazing.

e. Glazing: 1/4 inch (6 mm) DSB sheet glass glazing.
f. Glazing: 1/4 inch (6 mm) tempered sheet glass glazing.
g. Glazing: 1/4 inch (6 mm) acrylic glazing.
h. Glazing: 1/4 inch (6 mm) clear polycarbonate glazing.

5. Windows: 24 inches by 12 inches (610 mm by 300 mm) with polypropylene frame to match door color.
   a. Glazing: 1/8 inch (3 mm) DSB sheet glass glazing.
   b. Glazing: 1/8 inch (3 mm) tempered sheet glass glazing.
   c. Glazing: 1/8 inch (3 mm) acrylic glazing.
   d. Glazing: 1/8 inch (3 mm) clear polycarbonate glazing.
   e. Glazing: 1/4 inch (6 mm) DSB sheet glass glazing.
   f. Glazing: 1/4 inch (6 mm) tempered sheet glass glazing.
   g. Glazing: 1/4 inch (6 mm) acrylic glazing.
   h. Glazing: 1/4 inch (6 mm) clear polycarbonate glazing.
   i. Glazing: 1/4 inch (6 mm) wire glazing.
6. Windows: Full-view sections, pre-painted to match door finish.
   a. Glazing: 1/8 inch (3 mm) DSB sheet glass glazing.
   b. Glazing: 1/8 inch (3 mm) tempered sheet glass glazing.
   c. Glazing: 1/8 inch (3 mm) acrylic glazing.
   d. Glazing: 1/8 inch (3 mm) clear polycarbonate glazing.
   e. Glazing: 1/4 inch (6 mm) DSB sheet glass glazing.
   f. Glazing: 1/4 inch (6 mm) tempered sheet glass glazing.
   g. Glazing: 1/4 inch (6 mm) acrylic glazing.
   h. Glazing: 1/4 inch (6 mm) clear polycarbonate glazing.
7. Finish: Exterior 1 mil (.025 mm) coating; interior 0.5 mil (0.013 mm) coating; color as follows:
   a. White.
   b. Brown.
   c. Tan.
   d. Gray.
   e. Trinar White.
8. Locking: No Lock.
9. Locking: Inside spring loaded slide bolt lock on end stile that engages slot in track.
   a. Provide one inside slide lock.
   b. Provide two inside slide lock.
   c. Provide five pin cylinder lock with outside key.
10. Weatherstripping: Provide complete perimeter seals selected from manufacturer's standard options. Provide flexible top seal, flexible jamb seal and U shaped bottom seal.
11. Tracks: Vertical tracks minimum 0.061 inch (1.55 mm) galvanized steel tapered and mounted for wedge type closing. Horizontal tracks minimum 0.075 inch (1.91 mm) galvanized steel, reinforced with minimum 0.0897 inch (2.28 mm) galvanized steel angles as required:
    a. Track Width: 2 inches (50 mm).
    b. Track Width: 3 inches (75 mm).
    c. Provide standard lift tracks with 15 inches (381 mm) radius track as indicated.
    d. Provide vertical lift tracks as indicated.
    e. Provide high lift tracks as indicated.
    f. Provide tracks that follow roof slope tracks as indicated.
    g. Provide low headroom tracks as indicated.
12. Spring Counterbalance: Torsion spring counterbalance mechanism 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 with minimum 7 to 1 safety factor.

a. Standard Cycle Spring: 10,000 cycle.
b. High Cycle Spring: 25,000 cycles.
c. High Cycle Spring: 50,000 cycles.
d. High Cycle Spring: 100,000 cycles.

13. Break-Away Bottom Section: Integral part of door; with fiberglass or 1/8 inch (3 mm) polycarbonate lined bottom section with flexible neoprene rubber side edges; exterior to match door face.
    a. Single breakaway bottom section for doors up to 20 feet (6 m) wide.
    b. Double breakaway botton section for doors up to 14 feet (4.3 m) wide.
14. Pass Door (Walk-Through Service Door): Integral part of door; 32 inches (813 mm) by 80 inches (2032 mm) with aluminum frame, welded corners, geared hinge, and pneumatic door closer; exterior matching door face; integral shiplap weather seal; keyed dead latch security lock.

2.3 ELECTRIC DOOR OPERATORS

A. General: Provide electric door operator provided by door manufacturer for door with operational life specified complete with electric motor and factory pre-wired motor controls, starter, gear-reduction unit, clutch, remote-control stations, control devices, integral gearing for locking door, and accessories required for proper operation. Comply with NFPA 70.

1. Solenoid-operated brake.

B. Disconnect Device: Provide hand-operated disconnect or mechanism for emergency manual operation while disconnecting motor, without affecting timing of limit switch. Mount disconnect and operator so they are accessible from floor level. Include interlock device to automatically prevent motor from operating when emergency operator is engaged.

C. Design operator so motor may be removed without disturbing limit switch adjustment and without affecting emergency auxiliary operator.

D. Provide control equipment complying with NEMA ICS1, NEMA ICS 2, and NEMA ICS 6, with NFPA 70 Class 2 control circuit, maximum 24-V, AC or DC.

E. Electric Motors: Provide high-starting torque, reversible, continuous-duty, Class A insulated, electric motor, complying with NEMA MG 1, with overload protection, sized to start, accelerate, and operate door in either direction, from any position, at not less than 2/3 fps (0.2 m/s) and not more than 1 fps (.03m/s), without exceeding nameplate ratings or considering service factor.

1. Type: Mechanical.
2. Type: Solid State.
3. Type: Jackshaft.
4. Type: Trolley.
5. HP:
    a. 1/3 hp (246 W).
    b. 1/2 hp (373 W).
    c. 3/4hp (559 W).
    d. 1 hp (746 W).
6. Power Characteristics:
    a. 115 V.
    b. 220 V.
    c. 460 V.
    d. 1 phase.
    e. 3 phase.
7. Service Factor:
    a. NEMA MG 1.
    b. NEMA 4 watertight.

c. NEMA 9 waterproof.
d. NEMA 10 oil resistant.
e. NEMA 12 explosion resistant.

8. Coordinate wiring requirements and electrical characteristics of motors with building electrical system.

F. Remote Control Station: Provide momentary contact, 3-button control station with push - button controls labeled "Open", "Close" and "Stop".

G. Remote Control Station: Provide continuous contact, 3-button control station with push - button controls labeled "Open", "Close" and "Stop".

H. Provide interior units, fully guarded, surface mounted, heavy-duty type, with general-purpose NEMA ICS 6 enclosure in one of the following types:

1. Enclosure Type: Type 1.
2. Enclosure Type: Type 4.
3. Enclosure Type: Type 12.

I. Obstruction Detection Device: Provide each motorized door with indicated external automatic safety sensor able to protect full width of door opening. Activation of sensor immediately stops and reverses downward door travel.

1. Sensor Edge: Provide each motorized door with an automatic safety sensing edge, located within astragal or weather stripping mounted to bottom bar. Contact with sensor immediately stops and reverses downward door travel. Connect to control circuit using manufacturer's standard take-up reel or self-coiling cord. Sensing edge shall be operated by:
   a. Electric.
   b. Pneumatic.
   c. Electric Fail safe.
   d. Pneumatic Fail safe.
2. Photo-electric control: Provide each motorized door with a photo-electric device that will stop and reverse the downward door travel if the light beam is broken or blocked. Device shall be:
   a. NEMA Type 1.
   b. NEMA Type 4.

J. Limit Switches: Provide adjustable switches, interlocked with motor controls and set to automatically stop door at fully opened and fully closed positions.

K. Radio Controls: Provide 3 button radio transmitter to provide remote open, close, stop functionality.

1. Provide external antenna and coaxial wiring to receiver to enhance radio control reception.

L. Provide auxiliary chain hoist: for emergency manual operation while disconnecting motor, without affecting timing of limit switch. Mount disconnect and operator so they are accessible from floor level. Include interlock device to automatically prevent motor from operating when emergency operator is engaged.

PART 3 EXECUTION

3.1 EXAMINATION

A. Examine wall and overhead areas, including opening framing and blocking, with installer present, for compliance with requirements for installation tolerances, clearances, and other conditions affecting performance of Work in this Section.

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

B. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.2 PREPARATION

A. 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.

3.4 PROTECTION

A. Protect installed products until completion of project.

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

END OF SECTION

SECTION 087100 - DOOR HARDWARE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section includes:

1. Mechanical door hardware for the following:

a. Swinging doors.
b. Sliding doors.
c. Folding doors.

2. Electrified door hardware.

B. Related Sections:
1. Division 08 Section "Hollow Metal Doors and Frames"
2. Division 08 Section "Flush Wood Doors"
3. Division 08 Section "Access Doors and Frames" for access door hardware.
4. Division 08 Section "Aluminum-Framed Entrances and Storefronts" for installation of entrance door hardware.
5. Division 26 Sections for connections to electrical power system and for low-voltage wiring work.

1.3 DOOR HARDWARE ALLOWANCE

A. Furnish door hardware as part of Door Hardware Allowance No. 1.

1.4 SUBMITTALS

A. Product Data: For each type of product indicated. Include construction and installation details, material descriptions, dimensions of individual components and profiles, and finishes.

B. Shop Drawings: Details of electrified door hardware, indicating the following:

1. Wiring Diagrams: For power, signal, and control wiring and including the following:

a. Details of interface of electrified door hardware and building safety and security systems.
b. Schematic diagram of systems that interface with electrified door hardware.
c. Point-to-point wiring.
d. Risers.

e. Elevations doors controlled by electrified door hardware.

2. Operation Narrative: Describe the operation of doors controlled by electrified door hardware.

C. Samples for Verification: For exposed door hardware of each type required, in each finish specified, prepared on Samples of size indicated below. Tag Samples with full description for coordination with the door hardware schedule. Submit Samples before, or concurrent with, submission of door hardware schedule.

D. Other Action Submittals:

1. Door Hardware Schedule: Prepared by or under the supervision of Installer, detailing fabrication and assembly of door hardware, as well as installation procedures and diagrams. Coordinate final door hardware schedule with doors, frames, and related work to ensure proper size, thickness, hand, function, and finish of door hardware.

2. Keying Schedule: Prepared by or under the supervision of Installer, detailing Owner's final keying instructions for locks. Include schematic keying diagram and index each key set to unique door designations that are coordinated with the Contract Documents.

E. Product Certificates: For electrified door hardware, from the manufacturer.

1. Certify that door hardware approved for use on types and sizes of labeled fire-rated doors complies with listed fire-rated door assemblies.

F. Product Test Reports: For compliance with accessibility requirements, based on evaluation of comprehensive tests performed by manufacturer and witnessed by a qualified testing agency, for door hardware on doors located in accessible routes.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: Supplier of products and an employer of workers trained and approved by product manufacturers and an Architectural Hardware Consultant who is available during the course of the Work to consult with Contractor, Architect, and Owner about door hardware and keying.

1. Warehousing Facilities: In Project's vicinity.
2. Scheduling Responsibility: Preparation of door hardware and keying schedules.
3. Engineering Responsibility: Preparation of data for electrified door hardware, including Shop Drawings, based on testing and engineering analysis of manufacturer's standard units in assemblies similar to those indicated for this Project.

B. Source Limitations: Obtain each type of door hardware from a single manufacturer.

1. Provide electrified door hardware from same manufacturer as mechanical door hardware, unless otherwise indicated. Manufacturers that perform electrical modifications and that are listed by a testing and inspecting agency acceptable to authorities having jurisdiction are acceptable.

C. Fire-Rated Door Assemblies: Where fire-rated door assemblies are indicated, provide door hardware rated for use in assemblies complying with NFPA 80 that are listed and labeled by a qualified testing agency, for fire-protection ratings indicated, based on testing at positive pressure according to NFPA 252 or UL 10C, unless otherwise indicated.

D. Electrified Door Hardware: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction.

E. Means of Egress Doors: Latches do not require more than 15 lbf (67 N) to release the latch. Locks do not require use of a key, tool, or special knowledge for operation.

F. Accessibility Requirements: For door hardware on doors in an accessible route, comply with all applicable codes.

G. Preinstallation Conference: Conduct conference at Project site.

1. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
2. Inspect and discuss preparatory work performed by other trades.
3. Inspect and discuss electrical roughing-in for electrified door hardware.
4. Review sequence of operation for each type of electrified door hardware.
5. Review required testing, inspecting, and certifying procedures.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Inventory door hardware on receipt and provide secure lock-up for door hardware delivered to Project site.

B. Tag each item or package separately with identification coordinated with the final door hardware schedule, and include installation instructions, templates, and necessary fasteners with each item or package.

1.7 COORDINATION

A. Installation Templates: Distribute for doors, frames, and other work specified to be factory prepared. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing door hardware to comply with indicated requirements.

B. Security: Coordinate installation of door hardware, keying, and access control with Owner's existing security.

C. Electrical System Roughing-In: Coordinate layout and installation of electrified door hardware with connections to power supplies and building safety and security systems.

D. Existing Openings: Where hardware components are scheduled for application to existing construction or where modifications to existing door hardware are required, field verify existing conditions and coordinate installation of door hardware to suit opening conditions and to provide proper door operation.

1.8 WARRANTY

A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of door hardware that fails in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, the following:

a. Structural failures including excessive deflection, cracking, or breakage.
b. Faulty operation of doors and door hardware.
c. Deterioration of metals, metal finishes, and other materials beyond normal weathering and use.

2. Warranty Period: Three (3) years from date of Substantial Completion, unless otherwise indicated.

a. Electromagnetic Locks: Five (5) years from date of Substantial Completion.
b. Exit Devices: Two (2) years from date of Substantial Completion.
c. Manual Closers: ten (10) years from date of Substantial Completion.
d. Concealed Floor Closers: Five (5) years from date of Substantial Completion.

1.9 MAINTENANCE SERVICE

A. Maintenance Tools and Instructions: Furnish a complete set of specialized tools and maintenance instructions for Owner's continued adjustment, maintenance, and removal and replacement of door hardware.

B. Maintenance Service: Beginning at Substantial Completion, provide six (6) months' full maintenance by skilled employees of door hardware installer. Include quarterly preventive maintenance, repair or replacement of worn or defective components, lubrication, cleaning, and adjusting as required for proper door and door hardware operation. Provide parts and supplies that are the same as those used in the manufacture and installation of original products.

PART 2 - PRODUCTS

2.1 DOOR HARDWARE SCHEDULE

A. Provide a door hardware schedule for each door listed to comply with requirements in this Section.

1. Door Hardware Sets: Provide quantity, item, size, finish or color indicated, and named manufacturers' products.
2. Sequence of Operation: Provide electrified door hardware function, sequence of operation, and interface with other building control systems indicated.

B. Designations: Requirements for design, grade, function, finish, size, and other distinctive qualities of each type of door hardware are are subject to the approval of the Owner and/or Architect. Products are identified by using door hardware designations, as follows:

1. Named Manufacturers' Products: Manufacturer and product designation are listed for each door hardware type required for the purpose of establishing minimum requirements. Manufacturers' names are abbreviated in Part 3 "Door Hardware Schedule" Article.
2. References to BHMA Designations: Provide products complying with these designations and requirements for description, quality, and function.

2.2 HINGES

A. Hinges: BHMA A156.1. Provide template-produced hinges for hinges installed on hollow-metal doors and hollow-metal frames.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. Baldwin Hardware Corporation.
b. Bommer Industries, Inc.
c. Cal-Royal Products, Inc.
d. Hager Companies.
e. IVES Hardware; an Ingersoll-Rand company.
f. Lawrence Hardware Inc.
g. McKinney Products Company; an ASSA ABLOY Group company.
h. PBB, Inc.
i. Stanley Commercial Hardware; Div. of The Stanley Works.

2.3 SELF-CLOSING HINGES AND PIVOTS

A. Self-Closing Hinges and Pivots: BHMA A156.17.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. Baldwin Hardware Corporation.
b. Bommer Industries, Inc.
c. Cal-Royal Products, Inc.
d. Hager Companies.
e. Lawrence Hardware Inc.
f. McKinney Products Company; an ASSA ABLOY Group company.
g. PBB, Inc.
h. Stanley Commercial Hardware; Div. of The Stanley Works.

2.4 CONTINUOUS HINGES

A. Continuous Hinges: BHMA A156.26; minimum 0.120-inch- (3.0-mm-) thick, hinge leaves with minimum overall width of 4 inches (102 mm); fabricated to full height of door and frame and to template screw locations; with components finished after milling and drilling are complete.

B. Pin-and-Barrel-Type Hinges:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. Hager Companies.
b. IVES Hardware; an Ingersoll-Rand company.
c. Lawrence Hardware Inc.
d. Markar Architectural Products, Inc.; a subsidiary of Adams Rite Manufacturing Co.
e. McKinney Products Company; an ASSA ABLOY Group company.
f. Select Products Limited.
g. Zero International.

2.5 MECHANICAL LOCKS AND LATCHES

A. Lock Functions: As scheduled by the door hardware supplier and approved by the Owner.

B. Lock Throw: Comply with testing requirements for length of bolts required for labeled fire doors, and as follows:

1. Bored Locks: Minimum 1/2-inch (13-mm) latchbolt throw.
2. Mortise Locks: Minimum 3/4-inch (19-mm) latchbolt throw.
3. Deadbolts: Minimum 1-inch (25-mm) bolt throw.

C. Lock Backset: 2-3/4 inches (70 mm).

D. Lock Trim:
1. Description: To match existing or as approved by the Architect
2. Levers: Cast
3. Knobs: Cast.
4. Escutcheons (Roses): Cast.
5. Dummy Trim: Match lever lock trim and escutcheons.
6. Operating Device: Lever with escutcheons (roses).

E. Strikes: Provide manufacturer's standard strike for each lock bolt or latchbolt complying with requirements indicated for applicable lock or latch and with strike box and curved lip extended to protect frame; finished to match lock or latch.

1. Flat-Lip Strikes: For locks with three-piece antifriction latchbolts, as recommended by manufacturer.
2. Extra-Long-Lip Strikes: For locks used on frames with applied wood casing trim.
3. Aluminum-Frame Strike Box: Manufacturer's special strike box fabricated for aluminum framing.
4. Rabbet Front and Strike: Provide on locksets for rabbeted meeting stiles.

F. Mortise Locks: BHMA A156.13; Operational Grade 1; stamped steel case with steel or brass parts; Series 1000.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. Accurate Lock & Hardware Co.
b. Adams Rite Manufacturing Co.; an ASSA ABLOY Group company.
c. Arrow USA; an ASSA ABLOY Group company.
d. Best Access Systems; Div. of Stanley Security Solutions, Inc.
e. Cal-Royal Products, Inc.
f. Corbin Russwin Architectural Hardware; an ASSA ABLOY Group company.
g. Falcon Lock; an Ingersoll-Rand company.
h. Marks USA.
i. PDQ Manufacturing.
j. SARGENT Manufacturing Company; an ASSA ABLOY Group company.
k. Schlage Commercial Lock Division; an Ingersoll-Rand company.
l. Yale Security Inc.; an ASSA ABLOY Group company.

G. Interconnected Locks: BHMA A156.12; Grade 1; Series 5000.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. Arrow USA; an ASSA ABLOY Group company.
b. Falcon Lock; an Ingersoll-Rand company.
c. Schlage Commercial Lock Division; an Ingersoll-Rand company.

H. Roller Latches: BHMA A156.16; Grade 1; rolling plunger that engages socket or catch, with adjustable roller projection.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. Architectural Builders Hardware Mfg., Inc.
b. Baldwin Hardware Corporation.
c. Don-Jo Mfg., Inc.
d. Door Controls International, Inc.
e. IVES Hardware; an Ingersoll-Rand company.
f. Rockwood Manufacturing Company.
g. Stanley Commercial Hardware; Div. of The Stanley Works.

I. Push-Pull Latches: Mortise, BHMA A156.13; Grade 1; with paddle handles that retract latchbolt; capable of being mounted vertically or horizontally.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. Adams Rite Manufacturing Co.; an ASSA ABLOY Group company.
b. Architectural Builders Hardware Mfg., Inc.
c. Corbin Russwin Architectural Hardware; an ASSA ABLOY Group company.
d. Don-Jo Mfg., Inc.
e. Glynn-Johnson; an Ingersoll-Rand company.
f. IVES Hardware; an Ingersoll-Rand company.
g. Rockwood Manufacturing Company.
h. SARGENT Manufacturing Company; an ASSA ABLOY Group company.
i. Trimco.

2.6 AUXILIARY LOCKS

A. Mortise Auxiliary Locks: BHMA A156.5; Grade 1; with strike that suits frame.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. Accurate Lock & Hardware Co.
b. Adams Rite Manufacturing Co.; an ASSA ABLOY Group company.
c. Arrow USA; an ASSA ABLOY Group company.
d. Best Access Systems; Div. of Stanley Security Solutions, Inc.
e. SARGENT Manufacturing Company; an ASSA ABLOY Group company.
f. Schlage Commercial Lock Division; an Ingersoll-Rand company.
g. Yale Security Inc.; an ASSA ABLOY Group company.

B. Push-Button Combination Locks: BHMA A156.5; mortise; Grade 2; lock opens by entering a one- to five-digit code by pushing correct buttons in correct sequence; automatically relocks when door is closed; with strike that suits frame.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

    a. Kaba Ilco Corp.; a Kaba Group company.

2.7 ELECTRIC STRIKES

A. Electric Strikes: BHMA A156.31; Grade 1; with faceplate to suit lock and frame.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

    a. Adams Rite Manufacturing Co.; an ASSA ABLOY Group company.
    b. Dortronics Systems, Inc.
    c. DynaLock Corp.
    d. Folger Adam Electric Door Controls; an ASSA ABLOY Group company.
    e. HES, Inc.; an ASSA ABLOY Group company.
    f. Rutherford Controls Int'l. Corp.
    g. Security Door Controls.
    h. Trine Access Technology.
    i. Von Duprin; an Ingersoll-Rand company.

2.8 ELECTROMAGNETIC LOCKS

A. Electromagnetic Locks: BHMA A156.23; electrically powered; with electromagnet attached to frame and armature plate attached to door; full-exterior or full-interior type, as required by application indicated.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

    a. Door Controls International, Inc.
    b. Dortronics Systems, Inc.
    c. DynaLock Corp.
    d. Rutherford Controls Int'l. Corp.
    e. Schlage Commercial Lock Division; an Ingersoll-Rand company.
    f. Securitron Magnalock Corporation; an ASSA ABLOY Group company.
    g. Security Door Controls.

2.9 EXIT LOCKS AND EXIT ALARMS

A. Exit Locks and Alarms: BHMA A156.29, Grade 1.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

    a. Arrow USA; an ASSA ABLOY Group company.
    b. Detex Corporation.
    c. SARGENT Manufacturing Company; an ASSA ABLOY Group company.

2.10 SURFACE BOLTS

A. Surface Bolts: BHMA A156.16.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. Burns Manufacturing Incorporated.
b. Don-Jo Mfg., Inc.
c. Door Controls International, Inc.
d. IVES Hardware; an Ingersoll-Rand company.
e. Trimco.

2.11 MANUAL FLUSH BOLTS

A. Manual Flush Bolts: BHMA A156.16; minimum 3/4-inch (19-mm) throw; designed for mortising into door edge.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. Adams Rite Manufacturing Co.; an ASSA ABLOY Group company.
b. Burns Manufacturing Incorporated.
c. Don-Jo Mfg., Inc.
d. Door Controls International, Inc.
e. Hiawatha, Inc.
f. IVES Hardware; an Ingersoll-Rand company.
g. Trimco.

2.12 AUTOMATIC AND SELF-LATCHING FLUSH BOLTS

A. Automatic and Self-Latching Flush Bolts: BHMA A156.16; minimum 3/4-inch (19-mm) throw; designed for mortising into door edge.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. Cal-Royal Products, Inc.
b. Door Controls International, Inc.
c. IVES Hardware; an Ingersoll-Rand company.
d. Trimco.

2.13 EXIT DEVICES AND AUXILIARY ITEMS

A. Exit Devices and Auxiliary Items: BHMA A156.3.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. Adams Rite Manufacturing Co.; an ASSA ABLOY Group company.
b. Arrow USA; an ASSA ABLOY Group company.

c. Cal-Royal Products, Inc.
d. Corbin Russwin Architectural Hardware; an ASSA ABLOY Group company.
e. Detex Corporation.
f. Door Controls International, Inc.
g. DORMA Architectural Hardware; Member of The DORMA Group North America.
h. Dor-O-Matic; an Ingersoll-Rand company.
i. K2 Commercial Hardware; a Black & Decker Corp. company.
j. Monarch Exit Devices & Panic Hardware; an Ingersoll-Rand company.
k. Precision Hardware, Inc.; Division of Stanley Security Solutions, Inc.
l. Rutherford Controls Int'l. Corp.
m. SARGENT Manufacturing Company; an ASSA ABLOY Group company.
n. Von Duprin; an Ingersoll-Rand company.
o. Yale Security Inc.; an ASSA ABLOY Group company.

2.14 LOCK CYLINDERS

A. Lock Cylinders: Tumbler type, constructed from brass or bronze, stainless steel, or nickel silver.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. Arrow USA; an ASSA ABLOY Group company.
b. ASSA, Inc.; An ASSA ABLOY Group Company.
c. Best Access Systems; Div. of Stanley Security Solutions, Inc.
d. Corbin Russwin Architectural Hardware; an ASSA ABLOY Group company.
e. Falcon Lock; an Ingersoll-Rand company.
f. Medeco Security Locks, Inc.; an ASSA ABLOY Group company.
g. SARGENT Manufacturing Company; an ASSA ABLOY Group company.
h. Schlage Commercial Lock Division; an Ingersoll-Rand company.
i. Yale Security Inc.; an ASSA ABLOY Group company.

B. Standard Lock Cylinders: BHMA A156.5; Grade 1; permanent cores that are removable; face finished to match lockset.

C. Construction Master Keys: Provide cylinders with feature that permits voiding of construction keys without cylinder removal. Provide 10 construction master keys.

D. Construction Cores: Provide construction cores that are replaceable by permanent cores. Provide 10 construction master keys.

2.15 KEYING

A. Keying System: Factory registered, complying with guidelines in BHMA A156.28, Appendix A. Incorporate decisions made in keying conference.

1. Master Key System: Change keys and a master key operate cylinders.
2. Grand Master Key System: Change keys, a master key, and a grand master key operate cylinders.
3. Great-Grand Master Key System: Change keys, a master key, a grand master key, and a great-grand master key operate cylinders.
4. Keyed Alike: Key all cylinders to same change key.

B. Keys: Nickel silver.

1. Stamping: Permanently inscribe each key with a visual key control number and include the following notation:

   a. Notation: Information to be furnished by Owner.

2. Quantity: In addition to one extra key blank for each lock, provide the following:

   a. Cylinder Change Keys: Three.
   b. Master Keys: Five.
   c. Grand Master Keys: Five.

2.16 KEY CONTROL SYSTEM

A. Key Control Cabinet: BHMA A156.5; metal cabinet with baked-enamel finish; containing key-holding hooks, labels, 2 sets of key tags with self-locking key holders, key-gathering envelopes, and temporary and permanent markers; with key capacity of 150 percent of the number of locks.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

   a. American Key Boxes and Cabinets.
   b. GE Security, Inc.
   c. HPC, Inc.
   d. Lund Equipment Co., Inc.
   e. MMF Industries.
   f. Tri Palm International

2. Wall-Mounted Cabinet: Cabinet with hinged-panel door equipped with key-holding panels and pin-tumbler cylinder door lock.

2.17 ACCESSORIES FOR PAIRS OF DOORS

A. Coordinators: BHMA A156.3; consisting of active-leaf, hold-open lever and inactive-leaf release trigger; fabricated from steel with nylon-coated strike plates; with built-in, adjustable safety release.

B. Carry-Open Bars: BHMA A156.3; prevent the inactive leaf from opening before the active leaf; provide polished brass or bronze carry-open bars with strike plate for inactive leaves of pairs of doors unless automatic or self-latching bolts are used.

C. Astragals: BHMA A156.22.

2.18 SURFACE CLOSERS

A. Surface Closers: BHMA A156.4; rack-and-pinion hydraulic type with adjustable sweep and latch speeds controlled by key-operated valves and forged-steel main arm. Comply with manufacturer's written recommendations for size of door closers depending on size of door, exposure to weather, and anticipated frequency of use. Provide factory-sized closers, adjustable to meet field conditions and requirements for opening force.

a. ManufacArrow USA; an ASSA ABLOY Group company.
b. Corbin Russwin Architectural Hardware; an ASSA ABLOY Group company.
c. DORMA Architectural Hardware; Member of The DORMA Group North America.
d. Dor-O-Matic; an Ingersoll-Rand company.
e. K2 Commercial Hardware; a Black & Decker Corp. company.
f. LCN Closers; an Ingersoll-Rand company.
g. Norton Door Controls; an ASSA ABLOY Group company.
h. Rixson Specialty Door Controls; an ASSA ABLOY Group company.
i. SARGENT Manufacturing Company; an ASSA ABLOY Group company.
j. Yale Security Inc.; an ASSA ABLOY Group company.

2.19 CONCEALED CLOSERS

A. Concealed Closers: BHMA A156.4; rack-and-pinion hydraulic type with adjustable sweep and latch speeds controlled by key-operated valves. Comply with manufacturer's written recommendations for size of door closers depending on size of door, exposure to weather, and anticipated frequency of use. Provide factory-sized closers, adjustable to meet field conditions and requirements for opening force.

a. ManufacDORMA Architectural Hardware; Member of The DORMA Group North America.
b. LCN Closers; an Ingersoll-Rand company.
c. Norton Door Controls; an ASSA ABLOY Group company.
d. Rixson Specialty Door Controls; an ASSA ABLOY Group company.
e. SARGENT Manufacturing Company; an ASSA ABLOY Group company.

2.20 CLOSER HOLDER RELEASE DEVICES

A. Closer Holder Release Devices: BHMA A156.15; Grade 1; closer connected with separate or integral releasing and fire- or smoke-detecting devices. Door shall become self-closing on interruption of signal to release device. Automatic release is activated by loss of power.

a. ManufacCorbin Russwin Architectural Hardware; an ASSA ABLOY Group company.
b. DORMA Architectural Hardware; Member of The DORMA Group North America.
c. LCN Closers; an Ingersoll-Rand company.
d. Norton Door Controls; an ASSA ABLOY Group company.
e. Rixson Specialty Door Controls; an ASSA ABLOY Group company.
f. SARGENT Manufacturing Company; an ASSA ABLOY Group company.

2.21 MECHANICAL STOPS AND HOLDERS

A. Wall- and Floor-Mounted Stops: BHMA A156.16; aluminum base metal.

a. ManufacArchitectural Builders Hardware Mfg., Inc.
b. Baldwin Hardware Corporation.
c. Burns Manufacturing Incorporated.
d. Cal-Royal Products, Inc.
e. Don-Jo Mfg., Inc.
f. Door Controls International, Inc.
g. Hager Companies.
h. Hiawatha, Inc.

i. IVES Hardware; an Ingersoll-Rand company.
j. Rockwood Manufacturing Company.
k. Stanley Commercial Hardware; Div. of The Stanley Works.
l. Trimco.

2.22 ELECTROMAGNETIC STOPS AND HOLDERS

A. Electromagnetic Door Holders: BHMA A156.15, Grade 1; wall-mounted electromagnetic single or floor-mounted electromagnet single or floor-mounted electromagnet double unit with strike plate attached to swinging door; coordinated with fire detectors and interface with fire alarm system for labeled fire-rated door assemblies.

a. ManufacArchitectural Builders Hardware Mfg., Inc.
b. DORMA Architectural Hardware; Member of The DORMA Group North America.
c. SARGENT Manufacturing Company; an ASSA ABLOY Group company.

2.23 OVERHEAD STOPS AND HOLDERS

A. Overhead Stops and Holders: BHMA A156.8.

a. ManufacArchitectural Builders Hardware Mfg., Inc.
b. Glynn-Johnson; an Ingersoll-Rand company.
c. Rockwood Manufacturing Company.
d. SARGENT Manufacturing Company; an ASSA ABLOY Group company.

2.24 DOOR GASKETING

A. Door Gasketing: BHMA A156.22; air leakage not to exceed 0.50 cfm per foot (0.000774 cu. m/s per m) of crack length for gasketing other than for smoke control, as tested according to ASTM E 283; with resilient or flexible seal strips that are easily replaceable and readily available from stocks maintained by manufacturer.

a. ManufacHager Companies.
b. M-D Building Products, Inc.
c. National Guard Products.
d. Pemko Manufacturing Co.; an ASSA ABLOY Group company.
e. Reese Enterprises, Inc.
f. Sealeze; a unit of Jason Incorporated.
g. Zero International.

2.25 THRESHOLDS

A. Thresholds: BHMA A156.21; fabricated to full width of opening indicated.

a. ManufacHager Companies.
b. M-D Building Products, Inc.
c. National Guard Products.
d. Pemko Manufacturing Co.; an ASSA ABLOY Group company.
e. Reese Enterprises, Inc.
f. Rixson Specialty Door Controls; an ASSA ABLOY Group company.

g. Sealeze; a unit of Jason Incorporated.
h. Zero International.

2.26 METAL PROTECTIVE TRIM UNITS

A. Metal Protective Trim Units: BHMA A156.6; fabricated from 0.050-inch- (1.3-mm-) thick with manufacturer's standard machine or self-tapping screw fasteners.

a. ManufacBaldwin Hardware Corporation.
b. Burns Manufacturing Incorporated.
c. Don-Jo Mfg., Inc.
d. Hiawatha, Inc.
e. IPC Door and Wall Protection Systems, Inc.; Div. of InPro Corporation.
f. IVES Hardware; an Ingersoll-Rand company.
g. Pawling Corporation.
h. Rockwood Manufacturing Company.
i. Trimco.

2.27 FABRICATION

A. Manufacturer's Nameplate: Do not provide products that have manufacturer's name or trade name displayed in a visible location except in conjunction with required fire-rated labels and as otherwise approved by Architect.

1. Manufacturer's identification is permitted on rim of lock cylinders only.

B. Base Metals: Produce door hardware units of base metal indicated, fabricated by forming method indicated, using manufacturer's standard metal alloy, composition, temper, and hardness. Furnish metals of a quality equal to or greater than that of specified door hardware units and BHMA A156.18.

C. Fasteners: Provide door hardware manufactured to comply with published templates prepared for machine, wood, and sheet metal screws. Provide screws that comply with commercially recognized industry standards for application intended, except aluminum fasteners are not permitted. Provide Phillips flat-head screws with finished heads to match surface of door hardware, unless otherwise indicated.

1. Concealed Fasteners: For door hardware units that are exposed when door is closed, except for units already specified with concealed fasteners. Do not use through bolts for installation where bolt head or nut on opposite face is exposed unless it is the only means of securely attaching the door hardware. Where through bolts are used on hollow door and frame construction, provide sleeves for each through bolt.
2. Fire-Rated Applications:

a. Wood or Machine Screws: For the following:

1) Hinges mortised to doors or frames.
2) Strike plates to frames.
3) Closers to doors and frames.

b. Steel Through Bolts: For the following unless door blocking is provided:

1) Surface hinges to doors.

2) Closers to doors and frames.
3) Surface-mounted exit devices.

3. Spacers or Sex Bolts: For through bolting of hollow-metal doors.
4. Fasteners for Wood Doors: Comply with requirements in DHI WDHS.2, "Recommended Fasteners for Wood Doors."
5. Gasketing Fasteners: Provide noncorrosive fasteners for exterior applications and elsewhere as indicated.

2.28 FINISHES

A. Provide finishes complying with BHMA A156.18.

B. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

C. Appearance of Finished Work: Variations in appearance of abutting or adjacent pieces are acceptable if they are within one-half of the range of approved Samples. Noticeable variations in the same piece are not acceptable. Variations in appearance of other components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine doors and frames, with Installer present, for compliance with requirements for installation tolerances, labeled fire-rated door assembly construction, wall and floor construction, and other conditions affecting performance.

B. Examine roughing-in for electrical power systems to verify actual locations of wiring connections before electrified door hardware installation.

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

3.2 PREPARATION

A. Steel Doors and Frames: For surface applied door hardware, drill and tap doors and frames according to ANSI/SDI A250.6.

B. Wood Doors: Comply with DHI WDHS.5 "Recommended Hardware Reinforcement Locations for Mineral Core Wood Flush Doors."

3.3 INSTALLATION

A. Mounting Heights: Mount door hardware units at heights with the following unless otherwise indicated or required to comply with governing regulations.

1. Standard Steel Doors and Frames: ANSI/SDI A250.8.

2. Custom Steel Doors and Frames: HMMA 831.
3. Wood Doors: DHI WDHS.3, "Recommended Locations for Architectural Hardware for Wood Flush Doors."

B. Install each door hardware item to comply with manufacturer's written instructions. Where cutting and fitting are required to install door hardware onto or into surfaces that are later to be painted or finished in another way, coordinate removal, storage, and reinstallation of surface protective trim units with finishing work specified in Division 09 Sections. Do not install surface-mounted items until finishes have been completed on substrates involved.

1. Set units level, plumb, and true to line and location. Adjust and reinforce attachment substrates as necessary for proper installation and operation.
2. Drill and countersink units that are not factory prepared for anchorage fasteners. Space fasteners and anchors according to industry standards.

C. Hinges: Install types and in quantities indicated in door hardware schedule but not fewer than the number recommended by manufacturer for application indicated or one hinge for every 30 inches (750 mm) of door height, whichever is more stringent, unless other equivalent means of support for door, such as spring hinges or pivots, are provided.

D. Intermediate Offset Pivots: Where offset pivots are indicated, provide intermediate offset pivots in quantities indicated in door hardware schedule but not fewer than one intermediate offset pivot per door and one additional intermediate offset pivot for every 30 inches (750 mm) of door height greater than 90 inches (2286 mm).

E. Lock Cylinders: Install construction cores to secure building and areas during construction period.

1. Replace construction cores with permanent cores as directed by Owner.
2. Furnish permanent cores to Owner for installation.

F. Key Control System: Tag keys and place them on markers and hooks in key control system cabinet, as determined by final keying schedule.

G. Thresholds: Set thresholds for exterior doors and other doors indicated in full bed of sealant complying with requirements specified in Division 07 Section "Joint Sealants."

H. Stops: Provide floor stops for doors unless wall or other type stops are indicated in door hardware schedule. Do not mount floor stops where they will impede traffic.

I. Perimeter Gasketing: Apply to head and jamb, forming seal between door and frame.

J. Meeting Stile Gasketing: Fasten to meeting stiles, forming seal when doors are closed.

K. Door Bottoms: Apply to bottom of door, forming seal with threshold when door is closed.

3.4 FIELD QUALITY CONTROL

A. Independent Architectural Hardware Consultant: Owner will engage a qualified independent Architectural Hardware Consultant to perform inspections and to prepare inspection reports.

1. Independent Architectural Hardware Consultant will inspect door hardware and state in each report whether installed work complies with or deviates from requirements, including whether door hardware is properly installed and adjusted.

3.5 ADJUSTING

A. Initial Adjustment: Adjust and check each operating item of door hardware and each door to ensure proper operation or function of every unit. Replace units that cannot be adjusted to operate as intended. Adjust door control devices to compensate for final operation of heating and ventilating equipment and to comply with referenced accessibility requirements.

1. Spring Hinges: Adjust to achieve positive latching when door is allowed to close freely from an open position of 30 degrees.
2. Electric Strikes: Adjust horizontal and vertical alignment of keeper to properly engage lock bolt.
3. Door Closers: Adjust sweep period to comply with accessibility requirements and requirements of authorities having jurisdiction.

B. Occupancy Adjustment: Approximately six months after date of Substantial Completion, Installer's Architectural Hardware Consultant shall examine and readjust each item of door hardware, including adjusting operating forces, as necessary to ensure function of doors, door hardware, and electrified door hardware.

3.6 CLEANING AND PROTECTION

A. Clean adjacent surfaces soiled by door hardware installation.

B. Clean operating items as necessary to restore proper function and finish.

C. Provide final protection and maintain conditions that ensure that door hardware is without damage or deterioration at time of Substantial Completion.

3.7 DEMONSTRATION

A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain door hardware and door hardware finishes. Refer to Division 01 Section "Operation and Maintenance Data."

SECTION 09255 - GYPSUM BOARD ASSEMBLIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes the following:

1. Nonload-bearing steel framing members for gypsum board assemblies.
2. Gypsum board assemblies attached to steel framing.
3. Gypsum board bonded adhesively to interior concrete and masonry substrates.
4. Cementitious backer units installed with gypsum board assemblies.
5. Glass-mat, water-resistant gypsum backing board installed with gypsum board assemblies.

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

1. Division 5 Section "Cold-Formed Metal Framing" for load-bearing steel framing.
2. Division 6 Section "Rough Carpentry" for wood framing and furring, and gypsum sheathing applied over wood framing.

1.3 DEFINITIONS

A. Gypsum Board Construction Terminology: Refer to ASTM C 11 and GA-505 for definitions of terms for gypsum board assemblies not defined in this Section or in other referenced standards.

1.4 ASSEMBLY PERFORMANCE REQUIREMENTS

A. Sound Transmission Characteristics: For gypsum board assemblies with STC ratings, provide materials and construction identical to those of assemblies whose STC ratings were determined according to ASTM E 90 and classified according to ASTM E 413 by a qualified independent testing agency.

B. Fire Resistance: Provide gypsum board assemblies with fire-resistance ratings indicated.

1.5 SUBMITTALS

A. General: Submit each item in this Article according to the Conditions of the Contract and Division 1 Specification Sections.

B. Product Data for each type of product specified.

C. Shop Drawings showing locations, fabrication, and installation of control and expansion joints including plans, elevations, sections, details of components, and attachments to other units of Work.

D. Product certificates signed by manufacturers of gypsum board assembly components certifying that their products comply with specified requirements.

1.6 QUALITY ASSURANCE

A. Single-Source Responsibility for Steel Framing: Obtain steel framing members for gypsum board assemblies from a single manufacturer, unless otherwise indicated.

B. Single-Source Responsibility for Panel Products: Obtain each type of gypsum board and other panel products from a single manufacturer.

C. Single-Source Responsibility for Finishing Materials: Obtain finishing materials from either the same manufacturer that supplies gypsum board and other panel products or from a manufacturer acceptable to gypsum board manufacturer.

D. Fire-Test-Response Characteristics: Where fire-resistance-rated gypsum board assemblies are indicated, provide gypsum board assemblies that comply with the following requirements:

1. Fire-Resistance Ratings: As indicated by GA File Numbers in GA-600 "Fire Resistance Design Manual" or design designations in UL "Fire Resistance Directory" or in the listing of another testing and inspecting agency acceptable to authorities having jurisdiction.
2. Gypsum board assemblies indicated are identical to assemblies tested for fire resistance according to ASTM E 119 by an independent testing and inspecting agency acceptable to authorities having jurisdiction.
3. Deflection and Firestop Track: Top runner provided in fire-resistance-rated assemblies indicated is labeled and listed by UL, Warnock Hersey, or another testing and inspecting agency acceptable to authorities having jurisdiction.

E. n/a

1.7 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials in original packages, containers, or bundles bearing brand name and identification of manufacturer or supplier.

B. Store materials inside under cover and keep them dry and protected against damage from

weather, direct sunlight, surface contamination, corrosion, construction traffic, and other causes. Neatly stack gypsum panels flat to prevent sagging.

1.8 PROJECT CONDITIONS

A. Environmental Conditions, General: Establish and maintain environmental conditions for applying and finishing gypsum board to comply with ASTM C 840 requirements or gypsum board manufacturer's recommendations, whichever are more stringent.

B. Room Temperatures: For nonadhesive attachment of gypsum board to framing, maintain not less than 40 deg F (4 deg C). For adhesive attachment and finishing of gypsum board, maintain not less than 50 deg F (10 deg C) for 48 hours before application and continuously after until dry. Do not exceed 95 deg F (35 deg C) when using temporary heat sources.

C. Ventilation: Ventilate building spaces as required to dry joint treatment materials. Avoid drafts during hot, dry weather to prevent finishing materials from drying too rapidly.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated in the Work include, but are not limited to, the following:

B. n/a

1. Steel Framing and Furring:

   a. Clark Steel Framing, Inc.
   b. Consolidated Systems, Inc.
   c. Dale Industries, Inc.
   d. Dietrich Industries, Inc.
   e. Marino/Ware (formerly Marino Industries Corp.).
   f. National Gypsum Co.; Gold Bond Building Products Division.
   g. Unimast, Inc.

2. Grid Suspension Assemblies:

   a. Armstrong World Industries, Inc.
   b. Chicago Metallic Corp.
   c. USG Interiors, Inc.
   d. Worthington Steel Company (formerly National Rolling Mills).

3. Gypsum Board and Related Products:

a. Domtar Gypsum.
b. Georgia-Pacific Corp.
c. National Gypsum Co.; Gold Bond Building Products Division.
d. United States Gypsum Co.

C. Available Products: Subject to compliance with requirements, products that may be incorporated in the Work where proprietary gypsum wallboard is indicated include, but are not limited to, the following:

D. Products: Subject to compliance with requirements, provide one of the following products where proprietary gypsum wallboard is indicated:

1. Gyprock Fireguard C Gypsum Board; Domtar Gypsum.
2. Firestop Type C; Georgia-Pacific Corp.
3. Fire-Shield G; National Gypsum Co.; Gold Bond Building Products Division.
4. SHEETROCK Brand Gypsum Panels, FIRECODE C Core; United States Gypsum Co.
5. SHEETROCK Brand Gypsum Panels, ULTRACODE Core; United States Gypsum Co.

2.2 STEEL FRAMING COMPONENTS FOR SUSPENDED AND FURRED CEILINGS

A. General: Provide components complying with ASTM C 754 for conditions indicated.

B. Cast-in-Place and Postinstalled Anchors in Concrete: Anchors of type indicated below, fabricated from corrosion-resistant materials, with holes or loops for attaching hanger wires, and with capability to sustain, without failure, a load equal to 5 times that imposed by ceiling construction, as determined by testing according to ASTM E 488 conducted by a qualified independent testing agency.

1. Cast-in-place type designed for attachment to concrete forms.
2. Chemical anchor.
3. Expansion anchor.

C. Powder-Actuated Fasteners in Concrete: Fastener system of type suitable for application indicated, fabricated from corrosion-resistant materials, with clips or other accessory devices for attaching hangers of type indicated, and with capability to sustain, without failure, a load equal to 10 times that imposed by ceiling construction, as determined by testing according to ASTM E 1190 conducted by a qualified independent testing agency.

D. Wire Ties: ASTM A 641 (ASTM A 641M), Class 1 zinc coating, soft temper, 0.062 inch (1.6 mm) thick.

E. Wire Hangers: ASTM A 641 (ASTM A 641M), Class 1 zinc coating, soft temper, 0.162-inch (4.1-mm) diameter.

F. Hanger Rods: Mild steel and zinc coated or protected with rust-inhibitive paint.

G. Flat Hangers: Mild steel and zinc coated or protected with rust-inhibitive paint.

H. Angle-Type Hangers: Angles with legs not less than 7/8 inch (22.2 mm) wide, formed from 0.0635-inch- (1.6-mm-) thick galvanized steel sheet complying with ASTM A 653, G 90 (ASTM A 653M, Z 180) coating designation, with bolted connections and 5/16-inch (8-mm) diameter bolts.

I. Channels: Cold-rolled steel, 0.0598-inch (1.5-mm) minimum thickness of base (uncoated) metal and 7/16-inch- (11.1-mm-) wide flanges, and as follows:

1. Carrying Channels: 2 inches (50.8 mm) deep, 590 lb/1000 feet (88 kg/100 m), unless otherwise indicated.
2. Carrying Channels: 1-1/2 inches (38.1 mm) deep, 475 lb/1000 feet (70 kg/100 m), unless otherwise indicated.
3. Furring Channels: 3/4 inch (19.1 mm) deep, 300 lb/1000 feet (45 kg/100 m), unless otherwise indicated.
4. Finish: Rust-inhibitive paint, unless otherwise indicated.
5. Finish: ASTM A 653, G 60 (ASTM A 653M, Z 180) hot-dip galvanized coating for framing for exterior soffits and where indicated.

J. Steel Studs for Furring Channels: ASTM C 645, with flange edges of studs bent back 90 degrees and doubled over to form 3/16-inch- (5-mm-) wide minimum lip (return), and complying with the following requirements for minimum thickness of base (uncoated) metal and for depth:

1. Thickness: 0.0179 inch (0.45 mm), unless otherwise indicated.
2. Thickness: 0.0329 inch (0.84 mm), unless otherwise indicated.
3. Thickness: As indicated.
4. Depth: 1-5/8 inch (41.3 mm), unless otherwise indicated.
5. Depth: 2-1/2 inches (63.5 mm), unless otherwise indicated.
6. Depth: 3-5/8 inches (92.1 mm), unless otherwise indicated.
7. Depth: As indicated.
8. Protective Coating: ASTM A 653, G 40 (ASTM A 653M, Z 90) hot-dip galvanized coating.
9. Protective Coating: Manufacturer's standard corrosion-resistant coating.
10. Protective Coating: ASTM A 653, G 40 (ASTM A 653M, Z 90) hot-dip galvanized coating for framing for exterior soffits and ceiling suspension members in areas within 10 feet (3 m) of exterior walls.

K. Steel Rigid Furring Channels: ASTM C 645, hat shaped, depth of 7/8 inch (22.2 mm), and minimum thickness of base (uncoated) metal as follows:

1. Thickness: 0.0179 inch (0.45 mm), unless otherwise indicated.
2. Thickness: 0.0329 inch (0.84 mm), unless otherwise indicated.
3. Thickness: As indicated.
4. Protective Coating: ASTM A 653, G 40 (ASTM A 653M, Z 90) hot-dip galvanized coating.

5. Protective Coating: Manufacturer's standard corrosion-resistant coating.
6. Protective Coating: ASTM A 653, G 40 (ASTM A 653M, Z 90) hot-dip galvanized coating for framing for exterior soffits and ceiling suspension members in areas within 10 feet (3 m) of exterior walls.

L. Steel Resilient Furring Channels: Manufacturer's standard product designed to reduce sound transmission, fabricated from steel sheet complying with ASTM A 653 (ASTM A 653M) or ASTM A 568 (ASTM A 568M) to form 1/2-inch- (12.7-mm-) deep channel of the following configuration:

1. Single-Leg Configuration: Asymmetric-shaped channel with face connected to a single flange by a single-slotted leg (web).
2. Double-Leg Configuration: Hat-shaped channel with 1-1/2-inch- (38.1-mm-) wide face connected to flanges by double-slotted or expanded-metal legs (webs).
3. Single- or Double-Leg Configuration: Asymmetric-shaped channel with face connected to a single flange by a single-slotted leg (web) or hat-shaped channel, with 1-1/2-inch- (38.1-mm-) wide face connected to flanges by double-slotted or expanded-metal legs (webs).

M. Grid Suspension System for Interior Ceilings: ASTM C 645, manufacturer's standard direct-hung grid suspension system composed of main beams and cross-furring members that interlock to form a modular supporting network.

2.3 STEEL FRAMING FOR WALLS AND PARTITIONS

A. General: Provide steel framing members complying with the following requirements:

1. Protective Coating: Manufacturer's standard corrosion-resistant coating.
2. Protective Coating: ASTM A 653, G 40 (ASTM A 653M, Z 90) hot-dip galvanized coating for framing members attached to and within 10 feet (3 m) of exterior walls.

B. Steel Studs and Runners: ASTM C 645, with flange edges of studs bent back 90 degrees and doubled over to form 3/16-inch- (5-mm-) wide minimum lip (return), and complying with the following requirements for minimum thickness of base (uncoated) metal and for depth:

1. Thickness: 0.0179 inch (0.45 mm), unless otherwise indicated.
2. Thickness: 0.027 inch (0.7 mm) where indicated.
3. Thickness: 0.0329 inch (0.84 mm) as follows:

    a. For head runner, sill runner, jamb, and cripple studs at door and other openings.
    b. In locations to receive cementitious backer units.
    c. Where indicated.

4. Thickness: As indicated.
5. Depth: 3-5/8 inches (92.1 mm), unless otherwise indicated.

6. Depth: 6 inches (152.4 mm) where indicated.
7. Depth: 4 inches (101.6 mm) where indicated.
8. Depth: 2-1/2 inches (63.5 mm) where indicated.
9. Depth: 1-5/8 inch (41.3 mm) where indicated.
10. Depth: As indicated.

C. Deflection Track: Manufacturer's top runner complying with the requirements of ASTM C 645 and with 2-inch- (50.8-mm-) deep flanges.

D. Deflection Track: Manufacturer's standard top runner designed to prevent cracking of gypsum board applied to interior partitions resulting from deflection of the structure above fabricated from steel sheet complying with ASTM A 653 (ASTM A 653M) or ASTM A 568 (ASTM A 568M). Thickness as indicated for studs, and width to accommodated depth of studs, and of the following configuration:

1. Top Runner with Compressible Flanges: 2-1/2-inch- (63.5-mm-) deep flanges with V-shaped offsets that compress when pressure is applied from construction above.
2. Top Runner with Slotted Flanges: 2-1/2-inch- (63.5-mm-) deep flanges with slots 1 inch (25.4 mm) o.c.
3. Top runner with 2-1/2-inch- (63.5-mm-) deep flanges that either have V-shaped offsets that compress when pressure is applied from construction above or have slots 1 inch (25.4 mm) o.c. that allow fasteners attached to studs through the slots to accommodate structural movement by slipping.

    a. Available Products: Subject to compliance with requirements, products that may be incorporated in the Work include, but are not limited to, the following:
    b. Products: Subject to compliance with requirements, provide one of the following:

        1) Superior Flex Track System (SFT); Delta Star, Inc.
        2) SLP-TRK; Metal-Lite, Inc.

E. n/a

F. Steel Rigid Furring Channels: ASTM C 645, hat shaped, depth and minimum thickness of base (uncoated) metal as follows:

1. Thickness: 0.0179 inch (0.45 mm), unless otherwise indicated.
2. Thickness: 0.0329 inch (0.84 mm), unless otherwise indicated.
3. Thickness: As indicated.
4. Depth: 7/8 inch (22.2 mm).
5. Depth: 1-1/2 inch (38.1 mm).
6. Depth: As Noted

G. Furring Brackets: Serrated-arm type, adjustable, fabricated from corrosion-resistant steel sheet complying with ASTM C 645, minimum thickness of base (uncoated) metal of 0.0329 inch (0.84 mm), designed for screw attachment to steel studs and steel rigid

furring channels used for furring.

H. Steel Resilient Furring Channels: Manufacturer's standard product designed to reduce sound transmission, fabricated from steel sheet complying with ASTM A 653 (ASTM A 653M) or ASTM A 568 (ASTM A 568M) to form 1/2-inch- (12.7-mm-) deep channel of the following configuration:

1. Single-Leg Configuration: Asymmetric-shaped channel with face connected to a single flange by a single-slotted leg (web).
2. Double-Leg Configuration: Hat-shaped channel with 1-1/2-inch- (38.1-mm-) wide face connected to flanges by double-slotted or expanded-metal legs (webs).
3. Single- or Double-Leg Configuration: Asymmetric-shaped channel with face connected to a single flange by a single-slotted leg (web) or hat-shaped channel, with 1-1/2-inch- (38.1-mm-) wide face connected to flanges by double-slotted or expanded-metal legs (webs).

I. Z-Furring Members: Manufacturer's standard Z-shaped furring members with slotted or nonslotted web, fabricated from steel sheet complying with ASTM A 653 (ASTM A 653M) or ASTM A 568 (ASTM A 568M); with a minimum base metal (uncoated) thickness of 0.0179 inch (0.45 mm), face flange of 1-1/4 inch (31.8 mm), wall-attachment flange of 7/8 inch (22.2 mm), and of depth required to fit insulation thickness indicated.

J. Steel Channel Bridging: Cold-rolled steel, 0.0598-inch (1.5-mm) minimum thickness of base (uncoated) metal and 7/16-inch- (11.1-mm-) wide flanges, 1-1/2 inches (38.1 mm) deep, 475 lb/1000 feet (45 kg/100 m), unless otherwise indicated.

K. Steel Flat Strap and Backing Plate: Steel sheet for blocking and bracing complying with ASTM A 653 (ASTM A 653M) or ASTM A 568 (ASTM A 568M), length and width as indicated, and with a minimum base metal (uncoated) thickness as follows:

1. Thickness: 0.0179 inch (0.45 mm), unless otherwise indicated.
2. Thickness: 0.027 inch (0.7 mm) where indicated.
3. Thickness: 0.0329 inch (0.84 mm) where indicated.
4. Thickness: 0.0598 inch (1.5 mm) where indicated.
5. Thickness: As indicated.

L. Fasteners for Metal Framing: Provide fasteners of type, material, size, corrosion resistance, holding power, and other properties required to fasten steel framing and furring members securely to substrates involved; complying with the recommendations of gypsum board manufacturers for applications indicated.

2.4 GYPSUM BOARD PRODUCTS

A. General: Provide gypsum board of types indicated in maximum lengths available that will minimize end-to-end butt joints in each area indicated to receive gypsum board application.

1. Widths: Provide gypsum board in widths of 48 inches (1219 mm).

B. Gypsum Wallboard: ASTM C 36 and as follows:

1. Type: Regular for vertical surfaces, unless otherwise indicated.
2. Type: Foil backed where indicated.
3. Type: Type X where required for fire-resistance-rated assemblies.
4. Type: Sag-resistant type for ceiling surfaces.
5. Type: Proprietary type as required for specific fire-resistance-rated assemblies.
6. Edges: Tapered.
7. Edges: Tapered and featured (rounded or beveled) for prefilling.
8. Thickness: 1/2 inch (12.7 mm), unless otherwise indicated.
9. Thickness: 5/8 inch (15.9 mm) where indicated.
10. Thickness: 3/4 inch (19.1 mm) where indicated for proprietary-type gypsum panels.
11. Thickness: As indicated.

C. Gypsum Board Base Layer(s) for Multilayer Applications: Gypsum wallboard, ASTM C 36, and as follows:

1. Type: Regular for vertical surfaces, unless otherwise indicated.
2. Type: Foil backed where indicated.
3. Type: Type X where indicated or required for fire-resistance-rated assemblies.
4. Type: Sag-resistant type for ceiling surfaces, unless otherwise indicated.
5. Type: Proprietary type matching that indicated for face layer and as required for specific fire-resistance-rated assemblies.
6. Edges: Manufacturer's standard.
7. Edges: Square, nontapered.
8. Thickness: 1/2 inch (12.7 mm), unless otherwise indicated.
9. Thickness: 5/8 inch (15.9 mm) where indicated.
10. Thickness: As indicated.

D. Exterior Gypsum Soffit Board: ASTM C 931, with manufacturer's standard edges, of type and thickness indicated below:

1. Type: Regular, unless otherwise indicated.
2. Type: Type X where required for fire-resistance-rated assemblies and where indicated.
3. Thickness: 5/8 inch (15.9 mm), unless otherwise indicated.
4. Thickness: 1/2 inch (12.7 mm), unless otherwise indicated.

E. Water-Resistant Gypsum Backing Board: ASTM C 630 and as follows:

1. Type: Regular, unless otherwise indicated.
2. Type: Type X where required for fire-resistance-rated assemblies and where indicated.
3. Thickness: 5/8 inch (15.9 mm), unless otherwise indicated.
4. Thickness: 1/2 inch (12.7 mm) where indicated.

5. Thickness: As indicated.

F. Glass-Mat, Water-Resistant Gypsum Backing Board: ASTM C 1178, of type and thickness indicated below:

1. Type and Thickness: Regular, 1/2 inch (12.7 mm) thick, unless otherwise indicated.
2. Type and Thickness: Type X, 5/8 inch (15.9 mm) thick, where required for fire-resistance-rated assemblies and where indicated.
3. Available Product: Subject to compliance with requirements, a product that may be incorporated in the Work includes, but is not limited to, "Dens-Shield Tile Backer" manufactured by Georgia-Pacific Corp.
4. Products: Subject to compliance with requirements, provide "Dens-Shield Tile Backer" manufactured by Georgia-Pacific Corp.

2.5 CEMENTITIOUS BACKER UNITS

A. Provide cementitious backer units complying with ANSI A118.9, of thickness and width indicated below, and in maximum lengths available to minimize end-to-end butt joints.

1. Thickness: 7/16 inch (11.1 mm), unless otherwise indicated.
2. Thickness: 1/2 inch (12.7 mm), unless otherwise indicated.
3. Thickness: Manufacturer's standard thickness, but not less than 7/16 inch (11.1 mm), unless otherwise indicated.
4. Thickness: 5/8 inch (15.9 mm), where indicated.
5. Thickness: As indicated.
6. Width: 32 inches (813 mm).
7. Width: 800 mm.
8. Width: 36 inches (915 mm).
9. Width: 900 mm.
10. Width: 48 inches (1219 mm).
11. Width: 1200 mm.
12. Width: Manufacturer's standard width, but not less than 32 inches (813 mm).
13. Width: Manufacturer's standard width, but not less than 800 mm.

B. Available Products: Subject to compliance with requirements, cementitious backer units that may be incorporated in the Work include, but are not limited to, the following:

C. n/a

1. The Original Wonderboard; Custom Building Products.
2. Wonderboard Multi+Board; Custom Building Products.
3. DomCrete Cementitious Tile-Backer Board; Domtar Gypsum.
4. Util-A-Crete Concrete Backer Board; FinPan, Inc.
5. DUROCK Cement Board; United States Gypsum Co.

2.6 TRIM ACCESSORIES

A. Accessories for Interior Installation: Cornerbead, edge trim, and control joints complying with ASTM C 1047 and requirements indicated below:

1. Material: Formed metal or plastic, with metal complying with the following requirement:

a. Steel sheet zinc coated by hot-dip process or rolled zinc.
b. Steel sheet zinc coated by hot-dip or electrolytic process, or steel sheet coated with aluminum or rolled zinc.

2. Shapes indicated below by reference to Fig. 1 designations in ASTM C 1047:

a. Cornerbead on outside corners, unless otherwise indicated.
b. LC-bead with both face and back flanges; face flange formed to receive joint compound. Use LC-beads for edge trim, unless otherwise indicated.
c. L-bead with face flange only; face flange formed to receive joint compound. Use L-bead where indicated.
d. U-bead with face and back flanges; face flange formed to be left without application of joint compound. Use U-bead where indicated.
e. One-piece control joint formed with V-shaped slot and removable strip covering slot opening.

B. n/a

C. n/a

D. n/a

2.7 JOINT TREATMENT MATERIALS

A. General: Provide joint treatment materials complying with ASTM C 475 and the recommendations of both the manufacturers of sheet products and of joint treatment materials for each application indicated.

B. Joint Tape for Gypsum Board: Paper reinforcing tape, unless otherwise indicated.

1. Use pressure-sensitive or staple-attached, open-weave, glass-fiber reinforcing tape with compatible joint compound where recommended by manufacturer of gypsum board and joint treatment materials for application indicated.

C. Joint Tape for Cementitious Backer Units: As recommended by cementitious backer unit manufacturer.

D. Setting-Type Joint Compounds for Gypsum Board: Factory-packaged, job-mixed, chemical-hardening powder products formulated for uses indicated.

1. Where setting-type joint compounds are indicated as a taping compound only or for

taping and filling only, use formulation that is compatible with other joint compounds applied over it.

2. For prefilling gypsum board joints, use formulation recommended by gypsum board manufacturer.
3. For filling joints and treating fasteners of water-resistant gypsum backing board behind base for ceramic tile, use formulation recommended by gypsum board manufacturer.
4. For topping compound, use sandable formulation.

E. Drying-Type Joint Compounds for Gypsum Board: Factory-packaged vinyl-based products complying with the following requirements for formulation and intended use.

1. Ready-Mixed Formulation: Factory-mixed product.

a. Taping compound formulated for embedding tape and for first coat over fasteners and face flanges of trim accessories.
b. Topping compound formulated for fill (second) and finish (third) coats.
c. All-purpose compound formulated for both taping and topping compounds.

2. n/a

F. Joint Compound for Cementitious Backer Units: Material recommended by cementitious backer unit manufacturer.

2.8 ACOUSTICAL SEALANT

A. Acoustical Sealant for Exposed and Concealed Joints: Manufacturer's standard nonsag, paintable, nonstaining latex sealant complying with ASTM C 834 and the following requirements:

1. Product is effective in reducing airborne sound transmission through perimeter joints and openings in building construction as demonstrated by testing representative assemblies according to ASTM E 90.

B. Acoustical Sealant for Concealed Joints: Manufacturer's standard nondrying, nonhardening, nonskinning, nonstaining, gunnable, synthetic-rubber sealant recommended for sealing interior concealed joints to reduce transmission of airborne sound.

C. Available Products: Subject to compliance with requirements, acoustical sealants that may be incorporated in the Work include, but are not limited to, the following:

D. n/a

1. Acoustical Sealant for Exposed and Concealed Joints:

a. PL Acoustical Sealant; ChemRex, Inc.; Contech Brands.
b. AC-20 FTR Acoustical and Insulation Sealant; Pecora Corp.

c. SHEETROCK Acoustical Sealant; United States Gypsum Co.

2. Acoustical Sealant for Concealed Joints:

a. BA-98; Pecora Corp.
b. Tremco Acoustical Sealant; Tremco, Inc.

2.9 MISCELLANEOUS MATERIALS

A. General: Provide auxiliary materials for gypsum board construction that comply with referenced standards and recommendations of gypsum board manufacturer.

B. Laminating Adhesive: Special adhesive or joint compound recommended for laminating gypsum panels.

C. Spot Grout: ASTM C 475, setting-type joint compound recommended for spot-grouting hollow metal door frames.

D. Fastening Adhesive for Wood: ASTM C 557.

E. Fastening Adhesive for Metal: Special adhesive recommended for laminating gypsum panels to steel framing.

F. Steel drill screws complying with ASTM C 1002 for the following applications:

1. Fastening gypsum board to steel members less than 0.033 inch (0.84 mm) thick.
2. Fastening gypsum board to wood members.
3. Fastening gypsum board to gypsum board.

G. Steel drill screws complying with ASTM C 954 for fastening gypsum board to steel members from 0.033 to 0.112 inch (0.84 to 2.84 mm) thick.

H. Steel drill screws of size and type recommended by unit manufacturer for fastening cementitious backer units.

I. Gypsum Board Nails: ASTM C 514.

J. Asphalt-Saturated Organic Felt: ASTM D 226, Type I (No. 15 asphalt felt), nonperforated.

K. Foam Gaskets: Closed-cell vinyl foam adhesive-backed strips that allow fastener penetration without foam displacement, 1/8 inch (3.2 mm) thick, in width to suit metal stud size indicated.

L. Sound-Attenuation Blankets: Unfaced mineral-fiber blanket insulation produced by combining mineral fibers of type described below with thermosetting resins to comply with ASTM C 665 for Type I (blankets without membrane facing).

1. Mineral-Fiber Type: Fibers manufactured from glass, slag wool, or rock wool.

M. Thermal Insulation: Material indicated below, of thickness and width to fill voids formed by Z-furring members:

1. Unfaced Mineral-Fiber Blanket Insulation: Unfaced mineral-fiber blanket insulation produced by combining mineral fibers of type described below with thermosetting resins to comply with ASTM C 665 for Type I (blankets without membrane facing).

a. Mineral-Fiber Type: Fibers manufactured from glass, slag wool, or rock wool.

2. Extruded-Polystyrene Board Insulation: Rigid, cellular, polystyrene thermal insulation formed from a polystyrene base resin by an extrusion process using hydrochlorofluorocarbons as the blowing agent to comply with ASTM C 578 for Type IV, and with the following surface-burning characteristics:

a. Flame-spread and smoke-developed ratings of 75 and 450, respectively, according to ASTM E 84.

N. Polyethylene Vapor Retarder: ASTM D 4397, thickness and maximum permeance rating as follows:

1. 4 mils (0.1 mm), 0.19 perms (10.9 ng/Pa x s x sq. m).
2. 6 mils (0.15 mm), 0.13 perms (7.5 ng/Pa x s x sq. m).

O. Vapor Retarder Tape: Pressure-sensitive tape of type recommended by vapor retarder manufacturer for sealing joints and penetrations in vapor retarder.

2.10 n/a

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates to which gypsum board assemblies attach or abut, installed hollow metal frames, cast-in-anchors, and structural framing, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of assemblies specified in this Section. Do not proceed with installation until unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Ceiling Anchorages: Coordinate installation of ceiling suspension systems with installation of overhead structural assemblies to ensure that inserts and other provisions for anchorages to building structure have been installed to receive ceiling hangers that will develop their full strength and at spacing required to support ceilings.

1. Furnish concrete inserts and other devices indicated to other trades for installation well in advance of time needed for coordination with other construction.

B. Before sprayed-on fireproofing is applied, attach offset anchor plates or ceiling runners (tracks) to surfaces indicated to receive sprayed-on fireproofing. Where offset anchor plates are required, provide continuous units fastened to building structure not more than 24 inches (600 mm) o.c.

C. After sprayed-on fireproofing has been applied, remove only as much fireproofing as needed to complete installation of gypsum board assemblies without reducing thickness of fireproofing below that is required to obtain fire-resistance rating indicated. Protect remaining fireproofing from damage.

3.3 INSTALLING STEEL FRAMING, GENERAL

A. Steel Framing Installation Standard: Install steel framing to comply with ASTM C 754 and with ASTM C 840 requirements that apply to framing installation.

B. Install supplementary framing, blocking, and bracing at terminations in gypsum board assemblies to support fixtures, equipment services, heavy trim, grab bars, toilet accessories, furnishings, or similar construction. Comply with details indicated and with recommendations of gypsum board manufacturer or, if none available, with United States Gypsum Co.'s "Gypsum Construction Handbook."

C. Isolate steel framing from building structure at locations indicated to prevent transfer of loading imposed by structural movement. Comply with details shown on Drawings.

1. Where building structure abuts ceiling perimeter or penetrates ceiling.
2. Where partition framing and wall furring abut structure, except at floor.

a. Provide slip- or cushioned-type joints as detailed to attain lateral support and avoid axial loading.
b. Install deflection track top runner to attain lateral support and avoid axial loading.
c. Install deflection and firestop track top runner at fire-resistance-rated assemblies where indicated.

1) Attach jamb studs at openings to tracks using manufacturer's standard stud clip.

D. Do not bridge building control and expansion joints with steel framing or furring members. Independently frame both sides of joints with framing or furring members as indicated.

3.4 INSTALLING STEEL FRAMING FOR SUSPENDED AND FURRED CEILINGS

A. Screw furring members to wood framing.

B. Suspend ceiling hangers from building structural members and as follows:

1. Install hangers plumb and free from contact with insulation or other objects within ceiling plenum that are not part of supporting structural or ceiling suspension system. Splay hangers only where required to miss obstructions and offset resulting horizontal forces by bracing, countersplaying, or other equally effective means.
2. Where width of ducts and other construction within ceiling plenum produces hanger spacings that interfere with the location of hangers required to support standard suspension system members, install supplemental suspension members and hangers in form of trapezes or equivalent devices. Size supplemental suspension members and hangers to support ceiling loads within performance limits established by referenced standards.
3. Secure wire hangers by looping and wire-tying, either directly to structures or to inserts, eyescrews, or other devices and fasteners that are secure and appropriate for substrate, and in a manner that will not cause them to deteriorate or otherwise fail.
4. Secure flat, angle, and rod hangers to structure, including intermediate framing members, by attaching to inserts, eyescrews, or other devices and fasteners that are secure and appropriate for structure as well as for type of hanger involved, and in a manner that will not cause them to deteriorate or otherwise fail.
5. Do not support ceilings directly from permanent metal forms. Furnish cast-in-place hanger inserts that extend through forms.
6. Do not attach hangers to steel deck tabs.
7. Do not attach hangers to steel roof deck. Attach hangers to structural members.
8. Do not connect or suspend steel framing from ducts, pipes, or conduit.

C. Sway-brace suspended steel framing with hangers used for support.

D. Install suspended steel framing components in sizes and at spacings indicated, but not less than that required by the referenced steel framing installation standard.

1. Wire Hangers: 48 inches (1219 mm) o.c.
2. Carrying Channels (Main Runners): 48 inches (1219 mm) o.c.
3. Furring Channels (Furring Members): 16 inches (406 mm) o.c.

E. Installation Tolerances: Install steel framing components for suspended ceilings so that cross-furring or grid suspension members are level to within 1/8 inch in 12 feet (3 mm in 3.6 m) as measured both lengthwise on each member and transversely between parallel members.

F. Wire-tie or clip furring members to main runners and to other structural supports as indicated.

G. Grid Suspension System: Attach perimeter wall track or angle where grid suspension system meets vertical surfaces. Mechanically join main beam and cross-furring members to each other and butt-cut to fit into wall track.

H. For exterior soffits, install cross-bracing and additional framing to resist wind uplift according to details on Drawings.

3.5 INSTALLING STEEL FRAMING FOR WALLS AND PARTITIONS

A. Install runners (tracks) at floors, ceilings, and structural walls and columns where gypsum board stud assemblies abut other construction.

1. Where studs are installed directly against exterior walls, install asphalt felt strips or foam gaskets between studs and wall.

B. Installation Tolerances: Install each steel framing and furring member so that fastening surfaces do not vary more than 1/8 inch (3 mm) from the plane formed by the faces of adjacent framing.

C. Extend partition framing full height to structural supports or substrates above suspended ceilings, except where partitions are indicated to terminate at suspended ceilings. Continue framing over frames for doors and openings and frame around ducts penetrating partitions above ceiling to provide support for gypsum board.

1. Cut studs 1/2 inch (13 mm) short of full height to provide perimeter relief.
2. For STC-rated and fire-resistance-rated partitions that extend to the underside of floor/roof slabs and decks or other continuous solid structural surfaces to obtain ratings, install framing around structural and other members extending below floor/roof slabs and decks, as needed, to support gypsum board closures needed to make partitions continuous from floor to underside of solid structure.

D. Terminate partition framing at suspended ceilings where indicated.

E. Install steel studs and furring in sizes and at spacings indicated.

1. Single-Layer Construction: Space studs 16 inches (406 mm) o.c., unless otherwise indicated.

F. Install steel studs so flanges point in the same direction and leading edge or end of each gypsum board panel can be attached to open (unsupported) edges of stud flanges first.

G. n/a

H. Frame door openings to comply with GA-219, and with applicable published recommendations of gypsum board manufacturer, unless otherwise indicated. Attach vertical studs at jambs with screws either directly to frames or to jamb anchor clips on door frames; install runner track section (for cripple studs) at head and secure to jamb studs.

1. Install 2 studs at each jamb, unless otherwise indicated.
2. Install cripple studs at head adjacent to each jamb stud, with a minimum 1/2-inch (12.7-mm) clearance from jamb stud to allow for installation of control joint.
3. Extend jamb studs through suspended ceilings and attach to underside of floor or roof structure above.

I. Frame openings other than door openings to comply with details indicated or, if none indicated, as required for door openings. Install framing below sills of openings to match framing required above door heads.

J. Install thermal insulation as follows:

1. Erect insulation vertically and hold in place with Z-furring members spaced 24 inches (610 mm) o.c.
2. Erect insulation vertically and hold in place with Z-furring members spaced 600 mm o.c.
3. Except at exterior corners, securely attach narrow flanges of furring members to wall with concrete stub nails, screws designed for masonry attachment, or powder-driven fasteners spaced 24 inches (600 mm) o.c.
4. At exterior corners, attach wide flange of furring members to wall with short flange extending beyond corner; on adjacent wall surface, screw attach short flange of furring channel to web of attached channel. Start from this furring channel with standard width insulation panel and continue in regular manner. At interior corners, space second member no more than 12 inches (300 mm) from corner and cut insulation to fit.
5. Until gypsum board is installed, hold insulation in place with 10-inch (250-mm) staples fabricated from 0.0625-inch (1.6-mm) diameter tie wire and inserted through slot in web of member.

K. Install polyethylene vapor retarder where indicated to comply with the following requirements:

1. Extend vapor retarder to extremities of areas to be protected from vapor transmission. Secure in place with mechanical fasteners or adhesives. Extend vapor retarder to cover miscellaneous voids in insulated substrates, including those filled with loose mineral-fiber insulation.
2. Seal vertical joints in vapor retarders over framing by lapping not less than 2 wall studs. Fasten vapor retarders to framing at top, end, and bottom edges, at perimeter of wall openings, and at lap joints; space fasteners 16 inches (400 mm) o.c.
3. Seal joints in vapor retarders caused by pipes, conduits, electrical boxes, and similar items penetrating vapor retarders with vapor retarder tape.
4. Repair any tears or punctures in vapor retarder immediately before concealing it with the installation of gypsum board or other construction.

3.6 APPLYING AND FINISHING GYPSUM BOARD, GENERAL

A. Gypsum Board Application and Finishing Standards: Install and finish gypsum panels to comply with ASTM C 840 and GA-216.

B. Install sound-attenuation blankets, where indicated, prior to installing gypsum panels unless blankets are readily installed after panels have been installed on one side.

C. Install ceiling board panels across framing to minimize the number of abutting end joints and to avoid abutting end joints in the central area of each ceiling. Stagger abutting end joints of adjacent panels not less than one framing member.

D. Install gypsum panels with face side out. Do not install imperfect, damaged, or damp panels. Butt panels together for a light contact at edges and ends with not more than 1/16 inch (1.5 mm) of open space between panels. Do not force into place.

E. Locate both edge or end joints over supports, except in ceiling applications where intermediate supports or gypsum board back-blocking is provided behind end joints. Do not place tapered edges against cut edges or ends. Stagger vertical joints on opposite sides of partitions. Avoid joints other than control joints at corners of framed openings where possible.

F. Attach gypsum panels to steel studs so leading edge or end of each panel is attached to open (unsupported) edges of stud flanges first.

G. Attach gypsum panels to framing provided at openings and cutouts.

H. Do not attach gypsum panels across the flat grain of wide-dimension lumber, including floor joists and headers. Instead, float gypsum panels over these members using resilient channels or provide control joints to counteract wood shrinkage.

I. Spot grout hollow metal door frames for solid-core wood doors, hollow metal doors, and doors over 32 inches (813 mm) wide. Apply spot grout at each jamb anchor clip and immediately insert gypsum panels into frames.

J. Form control and expansion joints at locations indicated and as detailed, with space between edges of adjoining gypsum panels, as well as supporting framing behind gypsum panels.

K. Cover both faces of steel stud partition framing with gypsum panels in concealed spaces (above ceilings, etc.), except in chases that are braced internally.

1. Except where concealed application is indicated or required for sound, fire, air, or smoke ratings, coverage may be accomplished with scraps of not less than 8 sq. ft. (0.7 sq. m) in area.
2. Fit gypsum panels around ducts, pipes, and conduits.
3. Where partitions intersect open concrete coffers, concrete joists, and other structural members projecting below underside of floor/roof slabs and decks, cut gypsum panels to fit profile formed by coffers, joists, and other structural members; allow 1/4- to 3/8-inch- (6.4- to 9.5-mm-) wide joints to install sealant.

L. Isolate perimeter of nonload-bearing gypsum board partitions at structural abutments, except floors, as detailed. Provide 1/4- to 1/2-inch- (6.4- to 12.7-mm-) wide spaces at these locations and trim edges with U-bead edge trim where edges of gypsum panels are exposed. Seal joints between edges and abutting structural surfaces with acoustical sealant.

M. Floating Construction: Where feasible, including where recommended by manufacturer, install gypsum panels over wood framing, with floating internal corner construction.

N. Where STC-rated gypsum board assemblies are indicated, seal construction at perimeters, behind control and expansion joints, openings, and penetrations with a continuous bead of acoustical sealant including a bead at both faces of the partitions. Comply with ASTM C 919 and manufacturer's recommendations for location of edge trim and closing off sound-flanking paths around or through gypsum board assemblies, including sealing partitions above acoustical ceilings.

O. Space fasteners in gypsum panels according to referenced gypsum board application and finishing standard and manufacturer's recommendations.

1. Space screws a maximum of 12 inches (304.8 mm) o.c. for vertical applications.

P. Space fasteners in panels that are tile substrates a maximum of 8 inches (203.2 mm) o.c.

3.7 GYPSUM BOARD APPLICATION METHODS

A. Single-Layer Application: Install gypsum wallboard panels as follows:

1. On ceilings, apply gypsum panels prior to wall/partition board application to the greatest extent possible and at right angles to framing, unless otherwise indicated.
2. On partitions/walls, apply gypsum panels vertically (parallel to framing), unless otherwise indicated, and provide panel lengths that will minimize end joints.
3. On partitions/walls, apply gypsum panels horizontally (perpendicular to framing), unless parallel application is required for fire-resistance-rated assemblies. Use maximum-length panels to minimize end joints.

    a. Stagger abutting end joints not less than one framing member in alternate courses of board.
    b. At stairwells and other high walls, install panels horizontally.

4. On Z-furring members, apply gypsum panels vertically (parallel to framing) with no end joints. Locate edge joints over furring members.

B. Wall Tile Substrates: For substrates indicated to receive thin-set ceramic tile and similar rigid applied wall finishes, comply with the following:

1. Install cementitious backer units to comply with ANSI A108.11 at showers, tubs, and where indicated.

2. Install cementitious backer units to comply with ANSI A108.11 at locations indicated to receive wall tile.
3. Install glass-mat, water-resistant gypsum backing board panels to comply with manufacturer's installation instructions at showers, tubs, and where indicated. Install with 1/4-inch (6.4-mm) open space where panels abut other construction or penetrations.
4. Install glass-mat, water-resistant gypsum backing board panels to comply with manufacturer's installation instructions at locations indicated to receive wall tile. Install with 1/4-inch (6.4-mm) open space where panels abut other construction or penetrations.
5. Install water-resistant gypsum backing board panels at showers, tubs, and where indicated. Install with 1/4-inch (6.4-mm) open space where panels abut other construction or penetrations.
6. Install gypsum wallboard panels with tapered edges taped and finished to produce a flat surface except at showers, tubs, and other locations indicated to receive water-resistant panels.

C. Multilayer Application on Ceilings: Apply gypsum board indicated for base layers prior to applying base layers on walls/partitions; apply gypsum wallboard face layers in same sequence. Offset face-layer joints one framing member, 16 inches (400 mm) minimum, from parallel base-layer joints. Apply base layers at right angles to framing members, unless otherwise indicated.

D. Multilayer Application on Partitions/Walls: Apply gypsum board indicated for base layers and gypsum wallboard face layers vertically (parallel to framing) with joints of base layers located over stud or furring member and face-layer joints offset at least one stud or furring member with base-layer joints. Stagger joints on opposite sides of partitions.

1. On Z-furring members, apply base layer vertically (parallel to framing) and face layer either vertically (parallel to framing) or horizontally (perpendicular to framing) with vertical joints offset at least one furring member. Locate edge joints of base layer over furring members.

E. Acoustical Tile Base: Where gypsum panels form the base for adhesively applied acoustical tile, install gypsum wallboard panels with tapered edges taped and finished to produce a flat surface.

F. Single-Layer Fastening Methods: Apply gypsum panels to supports as follows:

1. Fasten with screws.
2. n/a
3. n/a
4. n/a

G. Multilayer Fastening Methods: Apply base layers of gypsum panels and face layer to base layers as follows:

1. Fasten both base layers and face layers separately to supports with screws.

2. n/a
3. n/a

H. Direct-Bonding to Substrate: Where gypsum panels are indicated as directly adhered to a substrate (other than studs, joists, furring members, or base layer of gypsum board), comply with gypsum board manufacturer's recommendations, and temporarily brace or fasten gypsum panels until fastening adhesive has set.

I. Exterior Soffits and Ceilings: Apply exterior gypsum soffit board panels perpendicular to supports, with end joints staggered over supports.

1. n/a
2. Fasten with corrosion-resistant screws.

J. n/a

3.8 INSTALLING TRIM ACCESSORIES

A. General: For trim accessories with back flanges, fasten to framing with the same fasteners used to fasten gypsum board. Otherwise, fasten trim accessories according to accessory manufacturer's directions for type, length, and spacing of fasteners.

B. Install cornerbead at external corners.
C. Install edge trim where edge of gypsum panels would otherwise be exposed. Provide edge trim type with face flange formed to receive joint compound, except where other types are indicated.

1. n/a
2. Install L-bead where edge trim can only be installed after gypsum panels are installed.
3. n/a
4. n/a

D. Install control joints at locations indicated.

E. Install control joints according to ASTM C 840 and manufacturer's recommendations and in specific locations approved by Architect for visual effect.

3.9 FINISHING GYPSUM BOARD ASSEMBLIES

A. General: Treat gypsum board joints, interior angles, flanges of cornerbead, edge trim, control joints, penetrations, fastener heads, surface defects, and elsewhere as required to prepare gypsum board surfaces for decoration.

B. Prefill open joints, rounded or beveled edges, and damaged areas using setting-type joint compound.

C. Apply joint tape over gypsum board joints, except those with trim accessories having

flanges not requiring tape.

D. Apply joint tape over gypsum board joints and to flanges of trim accessories as recommended by trim accessory manufacturer.

E. Levels of Gypsum Board Finish: Provide the following levels of gypsum board finish per GA-214.

1. Level 1 for ceiling plenum areas, concealed areas, and where indicated, unless a higher level of finish is required for fire-resistance-rated assemblies and sound-rated assemblies.
2. Level 2 where panels form substrates for tile and where indicated.
3. Level 2 for gypsum board where indicated.
4. Level 3 for gypsum board where indicated.
5. Level 4 for gypsum board surfaces, unless otherwise indicated.
6. Level 5 for gypsum board surfaces where indicated.

F. Use one of the following joint compound combinations as applicable to the finish levels specified:

G. Use the following joint compound combination as applicable to the finish levels specified:

1. n/a
2. n/a
3. Embedding and First Coat: Ready-mixed, drying-type, all-purpose or taping compound. Fill (Second) Coat: Ready-mixed, drying-type, all-purpose or topping compound. Finish (Third) Coat: Ready-mixed, drying-type, all-purpose or topping compound.
4. n/a
5. n/a
6. Embedding and First Coat: Setting-type compound. Fill (Second) Coat: Setting-type compound. Finish (Third) Coat: Job-mixed, drying-type, all-purpose compound.

H. Where Level 5 gypsum board finish is indicated, embed tape in joint compound and apply first, fill (second), and finish (third) coats of joint compound over joints, angles, fastener heads, and accessories; and apply a thin, uniform skim coat of joint compound over entire surface. For skim coat, use joint compound specified for third coat, or a product specially formulated for this purpose and acceptable to gypsum board manufacturer. Touch up and sand between coats and after last coat as needed to produce a surface free of visual defects, tool marks, and ridges and ready for decoration.

I. For Level 4 gypsum board finish, embed tape in joint compound and apply first, fill (second), and finish (third) coats of joint compound over joints, angles, fastener heads, and accessories. Touch up and sand between coats and after last coat as needed to produce a surface free of visual defects and ready for decoration.

J. Where Level 3 gypsum board finish is indicated, embed tape in joint compound and

apply first and fill (second) coats of joint compound.

K. Where Level 2 gypsum board finish is indicated, embed tape in joint compound and apply first coat of joint compound.

L. Where Level 1 gypsum board finish is indicated, embed tape in joint compound.

M. Finish exterior gypsum soffit board using setting-type joint compounds to prefill joints and embed tape, and for first, fill (second), and finish (third) coats, with the last coat being a sandable product. Smooth each coat before joint compound hardens to minimize need for sanding. Sand between coats and after finish coat.

1. Painting exterior gypsum soffit board after finish coat has dried is specified in another Division 9 Section.

N. Base for Acoustical Tile: Where gypsum board is indicated as a base for adhesively applied acoustical tile, install joint tape and a 2-coat compound treatment, without sanding.

O. Finish water-resistant gypsum backing board forming base for ceramic tile to comply with ASTM C 840 and gypsum board manufacturer's directions for treatment of joints behind tile.

P. Finish glass-mat, water-resistant gypsum backing board to comply with gypsum board manufacturer's directions.

Q. Finish cementitious backer units to comply with unit manufacturer's directions.

3.10 n/a

3.11 FIELD QUALITY CONTROL

A. Above-Ceiling Observation: Architect will conduct an above-ceiling observation prior to installation of gypsum board ceilings and report any deficiencies in the Work observed. Do not proceed with installation of gypsum board to ceiling support framing until deficiencies have been corrected.

1. Notify Architect one week in advance of the date and the time when the Project, or part of the Project, will be ready for an above-ceiling observation.
2. Prior to notifying Architect, complete the following in areas to receive gypsum board ceilings:

a. Installation of 80 percent of lighting fixtures, powered for operation.
b. Installation, insulation, and leak and pressure testing of water piping systems.
c. Installation of air duct systems.
d. Installation of air devices.
e. Installation of mechanical system control air tubing.
f. Installation of ceiling support framing.

3.12 CLEANING AND PROTECTION

A. Promptly remove any residual joint compound from adjacent surfaces.

B. Provide final protection and maintain conditions, in a manner acceptable to Installer, that ensure gypsum board assemblies are without damage or deterioration at the time of Substantial Completion.

END OF SECTION

SECTION 093000 - TILING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Ceramic tile.
2. Stone thresholds.
3. Waterproof membrane.
4. Crack isolation membrane.
5. Tile backing panels.
6. Metal edge strips.
7. Cementitous back units

B. Related Sections:
1. Division 07 Section "Joint Sealants" for sealing of expansion, contraction, control, and isolation joints in tile surfaces.
2. Division 09 Section "Gypsum Board" for cementitious backer units Durabacker or Permabase ½" thick or 5/8" thick to match drywall thickness.

1.3 DEFINITIONS

A. General: Definitions in the ANSI A108 series of tile installation standards and in ANSI A137.1 apply to Work of this Section unless otherwise specified.

B. ANSI A108 Series: ANSI A108.01, ANSI A108.02, ANSI A108.1A, ANSI A108.1B, ANSI A108.1C, ANSI A108.4, ANSI A108.5, ANSI A108.6, ANSI A108.8, ANSI A108.9, ANSI A108.10, ANSI A108.11, ANSI A108.12, ANSI A108.13, ANSI A108.14, ANSI A108.15, ANSI A108.16, and ANSI A108.17, which are contained in "American National Standard Specifications for Installation of Ceramic Tile."

C. Module Size: Actual tile size plus joint width indicated.

D. Face Size: Actual tile size, excluding spacer lugs.

1.4 PERFORMANCE REQUIREMENTS

A. Static Coefficient of Friction: For tile installed on walkway surfaces, provide products with the following values as determined by testing identical products per ASTM C 1028:

1. Level Surfaces: Minimum .60 wet

1.5 SUBMITTALS

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

B. Shop Drawings: Show locations of each type of tile and tile pattern. Show widths, details, and locations of expansion, contraction, control, and isolation joints in tile substrates and finished tile surfaces.

C. Samples for Verification:

1. Full-size units of each type and composition of tile and for each color and finish required. For ceramic mosaic tile in color blend patterns, provide full sheets of each color blend.
2. Assembled samples mounted on a rigid panel, with grouted joints, for each type and composition of tile and for each color and finish required. Make samples at least 12 inches (300 mm) square, but not fewer than 4 tiles. Use grout of type and in color or colors approved for completed Work.
3. Full-size units of each type of trim and accessory for each color and finish required.
4. Stone thresholds in 6-inch (150-mm) lengths.
5. Metal edge strips in 6-inch (150-mm) lengths.

D. Qualification Data: For qualified Installer.

E. Material Test Reports: For each tile-setting and -grouting product and special purpose tile.

1.6 QUALITY ASSURANCE

A. Source Limitations for Tile: Obtain tile of each type and color or finish from one source or producer.

1. Obtain tile of each type and color or finish from same production run and of consistent quality in appearance and physical properties for each contiguous area.

B. Source Limitations for Setting and Grouting Materials: Obtain ingredients of a uniform quality for each mortar, adhesive, and grout component from one manufacturer and each aggregate from one source or producer.

C. Source Limitations for Other Products: Obtain each of the following products specified in this Section from a single manufacturer for each product:
1. Waterproof membrane.
2. Crack isolation membrane.
3. Joint sealants.
4. Cementitious backer units.
5. Metal edge strips.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Deliver and store packaged materials in original containers with seals unbroken and labels intact until time of use. Comply with requirements in ANSI A137.1 for labeling tile packages.

B. Store tile and cementitious materials on elevated platforms, under cover, and in a dry location.

C. Store aggregates where grading and other required characteristics can be maintained and contamination can be avoided.

D. Store liquid materials in unopened containers and protected from freezing.

E. Handle tile that has temporary protective coating on exposed surfaces to prevent coated surfaces from contacting backs or edges of other units. If coating does contact bonding surfaces of tile, remove coating from bonding surfaces before setting tile.

1.8 PROJECT CONDITIONS

A. Environmental Limitations: Do not install tile until construction in spaces is complete and ambient temperature and humidity conditions are maintained at the levels indicated in referenced standards and manufacturer's written instructions.

1.9 EXTRA MATERIALS

A. Furnish extra materials that match and are from same production runs as products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Tile and Trim Units: Furnish quantity of full-size units equal to 3 percent of amount installed for each type, composition, color, pattern, and size indicated.

2. Grout: Furnish quantity of grout equal to 3 percent of amount installed for each type, composition, and color indicated.

PART 2 - PRODUCTS

2.1 PRODUCTS, GENERAL

A. ANSI Ceramic Tile Standard: Provide tile that complies with ANSI A137.1 for types, compositions, and other characteristics indicated.

B. ANSI Standards for Tile Installation Materials: Provide materials complying with ANSI A108.02, ANSI standards referenced in other Part 2 articles, ANSI standards referenced by TCA installation methods specified in tile installation schedules, and other requirements specified.

C. Factory Blending: For tile exhibiting color variations within ranges, blend tile in factory and package so tile units taken from one package show same range in colors as those taken from other packages and match approved Samples.

D. Mounting: For factory-mounted tile, provide back- or edge-mounted tile assemblies as standard with manufacturer unless otherwise indicated.

1. Where tile is indicated for installation in wet areas, do not use back- or edge-mounted tile assemblies unless tile manufacturer specifies in writing that this type of mounting is suitable for installation indicated and has a record of successful in-service performance.

E. Factory-Applied Temporary Protective Coating: Where indicated under tile type, protect exposed surfaces of tile against adherence of mortar and grout by pre-coating with continuous film of petroleum paraffin wax, applied hot. Do not coat unexposed tile surfaces.

2.2 TILE PRODUCTS

A. Tile Type CT-1 (Flooring) Factory-mounted unglazed ceramic mosaic tile.

1. Basis-of-Design Product: Subject to compliance with requirements, provide Daltile Mosaic Keystones 1"x1" or submit comparable product to architect 7 days prior to bid for architect approval :

2. Composition: Porcelain

3. Module Size: 1 by 1 inch (25.4 by 25.4 mm)
4. Thickness: 1/4 inch (6.35 mm).
5. Face: Pattern of design indicated with chamfered or straight edges.
6. Surface: 25% abrasive admixture, 75% Without Abrasive admixture.
7. Finish: Unglazed surface.
8. Tile Color and Pattern: To be selected by Architect from manufacturer's full range.
9. Grout: Epoxy Grout, color to be selected by architect from manufacturer's full range.

B. Tile Type CT-2 (Wall Base) Ceramic Cove Base .

1. Basis-of-Design Product: Subject to compliance with requirements, provide Daltile Matte Ceramic Tile or submit comparable product to architect 7 days prior to bid for architect approval :

2. Composition: Porcelain

3. Module Size: 4-1/4"x 4-1/4"
4. Thickness: 1/4 inch (6.35 mm).
5. Face: Pattern of design indicated with chamfered or straight edges.
6. Finish: Matte
7. Tile Color and Pattern: To be selected by Architect from manufacturer's full range.
8. Grout: Epoxy Grout, color to be selected by architect from manufacturer's full range, align grout lines with wall tile.

C. Tile Type CT-3 (Wall Tile) Ceramic Wall Tile

1. Basis-of-Design Product: Subject to compliance with requirements, provide Daltile Matte Ceramic Tile or submit comparable product to architect 7 days prior to bid for architect approval :

2. Composition: Porcelain

3. Module Size: 4-1/4" x 4-1/4"
4. Thickness: 1/4 inch (6.35 mm).
5. Face: Pattern of design indicated with chamfered or straight edges.

6. Finish: Matte
7. Tile Color and Pattern: To be selected by Architect from manufacturer's full range.
8. Grout: Epoxy Grout, color to be selected by architect from manufacturer's full range.

D.

1. Substitutions will only be considered up to 5 days prior to the receipt of bids on a case-by-case basis. Refer to section 012500 "substitution procedures" for submittal requirements.
2. Pre-approval will be based on the architect's interpretation of equal or better performance and quality characteristics as well as the degree to which the proposed substitution matches the specified color and finish

2.3 THRESHOLDS

A. General: Fabricate to sizes and profiles indicated or required to provide transition between adjacent floor finishes.

1. Bevel edges at 1:2 slope, with lower edge of bevel aligned with or up to 1/16 inch (1.5 mm) above adjacent floor surface. Finish bevel to match top surface of threshold. Limit height of threshold to 1/2 inch (12.7 mm) or less above adjacent floor surface.

2. Schluter or compatible transition product, submit sample to architect prior to ordering, finish and color to be determined by architect.

2.4 TILE BACKING PANELS

A. Cementitious Backer Units: ANSI A118.9 or ASTM C 1325, in maximum lengths available to minimize end-to-end butt joints.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

a. C-Cure; C-Cure Board 990.
b. Custom Building Products; Wonderboard.
c. FinPan, Inc.; Util-A-Crete Concrete Backer Board.
d. USG Corporation; DUROCK Cement Board.

2. Thickness: 1/2 inch (12.7 mm)

2.5 WATERPROOFING AND CRACK-SUPPRESSION MEMBRANES FOR THIN-SET TILE INSTALLATIONS

A. General: Manufacturer's standard product that complies with ANSI A118.10, and is recommended by the manufacturer for the application indicated. Include reinforcement and accessories recommended by manufacturer.

2.6 SETTING AND GROUTING MATERIALS

A. Portland Cement Mortar (Thickset) Installation Materials: ANSI A108.02.

1. Cleavage Membrane: Asphalt felt, ASTM D 226, Type I (No. 15); or polyethylene sheeting, ASTM D 4397, 4.0 mils (0.1 mm) thick.

B. Available Manufacturers:
1. Bonsal, W. R., Company.
2. Custom Building Products.
3. LATICRETE International Inc.
4. MAPEI Corporation.
5. Southern Grouts & Mortars, Inc.
6. Summitville Tiles, Inc.

C. Latex-Portland Cement Mortar (Thin Set): ANSI A118.4, consisting of the following:

1. Prepackaged dry-mortar mix containing dry, redispersible, ethylene vinyl acetate additive to which only water must be added at Project site.

a. For wall applications, over cementitious backer units (white) and on all floors. Provide non-sagging mortar that complies with Paragraph F-4.6.1 in addition to the other requirements in ANSI A118.4.

D. Water-Cleanable Epoxy Grout: ANSI A118.3.

1. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated on finish schedule or comparable product by one of the following:

a. Bonsal American; an Oldcastle company.
b. Custom Building Products.
c. Laticrete International, Inc.
d. MAPEI Corporation.
e. Summitville Tiles, Inc.

2. Provide product capable of withstanding continuous and intermittent exposure to temperatures of up to 140 deg F (60 deg C) and 212 deg F (100 deg C), respectively, and certified by manufacturer for intended use.

2.7 ELASTOMERIC SEALANTS

A. General: Provide manufacturer's standard chemically curing, elastomeric sealants of base polymer and characteristics indicated that comply with applicable requirements in Division 7 Section "Joint Sealants."

B. Colors: Provide colors of exposed sealants to match colors of grout in tile adjoining sealed joints, unless otherwise indicated.

C. One-Part, Mildew-Resistant Silicone Sealant: ASTM C 920; Type S; Grade NS; Class 25; Uses NT, G, A, and, as applicable to nonporous joint substrates indicated, O; formulated with fungicide, intended for sealing interior ceramic tile joints and other nonporous substrates that are subject to in-service exposures of high humidity and extreme temperatures.

1. Available Products:

a. Dow Corning Corporation; Dow Corning 786.

b. GE Silicones; Sanitary 1700.
c. Pecora Corporation; Pecora 898 Sanitary Silicone Sealant.
d. Tremco, Inc.; Tremsil 600 White.

D. Multipart, Pourable Urethane Sealant for Use T: ASTM C 920; Type M; Grade P; Class 25; Uses T, M, A, and, as applicable to joint substrates indicated, O.

1. Available Products:

a. Bostik; Chem-Calk 550.
b. Mameco International, Inc.; Vulkem 245.
c. Pecora Corporation; NR-200 Urexpan.
d. Tremco, Inc.; THC-900.

E. Chemical-Resistant Sealants: For chemical-resistant floors, provide chemical-resistant elastomeric sealant of type recommended and produced by chemical-resistant mortar and grout manufacturer for type of application indicated, with proven service record and compatibility with tile and other setting materials, and with chemical resistance equivalent to mortar/grout. Include primer and backer rod recommended by manufacturer.

2.8 MISCELLANEOUS MATERIALS

A. Trowelable Underlayments and Patching Compounds: Latex-modified, portland cement-based formulation provided or approved by manufacturer of tile-setting materials for installations indicated.

B. Metal Edge Strips: Angle or L-shape, height to match tile and setting-bed thickness, metallic or combination of metal and PVC or neoprene base, designed specifically for flooring applications, stainless steel; ASTM A 666, 300 Series exposed-edge material.

C. Temporary Protective Coating: Product indicated below that is formulated to protect exposed surfaces of tile against adherence of mortar and grout; compatible with tile, mortar, and grout products; and easily removable after grouting is completed without damaging grout or tile.

1. Petroleum paraffin wax, fully refined and odorless, containing at least 0.5 percent oil with a melting point of 120 to 140 deg F (49 to 60 deg C) per ASTM D 87.
2. Grout release in form of manufacturer's standard proprietary liquid coating that is specially formulated and recommended for use as temporary protective coating for tile.

D. Tile Cleaner: A neutral cleaner capable of removing soil and residue without harming tile and grout surfaces, specifically approved for materials and installations indicated by tile and grout manufacturers.

E. Grout Sealer: Manufacturer's standard silicone product for sealing grout joints that does not change color or appearance of grout.

1. Available Products:

a. Bonsal, W. R., Company; Grout Sealer.
b. Custom Building Products; Surfaceguard, Grout and Tile, Grout Sealer.
c. MAPEI Corporation; KER 003, Silicone Spray Sealer for Cementitious Tile Grout, 004, Keraseal Penetrating Sealer for Unglazed Grout and Tile.
d. Southern Grouts & Mortars, Inc.; Silicone Grout Sealer.
e. Summitville Tiles, Inc.; SL-15, Invisible Seal Penetrating Grout and Tile Sealer.

2.9 MIXING MORTARS AND GROUT

A. Mix mortars and grouts to comply with referenced standards and mortar and grout manufacturers' written instructions.

B. Add materials, water, and additives in accurate proportions.

C. Obtain and use type of mixing equipment, mixer speeds, mixing containers, mixing time, and other procedures to produce mortars and grouts of uniform quality with optimum performance characteristics for installations indicated.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions where tile will be installed, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of installed tile.

1. Verify that substrates for setting tile are firm; dry; clean; free of oil, waxy films, and curing compounds; and within flatness tolerances required by referenced ANSI A108 Series of tile installation standards for installations indicated.
2. Verify that installation of grounds, anchors, recessed frames, electrical and mechanical units of work, and similar items located in or behind tile has been completed before installing tile.
3. Verify that joints and cracks in tile substrates are coordinated with tile joint locations; if not coordinated, adjust joint locations in consultation with Architect.

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

3.2 PREPARATION

A. Remove coatings, including curing compounds and other substances that contain soap, wax, oil, or silicone, that are incompatible with tile-setting materials.

B. Provide concrete substrates for tile floors installed with adhesives or thin-set mortar that comply with flatness tolerances specified in referenced ANSI A108 Series of tile installation standards.

1. Fill cracks, holes, and depressions with trowelable leveling and patching compound according to tile-setting material manufacturer's written instructions. Use product specifically recommended by tile-setting material manufacturer.
2. Remove protrusions, bumps, and ridges by sanding or grinding.

C. Blending: For tile exhibiting color variations within ranges selected during Sample submittals, verify that tile has been factory blended and packaged so tile units taken from one package show same range of colors as those taken from other packages and match approved Samples. If not factory blended, either return to manufacturer or blend tiles at Project site before installing.

D. Field-Applied Temporary Protective Coating: Where indicated under tile type or needed to prevent grout from staining or adhering to exposed tile surfaces, precoat them with continuous film of temporary protective coating, taking care not to coat unexposed tile surfaces.

3.3 INSTALLATION, GENERAL

A. ANSI Tile Installation Standards: Comply with parts of ANSI A108 Series "Specifications for Installation of Ceramic Tile" that apply to types of setting and grouting materials and to methods indicated in ceramic tile installation schedules.

B. TCA Installation Guidelines: TCA's "Handbook for Ceramic Tile Installation." Comply with TCA installation methods indicated in ceramic tile installation schedules.

C. Extend tile work into recesses and under or behind equipment and fixtures to form complete covering without interruptions, unless otherwise indicated. Terminate work neatly at obstructions, edges, and corners without disrupting pattern or joint alignments.

D. Accurately form intersections and returns. Perform cutting and drilling of tile without marring visible surfaces. Carefully grind cut edges of tile abutting trim, finish, or built-in items for straight aligned joints. Fit tile closely to electrical outlets, piping, fixtures, and other penetrations so plates, collars, or covers overlap tile.

E. Jointing Pattern: Lay tile in grid pattern, unless otherwise indicated. Align joints when adjoining tiles on floor, base, walls, and trim are same size. Lay out tile work and center tile fields in both directions in each space or on each wall area. Adjust to minimize tile cutting. Provide uniform joint widths, unless otherwise indicated.

1. For tile mounted in sheets, make joints between tile sheets same width as joints within tile sheets so joints between sheets are not apparent in finished work.

F. Lay out tile wainscots to next full tile beyond dimensions indicated.

G. Expansion Joints: Locate expansion joints and other sealant-filled joints, including control, contraction, and isolation joints, where indicated during installation of setting materials, mortar beds, and tile. Do not saw-cut joints after installing tiles.

1. Locate joints in tile surfaces directly above joints in concrete substrates.
2. Prepare joints and apply sealants to comply with requirements in Division 7 Section "Joint Sealants."

H. Grout tile to comply with requirements of the following tile installation standards:

1. For ceramic tile grouts (sand-portland cement; dry-set, commercial portland cement; and latex-portland cement grouts), comply with ANSI A108.10.
2. For chemical-resistant epoxy grouts, comply with ANSI A108.6.
3. For chemical-resistant furan grouts, comply with ANSI A108.8.

I. At showers, tubs, and where indicated, install cementitious backer units and treat joints to comply with ANSI A108.11 and manufacturer's written instructions for type of application indicated.

3.4 WATERPROOFING AND CRACK-SUPPRESSION MEMBRANE INSTALLATION

A. Install waterproofing to comply with ANSI A108.13 and waterproofing manufacturer's written instructions to produce waterproof membrane of uniform thickness bonded securely to substrate.

B. Install crack-suppression membrane to comply with manufacturer's written instructions to produce membrane of uniform thickness bonded securely to substrate.

C. Do not install tile over waterproofing until waterproofing has cured and been tested to determine that it is watertight.

3.5 FLOOR TILE INSTALLATION

A. General: Install tile to comply with requirements in the Floor Tile Installation Schedule, including those referencing TCA installation methods and ANSI A108 Series of tile installation standards.

1. For installations indicated below, follow procedures in ANSI A108 Series tile installation standards for providing 95 percent mortar coverage.
   a. Tile floors in wet areas.

B. Joint Widths: Install tile on floors with the following joint widths:

1. Ceramic Mosaic Tile: 1/16 inch (1.6 mm).

C. Stone Thresholds: Install stone thresholds at locations indicated; set in same type of setting bed as abutting field tile, unless otherwise indicated.

1. Set thresholds in latex-portland cement mortar for locations where mortar bed would otherwise be exposed above adjacent nontile floor finish.

D. Metal Edge Strips: Install at locations indicated or where exposed edge of tile flooring meets carpet, wood, or other flooring that finishes flush with top of tile.

E. Grout Sealer: Apply grout sealer to cementitious grout joints according to grout-sealer manufacturer's written instructions. As soon as grout sealer has penetrated grout joints, remove excess sealer and sealer that has gotten on tile faces by wiping with soft cloth.

3.6 WALL TILE INSTALLATION

A. Install types of tile designated for wall installations to comply with requirements in the Wall Tile Installation Schedule, including those referencing TCA installation methods and ANSI setting-bed standards.

B. Joint Widths: Install tile on walls with the following joint widths:

1. Wall Tile: 1/16 inch (1.6 mm).

3.7 CLEANING AND PROTECTING

A. Cleaning: On completion of placement and grouting, clean all ceramic tile surfaces so they are free of foreign matter.

1. Remove epoxy and latex-portland cement grout residue from tile as soon as possible.

2. Clean grout smears and haze from tile according to tile and grout manufacturer's written instructions, but no sooner than 10 days after installation. Use only cleaners recommended by tile and grout manufacturers and only after determining that cleaners are safe to use by testing on samples of tile and other surfaces to be cleaned. Protect metal surfaces and plumbing fixtures from effects of cleaning. Flush surfaces with clean water before and after cleaning.
3. Remove temporary protective coating by method recommended by coating manufacturer that is acceptable to tile and grout manufacturer. Trap and remove coating to prevent it from clogging drains.

B. When recommended by tile manufacturer, apply coat of neutral protective cleaner to completed tile walls and floors. Protect installed tile work with kraft paper or other heavy covering during construction period to prevent staining, damage, and wear.

C. Prohibit foot and wheel traffic from tiled floors for at least seven days after grouting is completed.

D. Before final inspection, remove protective coverings and rinse neutral cleaner from tile surfaces.

END OF SECTION 093000

SECTION 096513 - RESILIENT BASE AND ACCESSORIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Resilient base.
2. Resilient molding accessories.

B. Related Sections:

1. Division 09 Section "Resilient Tile Flooring" for resilient floor tile.

1.3 SUBMITTALS

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

B. Samples for Verification: For each type of product indicated, in manufacturer's standard-size Samples but not less than 12 inches (300 mm) long, of each resilient product color, texture, and pattern required.

C. Product Schedule: For resilient products see Finish Schedule.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Store resilient products and installation materials in dry spaces protected from the weather, with ambient temperatures maintained within range recommended by manufacturer, but not less than 50 deg F (10 deg C) or more than 90 deg F (32 deg C).

1.5 PROJECT CONDITIONS

A. Maintain ambient temperatures within range recommended by manufacturer, but not less than 65 deg F (21 deg C) or more than 95 deg F (35 deg C) in spaces to receive resilient products during the following time periods:

1. 48 hours before installation.
2. During installation.
3. 48 hours after installation.

B. Until Substantial Completion, maintain ambient temperatures within range recommended by manufacturer, but not less than 55 deg F (13 deg C) or more than 95 deg F (35 deg C)

C. Install resilient products after other finishing operations, including painting, have been completed.

1.6 EXTRA MATERIALS

A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Furnish not less than 10 linear feet (3 linear m) for every 500 linear feet (150 linear m) or fraction thereof, of each type, color, pattern, and size of resilient product installed.

PART 2 - PRODUCTS

2.1 RESILIENT BASE (RB)

A. Resilient Base:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. Burke Mercer Flooring Products; Division of Burke Industries, Inc.
b. Johnsonite.
c. Roppe Corporation, USA.
d. Forbo
e. Allstate

B. Resilient Base Standard: ASTM F 1861.

1. Material Requirement: Type TP (rubber, thermoplastic)
2. Manufacturing Method: Group I (solid, homogeneous)
3. Style: Vented Cove (base with toe)

C. Minimum Thickness: 0.125 inch (3.2 mm).

D. Height: 4 inches (102 mm), as indicated on drawings.

E. Lengths: Coils in manufacturer's standard length

F. Outside Corners: Job formed

G. Inside Corners: Job formed

H. Finish: Satin

I. Colors and Patterns: To be selected by architect from manufacturer's full line.

2.2 RESILIENT MOLDING ACCESSORY

A. Resilient Molding Accessory:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. Burke Mercer Flooring Products; Division of Burke Industries, Inc.
b. Johnsonite.
c. Roppe Corporation, USA.
d. Forbo
e. Allstate

B. Description: Cap for cove carpet, Cap for cove resilient floor covering, Carpet bar for tackless installations, Carpet edge for glue-down applications, Nosing for carpet, Nosing for resilient floor covering, Reducer strip for resilient floor covering, Joiner for tile and carpet, Transition strips.

C. Material: Rubber.

D. Profile and Dimensions: Per condition needed

E. Colors and Patterns: To be selected by architect from manufacturer's full line.

2.3 INSTALLATION MATERIALS

A. Trowelable Leveling and Patching Compounds: Latex-modified, portland cement based or blended hydraulic-cement-based formulation provided or approved by manufacturer for applications indicated.

B. Adhesives: Water-resistant type recommended by manufacturer to suit resilient products and substrate conditions indicated.

C. Stair-Tread-Nose Filler: Two-part epoxy compound recommended by resilient tread manufacturer to fill nosing substrates that do not conform to tread contours.

D. Metal Edge Strips: Extruded aluminum with mill finish of width shown, of height required to protect exposed edges of tiles, and in maximum available lengths to minimize running joints.

E. Floor Polish: Provide protective liquid floor polish products as recommended by resilient stair tread manufacturer.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, with Installer present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.

B. Verify that finishes of substrates comply with tolerances and other requirements specified in other Sections and that substrates are free of cracks, ridges, depressions, scale, and foreign deposits that might interfere with adhesion of resilient products.

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

3.2 PREPARATION

A. Prepare substrates according to manufacturer's written instructions to ensure adhesion of resilient products.

B. Concrete Substrates for Resilient Stair Treads and Accessories: Prepare according to ASTM F 710.

1. Verify that substrates are dry and free of curing compounds, sealers, and hardeners.
2. Remove substrate coatings and other substances that are incompatible with adhesives and that contain soap, wax, oil, or silicone, using mechanical methods recommended by manufacturer. Do not use solvents.
3. Alkalinity and Adhesion Testing: Perform tests recommended by manufacturer.
4. Moisture Testing: Perform tests recommended by manufacturer. Proceed with installation only after substrates pass testing.

    a. Perform anhydrous calcium chloride test, ASTM F 1869. Proceed with installation only after substrates have maximum moisture-vapor-emission rate of 3 lb of water/1000 sq. ft. (1.36 kg of water/92.9 sq. m) in 24 hours.
    b. Perform relative humidity test using in situ probes, ASTM F 2170. Proceed with installation only after substrates have maximum 75 percent relative humidity level measurement.

C. Fill cracks, holes, and depressions in substrates with trowelable leveling and patching compound and remove bumps and ridges to produce a uniform and smooth substrate.

D. Do not install resilient products until they are same temperature as the space where they are to be installed.

1. Move resilient products and installation materials into spaces where they will be installed at least 48 hours in advance of installation.

E. Sweep and vacuum clean substrates to be covered by resilient products immediately before installation.

3.3 RESILIENT BASE INSTALLATION

A. Comply with manufacturer's written instructions for installing resilient base.

B. Apply resilient base to walls, columns, pilasters, casework and cabinets in toe spaces, and other permanent fixtures in rooms and areas where base is required.

C. Install resilient base in lengths as long as practicable without gaps at seams and with tops of adjacent pieces aligned.

D. Tightly adhere resilient base to substrate throughout length of each piece, with base in continuous contact with horizontal and vertical substrates.

E. Do not stretch resilient base during installation.

F. On masonry surfaces or other similar irregular substrates, fill voids along top edge of resilient base with manufacturer's recommended adhesive filler material.

G. Job-Formed Corners:

1. Outside Corners: Use straight pieces of maximum lengths possible. Form without producing discoloration (whitening) at bends.
2. Inside Corners: Use straight pieces of maximum lengths possible.

3.4 RESILIENT ACCESSORY INSTALLATION

A. Comply with manufacturer's written instructions for installing resilient accessories.

B. Resilient Molding Accessories: Butt to adjacent materials and tightly adhere to substrates throughout length of each piece. Install reducer strips at edges of carpet and resilient floor covering that would otherwise be exposed.

3.5 CLEANING AND PROTECTION

A. Comply with manufacturer's written instructions for cleaning and protection of resilient products.

B. Perform the following operations immediately after completing resilient product installation:

1. Remove adhesive and other blemishes from exposed surfaces.
2. Sweep and vacuum surfaces thoroughly.
3. Damp-mop surfaces to remove marks and soil.

C. Protect resilient products from mars, marks, indentations, and other damage from construction operations and placement of equipment and fixtures during remainder of construction period.

D. Floor Polish: Remove soil, visible adhesive, and surface blemishes from resilient stair treads before applying liquid floor polish.

1. Apply manufacturer recommended coats

E. Cover resilient products until Substantial Completion.

END OF SECTION 096513

SECTION 09651 - RESILIENT FLOORING

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 WORK

Furnish and install all resilient flooring indicated on the drawings or specified herein.

1.3 Sub-Floor:

1. Prior to starting any work, inspect the sub-floor of areas to be covered. Do not proceed until all defects have been corrected.

B. Concrete Sub-floors shall have a dry, smooth, level, steel troweled surface.

C. Installation of floor covering shall constitute full acceptance of sub-floor.

1.4 Delivery and Storage:

A. Store materials at site for at least 24 hours before installation.

B. Maintain temperature of not less than 70 degrees F, not more than 90 degrees F, for at least 24 hours before and 48 hours after installation.

PART 2 - PRODUCTS

A. Resilient Flooring: See Construction Drawings for flooring Schedule

A minimum of one color will be used from " Standard Excelon" by Armstrong. pattern.

1. All materials shall be delivered in original unopened containers with manufacturer's label intact.

B. Base: "Johnsonite Inflection 4" See Contract Drawings, Color: Color by Owner

C. Shop Drawings: Show installation pattern.

D. Adhesive: Waterproof type, as recommended by the manufacturer.

E. Adhesive: Epoxy type for cold installations, as recommended by manufacturer.

F. Primer: As recommended by the manufacturer.

G. Wax: Type and brand recommended by the manufacturer.

PART 3 - EXECUTION

A. Do not begin flooring work until Paving, Air Conditioning, Heating and Ventilating, Plumbing and Electrical Contractors have completed their work. Sub-floor shall be free of foreign matter. Fill all cracks, low spots, and expansion joints with a plastic material.

B. Apply necessary primers as required.

C. Use only mechanics experienced in this type work, WITH A MINIMUM OF THREE YEARS IN COMMERCIAL WORK. Maintain full size tiles in field varying if necessary in borders. Lay tiles square with room axis in pattern as selected.

D. At completion of floor tile installation, all excessive adhesives shall be removed. After cleaning the flooring, the area shall be waxed and buffed with a buffing machine, after the tenant stocks his shelving and prior to store opening.

END OF SECTION 09651 RESILIENT TILE FLOORING