ATTACHMENT NUMBER 1

PROJECT MANUAL

HAMMOND PARK
RECREATION CENTER RENOVATION

Sandy Springs, Georgia

for

City of Sandy Springs

July 14, 2017

OWNER REVIEW SET

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SECTION 013100

PROJECT MANAGEMENT AND COORDINATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS:

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

1.2 SUMMARY:

A. Section includes administrative provisions for coordinating construction operations on Project including, but not limited to, the following:
   1. General coordination procedures.
   2. Coordination drawings.
   3. Request for Information (RFI).
   4. Digital project management procedures.
   5. Project meetings.

1.3 SUBMITTALS:

A. Subcontract List: Prepare a written summary identifying individuals or firms proposed for each portion of the Work, including those who are to furnish products or equipment fabricated to a special design. Include the following information in tabular form:
   1. Name, address, telephone number, and email address of entity performing subcontract or supplying products.
   2. Number and title of related Specification Section(s) covered by subcontract.
   3. Drawing number and detail references, as appropriate, covered by subcontract.

B. Key Personnel Names: Within fifteen (15) days of starting construction operations, submit a list of key personnel assignments, including superintendent and other personnel in attendance at Project site.
   1. Identify individuals and their duties and responsibilities; list addresses and cellular telephone numbers and e-mail addresses.
   2. Provide names, addresses, and telephone numbers of individuals assigned as alternates in the absence of individuals assigned to Project.

   3. Post copies of list in project meeting room, in temporary field office and in prominent location in built facility. Keep list current at all times.

1.4 GENERAL COORDINATION PROCEDURES:

A. Coordination: Coordinate construction operations included in different Sections of the Specifications to ensure efficient and orderly installation of each part of the Work. Coordinate

construction operations included in different Sections that depend on each other for proper installation, connection, and operation.

1. Schedule construction operations in sequence required to obtain the best results where installation of one part of the Work depends on installation of other components, before or after its own installation.
2. Coordinate installation of different components to ensure maximum performance and accessibility for required maintenance, service, and repair.
3. Make adequate provisions to accommodate items scheduled for later installation.

B. Prepare memoranda for distribution to each party involved, outlining special procedures required for coordination.

1. Include such items as required notices, reports, and list of attendees at meetings.
2. Prepare similar memoranda for Owner and separate contractors if coordination of their Work is required.

C. Administrative Procedures: Coordinate scheduling and timing of required administrative procedures with other construction activities to avoid conflicts and to ensure orderly progress of the Work. Such administrative activities include, but are not limited to, the following:

1. Preparation of Contractor's construction schedule.
2. Preparation of the schedule of values.
3. Installation and removal of temporary facilities and controls.
4. Delivery and processing of submittals.
5. Progress meetings.
6. Preinstallation conferences.
7. Project closeout activities.
8. Startup and adjustment of systems.

1.5 REQUEST FOR INFORMATION (RFI):

A. RFI Procedure: Immediately on discovery of the need for additional information, clarification, or interpretation of the Contract Documents, Contractor shall prepare and submit an RFI in the form specified.

1. Architect will return without response those RFIs submitted to Architect by other entities controlled by Contractor.
2. Coordinate and submit RFIs in a prompt manner so as to avoid delays in Contractor's work or work of subcontractors.

B. Content of the RFI: Include a detailed, legible description of item needing information or interpretation and the following:

1. Project name.
2. Project number.
3. Date.
4. Name of Contractor.
5. Name of Architect.
6. RFI number, numbered sequentially.
7. RFI subject.
8. Specification Section number and title and related paragraphs, as appropriate.
9. Drawing number and detail references, as appropriate.
10. Field dimensions and conditions, as appropriate.

11. Contractor's suggested resolution. If Contractor's suggested resolution impacts the Contract Time or the Contract Sum, Contractor shall state impact in the RFI.
12. Contractor's signature.
13. Attachments: Include sketches, descriptions, measurements, photos, Product Data, Shop Drawings, coordination drawings, and other information necessary to fully describe items needing interpretation. Include dimensions, thicknesses, structural grid references, and details of affected materials, assemblies, and attachments on attached sketches.

C. RFI Forms: Use AIA Document G716 or software-generated form with substantially the same content as indicated above, acceptable to Architect. Attachments shall be electronic files in PDF format.

D. Architect's Action: Architect will review each RFI, determine action required, and respond. Allow seven (7) working days for Architect's response for each RFI. RFIs received by Architect after 1:00 p.m. will be considered as received the following working day.
1. The following Contractor-generated RFIs will be returned without action:
    a. Requests for approval of submittals.
    b. Requests for approval of substitutions.
    c. Requests for approval of Contractor's means and methods.
    d. Requests for coordination information already indicated in the Contract Documents.
    e. Requests for adjustments in the Contract Time or the Contract Sum.
    f. Requests for interpretation of Architect's actions on submittals.
    g. Incomplete RFIs or inaccurately prepared RFIs.
2. Architect's action may include a request for additional information, in which case Architect's time for response will date from time of receipt by Architect of additional information.
3. Architect's action on RFIs that may result in a change to the Contract Time or the Contract Sum may be eligible for Contractor to submit Change Proposal according to the General Conditions of the Contract. If Contractor believes the RFI response warrants change in the Contract Time or the Contract Sum, notify Architect in writing within ten (10**)** days of receipt of the RFI response.

E. RFI Log: Prepare, maintain, and submit a tabular log of RFIs organized by the RFI number. Submit log monthly. Include the following information in the log:
1. Project name.
2. Name and address of Contractor.
3. Name and address of Architect.
4. RFI number including RFIs that were returned without action or withdrawn.
5. RFI description.
6. Date the RFI was submitted.
7. Date Architect's response was received.
8. Identification of related Minor Change in the Work, Construction Change Directive, and Proposal Request, as appropriate.

F. On receipt of Architect's action, update the RFI log and immediately distribute the RFI response to affected parties. Review response and notify Architect within seven (7) days if Contractor disagrees with response.

1.6 PROJECT MEETINGS:

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

B. Preconstruction Conference: Schedule and conduct a preconstruction conference before starting construction, at a time convenient to Owner and Architect, but no later than fifteen (15) days after execution of the Agreement.
   1. Attendees: Authorized representatives of Owner, Architect, and their consultants; Contractor and its superintendent; major subcontractors; suppliers; and other concerned parties shall attend the conference. Participants at the conference shall be familiar with Project and authorized to conclude matters relating to the Work.
   2. Agenda: Discuss items of significance that could affect progress, including the following:
      a. Responsibilities and personnel assignments, including designation of key personnel and their duties.
      b. Tentative construction schedule.
      c. Phasing.
      d. Critical work sequencing and long lead items.
      e. Lines of communications.
      f. Procedures for processing field decisions and Change Orders.
      g. Procedures for RFIs.
      h. Procedures for testing and inspecting.
      i. Procedures for processing Applications for Payment.
      j. Distribution of the Contract Documents.
      k. Submittal procedures.
      l. Preparation of Record Documents.
      m. Use of the premises.
      n. Work restrictions.
      o. Working hours.
      p. Owner's occupancy requirements.
      q. Responsibility for temporary facilities and controls.
      r. Procedures for moisture and mold control.
      s. Procedures for disruptions and shutdowns.
      t. Construction waste management and recycling.
      u. Parking availability.
      v. Office, work, and storage areas.
      w. Equipment deliveries and priorities.
      x. First aid.
      y. Security.
      z. Progress cleaning.
   3. Minutes: Entity responsible for conducting meeting will record and distribute meeting minutes.

C. Preinstallation Conferences: Conduct a preinstallation conference at Project site before each construction activity when required by other sections and when required for coordination with other construction.
   1. Attendees: Installer and representatives of manufacturers and fabricators involved in or affected by the installation and its coordination or integration with other materials and installations that have preceded or will follow, shall attend the meeting. Advise Architect of scheduled meeting dates.
   2. Agenda: Review progress of other construction activities and preparations for the particular activity under consideration, including requirements for the following:
      a. Contract Documents.
      b. Options.
      c. Related RFIs.
      d. Related Change Orders.
      e. Purchases.
      f. Deliveries.
      g. Submittals.
      h. Review of mockups.
      i. Possible conflicts.
      j. Compatibility requirements.
      k. Time schedules.
      l. Weather limitations.
      m. Manufacturer's written instructions.
      n. Warranty requirements.
      o. Compatibility of materials.
      p. Acceptability of substrates.
      q. Temporary facilities and controls.
      r. Space and access limitations.
      s. Regulations of authorities having jurisdiction.
      t. Testing and inspecting requirements.
      u. Installation procedures.
      v. Coordination with other work.
      w. Required performance results.
      x. Protection of adjacent work.
      y. Protection of construction and personnel.
   3. Record significant conference discussions, agreements, and disagreements, including required corrective measures and actions.
   4. Reporting: Distribute minutes of the meeting to each party present and to other parties requiring information.
   5. Do not proceed with installation if the conference cannot be successfully concluded. Initiate whatever actions are necessary to resolve impediments to performance of the Work and reconvene the conference at earliest feasible date.

D. Project Closeout Conference: Schedule and conduct a project closeout conference, at a time convenient to Owner and Architect, but no later than ninety (90) days prior to the scheduled date of Substantial Completion.
   1. Conduct the conference to review requirements and responsibilities related to Project closeout.
   2. Attendees: Authorized representatives of Owner, Architect, and their consultants; Contractor and its superintendent; major subcontractors; suppliers; and other concerned

parties shall attend the meeting. Participants at the meeting shall be familiar with Project and authorized to conclude matters relating to the Work.

3. Agenda: Discuss items of significance that could affect or delay Project closeout, including the following:
   a. Preparation of Record Documents.
   b. Procedures required prior to inspection for Substantial Completion and for final inspection for acceptance.
   c. Procedures for completing and archiving web-based Project software site data files.
   d. Submittal of written warranties.
   e. Requirements for preparing operations and maintenance data.
   f. Requirements for delivery of material samples, attic stock, and spare parts.
   g. Requirements for demonstration and training.
   h. Preparation of Contractor's punch list.
   i. Procedures for processing Applications for Payment at Substantial Completion and for final payment.
   j. Submittal procedures.
   k. Owner's partial occupancy requirements.
   l. Installation of Owner's furniture, fixtures, and equipment.
   m. Responsibility for removing temporary facilities and controls.
4. Minutes: Entity conducting meeting will record and distribute meeting minutes.

E. Progress Meetings: Conduct progress meetings at monthly intervals.
   1. Coordinate dates of meetings with preparation of payment requests.
   2. Attendees: Representatives of Owner and Architect, each contractor, subcontractor, supplier, and other entity concerned with current progress or involved in planning, coordination, or performance of future activities shall be represented at these meetings. All participants at the meeting shall be familiar with Project and authorized to conclude matters relating to the Work.
   3. Agenda: Review and correct or approve minutes of previous progress meeting. Review other items of significance that could affect progress. Include topics for discussion as appropriate to status of Project.
      a. Contractor's Construction Schedule: Review progress since the last meeting. Determine whether each activity is on time, ahead of schedule, or behind schedule, in relation to Contractor's construction schedule.
         1) Determine how construction behind schedule will be expedited; secure commitments from parties involved to do so.
         2) Discuss whether schedule revisions are required to ensure that current and subsequent activities will be completed within the Contract Time.
         3) Review schedule for next period.
      b. Review present and future needs of each entity present, including the following:
         1) Interface requirements.
         2) Sequence of operations.
         3) Status of submittals.
         4) Deliveries.
         5) Off-site fabrication.
         6) Access.
         7) Site use.
         8) Temporary facilities and controls.
         9) Progress cleaning.

10) Quality and work standards.
11) Status of correction of deficient items.
12) Field observations.
13) Status of RFIs.
14) Status of Proposal Requests.
15) Pending changes.
16) Status of Change Orders.
17) Pending claims and disputes.
18) Documentation of information for payment requests.

4. Minutes: Entity responsible for conducting the meeting will record and distribute the meeting minutes to each party present and to parties requiring information.
5. Schedule Updating: Revise Contractor's construction schedule after each progress meeting where revisions to the schedule have been made or recognized. Issue revised schedule concurrently with the report of each meeting.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF PROJECT MANAGEMENT AND COORDINATION

SECTION 013300
SUBMITTAL PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS:

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and other Division 1 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.

1.3 DEFINITIONS

A. Action Submittals: Written and graphic information and physical samples that require Architect's responsive action.

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.

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 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 revisions to submittals noted by Architect and additional time for handling and reviewing submittals required by those corrections.
   1. Coordinate submittal schedule with list of subcontracts, the schedule of values, and Contractor's construction schedule.
   2. Final Submittal: Submit concurrently with the first complete submittal of Contractor's construction schedule. Submit revised submittal schedule to reflect

changes in current status and timing for submittals.

3. Format: Arrange the following information in a tabular format:
   a. Scheduled date for first submittal.
   b. Specification Section number and title.
   c. Submittal category: Action; informational.
   d. Name of subcontractor.
   e. Description of the Work covered.
   f. Scheduled date for Architect's final release or approval.
   g. Scheduled date of fabrication.

1.5 SUBMITTAL ADMINISTRATIVE REQUIREMENTS

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

B. Submittal Identification: Place a permanent label or title block on each 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.
      c. Name of Architect.
      d. Name of Contractor.
      e. Name of subcontractor.
      f. Name of supplier.
      g. Name of manufacturer.
      h. Submittal number or other unique identifier, including revision identifier.
      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. Other necessary identification.
   4. Additional 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. Submit one copy of

submittal to concurrent reviewer in addition to specified number of copies to Architect.

5. Transmittal: Assemble each submittal individually and appropriately for transmittal and handling. Transmit each submittal using a transmittal form. Architect will discard submittals received from sources other than Contractor.
   a. Transmittal Form: Use AIA Document G810 or CSI Form 12.1A.
   b. Indicate the following on transmittal:
      1) Project name.
      2) Date.
      3) Destination (To:).
      4) Source (From:).
      5) Name and address of Architect.
      6) Name of Contractor.
      7) Name of firm or entity that prepared submittal.
      8) Names of subcontractor, manufacturer, and supplier.
      9) Category and type of submittal.
      10) Submittal purpose and description.
      11) Specification Section number and title.
      12) Specification paragraph number or drawing designation and generic name for each of multiple items.
      13) Drawing number and detail references, as appropriate.
      14) Indication of full or partial submittal.
      15) Transmittal number, numbered consecutively.
      16) Submittal and transmittal distribution record.
      17) Remarks.
      18) Signature of transmitter.

C. Electronic Submittals: Identify and incorporate information in each electronic submittal file as follows:
   1. Assemble complete submittal package into a single indexed file incorporating submittal requirements of a single Specification Section and transmittal form with links enabling navigation to each item.
   2. Name file with submittal number or other unique identifier, including revision identifier.
   3. Provide means for insertion to permanently record Contractor's review and approval markings and action taken by Architect.
   4. Transmittal Form for Electronic Submittals: Use electronic form acceptable to Owner**,** containing the following information:
      a. Project name.
      b. Date.
      c. Name and address of Architect.
      d. Name of Contractor.
      e. Name of firm or entity that prepared submittal.
      f. Names of subcontractor, manufacturer, and supplier.
      g. Category and type of submittal.
      h. Submittal purpose and description.
      i. Specification Section number and title.
      j. Specification paragraph number or drawing designation and generic name for each of multiple items.
      k. Drawing number and detail references, as appropriate.

l. Location(s) where product is to be installed, as appropriate.
m. Related physical samples submitted directly.
n. Indication of full or partial submittal.
o. Transmittal number, numbered consecutively.
p. Submittal and transmittal distribution record.
q. Other necessary identification.
r. Remarks.

5. Metadata: Include the following information as keywords in the electronic submittal file metadata:
   a. Project name.
   b. Number and title of appropriate Specification Section.
   c. Manufacturer name.
   d. Product name.

D. Options: Identify options requiring selection by Architect.

E. Deviations and Additional Information: 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.

F. 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.

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

H. Use for Construction: Retain complete copies of submittals on Project site. Use only final action 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.
      b. Annotate and retain one copy of file as an electronic Project record document file.
   2. 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. Submittal Method: Submit Product Data in PDF electronic file format.

C. Shop Drawings: Prepare Project-specific information, drawn accurately to scale. Do not base Shop Drawings on reproductions of the Contract Documents or standard printed data.

1. Preparation: Fully illustrate requirements in the Contract Documents. Include the following information, as applicable:
   a. Identification of products.
   b. Schedules.
   c. Fabrication and installation drawings.
   d. Roughing-in and setting diagrams.
   e. Wiring diagrams showing field-installed wiring, including power, signal, and control wiring.
   f. Templates and patterns.
   g. Compliance with specified standards.
   h. Notation of coordination requirements.
   i. Notation of dimensions established by field measurement.
   j. Relationship and attachment to adjoining construction clearly indicated.
   k. 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 40 inches.
3. Submittal Method: Submit Shop Drawings PDF electronic file format.

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.
   e. Specification paragraph number and generic name of each item.
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 of available choices where color, pattern, texture, or similar characteristics are required to be selected from manufacturer's product line.
   b. 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.
   a. Samples include, but are not limited to 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.
   b. Number of Samples: Submit three (3) sets of Samples. Architect will retain one Sample set; 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 three 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.
   1. Include the following information in tabular form:
      a. Type of product. Include unique identifier for each product indicated in the Contract Documents or assigned by Contractor if none is indicated.
      b. Manufacturer and product name, and model number if applicable.
      c. Number and name of room or space.
      d. Location within room or space.
   2. Submittal Method: Submit product schedule in PDF electronic file format.

F. Test and Inspection Reports and Schedule of Tests and Inspections Submittals: Comply with requirements specified in Division 1 Section "Quality Requirements."

G. Closeout Submittals and Maintenance Material Submittals: Comply with requirements specified in Division 1 Section "Project Closeout."

H. Maintenance Data: Comply with requirements specified in Division 1 Section "Project Closeout."

I. 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.

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

K. Installer Certificates: 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.

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

M. Product Certificates: Submit written statements on manufacturer's letterhead certifying that product complies with requirements in the Contract Documents.

N. Material Certificates: Submit written statements on manufacturer's letterhead certifying that material complies with requirements in the Contract Documents.

O. Material Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting test results of material for compliance with requirements in the Contract Documents.

P. Product Test Reports: Submit written reports indicating that 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. Research Reports: Submit written evidence, from a model code organization acceptable to authorities having jurisdiction, that product complies with building code in effect for Project. Include the following information:
1. Name of evaluation organization.
2. Date of evaluation.
3. Time period when report is in effect.
4. Product and manufacturers' names.
5. Description of product.
6. Test procedures and results.
7. Limitations of use.

R. Preconstruction Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of tests performed before installation of product, for compliance with performance requirements in the Contract Documents.

S. Compatibility Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of compatibility tests performed before installation of product. Include written recommendations for primers and substrate preparation needed for adhesion.

T. Field Test Reports: Submit written 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.

U. Design Data: Prepare and submit written and graphic information, including, but not limited to, performance and design criteria, list of applicable codes and regulations, and calculations.
1. Include list of assumptions and other performance and design criteria and a summary of loads. Include load diagrams if applicable.
2. Provide name and version of software, if any, used for calculations. Include page numbers.

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. If criteria indicated are not sufficient to perform services or certification required, submit a written request for additional information to Architect.

B. Delegated-Design Services Certification: In addition to Shop Drawings, Product Data, and other required submittals, submit digitally signed PDF electronic file and three (3) paper copies of certificate, signed and sealed by the responsible design professional, for

each product and system specifically assigned to Contractor to be designed or certified by a design professional.

1. Indicate that products and systems comply with performance and design criteria in the Contract Documents.
2. Include list of codes, loads, and other factors used in performing these services.

PART 3 - EXECUTION

3.1 CONTRACTOR'S REVIEW

A. 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. 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 ARCHITECT'S REVIEW

A. Action Submittals: Architect will review each submittal, make marks to indicate corrections or revisions required, and return it. Architect will stamp each submittal with an action stamp and will mark stamp appropriately to indicate action, as follows:

1. "NO EXCEPTIONS TAKEN" indicates that fabrication may begin on all items.
2. "REJECTED" indicates that the submission is unacceptable and requires resubmission. In the case of mock-up, reconstruction will be required. Contractor shall make corrections as noted and resubmit. Fabrication shall not begin on items covered by shop drawings bearing this notation.
3. "MAKE CORRECTIONS NOTED" indicates that Contractor shall make the corrections indicated on the returned submittal. This notation will permit fabrication to begin on all items subject to the corrections indicated.
4. “AMEND AND RESUBMIT” indicates that contractor shall delay fabrication on items affected by the corrections, make appropriate changes and resubmit.
5. "SUBMIT SPECIFIED ITEM" indicates that the item submitted is not specified and unacceptable. Submittal will be returned without review. Only the item specified is to be submitted for review.

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

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

D. Incomplete submittals are unacceptable, will be considered nonresponsive, and will be returned for resubmittal without review.

E. Submittals not required by the Contract Documents may be returned by the Architect without action.

END OF SUBMITTAL PROCEDURES

SECTION 014000

QUALITY REQUIREMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS:

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

1.2 SUMMARY

B. Section includes administrative and procedural requirements for quality assurance and quality control.

C. Testing and inspecting services are required to verify compliance with requirements specified or indicated. These services do not relieve Contractor of responsibility for compliance with the Contract Document requirements.

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

1.3 DEFINITIONS

A. Quality-Assurance Services: Activities, actions, and procedures performed before and during execution of the Work to guard against defects and deficiencies and substantiate that proposed construction will comply with requirements.

B. Quality-Control Services: Tests, inspections, procedures, and related actions during and after execution of the Work to evaluate that actual products incorporated into the Work and completed construction comply with requirements. Services do not include contract enforcement activities performed by Architect.

C. Mockups: Full-size physical assemblies that are constructed on-site. Mockups are constructed to verify selections made under Sample submittals; to demonstrate aesthetic effects and, where indicated, qualities of materials and execution; to review coordination, testing, or operation; to show interface between dissimilar materials; and to demonstrate compliance with specified installation tolerances.

1. Mockups are not Samples.
2. Unless otherwise indicated, approved mockups establish the standard by which the Work will be judged.

D. Preconstruction Testing: Tests and inspections performed specifically for Project before products and materials are incorporated into the Work, to verify performance or compliance with specified criteria.

E. Product Testing: Tests and inspections that are performed by an NRTL, an NVLAP, or a testing agency qualified to conduct product testing and acceptable to authorities having jurisdiction, to establish product performance and compliance with specified requirements.

F. Source Quality-Control Testing: Tests and inspections that are performed at the source, e.g., plant, mill, factory, or shop.

G. Field Quality-Control Testing: Tests and inspections that are performed on-site for installation of the Work and for completed Work.

H. Testing Agency: An entity engaged to perform specific tests, inspections, or both. Testing laboratory shall mean the same as testing agency.

I. Installer/Applicator/Erector: Contractor or another entity engaged by Contractor as an employee, Subcontractor, or Sub-subcontractor, to perform a particular construction operation, including installation, erection, application, and similar operations. Use of trade-specific terminology in referring to a trade or entity does not require that certain construction activities be performed by accredited or unionized individuals, or that requirements specified apply exclusively to specific trade(s).

J. Experienced: When used with an entity or individual, "experienced" means having successfully completed a minimum of five (5) previous projects similar in nature, size, and extent to this Project; being familiar with special requirements indicated; and having complied with requirements of authorities having jurisdiction.

1.4 CONFLICTING REQUIREMENTS

A. Referenced Standards: If compliance with two or more standards is specified and the standards establish different or conflicting requirements for minimum quantities or quality levels, comply with the most stringent requirement. Refer conflicting requirements that are different, but apparently equal, to Architect for a decision before proceeding.

B. Minimum Quantity or Quality Levels: The quantity or quality level shown or specified shall be the minimum provided or performed. The actual installation may comply exactly with the minimum quantity or quality specified, or it may exceed the minimum within reasonable limits. To comply with these requirements, indicated numeric values are minimum or maximum, as appropriate, for the context of requirements. Refer uncertainties to Architect for a decision before proceeding.

1.5 SUBMITTALS

A. Contractor's Statement of Responsibility: When required by authorities having jurisdiction, submit copy of written statement of responsibility sent to authorities having jurisdiction before starting work on the following systems:

B. Testing Agency Qualifications: For testing agencies specified in "Quality Assurance" Article to demonstrate their capabilities and experience. Include proof of qualifications in the form of a recent report on the inspection of the testing agency by a recognized authority.

C. Schedule of Tests and Inspections: Prepare in tabular form and include the following:
1. Specification Section number and title.
2. Entity responsible for performing tests and inspections.
3. Description of test and inspection.
4. Identification of applicable standards.
5. Identification of test and inspection methods.
6. Number of tests and inspections required.
7. Time schedule or time span for tests and inspections.
8. Requirements for obtaining samples.
9. Unique characteristics of each quality-control service.

1.6 REPORTS AND DOCUMENTS

A. Test and Inspection Reports: Prepare and submit certified written reports specified in other Sections. Include the following:
1. Date of issue.
2. Project title and number.
3. Name, address, and telephone number of testing agency.
4. Dates and locations of samples and tests or inspections.
5. Names of individuals making tests and inspections.
6. Description of the Work and test and inspection method.
7. Identification of product and Specification Section.
8. Complete test or inspection data.
9. Test and inspection results and an interpretation of test results.
10. Record of temperature and weather conditions at time of sample taking and testing and inspecting.
11. Comments or professional opinion on whether tested or inspected Work complies with the Contract Document requirements.
12. Name and signature of laboratory inspector.
13. Recommendations on retesting and reinspecting.

B. Manufacturer's Technical Representative's Field Reports: Prepare written information documenting manufacturer's technical representative's tests and inspections specified in other Sections. Include the following:
1. Name, address, and telephone number of technical representative making report.
2. Statement on condition of substrates and their acceptability for installation of product.
3. Statement that products at Project site comply with requirements.
4. Summary of installation procedures being followed, whether they comply with requirements and, if not, what corrective action was taken.
5. Results of operational and other tests and a statement of whether observed performance complies with requirements.
6. Statement whether conditions, products, and installation will affect warranty.
7. Other required items indicated in individual Specification Sections.

C. Factory-Authorized Service Representative's Reports: Prepare written information documenting manufacturer's factory-authorized service representative's tests and inspections specified in other Sections. Include the following:
   1. Name, address, and telephone number of factory-authorized service representative making report.
   2. Statement that equipment complies with requirements.
   3. Results of operational and other tests and a statement of whether observed performance complies with requirements.
   4. Statement whether conditions, products, and installation will affect warranty.
   5. Other required items indicated in individual Specification Sections.

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

1.7 QUALITY ASSURANCE

A. Qualifications paragraphs in this article establish the minimum qualification levels required; individual Specification Sections specify additional requirements.

B. Manufacturer Qualifications: A firm experienced in manufacturing products or systems similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.

C. Fabricator Qualifications: A firm experienced in producing products similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.

D. Installer Qualifications: A firm or individual experienced in installing, erecting, or assembling work similar in material, design, and extent to that indicated for this Project, whose work has resulted in construction with a record of successful in-service performance.

E. Professional Engineer Qualifications: A professional engineer who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing engineering services of the kind indicated. Engineering services are defined as those performed for installations of the system, assembly, or product that are similar in material, design, and extent to those indicated for this Project.

F. Specialists: Certain Specification Sections require that specific construction activities shall be performed by entities who are recognized experts in those operations.
   1. Specialists shall satisfy qualification requirements indicated and shall be engaged for the activities indicated.
   2. Requirements of authorities having jurisdiction shall supersede requirements for specialists.

G. Testing Agency Qualifications: An NRTL, an NVLAP, or an A2LA independent agency with the experience and capability to conduct testing and inspecting indicated, as documented according to ASTM E 329; and with additional qualifications specified in

individual Sections; and, where required by authorities having jurisdiction, that is acceptable to authorities.

1. NRTL: A nationally recognized testing laboratory according to 29 CFR 1910.7.
2. NVLAP: A testing agency accredited according to NIST's National Voluntary Laboratory Accreditation Program.
3. A2LA: A testing agency accredited by the American Association for Laboratory Accreditation.

H. Manufacturer's Technical Representative Qualifications: An authorized representative of manufacturer who is trained and approved by manufacturer to observe and inspect installation of manufacturer's products that are similar in material, design, and extent to those indicated for this Project.

I. Factory-Authorized Service Representative Qualifications: An authorized representative of manufacturer who is trained and approved by manufacturer to inspect installation of manufacturer's products that are similar in material, design, and extent to those indicated for this Project.

J. Preconstruction Testing: Where testing agency is indicated to perform preconstruction testing for compliance with specified requirements for performance and test methods, comply with the following:

1. Contractor responsibilities include the following:
    a. Provide test specimens representative of proposed products and construction.
    b. Submit specimens in a timely manner with sufficient time for testing and analyzing results to prevent delaying the Work.
    c. Provide sizes and configurations of test assemblies, mockups, and laboratory mockups to adequately demonstrate capability of products to comply with performance requirements.
    d. Build laboratory mockups at testing facility using personnel, products, and methods of construction indicated for the completed Work.
    e. When testing is complete, remove test specimens, assemblies, and mockups; do not reuse products on Project.

2. Testing Agency Responsibilities: Submit a certified written report of each test, inspection, and similar quality-assurance service to Architect, with copy to Contractor. Interpret tests and inspections and state in each report whether tested and inspected work complies with or deviates from the Contract Documents.

K. Mockups: Before installing portions of the Work requiring mockups, build mockups for each form of construction and finish required to comply with the following requirements, using materials indicated for the completed Work:

1. Build mockups in location and of size indicated or, if not indicated, as directed by Architect.
2. Notify Architect seven (7) days in advance of dates and times when mockups will be constructed.
3. Employ supervisory personnel who will oversee mockup construction. Employ workers that will be employed during the construction at Project.
4. Demonstrate the proposed range of aesthetic effects and workmanship.

5. Obtain Architect's approval of mockups before starting work, fabrication, or construction. Allow seven (7) days for initial review and each re-review of each mockup.
6. Maintain mockups during construction in an undisturbed condition as a standard for judging the completed Work.
7. Demolish and remove mockups when directed unless otherwise indicated.

1.8 QUALITY CONTROL

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

B. Contractor Responsibilities: Tests and inspections not explicitly assigned to Owner are Contractor's responsibility. Perform additional quality-control activities required to verify that the Work complies with requirements, whether specified or not.
1. Unless otherwise indicated, provide quality-control services specified and those required by authorities having jurisdiction. Perform quality-control services required of Contractor by authorities having jurisdiction, whether specified or not.
2. Where services are indicated as Contractor's responsibility, engage a qualified testing agency to perform these quality-control services. Contractor shall not employ same entity engaged by Owner, unless agreed to in writing by Owner.
3. Notify testing agencies at least twenty-four (24) hours in advance of time when Work that requires testing or inspecting will be performed.
4. Where quality-control services are indicated as Contractor's responsibility, submit a certified written report, in duplicate, of each quality-control service.
5. Testing and inspecting requested by Contractor and not required by the Contract Documents are Contractor's responsibility.
6. Submit additional copies of each written report directly to authorities having jurisdiction, when they so direct.

C. Manufacturer's Field Services: Where indicated, engage a factory-authorized service representative to inspect field-assembled components and equipment installation, including service connections. Report results in writing as specified in Section 013300 "Submittal Procedures."

D. Manufacturer's Technical Services: Where indicated, engage a manufacturer's technical representative to observe and inspect the Work. Manufacturer's technical representative's services include participation in preinstallation conferences, examination of substrates and conditions, verification of materials, observation of Installer activities, inspection of completed portions of the Work, and submittal of written reports.

E. Retesting/Reinspecting: Regardless of whether original tests or inspections were Contractor's responsibility, provide quality-control services, including retesting and reinspecting, for construction that replaced Work that failed to comply with the Contract Documents.

F. Associated Services: Cooperate with agencies performing required tests, inspections, and similar quality-control services, and provide reasonable auxiliary services as requested. Notify agency sufficiently in advance of operations to permit assignment of personnel. Provide the following:
1. Access to the Work.
2. Incidental labor and facilities necessary to facilitate tests and inspections.
3. Adequate quantities of representative samples of materials that require testing and inspecting. Assist agency in obtaining samples.
4. Facilities for storage and field curing of test samples.
5. Delivery of samples to testing agencies.
6. Preliminary design mix proposed for use for material mixes that require control by testing agency.
7. Security and protection for samples and for testing and inspecting equipment at Project site.

G. Coordination:
1. Coordinate sequence of activities to accommodate required quality assurance and control services with a minimum of delay and to avoid necessity of removing and replacing construction to accommodate testing and inspecting.
2. Schedule times for tests, inspections, obtaining samples, and similar activities.

1.9 SPECIAL TESTS AND INSPECTIONS

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

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 TEST AND INSPECTION LOG

A. Test and Inspection Log: Prepare a record of tests and inspections. Include the following:
   1. Date test or inspection was conducted.
   2. Description of the Work tested or inspected.
   3. Date test or inspection results were transmitted to Architect.
   4. Identification of testing agency or special inspector conducting test or inspection.

B. Maintain log at Project site. Post changes and revisions as they occur. Provide access to test and inspection log for Architect's reference during normal working hours.

3.2 REPAIR AND PROTECTION

A. On completion of testing, inspecting, sample taking, and similar services, repair damaged construction and restore substrates and finishes.
   1. Provide materials and comply with installation requirements specified in other Specification Sections or matching existing substrates and finishes.
   2. Restore patched areas and extend restoration into adjoining areas with durable seams that are as invisible as possible.
   3. Comply with the Contract Document requirements for cutting and patching in Division 1 Section "Cutting and Patching."

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

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

END OF QUALITY REQUIREMENTS

SECTION 014200

REFERENCE STANDARDS AND DEFINITIONS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS:

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

1.2 DEFINITIONS:

A. General: Basic Contract definitions are included in the Conditions of the Contract.

B. Indicated: The term "indicated" refers to graphic representations, notes or schedules on the Drawings, or other Paragraphs or Schedules in the Specifications, and similar requirements in the Contract Documents. Where terms such as "shown," "noted," "scheduled," and "specified" are used, it is to help the reader locate the reference; no limitation on location is intended.

C. Directed: Terms such as "directed," "requested," "authorized," "selected," "approved," "required," and "permitted" mean "directed by the Architect," "requested by the Architect," and similar phrases.

D. Approve: The term "approved," where used in conjunction with the Architect's action on the Contractor's submittals, applications, and requests, is limited to the Architect's duties and responsibilities as stated in the Conditions of the Contract.

E. Regulation: The term "Regulations" includes laws, ordinances, statutes, and lawful orders issued by authorities having jurisdiction, as well as rules, conventions, and agreements within the construction industry that control performance of the Work.

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

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

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

I. Installer:

1. An "Installer" is the Contractor or an entity engaged by the Contractor, either as an employee, subcontractor, or contractor of lower tier for performance of a particular construction activity, including installation, erection, application, and similar operations. Installers are required to be experienced in the operations they are engaged to perform.

2. The term "experienced," when used with the term "Installer," means having a minimum of five previous projects similar in size and scope to this Project, being familiar with the special requirements indicated, and having complied with requirements of the authority having jurisdiction.

3. Trades: Use of titles such as "carpentry" is not intended to imply that certain construction activities must be performed by accredited or unionized individuals of a corresponding generic name, such as "carpenter." It also does not imply that requirements specified apply exclusively to tradespersons of the corresponding generic name.

J. Project Site is the space available to the Contractor for performance of construction activities, either exclusively or in conjunction with others performing other work as part of the Project.

1. The extent of the Project Site is shown on the Drawings, and may or may not be identical with the description of the land on which the Project is to be built.

2. If areas available are not indicated, they will be as mutually agreed by Owner and Contractor at Preconstruction Conference and as modified during construction.

K. Testing Laboratories: A "testing laboratory" is an independent entity engaged to perform specific inspections or tests, either at the Project Site or elsewhere, and to report on and, if required, to interpret results of those inspections or tests.

1.3 SPECIFICATION FORMAT AND CONTENT EXPLANATION:

A. Specification Format: These Specifications are organized into Divisions and Sections based on the Construction Specifications Institute's 2004 MASTERFORMAT numbering system with 49-Division format.

B. Specification Content: This Specification uses certain conventions in the use of language and the intended meaning of certain terms, words, and phrases when used in particular situations or circumstances. These conventions are explained as follows:

1. Abbreviated Language:
   a. Language used in Specifications and other Contract Documents is the abbreviated type. Words and meanings shall be interpreted as appropriate.
   b. Words that are implied, but not stated shall be interpolated as the sense required.
   c. Singular words will be interpreted as plural and plural words interpreted as singular where applicable and the context of the Contract Documents so indicates.

2. Imperative and streamlined language is used generally in the Specifications. Requirements expressed in the imperative mood are to be performed by the Contractor. At certain locations in the text, for clarity, subjective language is used to describe responsibilities that must be fulfilled indirectly by the Contractor, or by others when so noted.

1.4 INDUSTRY STANDARDS:

A. Applicability of Standards: Except where the Contract Documents include more stringent requirements, applicable construction industry standards have the same force and effect as if bound or copied directly into the Contract Documents to the extent referenced. Such standards are made a part of the Contract Documents by reference.

B. Publication Dates: Comply with the standard in effect as of the date of the Contract Documents.

C. Conflicting Requirements:

1. Where compliance with two or more standards is specified, and the standards may establish different or conflicting requirements for minimum quantities or quality levels. Refer requirements that are different, but apparently equal, and uncertainties to the Architect for a decision before proceeding.

2. Minimum Quantity or Quality Levels: The quantity or quality level shown or specified shall be the minimum provided or performed. The actual installation may comply exactly with the minimum quantity or quality specified, or it may exceed the minimum within reasonable limits. In complying with these requirements, indicated numeric values are minimum or maximum, as appropriate for the context of the requirements. Refer uncertainties to the Architect for a decision before proceeding.

D. Copies of Standards:

1. Each entity engaged in construction on the Project is required to be familiar with industry standards applicable to that entity's construction activity. Copies of applicable standards are not bound with the Contract Documents.

2. Where copies of standards are needed for performance of a required construction activity, the Contractor shall obtain copies directly from the publication source.

1.5 DRAWING SYMBOLS:

A. General: Except as otherwise indicated, graphic symbols used on drawings are those symbols recognized in the construction industry for purposes indicated. Where not otherwise noted, symbols are defined by "Architectural Graphic Standards", published by John Wiley & Sons, Inc., seventh edition.

B. Mechanical/Electrical Drawings: Graphic symbols used on mechanical and electrical drawings are generally aligned with symbols recommended by ASHRAE. Where appropriate, these symbols are supplemented by more specific symbols as recommended by other recognized technical associations including ASME, ASPE, IEEE and similar organizations. Refer instances of uncertainty to the Architect/Engineer for clarification before proceeding.

1.6 SUBMITTALS:

A. Permits, Licenses, and Certificates: For the Owner's records, submit copies of permits, licenses, certifications, inspection reports, releases, jurisdictional settlements, notices, receipts for fee payments, judgments, and similar documents, correspondence, and

records established in conjunction with compliance with standards and regulations bearing upon performance of the Work.

PART 2 - PRODUCTS: (Not Used)

PART 3 - EXECUTION (Not Used)

END OF REFERENCE STANDARDS AND DEFINITIONS

SECTION 015000

TEMPORARY FACILITIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS:

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

1.2 TEMPORARY FACILITIES:

A. Proper provision shall be made for storage of bulk materials, parking of construction vehicles and direct access to the building site as acceptable to the Owner and approved by the Architect.

B. Site Parking: On-site parking will be available to the Contractor within the "staging areas" indicated, or if not indicated, as agreed to and designated by the Owner.

C. Field Offices: At the Contractor's option (not required), provide temporary field offices of sufficient size to accommodate Contractor's requirements at the project site.

D. Digital Camera: Provide no less than 5 megapixels resolution, with 5× zoom, for daily construction documentation at the site, including flash, memory cards, charger and rechargeable batteries, standard batteries as back-up or for primary use, and all standard accessories and hardware for equipment, for complete and proper operation, and for downloading and emailing.

1.3 TOILET FACILITIES:

A. Contractor shall provide temporary toilet(s) on site for the duration of the project, for construction personnel use. They shall be enclosed weatherproof and sanitary toilets.

1. Maintain toilets in sanitary condition at all times. Remove outside toilets when no longer required, and leave site in clean condition.

2. Conform to local ordinances and regulations.

B. Toilet facilities in the Owner's buildings are not available to, and shall not be used by, the Contractor, subcontractors, and construction personnel.

1.4 TEMPORARY TELEPHONES:

A. Provide telephone for Contractor and Architect in the Contractor's job office at the project site, or if no on-site office is provided, provide a portable or cellular telephone to the Contractor's Superintendent. Cost of service and local calls shall be paid by General Contractor. Long distance and toll calls shall be paid by the party making such calls.

B. Provide telephone answering machine or service (or "voice mail" for cellular phone), to facilitate communication with the Contractor's Superintendent.

C. The Owner's telephones are not available to, and shall not be used by, the Contractor, except in an emergency situation.

1.5 TEMPORARY BARRIERS AND FENCES:

A. Contractor shall provide and maintain adequate fencing, barricades and protective walkways where required to provide suitable protection for employees, children, and the public at all times until completion of the work, acceptable to authorities having jurisdiction.

B. The Contractor shall confine the activities of work on this project to within the protected areas, unless otherwise directed by the Architect or Owner.

1.6 ELECTRIC POWER:

A. The Owner will provide electric service for reasonable use, as necessary for this project and any demolition and/or construction to continue without interruption, to the extent it is available at the site, and shall pay the power bills for such use for the duration of the Work of this Contract. Otherwise, the Contractor shall obtain the service from the local power company. Cost of temporary power from the local power company and related billings shall be paid by the Contractor from their Contract amount.

B. Use of Owner's existing on-site power service shall be limited to 110V/120V hand tools, lighting, or other use acceptable to the Owner.

C. Where need for electricity exists for use of other than 110V/120V hand tools or lighting, the Contractor shall provide temporary non-vibrating or vibration isolated portable generator with muffler in compliance with local noise ordinances, or other acceptable power source.

D. The Contractor shall be responsible for all extensions and connections required for the Work. Contractor shall remove all temporary wiring, extensions and connections prior to Substantial Completion.

E. The Contractor shall protect the Owner's systems from outage or damage, and repair of any damage to at least its previously existing condition - subject to the Owner's approval.

1.7 WATER:

A. The Owner will provide water for reasonable use, as necessary for this project and any construction, and/or demolition to continue without interruption, to the extent it is available at the site, and shall pay the water bills for such use for the duration of the Work of this Contract. Otherwise, the Contractor shall obtain the service from the local utility company. Cost of temporary water from the utility company and related billings shall be paid by the Contractor from their Contract amount.

B. The Contractor shall provide temporary stub-up, connections, valves and hose bibs required for the Work. Contractor shall remove all temporary piping, valves and other related connections prior to Substantial Completion.

C. The Contractor shall protect the Owner's water systems, new and temporary water lines valves and related connections from freezing, damage and contamination, and repair of any damage to the Owner's water systems to at least its previously existing condition - subject to the Owner's approval.

1. Where new water service is indicated to be installed, the Owner will pay for reasonable use of water from this new source.

2. However, the Contractor shall be responsible for any and all costs associated with the procurement and installation of any new meters, all fees for service connection, permits, tap fees, impact fees, and pay for same from the Contract amount.

1.8 TEMPORARY HEAT:

A. Contractor shall furnish temporary heat as required for uninterrupted construction and other operations, protection of new work, for drying out buildings and for curing of completed installations. Select equipment that will not have a harmful effect on completed installations or elements being installed.

1.9 ENCLOSURES AND PROTECTION:

A. Provide and maintain for the duration of construction of scaffolds, tarpaulins, canopies, warning signs, steps, platforms, bridges and other temporary construction necessary for proper completion and observation of the work, in compliance with pertinent safety and other regulations, and authorities having jurisdiction.

1.10 CLEAN UP:

A. The Contractor or his agent, upon completion of the work shall immediately remove all temporary fences, temporary utility lines, debris or any other obstructions and leave such property in as good a condition as it was before such work was commenced.

B. The Contractor, upon completion of the work, shall remove all other temporary structures and facilities from the site.

C. The Contractor shall legally dispose of all trash, debris, and construction waste, off site, on a regular basis.

D. Items salvaged by Contractor for his own purposes or for the Owner where indicated, may be stored temporarily on site and removed as soon as possible, unless directed otherwise by Architect, or Owner.

E. The sale or advertising for sale of salvaged or other materials ***shall not be permitted*** on site under any circumstances.

F. Control dust on site and clean mud and/or debris from on site and city streets and sidewalks, as it occurs.

G. Provide facilities to wash mud off of truck tires and equipment before it can be tracked onto streets, roads or public thoroughfares.

END OF TEMPORARY FACILITIES

SECTION 016000
PRODUCT REQUIREMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS:

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

1.2 SUMMARY

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

1.3 DEFINITIONS

A. Products: Items obtained for incorporating into the Work, whether purchased for Project or taken from previously purchased stock. The term "product" includes the terms "material," "equipment," "system," and terms of similar intent.
   1. Named Products: Items identified by manufacturer's product name, including make or model number or other designation shown or listed in manufacturer's published product literature, that is current as of date of the Contract Documents.
   2. New Products: Items that have not previously been incorporated into another project or facility. Products salvaged or recycled from other projects are not considered new products.
   3. Comparable Product: Product that is demonstrated and approved through submittal process to have the indicated qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics that equal or exceed those of specified product.

B. Basis-of-Design Product Specification: A specification in which a specific manufacturer's product is named and accompanied by the words "basis-of-design" including make or model number or other designation, to establish the significant qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics for purposes of evaluating comparable products of additional manufacturers named in the specification.

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

D. Manufacturer's Warranty: Preprinted written warranty published by individual manufacturer for a particular product and specifically endorsed by manufacturer to Owner.

E. Special Warranty: Written warranty required by or incorporated into the Contract Documents, either to extend time limit provided by manufacturer's warranty or to provide more rights for Owner.

1.4 SUBMITTALS

A. Comparable Product Requests: Submit request for consideration of each comparable product. Identify product or fabrication or installation method to be replaced. Include Specification Section number and title and Drawing numbers and titles.
   1. Include data to indicate compliance with the requirements specified in "Comparable Products" Article.
   2. If necessary, Architect will request additional information or documentation for evaluation within one week of receipt of a comparable product request.
   a. Architect will notify Contractor of approval or rejection of proposed comparable product request within fifteen (15**)** days of receipt of request, or seven (7) days of receipt of additional information or documentation, whichever is later.
   b. Use product specified if Architect does not issue a decision on use of a comparable product request within time allocated.

B. Substitution Requests: Submit three copies of each request for consideration. Identify product or fabrication or installation method to be replaced. Include Specification Section number and title and Drawing numbers and titles.
   1. Substitution Request Form: Use CSI Form 13.1A.
   2. Documentation: Show compliance with requirements for substitutions and the following, as applicable:
      a. Statement indicating why specified material or product cannot be provided.
      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. Significant qualities may include attributes such as performance, weight, size, durability, visual effect, and specific features and requirements indicated.
      d. Product Data, including drawings and descriptions of products and fabrication and installation procedures.
      e. Samples, where applicable or requested.
      f. List of similar installations for completed projects with project names and addresses and names and addresses of architects and owners.
      g. Material test reports from a qualified testing agency indicating and interpreting test results for compliance with requirements indicated.
      h. Research/evaluation reports evidencing compliance with building code in effect for Project, from a model code organization acceptable to authorities having jurisdiction.
      i. 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 lack of availability or delays in delivery.

j. Cost information, including a proposal of change, if any, in the Contract Sum.

k. Contractor's certification that proposed substitution complies with requirements in the Contract Documents and is appropriate for applications indicated.

l. Contractor's waiver of rights to additional payment or time that may subsequently become necessary because of failure of proposed substitution to produce indicated results.

3. Architect's Action: If necessary, Architect will request additional information or documentation for evaluation within 7 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 7 days of receipt of additional information or documentation, whichever is later.

a. Form of Acceptance: Change Order.

b. Use product specified if Architect cannot make a decision on use of a proposed substitution within time allocated.

1.5 QUALITY ASSURANCE

A. Compatibility of Options: If Contractor is given option of selecting between two or more products for use on Project, select product compatible with products previously selected, even if previously selected products were also options.

1.6 PRODUCT DELIVERY, STORAGE, AND HANDLING

A. Deliver, store, and handle products using means and methods that will prevent damage, deterioration, and loss, including theft and vandalism. Comply with manufacturer's written instructions.

B. Delivery and Handling:

1. Schedule delivery to minimize long-term storage at Project site and to prevent overcrowding of construction spaces.
2. Coordinate delivery with installation time to ensure minimum holding time for items that are flammable, hazardous, easily damaged, or sensitive to deterioration, theft, and other losses.
3. Deliver products to Project site in an undamaged condition in manufacturer's original sealed container or other packaging system, complete with labels and instructions for handling, storing, unpacking, protecting, and installing.
4. Inspect products on delivery to determine compliance with the Contract Documents and to determine that products are undamaged and properly protected.

C. Storage:

1. Store products to allow for inspection and measurement of quantity or counting of units.
2. Store materials in a manner that will not endanger Project structure.

3. Store products that are subject to damage by the elements, under cover in a weathertight enclosure above ground, with ventilation adequate to prevent condensation.
4. Store cementitious products and materials on elevated platforms.
5. Protect foam plastic from exposure to sunlight, except to extent necessary for period of installation and concealment.
6. Comply with product manufacturer's written instructions for temperature, humidity, ventilation, and weather-protection requirements for storage.
7. Protect stored products from damage and liquids from freezing.

1.7 PRODUCT WARRANTIES

A. Warranties specified in other Sections shall be in addition to, and run concurrent with, other warranties required by the Contract Documents. Manufacturer's disclaimers and limitations on product warranties do not relieve Contractor of obligations under requirements of the Contract Documents.

B. Submittal Time: Comply with requirements in Division 1 Section "Project Closeout."

PART 2 - PRODUCTS

2.1 PRODUCT SELECTION PROCEDURES

A. General Product Requirements: Provide products that comply with the Contract Documents, are undamaged and, unless otherwise indicated, are new at time of installation.
1. Provide products complete with accessories, trim, finish, fasteners, and other items needed for a complete installation and indicated use and effect.
2. Standard Products: If available, and unless custom products or nonstandard options are specified, provide standard products of types that have been produced and used successfully in similar situations on other projects.
3. Owner reserves the right to limit selection to products with warranties not in conflict with requirements of the Contract Documents.
4. Where products are accompanied by the term "as selected," Architect will make selection.
5. Descriptive, performance, and reference standard requirements in the Specifications establish salient characteristics of products.
6. Or Equal: For products specified by name and accompanied by the term "or equal," or "or approved equal," or "or approved," comply with requirements in "Comparable Products" Article to obtain approval for use of an unnamed product.

B. Product Selection Procedures:
1. Product: Where Specifications name a single manufacturer and product, provide the named product that complies with requirements. Comparable products or substitutions for Contractor's convenience will not be considered.
2. Manufacturer/Source: Where Specifications name a single manufacturer or source, provide a product by the named manufacturer or source that complies

with requirements. Comparable products or substitutions for Contractor's convenience will not be considered.

3. Products: Where Specifications include a list of names of both manufacturers and products, provide one of the products listed that complies with requirements.
4. Manufacturers: Where Specifications include a list of manufacturers' names, provide a product by one of the manufacturers listed that complies with requirements.
5. Basis-of-Design Product: Where Specifications name a product, or refer to a product indicated on Drawings, and include a list of manufacturers, provide the specified or indicated product or a comparable product by one of the other named manufacturers.

a. Drawings and Specifications indicate sizes, profiles, dimensions, and other characteristics that are based on the product named.
b. Comply with requirements in "Comparable Products" Article for consideration of an unnamed product by one of the other named manufacturers.

C. Visual Matching Specification: Where Specifications require "match Architect's sample", provide a product that complies with requirements and matches Architect's sample.
1. Architect's decision will be final on whether a proposed product matches.
2. If no product is available within specified category matches and complies with other specified requirements, comply with requirements in "Product Substitution" Article for proposal of product.

D. Visual Selection Specification: Where Specifications include the phrase "as selected by Architect from manufacturer's full range" or similar phrase, select a product that complies with requirements. Architect will select color, gloss, pattern, density, or texture from manufacturer's product line that includes both standard and premium items.

2.2 PRODUCT SUBSTITUTIONS

A. Requests for substitution shall reach the Architect not less than ten (10) calendar days prior to the date set for Bid opening. Requests received by Architect after this date will not be considered.

B. Architect will consider Contractor's request for substitution in accordance with conditions and procedures described in the Instructions to Bidders.

C. Conditions for Consideration: Architect will consider Contractor's request for substitution when the following conditions are satisfied.
1. Requested substitution offers Owner a substantial advantage in cost, time, energy conservation, or other considerations, after deducting additional responsibilities Owner must assume. Owner's additional responsibilities may include compensation to Architect for redesign and evaluation services, increased cost of other construction by Owner, and similar considerations.
2. Requested substitution does not require extensive revisions to the Contract Documents.
3. Requested substitution is consistent with the Contract Documents and will produce indicated results.
4. Substitution request is fully documented and properly submitted.

5. Requested substitution will not adversely affect Contractor's Construction Schedule.
6. Requested substitution has received necessary approvals of authorities having jurisdiction.
7. Requested substitution is compatible with other portions of the Work.
8. Requested substitution has been coordinated with other portions of the Work.
9. Requested substitution provides specified warranty.
10. 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.

D. Architect will determine acceptability of proposed substitutions. In accepting a substitution the Architect does not warrant that the product meets all expressed requirements of the Contract Documents. The approved substitution is subject to the same subsequent review and approval procedures as the products originally specified.
1. Determination as to acceptability of proposed substitutions will be made based only on data submitted.
2. Substitute products shall not be ordered or installed without written acceptance by the Architect.

E. Contractor shall coordinate installation of accepted substitutions with interfacing work, bearing re-design costs and making approved changes in the Work to properly incorporate the substitutions, and shall waive all claims for additional costs related to use of acceptable substitutions which become apparent following acceptance.

2.3 COMPARABLE PRODUCTS

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

PART 3 - EXECUTION (Not Used)

END OF PRODUCT REQUIREMENTS

SECTION 017329

CUTTING AND PATCHING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS:

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

1.2 DESCRIPTION OF REQUIREMENTS:

A. Definition:
1. Cutting and patching includes cutting into existing construction to provide for the installation or performance of other work and subsequent fitting and patching required to restore surfaces to their original condition.
2. Cutting and patching is performed for coordination of the Work, to uncover work for access or inspection, to obtain samples for testing, to permit alterations to be performed or for other similar purposes.
3. Cutting and patching performed during the manufacture of products, or during the initial fabrication, erection or installation processes is not considered to be "cutting and patching" under this definition. Drilling of holes to install fasteners and similar operations are also not considered to be "cutting and patching".

1.3 SUBMITTALS:

A. Procedural Proposal for Cutting and Patching:
1. Where prior approval of cutting and patching is required, submit proposed procedures for this work well in advance of the time work will be performed and request approval to proceed. Include the following information, as application, in the submittal.
2. Describe nature of the work and how it is to be performed, indicating why cutting and patching cannot be avoided. Describe anticipated results of the work in terms of changes to existing work, including structural, operational and visual changes as well as other significant elements.
3. List products to be used and firms that will perform work.
4. Give dates when work is expected to be performed.
5. List utilities that will be disturbed or otherwise be affected by work, including those that will be relocated and those that work be out-of-service temporarily. Indicate how long utility service will be disrupted.
6. Approval by the Architect/Engineer to proceed with cutting and patching work does not waive the Architect/Engineer’s right to later require complete removal and replacement of work found to be cut and patched in an unsatisfactory manner.

PART 2 - PRODUCTS

2.1 MATERIALS:

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

PART 3 - EXECUTION

3.1 INSPECTION:

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

3.2 PREPARATION:

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

B. Protection:
1. Protect other work during cutting and patching to prevent damage. Provide protection from adverse weather conditions for that part of the project that may be exposed during cutting and patching operations.
2. Avoid interference with use of adjoining areas or interruption of free passage to adjoining areas.
3. Take precautions not to cut existing pipe, conduit or duct serving the building but scheduled to be relocated until provisions have been made to bypass them.

3.3 PERFORMANCE:

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

B. Cutting:
1. Cut the work using methods that are least likely to damage work to be retained or adjoining work. Where possible review proposed procedures with the original installer; comply with original installer's recommendations.
2. In general, where cutting is required use hand or small power tools designed for sawing or grinding, not hammering and chopping. Cut through concrete and masonry using a cutting machine such as a carborundum saw or core drill to insure a neat hole. Cut holes and slots neatly to size required with minimum disturbance of adjacent work. To avoid marring existing finished surfaces, cut or

drill from the exposed or finished side into concealed surfaces. Temporarily cover openings when not in use.

C. Patching:
1. Patch with seams which are durable and as invisible as possible. Comply with specified tolerances for the work.
2. Where feasible, inspect and test patched areas to demonstrate integrity of work.
3. Restore exposed finishes of patched areas and where necessary extend finish restoration into retained adjoining work in a manner which will eliminate evidence of patching and refinishing.
4. Where patch occurs in a smooth painted surface, extend final paint coat over entire unbroken surface containing patch, after patched area has received prime and base coat.
5. Patch, repair or rehang existing ceilings as necessary or called for on plans to provide an even plane surface of uniform appearance.

3.4 CLEANING:

A. Thoroughly clean areas and spaces where work is performed or used as access to work. Remove completely point, mortar, oils, putty and items of similar nature.

B. Thoroughly clean piping, conduit and similar features before painting or other finishing is applied. Restore damaged pipe covering to its original condition.

END OF CUTTING AND PATCHING

SECTION 017720

PROJECT CLOSEOUT

PART 1 - GENERAL

1.1 RELATED DOCUMENTS:

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

1.2 DESCRIPTION OF REQUIREMENTS:

A. Definitions:

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

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

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

1.3 PREREQUISITES TO SUBSTANTIAL COMPLETION:

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

1. Inspection Procedures:
   a. The Contractor shall conduct their own complete Prefinal Inspections, distribute punchlists to all trades, the Owner, Architect and their Consultants, and complete all resulting work items, prior to any Final Inspection by the Architect or their Consultants.
   b. Following the Contractor's completion of work resulting from their own inspection(s), and upon receipt of the Contractor's request for inspection, the Architect/Engineer will either proceed with inspection or advise the Contractor of unfilled prerequisites.
   c. Following the initial inspection, the Architect/Engineer will either prepare the certificate of substantial completion, or will advise the Contractor of work which must be performed before the certificate will be issued. The Architect/Engineer will repeat the inspection when requested and when assured that the Work has been substantially completed.

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

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

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

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

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

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

7. Make the final change-over of locks and transmit the keys to the Owner. Advise the Owner's personnel of the change-over in security provisions.

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

1.4 PREREQUISITES TO FINAL ACCEPTANCE:

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

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

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

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

4. Submit final meter readings for utilities, a measured record of stored fuel, and similar date either as of the date of substantial completion, or else when the Owner or subsequent Contractor took possession of and responsibility for corresponding elements of the Work.

5. Submit consent of surety.

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

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

B. Reinspection Procedure:

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

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

3. If necessary, the reinspection procedure will be repeated.

1.5 RECORD DOCUMENT SUBMITTALS:

A. General:

1. Specific requirements for record documents are indicated in the individual sections of these specifications. Other requirements are indicated in the General Conditions. General submittal requirements are indicated in the various "submittals" sections.

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

B. Record Drawings:

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

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

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

4. Note related change-order numbers where applicable.

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

C. Record Specifications: Maintain one complete copy of the Project Manual, including specifications and addenda(s), and one copy of other written construction documents such as change orders and similar modifications issued in printed for during construction.

1. Mark these documents to show substantial variations in the actual work performed in comparison with the text of the specifications and modifications as issued.

2. Give particular attention to substitutions, selection of options and similar information on work where it is concealed or cannot otherwise be readily discerned at a later date by direct observation.

3. Note related record drawing information and product data, where applicable.

4. Upon completion of the Work, submit record specifications to the Architect/Engineer for the Owner's records.

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

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

F. Maintenance Manuals, Warranties, and Guarantees:

1. Unless indicated otherwise, submit one (1) original and one (1) copy of each item required by the Project Manual.

2. Furnish to Architect for review, and then to Owner, in two (2) separate sets bound in three-ring binders, permanently and clearly identifying the project and contents on front and edge.

PART 2 – PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 CLOSEOUT PROCEDURES:

A. General Operating and Maintenance Instructions:

1. Arrange for each installer of operating equipment and other work that requires regular or continuing maintenance, to meet at the site with the Owner's personnel to provide necessary basic instruction in the proper operation and maintenance of

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

2. As part of this instruction, provide a detailed review of the following items:
   a. Maintenance manuals
   b. Record documents
   c. Spare parts and materials
   d. Tools
   e. Identification systems
   f. Control sequences
   g. Cleaning procedures
   h. Warranties, bonds, maintenance agreements, and similar continuing commitments.

3. As a part of this instruction for operating equipment, demonstrate the following procedures:
   a. Start-up
   b. Shut-down
   c. Emergency operations
   d. Noise and vibration adjustments
   e. Safety procedures
   f. Economy and efficiency adjustments
   g. Effective energy utilization.

3.2 FINAL CLEANING:

A. General: Special cleaning requirements for specific units of Work are included in the appropriate sections of Divisions 2 through 16. General Cleaning during the regular progress of the Work is required by the General Conditions and is included under section "Temporary Facilities".

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

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

1. Clean the project site, including landscape development areas, of rubbish, litter and other foreign substances.

2. Sweep paved areas to a broom clean condition; remove stains, spills and other foreign deposits. Rake grounds that are neither paved nor planted, to a smooth even-textured surface.

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

E. Compliance:

1. Comply with safety standards and governing regulations for cleaning operations. Remove waste materials from the site and dispose of in a lawful manner.
2. Do not burn waste materials at the site.
3. Do not bury debris or excess materials on the Owner's property.
4. Do not discharge volatile or other harmful or dangerous materials into drainage systems.
5. Where extra materials of value remaining after completion of associated work have become the Owner's property, dispose of these materials to the Owner's best advantage as directed.

END OF PROJECT CLOSEOUT

SECTION 017839

PROJECT RECORD DOCUMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS:

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

1.2 DOCUMENTS:

A. Maintain at least one (1) copy of all drawings, specifications, addenda, approved shop drawings, change orders, filed orders, other contract modifications and other reviewed documents submitted by the Contractor in compliance with various sections of the specifications.

1.3 IDENTIFICATION AND MAINTENANCE:

A. Each of these project record documents shall be clearly marked "Project Record Copy," maintained in good condition, available for inspection by the Architect or Owner, and not used for construction purposes.

1.4 RECORDS:

A. Mark up the most appropriate documents with permanent red ink pen or red pencil to show:

1. Significant changes made during the construction progress.
2. Significant detail not shown in the original contract documents.

B. The information given shall include, but not be limited to the location of underground utilities and appurtenances, referenced to permanent surface improvements by dimensions(s) and description(s).

C. Keep project record documents current. Do not permanently conceal any work until the required information has been recorded.

D. As-built Drawings: At completion of project, the Contractor shall submit to Architect complete sets of marked-up Project Record Drawings, as follows:

1. One (1) Original Set.
2. One (1) set, blueline or blackline prints or copies.
3. Two (2) sets of digital copies in latest edition of ISO/Adobe compliant "Portable Document Format" (PDF) saved as "Read Only" on compact discs (CD's), clearly and permanently labeled as to their contents. Minimum Resolution shall be 300 dpi for small format documents and 600 dpi for large format documents ("large format" is defined as larger than 11-inches by 17-inches).
   a. Original documents which include color, colored markings, etc., shall be scanned and saved as color documents. Documents may be saved in a

non-proprietary ISO compliant self-extracting compressed file format, and no documents shall be password protected.

b. Deliver in standard CD cases or sleeves which are free of any PVC content, also clearly and permanently labeled.

E. As-Built Project Manual and Specifications: At completion of project, the Contractor shall submit to Architect complete sets of marked-up Project Record Specifications, in same quantities and formats as required for the As-built Drawings.

1.5 SUBMITTALS:

A. Submit project record documents and as-built drawings within ten (10) days of acceptance of the entire completed project.

END OF PROJECT RECORD DOCUMENTS

SECTION 024120

SELECTIVE DEMOLITION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS:

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

1.2 SUMMARY:

A. This Section requires the selective removal and subsequent offsite disposal of the following:

1. Portions of existing interior and exterior construction and improvements indicated on Drawings, and as otherwise required to accommodate new construction.

2. Removal of existing improvements indicated "remove", or similar indication.

3. Removal and protection of existing fixtures, materials, and equipment items indicated "salvage," or otherwise to be re-used. Refer to other Sections of Project Manual, including and Drawings for additional information and requirements.

4. The work described in this Section, by other referenced Sections and Regulations, and by authorities having jurisdiction, require in part, that the Contractor and any Specialty Subcontractors for removal of any mold/mildew and any hazardous materials encountered, shall be knowledgeable of and comply with current regulations regarding removal, handling, worker safety, environmental safety, and legal disposal of hazardous materials.

5. Compliance with all Federal and State regulations regarding building demolition and disposal, including in part and where applicable, any thermostats and other items containing mercury, fluorescent light bulbs, transformers, ballasts, PCB’s, capture of Freon, etc.

B. Related work specified elsewhere:

1. Remodeling, construction work, and patching are included within the respective sections of specifications, including removal of materials for reuse and incorporation into remodeling or new construction, and/or delivery of salvage items to Owner at on site location indicated.

2. Relocation of pipes, conduits, ducts, and other mechanical and electrical work is specified in other Divisions, and/or indicated on the Drawings.

1.3 SUBMITTALS:

B. Demolition Schedules: Submit schedules indicating proposed sequence of operations for selective demolition work to Owner’s Representative for review prior to start of work.

1. Include coordination for shutoff, capping, and continuation of utility services as

required, together with details for dust and noise control protection.

2. Provide detailed sequence of demolition and removal work to ensure uninterrupted progress of Owner's on-site operations (i.e.: Work by others on behalf of the Owner, normal work of Owner's personnel and other building occupants, etc.).

C. Photographic Survey: Submit photographs taken of existing conditions of structure surfaces, equipment, and adjacent improvements that might be misconstrued as damage related to removal operations. File with Owner's Representative prior to start of work, with copy to the Architect.

1.4 JOB CONDITIONS:

A. Occupancy: Owner may occupy portions of the building or site immediately adjacent to areas of selective demolition. Conduct selective demolition work in manner that will minimize need for disruption of Owner's operations. Provide minimum of 72 hours advance notice to Owner of demolition activities that will affect Owner's operations.

B. Condition of Structures: Owner assumes no responsibility for actual condition of items or structures to be demolished. Conditions existing at time of inspection for bidding purposes will be maintained by Owner insofar as practicable. However, minor variations within structure may occur by Owner's removal and salvage operations prior to start of selective demolition work.

C. Partial Demolition and Removal: Items indicated to be removed but of salvageable value to Contractor may be removed from structure as work progresses.

1. Transport salvaged items from site as they are removed.

2. Storage or sale of removed items on site *will not be permitted*.

D. Protections: Provide temporary barricades and other forms of protection to protect Contractor's and Owner's personnel and general public from injury due to selective demolition work.

1. Provide protective measures as required to provide free and safe passage of Owner's personnel and representatives to portions of building and/or site, as required.

2. Erect temporary covered passageways if required by authorities having jurisdiction.

3. Provide interior bracing or support to prevent movement, settlement, or collapse of structure or element to be demolished and adjacent facilities or work to remain.

4. Protect from damage existing finish work that is to remain in place and which becomes exposed during demolition operations.

5. Protect floors with suitable coverings when necessary.

6. Construct temporary insulated dustproof partitions where required to separate areas where noisy or extensive dirt or dust operations are performed. Equip partitions with dustproof doors and security locks. Temporary exterior partitions shall be weatherproof.

7. Remove protections at completion of work.

E. Damages: Promptly repair damages caused to adjacent facilities by demolition work.

F. Traffic: Conduct selective demolition operations and debris removal to ensure minimum interference with roads, streets, walks, building egress, and other adjacent occupied or used facilities.

1. Do not close, block, or otherwise obstruct streets, walks, exit egress from building, or other occupied or used facilities without written permission from authorities having jurisdiction.

2. Provide alternate routes around closed or obstructed traffic ways if required by governing regulations.

G. Flame Cutting: Do not use cutting torches for removal until work area is cleared of flammable materials. At concealed spaces, such as interior of ducts and pipe spaces, verify condition of hidden space before starting flame-cutting operations. Maintain portable fire suppression devices during flame-cutting operations.

H. Utility Services: Maintain existing utilities indicated to remain in service and protect them against damage during demolition operations.

1. Do not interrupt utilities serving occupied or used facilities, except when authorized in writing by authorities having jurisdiction. Provide temporary services during interruptions to existing utilities, as acceptable to governing authorities.

2. Maintain fire protection services during selective demolition operations.

I. Environmental Controls: Use temporary enclosures and other methods to limit dust and dirt migration. Comply with governing regulations pertaining to environmental protection.

PART 2 - PRODUCTS

Not applicable.

PART 3 - EXECUTION

3.1 PREPARATION:

A. General: Provide interior bracing, or support to prevent movement, settlement, or collapse of areas to be demolished and adjacent facilities to remain.

1. Cease operations and notify Owner’s Representative immediately if safety of structure appears to be endangered.

2. Take precautions to support structure until determination is made for continuing operations.

B. Cover and protect furniture, equipment, and fixtures from soilage or damage when demolition work is performed in areas where such items have not been removed.

C. Erect and maintain dust-proof partitions and closures, as required to prevent spread of dust or fumes to occupied portions of the building. Temporary partitions in exterior openings shall be weatherproof.

D. Locate, identify, stub off, and disconnect utility services that are not indicated to remain.

1. Provide bypass connections as necessary to maintain continuity of service to occupied areas of building.

2. Provide minimum of 72 hours advance notice to Owner if shutdown of service is necessary during changeover.

3.2 DEMOLITION:

A. General: Perform selective demolition work in a systematic manner. Use such methods as required to complete work indicated on Drawings in accordance with demolition schedule and governing regulations.

1. Cut concrete and masonry at junctures with construction to remain using power-driven masonry saw or hand tools; do not use power-driven impact tools.

2. Locate demolition equipment throughout structure and promptly remove debris to avoid imposing excessive loads on supporting walls, floors, or framing.

3. Provide services for effective air and water pollution controls as required by local authorities having jurisdiction.

B. If unanticipated mechanical, electrical, or structural elements that conflict with intended function or design are encountered, investigate and measure both nature and extent of the conflict. Submit report to Owner's Representative in written, accurate detail. Pending receipt of directive from Owner's Representative, rearrange selective demolition schedule as necessary to continue overall job progress without undue delay.

3.3 SALVAGED MATERIALS:

A. Salvaged Items: Where indicated on Drawings as "Salvage - Deliver to Owner," or similar indication, carefully remove indicated items, clean, store, and turn over to Owner and obtain receipt.

1. Historic artifacts, including cornerstones and their contents, commemorative plaques and tablets, antiques, and other articles of historic significance, remain property of Owner. Notify Owner's Representative if such items are encountered and obtain acceptance regarding method of removal and salvage for Owner.

2. Carefully remove, clean, and deliver to Owner items so on the Drawings.

3.4 DISPOSAL OF DEMOLISHED MATERIALS:

A. Remove from building site debris, rubbish, and other materials resulting from demolition operations. Transport and legally dispose of off site.

1. If hazardous materials are encountered during demolition operations, comply

with applicable regulations, laws, and ordinances concerning removal, handling, and protection against exposure or environmental pollution.

2. Burning of removed materials is not permitted on project site.

3.5 CLEANUP AND REPAIR:

A. General: Upon completion of demolition work, remove tools, equipment, and demolished materials from site. Remove protections and leave interior areas broom clean; vacuum carpets.

1. Repair demolition performed in excess of that required.

2. Return elements of construction and surfaces to remain to condition existing prior to start operations.

3. Repair adjacent construction or surfaces soiled or damaged by selective demolition work.

END OF SELECTIVE DEMOLITION

SECTION 054000

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 01 Specification Sections, apply to this Section.

1.2 SUMMARY;

A. Section Includes:
   1. Exterior non-load-bearing wall framing.
   2. Soffit framing.
   3. Framing accessories, including sub-girts for siding installation.

B. Related Sections:
   1. Division 7 Section – "Thermal Insulation."
   2. Division 9 Section – "Gypsum Board Assemblies."
   3. Division 9 Secton – "Gypsum Sheathing."

1.3 PERFORMANCE REQUIREMENTS;

A. Structural Performance: Provide cold-formed steel framing capable of withstanding design loads within limits and under conditions indicated.
   1. Design Loads: As indicated on Drawings.
   2. Deflection Limits: Design framing systems to withstand design loads without deflections greater than the following:
      a. Exterior Non-Load-Bearing Wall Framing: Horizontal deflection of 1/240 of the wall height.
      b. Soffit Framing: Vertical deflection of 1/240 of the span.
   3. Design framing systems to provide for movement of framing members located outside the insulated building envelope without damage or overstressing, sheathing failure, connection failure, undue strain on fasteners and anchors, or other detrimental effects when subject to a maximum ambient temperature change of 120-degress F.
   4. Design framing system to maintain clearances at openings, to allow for construction tolerances, and to accommodate live load deflection of primary building structure.
   5. Design exterior non-load-bearing wall framing to accommodate horizontal deflection without regard for contribution of sheathing materials.

B. Cold-Formed Steel Framing Standards: Comply with AISI S100, "North American Specification for the Design of Cold-Formed Steel Structural Members" and AISI S200 "North American Standard for Cold-Formed Steel Framing - General Provisions," including standards specified below.
   1. Wall Stud Design: AISI S211 "Standard for Cold-Formed Steel Framing – Wall Stud Design."

2. Header Design: AISI S212 "Standard for Cold-Formed Steel Framing – Header Design."
3. Lateral Design: AISI S213 "Standard for Cold-Formed Steel Framing - Lateral Design."

1.4 SUBMITTALS;

A. Product Data: For each type of cold-formed metal framing product and accessories.

B. Shop Drawings: Show layout, spacings, sizes, thicknesses, and types of cold-formed steel framing; fabrication; and fastening and anchorage details, including mechanical fasteners.
1. Indicate reinforcing channels, opening framing, supplemental framing, strapping, bracing, bridging, splices, accessories, connection details, and attachment to adjoining work.
2. Indicate shop and field assembly details.
3. Indicate type and location of welds, bolts and fastening devices.
4. Indicate provisions to accommodate structural movement, and erection details for connection to building structure.
5. Indicate that the qualified professional engineer providing structural analysis has reviewed shop drawings

C. Structural Analysis: Include structural analysis data signed and sealed by the qualified professional engineer responsible for their preparation indicating compliance with performance and design load requirements.

D. Welding Certificates: Submit welders' certificates for personnel performing the work complying with qualification requirements. Certificates shall be current within the previous twelve (12) months. (Submit for Architect's information only.)

E. Product Certificates: Submit for each type of code-compliance certification for studs and tracks. (Submit for Architect's information only.)

F. Mill Certificates: Submit certificates signed by steel sheet producer or test reports from a qualified independent testing agency indicating steel sheet complies with requirements, including base-metal thickness, yield strength, tensile strength, total elongation, chemical requirements, and metallic-coating thickness.

G. Product Test Reports: For each listed product, for tests performed by a qualified testing agency. (Submit for Architect's information only.)
1. Steel sheet.
2. Expansion anchors.
3. Power-actuated anchors.
4. Mechanical fasteners.
5. Miscellaneous structural clips and accessories.

H. Evaluation Reports: For nonstandard cold-formed steel framing, post-installed anchors and power-actuated fasteners, from ICC-ES or other qualified testing agency acceptable to authorities having jurisdiction. (Submit for Architect's information only.)

1.5 QUALITY ASSURANCE;

A. Product Tests: Mill certificates or data from a qualified independent testing agency, or in-house testing with calibrated test equipment, indicating steel sheet complies with requirements,

including base-metal thickness, yield strength, tensile strength, total elongation, chemical requirements, and metallic-coating thickness.

B. Code-Compliance Certification of Studs and Tracks: Provide documentation that framing members are certified according to the product-certification program of one of the following:

1. Certified Steel Stud Association (CSSA).
2. Steel Framing Industry Association (AFIA)
3. Steel Stud Manufacturers Association (SSMA).

C. Welding Qualifications: Qualify procedures and personnel according to the following:

1. AWS D1.1/D1.1M, "Structural Welding Code - Steel."
2. AWS D1.3/D1.3M, "Structural Welding Code - Sheet Steel."

D. Source Limitations: Obtain cold-formed metal framing from a single manufacturer and from a single source.

1.6 PRE-INSTALLATION MEETINGS:

A. Pre-installation Conference: Conduct conference at Project site.

PART 2 - PRODUCTS

2.1 MANUFACTURERS:

A. Acceptable Manufacturers; subject to compliance with requirements, provide cold-formed metal framing by one of the following:

1. Aegis Metal Framing / subsidiary of MiTek Holdings, Inc.
2. CEMCO / California Expanded Metal Products Co.
3. Clarkwestern Dietrich Building Systems, LLC.
4. Marino Ware / Div. Ware Industries, Inc.
5. The Steel Network, Inc.

2.2 COLD-FORMED STEEL FRAMING MATERIALS:

A. Galvanized Steel Sheet: ASTM A 1003/A 1003M, Structural Grade, Type H, zinc coated, of grade and coating designation as follows:

1. Grades:
   a. Grade 33 Type H (ST33H) for 33 mil (20-gauge) and 43-mil (18-gauge) framing members; 33,000 psi minimum yield strength.
   b. Grade 50 Type H (ST50H) for 54-mil (16-gauge) and thicker steel framing members; 50,000 psi minimum yield strength.
2. Coating Designation: G90 hot-dipped galvanized.

2.3 EXTERIOR NON-LOAD-BEARING WALL FRAMING:

A. Steel Studs: Manufacturer's standard C-shaped steel studs, of web depths indicated, punched, with stiffened flanges, and as follows:

1. Minimum Base-Metal Thickness: Not less than 43-mils (18-gauge, 0.0428-inch).
2. Flange Width: 1-5/8 inches.

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

1. Minimum Base-Metal Thickness: Matching steel studs.
2. Flange Width: 1-1/4 inches, minimum.

C. Deflection Track: Type as required by manufacturer's structural analysis of deep-leg design with web depth sized to contain studs while allowing free vertical movement and flanges capable to support horizontal and lateral loads and transfer them to the primary structure.
1. Minimum Base-Metal Thickness: Heavier than stud gauge to which it supports put not less than 54-mils (16-gauge) (0.0538 inch).
2. Flange Width: 1-inch plus twice the design gap or greater as recommended by manufacturer's analysis for Project design conditions.

D. Deflection Clips: Manufacturer's standard clips, capable of accommodating upward and downward vertical displacement of primary structure through positive mechanical attachment to stud web.
1. Type: As required by manufacturer's analysis for Project design conditions.
2. Minimum Base-Metal Thickness: Heavier than stud gauge to which it supports put not less than 68-mils 14-gauge (0.0677 inch.

2.4 SOFFIT FRAMING:

A. Exterior Soffit Framing: Manufacturer's standard C-shaped steel sections, of web depths indicated, with stiffened flanges, and as follows:

1. Minimum Base-Metal Thickness: As indicated on drawings but not less than 43-mils (18-gauge, 0.0428-inch).
2. Flange Width: 1-5/8 inches.

2.5 FRAMING ACCESSORIES:

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

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

1. Supplementary framing.
2. Bracing, bridging, and solid blocking.
3. Web stiffeners.
4. Anchor clips.
5. End clips.
6. Foundation clips.
7. Gusset plates.

8. Stud kickers and knee braces.
9. Hole-reinforcing plates.
10. Backer plates.

C. Sub-girts or Furring: Manufacturer's standard z-shaped sections, fabricated from specified cold-formed metallic-coated steel sheet material, not less than Coating Designation G60 hot-dip galvanized. Provide for installation of exterior rigid insulation and siding finish material.
1. Metal Thickness: Not less than 43-mils (18-gauge, 0.0428-inch).
2. Size: Depth as required to accommodate exterior insulation thickness indicated for installation to face of exterior masonry wall or sheathing surfaces and for attachment of siding finish material.

2.6 ANCHORS, CLIPS, AND FASTENERS:

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

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

C. Post-Installed Anchors: Fastener systems with bolts of same basic metal as fastened metal, if visible, unless otherwise indicated; with working capacity greater than or equal to the design load, according to an evaluation report acceptable to authorities having jurisdiction, based on ICC-ES AC193 "Acceptance Criteria for Mechanical Anchors in Concrete Elements," or ICC-ES AC308 "Acceptance Criteria for Post-Installed Adhesive Anchors in Concrete Elements," as appropriate for the substrate.

1. Uses: Securing cold-formed steel framing to structure.
2. Type: Torque-controlled expansion anchor or Torque-controlled adhesive anchor.
3. Materials:
   a. Exterior or Interior Locations and Where Stainless Steel Is Indicated: Alloy Group 1 or Group 2 stainless-steel bolts, ASTM F 593 , and nuts, ASTM F 594.
   b. Interior Locations Only: Carbon-steel components zinc plated to comply with ASTM B 633 or ASTM F 1941, Class Fe/Zn 5, unless otherwise indicated.

D. Power-Actuated Anchors: Fastener systems of type suitable for application indicated and fabricated from corrosion-resistant materials, with working capacity greater than or equal to the design load, according to an evaluation report acceptable to authorities having jurisdiction, based on ICC-ES AC70.

E. Mechanical Fasteners: ASTM C 1513, corrosion-resistant-coated, self-drilling, self-tapping, steel drill screws. Provide low-profile head type fasteners for installation beneath sheathing and manufacturer's standard elsewhere.

F. Welding Electrodes: Comply with AWS standards.

2.7 MISCELLANEOUS MATERIALS:

A. Galvanizing Repair Paint: Zinc-rich paint complying with ASTM A 780/A 780M or SSPC-Paint 20.

B. Cement Grout: Portland cement, ASTM C 150/C 150M, 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: Factory-packaged, nonmetallic, noncorrosive, nonstaining grout, complying with ASTM C 1107/C 1107M, and with a fluid consistency and 30-minute working time.

D. Shims: Load-bearing, high-density, multimonomer, nonleaching plastic; or cold-formed steel of same grade and metallic coating as framing members supported by shims.

E. Sealer Gaskets: Closed-cell neoprene foam, 1/4-inch thick, selected from manufacturer's standard widths to match width of bottom track members as required.

2.8 FABRICATION:

A. Fabricate cold-formed steel framing and accessories plumb, square, and true to line, and with connections securely fastened, according to referenced AISI's specifications and standards, manufacturer's written instructions, and requirements in this Section.

1. Fabricate framing assemblies using jigs or templates.
2. Cut framing members by sawing or shearing; do not torch cut.
3. Fasten cold-formed steel framing members by welding, screw fastening, clinch fastening, pneumatic pin fastening, or riveting as standard with fabricator. Wire tying of framing members is not permitted.
    a. Comply with AWS D1.3/D1.3M requirements and procedures for welding, appearance and quality of welds, and methods used in correcting welding work.
    b. Locate mechanical fasteners and install according to Shop Drawings, with screws penetrating joined members by no fewer than three exposed screw threads.
4. Fasten other materials to cold-formed steel framing by welding, bolting, pneumatic pin fastening, or screw fastening, according to Shop Drawings.

B. Reinforce, stiffen, and brace framing assemblies which are shop fabricated to withstand handling, delivery, and erection stresses.

C. Tolerances: Fabricate assemblies level, plumb, and true to line to a maximum allowable variation of 1/8-inch in 10 feet and as follows:

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

PART 3 - EXECUTION

3.1 EXAMINATION:

A. Examine substrates, areas, conditions, and abutting structural framing for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

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

3.2 PREPARATION:

A. Install load-bearing shims or grout between the underside of load-bearing wall bottom track and the top of foundation wall or slab at locations with a gap larger than 1/4-inch to ensure a uniform bearing surface on supporting concrete or masonry construction.

B. Install sealer gaskets at the underside of wall bottom track and at the top of foundation wall or slab at stud locations.

3.3 INSTALLATION, GENERAL:

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

B. Install cold-formed steel framing according to AISI S200, AISI S202, manufacturer's written instructions and final reviewed shop drawings, unless more stringent requirements are indicated.

C. Install shop or field fabricated, cold-formed framing anchored and secure to supporting structure.

1. Screw, bolt, or weld wall panels at horizontal and vertical junctures to produce flush, even, true-to-line joints.
2. Maximum variation in plane and true position between fabricated panels shall not exceed 1/16-inch.

D. Install cold-formed steel framing and accessories plumb, square, and true to line, and with connections securely fastened.

1. Cut framing members by sawing or shearing; do not torch cut.
2. Fasten cold-formed steel framing members by welding, screw fastening, clinch fastening, or riveting. Wire tying of framing members is not permitted.
    a. Comply with AWS D1.3/D1.3M requirements and procedures for welding, appearance and quality of welds, and methods used in correcting welding work.
    b. Locate mechanical fasteners, install according to Shop Drawings, and comply with requirements for spacing, edge distances, and screw penetration.

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

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

G. Handling and lifting of prefabricated panels or assemblies shall be performed in a manner as to not cause distortion or damage in any member, or damage to any connection. Lift fabricated assemblies by means that prevent damage or permanent distortion.

H. Install insulation, specified in Division 7 Section "Thermal Insulation," in framing-assembly members, such as headers, sills and multiple studs at openings that are inaccessible on

completion of framing work.

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

3.4 EXTERIOR STUD WALL FRAMING INSTALLATION:

A. Install continuous tracks sized to match studs. Align tracks accurately and securely anchor to supporting structure.
   1. Install sealer gaskets to top of slab at stud locations positioned on the underside of wall bottom track.
   2. Install tracks in full bearing where supporting vertical stud framing members.

B. Fasten both flanges of studs to top and bottom track unless otherwise indicated. Fasten to top track only when deflection tracks are not used and when framing conditions are designed not to allow for any movement.
   1. Secure tracks using specified fasteners or attachment methods indicated on shop drawings, spaced not to exceed 24-inches (2'-0") on center for powder actuated fasteners or 16-inches (1'-4") on center for other types of attachment.
   2. Provide fasteners within 3-inches of corners and ends of tracks.

C. Space studs at 24-inches (2'-0") on center, maximum, unless otherwise indicated.

D. Set studs plumb, except as needed for diagonal bracing or required for non-plumb walls or warped surfaces and similar requirements.
   1. Fit studs between top and bottom tracks with ends in full bearing.
   2. Install studs each side of windows, doors, and other punched openings; bridge top and bottom of openings as applicable, in accord with manufacturer's product data. Maintain specified stud spacing above and below opening.
   3. Install jack studs or cripples where required to maintain uniform stud spacing.
   4. Double studs at interior and exterior corners, expansion joints, panel terminations and as otherwise required by design requirements and manufacturer's product data.

E. Isolate non-load-bearing steel framing from building structure to prevent transfer of vertical loads while providing lateral support.
   1. Install specified deflection tracks and anchor to building structure.
   2. Connect vertical deflection clips to studs at locations where required by framing manufacturer's structural analysis and anchor to building structure.
   3. Connect drift clips to cold formed metal framing and anchor to building structure.

F. Bridging: Install horizontal bridging in wall studs, spaced vertically in rows indicated on shop drawings, but not more than 48-inches (4'-0") apart. Fasten at each stud intersection.
   1. Install bridging of type required by framing manufacturer's engineering analysis as indicated on final reviewed shop drawing.
   2. Bridging shall be of type or combination of types indicated as follows.
      a. Channel Bridging: Cold-rolled steel channel, welded or mechanically fastened to webs of punched studs.
      b. Strap Bridging: Combination of flat, taut, steel sheet straps of width and thickness indicated and stud-track solid blocking of width and thickness to match studs. Fasten flat straps to stud flanges and secure solid blocking to stud webs or flanges.

c. Bar Bridging: Proprietary bridging bars installed according to manufacturer's written instructions.

3. Where single deflection tracks are used, install row of horizontal bridging within 12-inches of deflection track.
   a. Install a combination of bridging and stud or stud-track solid blocking of width and thickness matching studs, secured to stud webs or flanges.
   b. Install solid blocking at spacings indicated on shop drawings.

G. Miscellaneous Framing and Connections: Install miscellaneous framing and connections, including stud kickers, web stiffeners, clip angles, continuous angles, anchors, and fasteners, to provide a complete and stable wall-framing system.

H. Supplementary Framing, Blocking, and Bracing: Install supplementary framing, blocking, and bracing as required where indicated to support fixtures, equipment, services, casework, heavy trim, furnishings, and similar work requiring attachment to stud framing. If type of supplementary support is not indicated, comply with stud manufacturer's written recommendations and industry standards in each case, considering weight or load resulting from item supported.

I. Sub-girts: Install z-shaped sub-girts to masonry wall substrates and sheathed metal-framed construction to hold insulation board in place for attachment of exterior siding finish material specified in Division-7 Section "Fiber-Cement Siding."
1. Install sub-girts spaced at 16-inches (1'-4") on center, unless otherwise indicated.
2. Coordinate installation of sub girts with insulation installation specified in Division 7 Section "Thermal Insulation" oriented as specified for each type siding application.
3. Orient sub-girts as required to accommodate siding installation requirements. Coordinate with siding finish manufacturer's installation guidelines.
   a. Install sub-girts vertically at specified spacing for installation of horizontal lap siding.
   b. Install sub-girts horizontally at specified spacing for installation of vertical panel siding.

3.5 EXTERIOR SOFFIT FRAMING INSTALLATION:

A. Install continuous tracks sized to match studs. Align tracks accurate in position and anchored secure to supporting structure.

B. Fasten both flanges of studs to tracks unless otherwise indicated. Space studs at 24-inches (2'-0") on center, maximum, unless indicated on drawings.

C. Install horizontal bridging in stud system, spaced vertically 48-inches (4'-0") on center, unless otherwise indicated on drawings. Fasten at each stud intersection. Provide bridging of type specified as follows:

1. Channel Bridging: Cold-rolled steel channel, welded or mechanically fastened to webs of punched studs.
2. Strap Bridging: Combination of flat, taut, steel sheet straps of width and thickness indicated and stud-track solid blocking of width and thickness to match studs. Fasten flat straps to stud flanges and secure solid blocking to stud webs or flanges.
3. Bar Bridging: Proprietary bridging bars installed according to manufacturer's written instructions.

D. Install miscellaneous framing and connections, including wind uplift bracing, web stiffeners, clip angles, continuous angles, anchors, and fasteners, to provide a complete and stable framing system.

3.6 ERECTION TOLERANCES:

A. Install cold-formed steel framing level, plumb, and true to line to a maximum allowable tolerance variation of 1/8-inch in 10-feet.

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

3.7 FIELD QUALITY CONTROL:

A. Testing and Inspections: Owner will engage a qualified independent testing and inspecting agency to perform field tests and inspections, including preparing test and inspection reports.
   1. Field and shop welds will be subject to testing and inspecting.
   2. Testing agency will report test results promptly and in writing to Contractor and Architect.

B. Remove and replace work where test results indicate that it does not comply with specified requirements.

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

3.8 REPAIRS AND PROTECTION:

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

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

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

END OF COLD-FORMED METAL FRAMING

SECTION 061000

ROUGH CARPENTRY

PART 1 - GENERAL

1.1 RELATED DOCUMENTS:

A. Drawings and general provisions of 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. Plywood sheathing.
   2. Wood blocking and nailers
   3. Wood furring and grounds.
   4. Treated wood materials, including preservative treated and fire retardant treated lumber and plywood products.
   5. Framing anchors and miscellaneous accessories.

1.3 DEFINITIONS:

A. Rough carpentry includes carpentry work not specified as part of other Sections and generally not exposed, unless otherwise specified.

1.4 SUBMITTALS:

A. General: Submit the following in accordance with Conditions of Contract and Division 1 Specification Sections.

B. Product Data: Submit for the following:

   1. Plywood sheathing.
   2. Metal framing anchors.
   3. Construction adhesives.

C. 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 ALSC Board of Review.

D. Wood Treatment Data: Submit the following, including chemical treatment manufacturer's instructions for handling, storing, installation, and finishing of treated material:

   1. For each type of preservative treated wood product include certification by treating plant stating type of preservative solution and pressure process used, net amount of preservative retained, and compliance with applicable standards.

   2. For each type of fire-retardant treated wood product include certification by treating plant indicating that treated materials comply with specified requirements and that

physical properties of treated materials are based on testing by a qualified independent testing agency.

3. For water-borne treated products include statement that moisture content of treated materials was reduced to levels indicated prior to shipment to project site.

4. Warranty of chemical treatment manufacturer for each type of treatment.

E. Research reports or evaluation reports of the model code organization acceptable to authorities having jurisdiction evidencing compliance of the following wood products with specified requirements and building code in effect for Project.
1. Wood-preservative-treated wood.
2. Fire-retardant-treated wood.
3. Metal framing anchors.

F. Additional information as needed to clarify materials and installation requirements, upon request by the Architect or Engineer.

1.5 DELIVERY, STORAGE, AND HANDLING:

A. Delivery and Storage: Keep materials under cover and dry. Protect against exposure to weather and contact with damp or wet surfaces.

1. Stack lumber, plywood, and other panels, flat with spacers beneath and between each bundle to provide air circulation.

2. Provide for air circulation within and around stacks and under temporary coverings, including polyethylene and similar materials.

PART 2 - PRODUCTS

2.1 LUMBER, GENERAL:

A. Lumber Standards: Furnish lumber manufactured to comply with PS 20 "American Softwood Lumber Standard" and with applicable grading rules of inspection agencies certified by American Lumber Standards Committee's (ALSC) Board of Review.

B. Inspection Agencies and Standards: Inspection agencies and standards and the abbreviations used to reference them with lumber grades and species include the following:

1. AFPA - American Forest and Paper Association (formerly NFPA)
2. AITC - American Institute of Timber Construction
3. AWPA - American Wood Preservers Association
4. AWPB - American Wood Preservers Bureau
5. NLGA - National Lumber Grades Authority (Canadian).
6. SPIB - Southern Pine Inspection Bureau.
7. WCLIB - West Coast Lumber Inspection Bureau.
8. WWPA - Western Wood Products Association.

C. Grade Stamps: Provide lumber with each piece factory-marked with grade stamp of inspection agency evidencing compliance with grading rule requirements and identifying grading agency, grade, species, moisture content at time of surfacing, and mill.

1. For exposed lumber furnish pieces with grade stamps applied to ends or back of each piece; or omit grade stamps entirely and provide certificates of grade compliance issued by inspection agency.

D. Nominal sizes are indicated, except as shown by detail dimensions. Provide actual sizes as required by PS 20, for moisture content specified for each use.

1. Provide dressed lumber, S4S, unless otherwise indicated.
2. Provide seasoned lumber with 19 percent maximum moisture content at time of dressing and shipment for sizes 2 inches or less in nominal thickness, unless otherwise indicated.

2.2 DIMENSION LUMBER FRAMING

A. Non-Load-Bearing Interior Partitions: Construction or No. 2 grade in any of the following species.

1. Southern Pine or Mixed Southern Pine; SPIB.
2. Spruce-Pine-Fir; NLGA.
3. Hem-Fir; WCLIB, or WWPA.
4. Spruce-Pine-Fir (South); NeLMA, WCLIB, or WWPA.

B. Load-Bearing Partitions, Joists, Rafters, and Other Framing: No. 2 grade in any of the following species.

1. Southern Pine or Mixed Southern Pine; SPIB.
2. Spruce-Pine-Fir; NLGA.
3. Hem-Fir; WCLIB or WWPA.
4. Douglas Fir-Larch (North); NLGA.
5. Spruce-Pine-fir (South); NeLMA, WCLIB, or WWPA.

2.3 BOARDS:

A. Concealed Boards: Where boards will be concealed by other work, provide lumber complying with the following specified requierments.

1. Moisture Content: 19-percent maximum moisture content (S-DRY or KD-19).

2. Species and Grade: Southern Pine No. 2 boards per SPIB rules, or any species graded construction boards per WCLIB, or WWPA rules.

2.4 MISCELLANEOUS LUMBER:

A. General: Provide lumber for support or attachment of other construction including cant strips, bucks, nailers, blocking, furring, grounds, stripping, utility shelving and similar members.

B. For items of dimension lumber size, provide Construction, Stud, or No. 2 grade lumber with 19-percent maximum moisture content and any of the following species:

1. Hem-fir (north); NLGA.

2. Mixed southern pine; SPIB.
3. Spruce-pine-fir; NLGA.
4. Hem-fir; WCLIB or WWPA.
5. Spruce-pine-fir (south); NeLMA, WCLIB, or WWPA.

C. For concealed boards, provide lumber with 15-percent maximum moisture content and any of the following species and grades:

6. Mixed southern pine, No. 2 grade; SPIB.
7. Eastern softwoods, No. 2 Common grade; NELMA.
8. Northern species, No. 2 Common grade; NLGA.
9. Western woods, Construction or No. 2 Common grade; WCLIB or WWPA.

D. Fabricate miscellaneous lumber from dimension lumber of sizes indicated and into shapes shown.

2.5 PERFORMANCE-RATED CONSTRUCTION PANELS:

A. General: Where construction panels are indicated for the following concealed types of applications, provide APA Performance-Rated Panels complying with requirements designated under each application for grade designation, span rating, exposure durability classification, edge detail (where applicable), and thickness.

B. Softwood Plywood Standards: Furnish plywood manufactured to comply with PS-1 "Structural Plywood"

C. Roof Sheathing: APA RATED SHEATHING.
1. Exposure Durability Classification: Exposure 1.
2. Span Rating: Complying with APA panel span rating recommendations for support spacings indicated but not less than 32/16.
3. Thickness: As indicated on drawings.

D. Wall Sheathing: APA RATED SHEATHING.
1. Exposure Durability Classification: Exposure 1.
2. Span Rating: Complying with APA panel span rating recommendations for support spacings indicated, but not less than 40/20.
3. Thickness: 5/8-inch (nominal), unless otherwise indicated, or as required to match thickness of any contiguous material.

E. Equipment Backing Panels: Plywood complying with DOC PS 1, Exposure 1, C-D Plugged, in thickness indicated or, if not indicated, not less than 1/2-inch nominal thickness.

2.6 FASTENERS:

A. General: Provide fasteners of size and type indicated that comply with requirements specified in this article for material and manufacture.

B. Fastener Compatibility Requirements: Where rough carpentry is in contact with preservative-pressure-treated (P.T.) wood, or fire-retardant-treated wood, exposed to weather, in ground contact, or in area of high relative humidity, provide fasteners with hot-dip zinc coating per ASTM A 153 or of AISI Type 304 stainless steel.

C. Nails, Brads, and Staples: ASTM F 1667.

D. Power-Driven Fasteners: Fastener systems with an evaluation report acceptable to authorities having jurisdiction, based on ICC-ES AC70.

E. Wood Screws: ANSI B18.6.1.

F. Lag Bolts: ANSI B18.2.1.

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

H. Post-Installed Anchors: Mechanical fastener systems with an evaluation report acceptable to authorities having jurisdiction, based on ICC-ES AC01 or ICC-ES AC193 as appropriate for the substrate. Anchors shall be of the following specified materials.
   1. Indoor Applications: Carbon-steel components, zinc plated to comply with ASTM B 633, Class Fe/Zn 5.
   2. Outdoor Applications and Indoor Areas of High Relative Humidity: Stainless steel with bolts and nuts complying with ASTM F 593 and ASTM F 594, Alloy Group 1 or 2.

I. Fasteners for Attachment of Plywood to Lightgage Steel Framing: Corrosion-resistant, type S-12 bugle head self-drilling screws; length as required to extend minimum 1/2-inch through framing member

2.7 METAL FRAMING ANCHORS:

A. General: Provide metal framing anchors of type, size, metal, and finish indicated that comply with requirements specified including the following:
   1. Current Evaluation/Research Reports: Provide products for which model code evaluation/research reports exist that are acceptable to authorities having jurisdiction and that evidence compliance of metal framing anchors for application indicated with the building code in effect for this Project.
   2. Allowable Design Loads: Provide products for which manufacturer publishes allowable design loads that are determined from empirical data or by rational engineering analysis and that are demonstrated by comprehensive testing performed by a qualified independent testing laboratory.

B. Framing Anchor Materials: Provide metal framing anchors fabricated from the following specified materials.
   1. Galvanized-Steel Sheet: Hot-dip, zinc-coated steel sheet complying with ASTM A 653/A 653M, G90 coating designation. Provide for use at interior locations unless otherwise indicated.
   2. Hot-Dip, Heavy-Galvanized Steel Sheet: ASTM A 653/A 653M; structural steel (SS), high-strength low-alloy steel Type A (HSLAS Type A), or high-strength low-alloy steel Type B (HSLAS Type B); G185 coating designation; and not less than 0.036 inch thickness. Provide for use with wood-preservative-treated lumber including the following locations:
      a. All exterior locations.
      b. Ground contact locations.

c. Areas of high relative humidity.
d. At every point of bearing.

2.8 MISCELLANEOUS MATERIALS:

A. Adhesives for Field Gluing Wood Panels: Formulation complying with APA AFG-01 that is approved for use with type of construction panel indicated by both adhesive and panel manufacturer.

B. Flexible Flashing: Composite, self-adhesive, flashing product consisting of a pliable, butyl rubber or rubberized-asphalt compound, bonded to a high-density polyethylene film or spunbonded polyolefin to produce an overall thickness of not less than 0.025 inch.

2.9 PRESERVATIVE WOOD TREATMENT:

A. Preservative Treatment by Pressure Process: Complying with AWPA U1 and meeting requirements of the following use categories specified.
1. Interior Construction Above Ground Use: Use Category UC2.
2. Exterior Construction Above Ground Use: Use Category UC3B.
3. Ground Contact Use: Use Category UC4B.

B. Kiln-dry lumber after treatment to a maximum moisture content of 19-percent for lumber and 15-percent for plywood. Do not use material that is warped or that does not comply with requirements for untreated material.

C. Mark lumber with treatment quality mark of an inspection agency approved by the ALSC Board of Review.

D. Treat indicated items 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. Plywood sheathing installed in connection with roofing and flashing work.
4. Wood floor plates that are installed over concrete slabs-on-grade.

E. Complete fabrication of treated items prior to treatment, where possible. If cut after treatment, coat cut surfaces to comply with AWPA M4. Inspect each piece of lumber or plywood after drying and discard damaged or defective pieces.

2.10 FIRE-RETARDANT WOOD TREATMENT:

A. Where fire-retardant-treated materials are indicated, materials shall comply with specified requirements that are acceptable to authorities having jurisdiction, and with fire performance characteristics as determined by testing identical products according to test method indicated by a qualified testing agency.

B. Fire-Retardant-Treated Lumber and Plywood by Pressure Process: Products shall have a flame-spread index of 25 or less when tested according to ASTM E 84, with no evidence of significant progressive combustion when the test is extended an additional 20 minutes, and

with the flame front not extending more than 10.5 feet beyond the centerline of the burners at any time during the test.

1. Treatment Type: Interior Type A, complying with AWPA C20 for lumber and AWPA C27 for plywood.
2. Hygroscopicity: Treated materials shall have maximum 28-percent equilibrium moisture content when tested according to ASTM D3201 at 92-percent relative humidity.
3. Corrosion Resistance: Treatment shall not promote corrosion of metal fasteners.
4. Identification: Identify fire-retardant-treated wood materials with appropriate classification marking of qualified testing agency.

C. Seasoning: Kiln-dry lumber after treatment to maximum moisture content of 19-percent. Kiln-dry plywood after treatment to maximum moisture content of 15-percent.

D. Provide fire-retardant-treated wood materials for the following uses:
1. Plywood used for equipment backing boards.
2. Other wood components as indicated on drawings.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL:

A. Framing Standard: Comply with American Forest & Paper Association (AFPA) WCD 1, "Details for Conventional Wood Frame Construction," unless otherwise indicated.

B. Install framing members of size and spacing indicated, or if not indicated, to comply with referenced standard.

C. Discard units of material with defects that impair quality of rough carpentry construction and that are too small to use in fabricating rough carpentry with minimum joints or optimum joint arrangement.

D. Set rough carpentry to required levels and lines, with members plumb and true to line and cut and fitted.

E. Fit rough carpentry to other construction; scribe and cope as required for accurate fit. Correlate location of furring, nailers, blocking, grounds, and similar supports to allow attachment of other construction.

F. Install plywood backing panels by fastening to studs; coordinate locations with utilities requiring backing panels.

G. Install metal framing anchors to comply with manufacturer's written instructions. Install fasteners through each fastener hole.

H. Do not splice structural members between supports unless otherwise indicated.

I. Provide blocking and framing as indicated and as required to support facing materials, fixtures, specialty items, and trim.

J. Sort and select lumber so that natural characteristics do not interfere with installation or with fastening other materials to lumber. Do not use materials with defects that interfere with function of member or pieces that are too small to use with minimum number of joints or optimum joint arrangement.

K. Comply with AWPA M4 for applying field treatment to cut surfaces of preservative-treated lumber and plywood.
   1. Use inorganic boron for items that are continuously protected from liquid water.
   2. Use copper naphthenate for items not continuously protected from liquid water.

L. Where wood-preservative-treated lumber is installed in contact with metal framing, install continuous flexible flashing separator between wood and metal framing.

M. Securely attach rough carpentry work to substrate by anchoring and fastening as indicated, complying with the following:
   1. Table 2304.9.1, "Fastening Schedule," in ICC's International Building Code (IBC).
   2. ICC-ES evaluation report for fastener.

N. Use common wire nails, unless otherwise indicated. Use finishing nails for finish work. Select fasteners of size that will not penetrate members where opposite side will be exposed to view or will receive finish materials.
   1. Make tight connections between members.
   2. Install fasteners without splitting of wood; predrill as required.
   3. Drive nails snug but do not countersink nail heads unless otherwise indicated.
   4. Countersink finishing nail heads on exposed carpentry work and fill holes.

3.2 WOOD NAILERS, BLOCKING, FURRING AND GROUNDS:

A. Install wood grounds, nailers, blocking, furring and grounds where shown and where required for screeding or attachment of other work. Form to shapes as shown and cut as required for true line and level of work to be attached. Coordinate location with other work involved.

B. Attach to substrates as required to support applied loading. Countersink bolts and nuts flush with surfaces, unless otherwise indicated. Build into masonry during installation of masonry work. Where possible, anchor to formwork before concrete placement.

C. Install permanent grounds of dressed, preservative treated, key-beveled lumber not less than 1-1/2 inches wide and of thickness required to bring face of ground to exact thickness of finish material involved. Remove temporary grounds when no longer required.

3.3 CONSTRUCTION PANEL INSTALLATION:

A. Install panels complying with applicable recommendations in APA Form No. E30W, "Engineered Wood Construction Guide," for types of structural-use panels and applications indicated; unless more stringent requirements are otherwise specified.

B. Fastening Methods: Fasten panels as specified.
   1. Roof Sheathing and Wall Sheathing:
      a. Nail to wood framing.
      b. Screw to cold-formed metal framing.

c. Space panels 1/8-inch apart at edges and ends. Install with face grain perpendicular to supports. Terminate panels over supports. Stagger end joints of adjacent panels.

2. Plywood Backing Panels:
   a. Install plywood backing panels by fastening to studs.
      1) Nail to wood framing.
      2) Screw to cold-formed metal framing.
   b. Coordinate locations with utilities requiring backing panels.
   c. Install fire-retardant-treated plywood backing panels with classification marking of testing agency exposed to view.

END OF ROUGH CARPENTRY

SECTION 064000

ARCHITECTURAL WOODWORK

PART 1 - GENERAL

1.1 RELATED DOCUMENTS:

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

1.2 SUMMARY:

A. Section Includes:
1. Plastic-laminate cabinets.
2. Plastic-laminate countertops.
3. Utility shelving.

B. Extent of each type of architectural woodwork is indicated on drawings and in schedules.

C. Related work specified elsewhere includes:
1. Division 6 Section – "Rough Carpentry"
2. Division 7 Section – "Joint Sealants"
3. Division 8 Section – "Door Hardware"
4. Division 9 Section – "Painting"

1.3 SUBMITTALS:

A. Product Data: Submit for panel products, high-pressure decorative laminate, adhesive for bonding plastic laminate, cabinet hardware and accessories, finishing materials and processes.

B. Shop Drawings: Show location of each item, dimensioned plans and elevations, large-scale details, attachment devices, and other components.
1. Show details full size.
2. Show locations and sizes of furring, blocking, and hanging strips, including concealed blocking and reinforcement specified in other Sections.
3. Show locations and sizes of cutouts and holes for items installed in architectural woodwork and cabinetwork.

C. Samples:
1. Plastic Laminates: Submit manufacturer’s standard samples, approximately 3-inches by 3-inches for each type, color, pattern, and surface finish as required for this project, and representative color range anticipated.
2. Exposed Cabinet Hardware: Submit one unit of each type and finish, which will be returned for use on the project, upon request by the Contractor

D. Qualification Data: Submit for installer and fabricator. Include lists of completed projects with project names and addresses, names and addresses of architects and owners, and other information specified.

1.4 QUALITY ASSURANCE:

A. Fabricator Qualifications: Fabricators shall be experienced firms specializing in the types of architectural woodwork, including solid surfacing fabrication work, required for this project for at least the past five-verifiable years and on at least ten-verifiable projects of similar size, scope, complexity, and quality as this project.
   1. Prequalification is required.
   2. Fabricator shall be a participant in AWI Quality Certification Program.
   3. Fabricator shall also be certified or approved by solid surfacing material manufacturer to fabricate work using specified materials.

B. Installer Qualifications: Arrange for installation of architectural woodwork by the fabricator, or by a firm under the control and direction of the fabricator, which can demonstrate at least five-verifiable years successful experience in installing architectural woodwork items on at least five-verifiable projects, similar in type and quality to those required for this project.

C. Source Limitations: Engage a qualified woodworking firm to assume undivided responsibility for production of interior architectural woodwork.

D. Quality Standard: Unless otherwise indicated, comply with AWI's "Architectural Woodwork Quality Standards" for grades of architectural woodwork indicated for construction, finishes, installation, and other requirements.

E. Mockups: Build mockups to verify selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.
   1. Construct mock-up of typical plastic-laminate cabinet unit, including countertop, indicating construction and finish required to verify selections made under sample:
   2. Build mockups in the location and of the size indicated or, if not indicated, as directed by Architect.
   3. Demonstrate the proposed range of aesthetic effects and workmanship.
   4. Notify Architect seven days in advance of dates and times when mockups will be fabricated and installed.
   5. Obtain Architect's approval of mockups before starting fabrication.
   6. Maintain mockups during construction in an undisturbed condition as a standard for judging the completed Work.
   7. Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

F. Pre-installation Conference: Conduct conference at Project site to review mock-up and Work to be performed.

1.5 DELIVERY, STORAGE, AND HANDLING:

A. Protect woodwork during transit, delivery, storage and handling to prevent damage, soilage and deterioration.

B. Do not deliver woodwork until painting and similar operations that could damage woodwork have been completed in installation areas. If woodwork must be stored in other than installation areas, store only in areas where environmental conditions comply with requirements specified in "Project Conditions" Article.

1.6 PROJECT CONDITIONS:

A. Environmental Limitations: Do not deliver or install woodwork until building is enclosed, wet work is complete, and HVAC system is operating and maintaining temperature and relative humidity at occupancy levels during the remainder of the construction period.

B. Field Measurements: Where woodwork is indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication, and indicate measurements on Shop Drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work.
   1. Locate concealed framing, blocking, and reinforcements that support woodwork by field measurements before being enclosed, and indicate measurements on Shop Drawings.
   2. Where field measurements cannot be made without delaying the Work, establish dimensions and proceed with fabricating woodwork without field measurements. Provide allowance for trimming at site, and coordinate construction to ensure that actual dimensions correspond to established dimensions.

1.7 COORDINATION:

A. Coordinate sizes and locations of framing, blocking, furring, reinforcements, and other related units of Work specified in other Sections to ensure that interior architectural woodwork can be supported and installed as indicated.

B. Coordinate fabrication and installation requirements of plumbing fixtures, trim and toilet accessories required to be mounted to countertops.

PART 2 - PRODUCTS

2.1 WOODWORK FABRICATORS:

A. Acceptable Fabricators; subject to compliance with requirements:
   1. Artisan Millwork, LLC.
   2. Cabinets by Design, Inc.
   3. Commercial Cabinetry of Georgia, LLC.
   4. Commercial & Custom Cabinets, Inc.
   5. Leeman Architectural Woodwork.
   6. Pierce & Pierce.
   7. Mortensen Woodwork, Inc.
   8. Royal Custom Cabinets, Inc.
   9. Willingham Sash and Door Company.

2.2 MATERIALS:

A. General: Provide materials that comply with requirements of AWI's quality standard for each type of woodwork and quality grade specified, unless otherwise indicated.

B. Wood Panel Products: Complying with the following:
   1. Hardboard: AHA A135.4.
   2. Medium-Density Fiberboard: ANSI A208.2, Grade MD, made with binder containing no urea formaldehyde.

3. Particleboard: ANSI A208.1, Grade M-2-Exterior Glue; made with binder containing no urea formaldehyde.
4. Softwood Plywood: DOC PS 1.
5. Veneer-Faced Panel Products (Hardwood Plywood): HPVA HP-1, made with adhesive containing no urea formaldehyde.

C. High-Pressure Decorative Laminate:
1. Acceptable Manufacturers; subject to compliance with specified requirements:
   a. Formica Corporation.
   b. Lamin-Art, Inc.
   c. Nevamar Company, LLC; Decorative Products Div.
   d. Panolam Industries International Incorporated.
   e. Wilsonart International; Div. of Premark International, Inc.
2. Type: NEMA LD 3, grades as indicated or, if not indicated, as required by woodwork quality standard.
   a. Grade HGS: 0.048-inch nominal thickness.
   b. Grade VGS: 0.028-inch nominal thickness.
   c. Grade HGP 0.039-inch nominal thickness.
   d. Grade VGP 0.028-inch nominal thickness.
   e. Grade CLS: 0.020-inch nominal thickness.
   f. Grade BKL: 0.020-inch nominal thickness.
3. Colors and Patterns: As selected by Architect from manufacturer's full range selection, unless otherwise scheduled on drawings.

2.3 CABINET HARDWARE AND ACCESSORIES:

A. General: Provide cabinet hardware and accessory materials associated with architectural cabinets, except for items specified in Division 8 Section "Door Hardware (Scheduled by Describing Products)."

B. Frameless Concealed Hinges (European Type): BHMA A156.9, B01602, 135 degrees of opening**,** self-closing.

C. Wire Pulls: Back mounted, solid metal, 4-inches long, 5/16-inch diameter; satin stainless steel.

D. Adjustable Shelf Standards and Supports: BHMA A156.9, B04071; with shelf rests, B04081.

E. Drawer Slides: BHMA A156.9, B05091.
1. Standard Duty (Grade 1, Grade 2, and Grade 3): Side mounted; full-extension type; zinc-plated steel with polymer rollers.
2. Heavy Duty (Grade 1HD-100 and Grade 1HD-200): Side mounted; full-extension type; zinc-plated steel ball-bearing slides.
3. Types:
   a. Box Drawer Slides: Grade 1; for drawers not more than 6-inches high and 24-inches wide.
   b. File Drawer Slides: Grade 1HD-100; for drawers more than 6 inches high or 24-inches wide.
   c. Pencil Drawer Slides: Grade 1; for drawers not more than 3 inches high and 24-inches wide.

F. Cabinet Locks:
1. Door Locks: BHMA A156.11, E07121.
2. Drawer Locks: BHMA A156.11, E07041.

G. Deal Trays:
1. Acceptable Products; subject to compliance with specified requirements:
   a. C.R. Laurence Co., Inc.; T18SS Deluxe Deal Tray.
   b. Nissen & Company, Inc.; T18SS Coin & Cash Tray.
2. Characteristics: Formed heavy gauge stainless steel, deep dish tray with front and rear flanges designed for recessed installation in countertops.
   a. Size: 18-inch (1'-6") width by 14-inch (1'-2") length by 2-3/8 inch depth, nominal dimensions.
   b. Finish: Brushed or satin finish stainless steel.

H. Exposed Hardware Finishes: For exposed hardware, provide finish that complies with BHMA A156.18 for BHMA finish number indicated.
1. Satin Chromium Plated: BHMA 626 for brass or bronze base; BHMA 652 for steel base.
2. Satin Stainless Steel: BHMA 630.

I. For concealed hardware, provide manufacturer's standard finish that complies with product class requirements in BHMA A156.9.

2.4 MISCELLANEOUS MATERIALS:

A. Furring, Blocking, Shims, and Hanging Strips: Softwood or hardwood lumber, kiln dried to less than 15 percent moisture content.

B. Anchors: Select material, type, size, and finish required for each substrate for secure anchorage. Provide nonferrous-metal or hot-dip galvanized anchors and inserts on inside face of exterior walls and elsewhere as required for corrosion resistance. Provide toothed-steel or lead expansion sleeves for drilled-in-place anchors.

C. Nails and Brads: ASTM F 1667; select material, type, size, and finish required for each use

D. Screws: Select material, type, size, and finish required for each use. Comply with ASME B18.6.1 for applicable requirements. For metal framing supports, provide screws as recommended by metal-framing manufacturer.

E. Adhesives: Types as recommended by fabricator that do not contain urea formaldehyde. Use installation adhesives and glues that comply with the following limits for VOC content when calculated according to 40 CFR 59, Subpart D (EPA Method 24):
1. Wood Glues: 30 g/L.
2. Contact Adhesive: 250 g/L.

F. Solid Surfacing Adhesives and Sealant:
1. Joint Adhesive: Solid surfacing manufacturer's standard two-part adhesive. Adhesive shall be type to create inconspicuous, non-porous joints and blend in with solid surfacing material.
2. Panel Adhesive: Solid surfacing manufacturer's standard neoprene-based adhesive meeting ANSI A136.1; UL Listed.

3. Sealant: FDA approved, mildew-resistant silicone sealant in colors matching components and acceptable to solid surfacing manufacturer.

2.5 FABRICATION, GENERAL:

A. Interior Woodwork Grade: Complying with the referenced quality standard as specified below unless otherwise indicated.
   1. Plastic Laminate Work: AWI Custom Grade.
   2. Solid Surfacing Countertop Work: AWI Premium Grade.

B. Wood Moisture Content: Comply with requirements of referenced quality standard for wood moisture content in relation to ambient relative humidity during fabrication and in installation areas.

C. Fabricate woodwork to dimensions, profiles, and details indicated. Ease edges to 1/16-inch radius.

D. Complete fabrication, including assembly, finishing, and hardware application, to maximum extent possible before shipment to Project site. Disassemble components only as necessary for shipment and installation. Where necessary for fitting at site, provide ample allowance for scribing, trimming, and fitting.
   1. Trial fit assemblies at fabrication shop that cannot be shipped completely assembled.
   2. Install dowels, screws, bolted connectors, and other fastening devices that can be removed after trial fitting.
   3. Verify that various parts fit as intended and check measurements of assemblies against field measurements indicated on Shop Drawings before disassembling for shipment.

E. Shop-cut openings to maximum extent possible to receive hardware, appliances, plumbing fixtures, electrical work, and similar items. Locate openings accurately and use templates or roughing-in diagrams to produce accurately sized and shaped openings.
   1. Sand edges of cutouts to remove splinters and burrs.
   2. Seal edges of openings in countertops with a coat of varnish.

2.6 PLASTIC-LAMINATE CABINETS:

A. AWI Grade: Custom.

B. AWI Type of Cabinet Construction: Flush overlay.

C. Laminate Cladding for Exposed Surfaces: High-pressure decorative laminate complying with the following requirements:
   1. Horizontal Surfaces Other Than Tops: Grade HGS.
   2. Postformed Surfaces: Grade HGP.
   3. Vertical Surfaces: Grade HGS.
   4. Edges: Grade HGS.

D. Materials for Semi-Exposed Surfaces:
   1. Surfaces Other Than Drawer Bodies: High-pressure decorative laminate, Grade CLS.
   2. Drawer Sides and Backs: Solid-hardwood lumber.

3. Drawer Bottoms: Hardwood plywood.

E. Concealed Backs of Panels with Exposed Plastic Laminate Surfaces: High-pressure decorative laminate, Grade BKL.

F. Colors, Patterns, and Finishes: Provide materials and products that result in colors and textures of exposed laminate surfaces as specified.

G. Provide dust panels of 1/4-inch plywood or tempered hardboard above compartments and drawers, unless located directly under tops.

2.7 PLASTIC-LAMINATE COUNTERTOPS:

A. AWI Grade: Custom.

B. High-Pressure Decorative Laminate Grade: HGS.

C. Colors, Patterns, and Finishes: Provide materials and products that result in colors and textures of exposed laminate surfaces as selected by Architect from manufacturer's full range selection unless otherwise indicated on Drawings.

D. Edge Treatment: Same as laminate cladding on horizontal surfaces, unless otherwise indicated on Drawings.

E. Core Material: Medium-density fiberboard.

F. Backer Sheet: Fabricate countertop with plastic-laminate backer sheet, Grade BKL, on underside of core material.

G. Fabricate plastic laminate counter top using specified materials. Bond plastic laminate to substrates with specified adhesives, including laminate backing sheet on unexposed surface.
   1. Fabricate countertop in maximum single continuous lengths practicable. Where joining is required use compression type fasteners forming flush, tight, hairline joints.
   2. Sand edges of cutouts to remove splinters and burrs.
   3. Provide matching back and end splashes for installation to wall surfaces where indicated.

2.8 UTILITY SHELVING

A. Grade: Custom.

B. Shelf Material: 3/4-inch solid lumber or veneer-faced panel product with solid-lumber edge.

C. Cleats: 3/4-inch solid lumber or panel product.

D. Wood Species: Any closed-grain hardwood.

PART 3 - EXECUTION

3.1 PREPARATION

A. Before installation, condition woodwork to average prevailing humidity conditions in installation areas.

B. Before installing architectural woodwork, examine shop-fabricated work for completion and complete work as required, including removal of packing and backpriming.

3.2 INSTALLATION

A. Grade: Install woodwork to comply with requirements for the same grade specified for fabrication of type of woodwork involved.

B. Assemble woodwork and complete fabrication at Project site to comply with requirements for fabrication, to extent that it was not completed in the shop.

C. Install woodwork level, plumb, true, and straight. Shim as required with concealed shims. Install level and plumb (including tops) to a tolerance of 1/8-inch in 96 inches.

D. Scribe and cut woodwork to fit adjoining work, refinish cut surfaces, and repair damaged finish at cuts.

E. Fire-Retardant-Treated Wood: Handle, store, and install fire-retardant-treated wood to comply with chemical treatment manufacturer's written instructions, including those for adhesives used to install woodwork.

F. Anchor woodwork to anchors or blocking built in or directly attached to substrates. Secure with countersunk, concealed fasteners and blind nailing as required for complete installation. Use fine finishing nails or finishing screws for exposed fastening, countersunk and filled flush with woodwork and matching final finish if transparent finish is indicated.

G. Cabinets: Install without distortion so doors and drawers fit openings properly and are accurately aligned. Adjust hardware to center doors and drawers in openings and to provide unencumbered operation. Complete installation of hardware and accessory items as indicated.
   1. Install cabinets with no more than 1/8-inch in 8-ft. (96-inch) sag, bow, or other variation from a straight line.
   2. Maintain veneer sequence matching of cabinets with transparent finish.
   3. Fasten wall cabinets through back, near top and bottom, at ends and not more than 16 inches on center. Attach with screws to framing, blocking or metal backing plates as follows:
      a. No. 10 wafer-head screws sized for 1-inch penetration into wood framing, blocking, or hanging strips.
      b. No. 10 wafer-head sheet metal screws through metal backing or metal framing behind wall finish.
      c. Toggle bolts through metal backing or metal framing behind wall finish.

H. Countertops: Anchor securely by screwing through corner blocks of base cabinets or other supports into underside of countertop.
   1. Install countertops with no more than 1/8-inch in 8-ft. (96-inch) sag, bow, or other variation from a straight line.
   2. Install countertops, including back and end splashes scribed to fit neat to walls or adjacent construction.
   3. Attach backsplashes to walls with adhesive**.**
   4. Caulk space between backsplash and wall with sealant specified in Division 7 Section "Joint Sealants".

I. Touch up finishing work specified in this Section after installation of woodwork. Fill nail holes with matching filler where exposed.

J. Refer to Division 9 Section "Painting" for final finishing of installed woodwork specified for opaque finish.

3.3 ADJUSTING AND CLEANING

A. Repair damaged and defective woodwork, where possible, to eliminate functional and visual defects; where not possible to repair, replace woodwork. Adjust joinery for uniform appearance.

B. Clean, lubricate, and adjust hardware.

C. Clean woodwork on exposed and semi-exposed surfaces. Use non-abrasive cleaners recommended by laminate manufacture for cleaning plastic laminate surfaces. Touch up shop-applied finishes to restore damaged or soiled areas.

3.4 PROTECTION

A. Provide final protection and maintain conditions in a matter acceptable to fabricator and Installer that ensures that woodwork is without damage or deterioration at the time of Substantial Completion.

B. Prior to Date of Substantial Completion, examine work for damages. Repair or replace damaged work to original conditions. Repairs shall be indiscernible in finished work and acceptable to Architect

C. Replace plastic laminate components which have been damaged during installation. Scratches, chips, abrasions or other damages in laminate work shall not be permitted.

END OF ARCHITECTURAL WOODWORK

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 1 Specification Sections, apply to this Section.

1.2 SUMMARY:

A. Section Includes:
1. Batt insulation.
2. Rigid foam board insulation.
3. Cement-faced insulation panels.

B. Related Sections include the following:
1. Division 5 Section – "Cold-Formed Metal Framing."
2. Division 9 Section – "Gypsum Board Assemblies."
3. Division 23 Section - "Mechanical Systems Insulation."

1.3 DEFINITIONS:

A. Mineral-Fiber Insulation: Insulation composed of rock-wool fibers, slag-wool fibers, or glass fibers; produced in boards and blanket with latter formed into batts (flat-cut lengths) or rolls.

1.4 SUBMITTALS:

A. Product Data: Submit manufacturer's technical data for each type of insulation required, including installation instructions. Include data substantiating that the materials comply with specified requirements.

B. Samples:
1. Submit 12-inch (1-ft.) square sample of each type of insulation. Identify each with manufacturer's name, brand name, R-values and composition.
2. Submit 1-ft (12-inch.) length of vapor-retarder tape.

C. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency for insulation products.

D. Research/Evaluation Reports: For foam-plastic insulation complying with requirements of the International Building Code.

1.5 QUALITY ASSURANCE:

A. Source Limitations: Obtain each type of building insulation through one source and from a single manufacturer.

B. 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.

1.6 DELIVERY, STORAGE, AND HANDLING:

A. Protect insulation materials from physical damage and from deterioration by 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 plastic insulation as follows:
1. Do not expose to sunlight, except to extent necessary for period of installation and concealment.
2. Protect against ignition at all times. Do not deliver plastic insulating materials to Project site before installation time.
3. Complete installation and concealment of plastic materials as rapidly as possible in each area of construction.

PART 2 - PRODUCTS

2.1 BATT INSULATION:

A. Acceptable Manufacturers; subject to compliance with specified requirements:
1. CertainTeed Corporation.
2. Guardian Fiberglass Inc.
3. Johns Manville Corporation/Building Insulation Division.
4. Knauf Insulation.
5. Owens-Corning Fiberglas Corporation.

B. Type: Unfaced, fiberglass blanket insulation meeting ASTM C665, Type I.
1. Surface Burning Characteristics: Meeting flame spread and smoke developed indexes specified when tested according to ASTM E84.
Flame Spread Index: Not more than 25.
Smoke Developed Index: Not more than 50.
2. Combustibility: Noncombustible when tested per ASTM E136.
3. Thermal Resistance and Thickness:
a. Walls: R-13, (13 deg F × h × sq. ft./Btu at 75 deg F) thermal resistance, 3-1/2 inch thickness; unless otherwise indicated.
Attics and Above Ceilings: R-38, (38 deg F × h × sq. ft./Btu at 75 deg F) thermal resistance, 12-inch thickness; unless otherwise indicated.
4. Size: Manufacturer's standard width equal to spacing of framing members.

2.2 RIGID FOAM BOARD INSULATION

A. Acceptable Products; subject to compliance with specified requirements:
1. Diversifoam Products; CertiFoam 25 SE.
2. Dow Chemical Company, Styrofoam Cavitymate Plus or Scoreboard.
3. Owens-Corning, Foamular 250.
4. Kingspan Insulation, LLC; GreenGuard Type IV XPS Insulation Board.

B. Type: Extruded, closed cell polystyrene boards meeting ASTM C578, Type IV.
   1. Compressive strength: 25 psi minimum, tested in accord with ASTM D1621.
   2. Density: 1.6 pcf, minimum, tested in accord with ASTM C303.
   3. Thermal Resistance: R-5.0 per inch (5.0 deg F x h x sq. ft./Btu at 75 deg F) when tested in accord with ASTM C518.
   4. Surface Burning Characteristics: Meeting flame spread and smoke developed index specified when tested in accord with ASTM E84.
      a. Flame Spread Index: Not more than 25.
      b. Smoke Developed Index: Not more than 200.
   5. Thickness: 2-inches; unless otherwise indicated.
   6. Sizes: Manufacturer's standard.
   7. Edges: Square.

2.3 CEMENT-FACED INSULATION PANELS:

A. Acceptable Products; subject to compliance with specified requirements:
   1. T. Clear Corporation; WallGuard.
   2. Tech-Crete Processors Ltd; CFI Concrete Faced Insulated Wall Panels.

B. Type: Cement-faced insulation panels consisting of factory-applied latex-modified cement topping bonded to extruded polystyrene insulation boards.
   1. Cement-Facing Properties:
      a. Tensile Bond Strength: No failure when tested for 1000 freeze/thaw cycles when tested in accord with ASTM C 666, Procedure B.
      b. Impact Resistance: Having impact strength equivalent to an 8-inch thickness concrete masonry unit when tested in accord with ASTM G 14.
      c. Cement-Facing Thickness: 5/16-inch, minimum
   2. Insulation Board Properties:
      a. Material: Extruded, closed cell polystyrene boards meeting ASTM C 578, Type VI.
      b. Compressive Strength: 40 psi, minimum, when tested according to ASTM D 1621.
      c. Density: 1.8 pcf, minimum, when tested according to ASTM C 303.
      d. Thermal Conductivity ("K" factor at 75-degrees F.): 0.20 Btu-in./hr.-sq. ft.-degree F., when tested according to ASTM C518.
      e. Thermal Resistance (R-Value): R-5.0 per inch (5.0 degrees F × h × sq. ft./Btu at 75-degrees F) when tested according to ASTM C 518.
      f. Water Vapor Permeance: Maximum 1.0 perm when tested according to ASTM E96.
      g. Insulation Board Thickness: 2-inches.
   3. Total Panel Thickness: 2-5/16 inches.
   4. Panel Size: Manufacturer's standard; provide in widths required to extend panel minimum 12-inches below finish grade or to bottom edge of turned-down concrete slab foundations.
   5. Edges: Tongue and groove.

2.4 AUXILIARY MATERIALS:

A. Attachment Clips for Cement-Faced Insulation Panels: Cement-faced insulation manufacturer's galvanized steel securement clips equipped with corrosion-resistant fasteners for anchoring to concrete or masonry substrates as indicated.

B. Impaling Pin Insulation Fasteners: Adhesive attached spindle-type anchors consisting of plate welded to projecting spindle; capable of holding insulation of specified thickness secure in position with self-locking washer. Provide for attachment of unfaced fiberglass batt insulation.
   1. Plate: Perforated, galvanized carbon-steel sheet, 0.030-inch thickness by 2-inches square.
   2. Spindle: Copper-coated, low-carbon steel; fully annealed; 0.105-inch diameter; length to suit thickness of insulation indicated.
   3. Fastener Adhesives: Types as recommended by fastener manufacturer with demonstrated capability to bond insulation anchors secure in place without damaging insulation, fasteners, and substrates.

C. Adhesive for Bonding Foam Board Insulation: Product with demonstrated capability to bond insulation securely to substrates indicated without damaging insulation and substrates. Adhesives used with plastic foam insulation for installation to masonry wall and sheathing shall be type compatible with substrate.

PART 3 - EXECUTION

3.1 EXAMINATION:

A. Examine substrates and conditions, with Installer present, for compliance with requirements of Sections in which substrates and related work are specified and for other conditions affecting performance.

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

3.2 PREPARATION:

A. Clean substrates of substances harmful to insulation, including removing projections capable of puncturing or interfering with insulation attachment.

B. Cut and fit insulation to maintain thermal integrity over areas indicated to be insulated.

3.3 GENERAL INSTALLATION REQUIREMENTS:

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

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

C. Extend insulation in thickness indicated 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. Water-Piping Coordination: If water piping is located within insulated exterior walls, coordinate location of piping to ensure that it is placed on warm side of insulation and insulation encapsulates piping.

E. For preformed insulating units, 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.

3.4 BATT INSULATION INSTALLATION:

A. Install specified batt insulation to exterior framed walls, underside of roof decks above ceilings, and other areas as indicated.
   1. Install batt insulation in uninterrupted continuous full height lengths.
   2. Install batt insulation with tight butted end joints.

B. Installation to Wall Framing:
   1. Friction fit batt insulation snug and tight between framing members.
   2. Insulate small areas between closely spaced framing members. Cut and fit insulation around pipes, conduits and other obstruction.
   3. Where pipes or conduit are located in stud spaces, place insulation between exterior wall and pipe, compressing insulation where necessary.

C. Installation to Underside of Roof Decks: Install unfaced fiberglass batt insulation attached to underside of roof decks at locations indicated using specified impaling pin fasteners.
   1. Adhered impaling pins to substrates using adhesives recommended by fastener manufacturer's product data.
   2. Space impaling pins not less than 3-inches from corners of insulation and at a rate of minimum one fastener per each two-square ft. of insulation area.
   3. Attach insulation impaled on pin fasteners with washers secured to pins to hold installation in place. Protect pin tips to prevent injuries where subject to human contact.

D. Do not install insulation compressed in excess of 10%.

E. Provide supplemental support using wire ties fastened 24-inches on center, maximum to prevent sagging of insulation.

3.5 RIGID FOAM BOARD INSULATION INSTALLATION:

A. Install rigid foam board insulation adhered to exterior masonry wall and sheathing substrates indicated, fitted snug between Z-girts or furring sized to secure insulation in place for application of siding finish specified in Division 7 Section "Fiber-Cement Siding."

B. Adhere insulation board to substrates using compatible adhesive acceptable to insulation manufacturer and friction fitted snug between metal girts or furring members.
   1. Place small dabs of adhesive, spaced approximately 12-inches on center each direction, on inside face of insulation boards, or attach with plastic fasteners designed for this purpose.
   2. Press board units firm against substrates to ensure full bond contact of adhesive.

C. Install insulation boards in full continuous lengths with end joints butted tight.

D. Fit courses of insulation between Z-girts and other obstructions, with edges and ends tight against each other in both directions.

E. Fill cracks and open gaps in insulation with crack sealer that is compatible with insulation and substrate materials.

F. Cut boards as required to fit between irregular spaced framing or furring and other conditions encountered to provide a continuous uninterrupted thermal barrier.

G. Foam insulation board shall not be permitted to be left exposed to the elements and shall be covered with exterior finish materials or metal flashing trim.

3.6 CEMENT-FACED INSULATION PANELS:

A. Install cement-faced extruded polystyrene insulation panels along perimeter base of exterior walls at finished grade locations as indicated extending not less than 12-inches (1-ft.) below grade or to bottom edge of turned-down concrete slab foundations, whichever is less.
   1. Attach above grade portion of insulation boards to vertical substrate surfaces with manufacturer's securement clips.
   2. Adhere below grade portion of insulation board to vertical substrate surfaces using specified adhesive.

B. Install insulation boards in full continuous lengths. Butt adjacent boards tight together and secured with specified attachment clips to prevent insulation movement.

C. Coordinate installation with backfill work to secure insulation boards firm in place against foundation walls.

3.7 PROTECTION:

A. Protect installed insulation material from damage due to harmful weather exposures, physical abuse, and other causes.

B. Provide temporary coverings or enclosures where insulation is subject to abuse and cannot be concealed and protected by permanent construction immediately after installation.

C. Remove and dispose of excess materials, litter and debris; leaving work areas in a clean condition.

END OF THERMAL INSULATION

SECTION 072650

UNDER SLAB VAPOR BARRIER

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. Section Includes: Vapor barrier membrane for installation under concrete slabs on grade.

B. Related Sections include the following:

1. Division 2 Section "Earthwork" for preparation of building pad and subbase.
2. Division 3 Section "Cast-In-Place Concrete" for concrete slab installation.

1.3 SUBMITTALS:

A. Product Data: Submit manufacturer's technical literature and test reports for vapor barrier material indicating compliance with specified requirements. Include installation instructions for placement, seaming of joints and sealing of penetrations.

B. Samples: Submit one foot (12-inches) square sample of vapor barrier material indicating thickness and composition.

1.4 QUALITY ASSURANCE:

A. Inspection: Obtain Architect's inspection and acceptance of installed vapor barrier before placing concrete.

1.5 PROJECT CONDITIONS:

A. Verify that subgrades are compacted, clean and free of debris prior to installation of vapor barrier.

B. Subgrades shall be smooth and without sharp projections which could puncture membrane material.

PART 2 - PRODUCTS

2.1 VAPOR BARRIER:

A. Acceptable Products; subject to compliance with specified requirements:

1. W. R. Meadows, Inc.; Perminator 15 Mil Underslab Vapor-Mat.
2. Reef Industries, Inc.; Griffolyn 15 Mil Green.
3. Stego Industries, LLC; Stego Wrap 15-Mil Class A.

B. Characteristics: Multi-ply, laminated, high density polyolefin or polyethylene membrane meeting ASTM E1745, Class A and having a perm rating less than 0.02 when tested in accord with ASTM E-96, Procedure A.; minimum 15 mils thickness.

C. Accessories:

1. Seam Tape: Type as recommended by vapor barrier manufacturer.
2. Vapor Proofing Mastic: Type as recommended by vapor barrier manufacturer.
3. Pipe Boots or Collars: Construct pipe boots or collars from vapor barrier material and pressure sensitive tape per manufacturer's instructions.

PART 3 - EXECUTION

3.1 EXAMINATION:

A. Verify that subgrades are compacted, level, and acceptable for installation of vapor barrier membrane.

B. Correct deficiencies before beginning installation of vapor barrier membrane.

3.2 INSTALLATION:

A. Comply with ASTM E1643 for installation of vapor barriers.

B. Install vapor barrier over compacted granular fill of interior building areas to receive concrete slabs and other locations as indicated.

C. Lay membrane with seams perpendicular to and lapped in direction of pour. Lap and seal edges of membrane, including openings and penetrations.

D. Vapor barrier shall be continuous under slab extending up vertical surfaces within 1/2-inch from top of slab and under joint filler material.

E. Seal penetrations in accord with manufacturer's instructions.

1. Install manufacturer's pipe boots or collars to seal pipes.
2. Seal around pipe banks with mastic as recommended by vapor barrier membrane manufacturer.

F. Repair damages in vapor barrier membrane by cutting patches of same material to overlap damaged areas at least 6-inches and taping all sides for a tight seal.

END OF UNDER SLAB VAPOR BARRIER

SECTION 074114

STANDING-SEAM METAL ROOF PANELS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS:

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

1.2 SUMMARY:

A. Section Includes: Standing-seam metal roof panel system including related sheet metal flashings and installation accessories.

B. Related Sections:

1. Division 5 Section – "Steel Decking."
2. Division 6 Section – "Rough Carpentry."

1.3 PERFORMANCE REQUIREMENTS:

A. System Performance: Provide manufactured roof panel assemblies complying with performance requirements indicated and capable of withstanding structural movement, thermally induced movement, and exposure to weather without failure or infiltration of water into the building interior.

B. Structural Performance: Provide metal panel systems capable of withstanding the effects of the following loads, based on testing according to ASTM E 1592:

1. Wind Loads: As indicated on Drawings.
2. Other Design Loads: As indicated on Drawings.
3. Deflection Limits: For wind loads, no greater than 1/180 of the span.

C. Water Penetration under Static Pressure: No water penetration when tested according to ASTM E 1646 at test-pressure difference of 6.24 lbf/sq. ft.

D. Wind-Uplift Resistance: Provide metal roof panel assemblies that comply with UL 580 for wind-uplift-resistance class UL 90 rating.

E. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes by preventing buckling, opening of joints, overstressing of components, failure of joint sealants, failure of connections, and other detrimental effects.

1. Temperature Change (Range): 120 deg F (67 deg C), ambient; 180 deg F (100 deg C), material surfaces.

2. Base calculations on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.

1.4 SUBMITTALS:

A. Product Data: Submit manufacturer's product specifications for each type of product indicated. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for each type of panel and accessory.

B. Shop Drawings: Show layout of metal roof panels, details of edge conditions, joints, panel profiles, supports, anchorages, trim and flashings.
   1. Include roof plan showing layout of sheathing panels and attachment methods to meet specified wind-uplift resistance requirements.
      a. Indicate fastener types, sizes, spacings and fastening patterns.
      b. Show roof edge eave and rake details.
   2. Include fabrication and installation details for metal roofing.
   3. Indicate attachment system, trim, flashings, closures, and accessories; and special details.
   4. Indicate fastener types and spacings, expansion provisions and sealant locations.
   5. Accessories: Include details of the flashing, trim, and anchorage systems, at a scale of not less than 1-1/2 inches per 12 inches.
   6. Indicate that the qualified Professional Engineer responsible for preparing structural analysis has reviewed shop drawings.

C. Structural Analysis: Include structural analysis data signed and sealed by the qualified Professional Engineer responsible for their preparation indicating compliance with specified structural performance requirements.

D. Samples:
   1. Metal Panels: Submit 12- inch length by actual panel width indicating profile, style, surface finish and color selected.
   2. Metal Roof Accessories: Submit one sample each actual accessory material required. Include fasteners, closures, and other metal panel accessories.
   3. Fasteners: Submit three actual fasteners of type, size and length required for attachment of specified roof sheathing material.

E. Qualification Data: Submit documentation for Installer and Professional Engineer indicating compliance with specified qualification requirements. (Submit for Architect's information only.)

F. Product Test Reports: Submit for each product performed by a qualified testing agency demonstrating compliance with specified performance requirements. (Submit for Architect's information only.)

G. Field Quality-Control Reports: Submit inspection reports and results of field tests performed on installed system prepared by manufacturer's factory-authorized service representative. (Submit for Architect's information only.)

H. Sample Warranties: Submit sample copies of specified warranties. (Submit for Architect's information only.)

I. Maintenance Data: Submit metal panel manufacturer's cleaning and maintenance recommendations. Include with operation and maintenance manuals as part of project closeout documents.

1.5 QUALITY ASSURANCE:

A. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by manufacturer. Installer shall have minimum five (5) years' experience in the erection of metal roof panel systems similar in material, design, and extent to that indicated for this Project and with a record of successful in-service performance.

B. Professional Engineer Qualifications: A professional engineer who is legally qualified to practice in the jurisdiction where the Project is located and who is experienced in providing engineering services of the kind indicated.

C. Mockups: Build mockups to verify selections made under Sample submittals and to demonstrate aesthetic effects and set quality standards for fabrication and installation.
   1. Build mockups for typical roof area only, including accessories.
      a. Size: Approximately 6-feet width by full roof panel length from eave to ridge.
      b. Indicate the following:
         1) Underlayment application.
         2) Panel layout and attachment method to supporting substrate.
         3) Exposed seam and seam termination.
         4) Flashing trim and accessories.
   2. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
   3. Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.6 DELIVERY, STORAGE, AND HANDLING:

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

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

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

D. Retain strippable protective covering on metal panels during installation.

1.7 PROJECT CONDITIONS:

A. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit assembly of metal panels to be performed according to manufacturers' written instructions and warranty requirements.

1.8 COORDINATION:

A. Coordinate metal panel installation with rain drainage work, flashing, trim, construction of soffits, and other adjoining work to provide a leakproof, secure, and noncorrosive installation.

1.9 WARRANTY:

A. Material Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of metal panel systems that fail in materials or workmanship within specified warranty period.
   1. Failures include, but are not limited to, the following:
      a. Structural failures including rupturing, cracking, or puncturing.
      b. Deterioration of metals and other materials beyond normal weathering.
   2. Warranty Period: Two (2) years from date of Substantial Completion.

B. Panel Finish Warranty: Manufacturer's standard form in which manufacturer agrees to repair finish or replace metal panels that show evidence of deterioration of factory-applied finishes within specified warranty period.
   1. Exposed Panel Finish: Deterioration includes, but is not limited to, the following:
      a. Color fading more than 5 Hunter units when tested according to ASTM D 2244.
      b. Chalking in excess of a No. 8 rating when tested according to ASTM D 4214.
      c. Cracking, checking, peeling, or failure of paint to adhere to bare metal.
   2. Finish Warranty Period: Twenty (20) years from date of Substantial Completion.

C. Weathertightness Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace standing-seam metal roof panel assemblies that fail to remain weathertight, including leaks, within warranty period of Twenty (20) years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PANEL MATERIALS AND FINISHES:

A. Panel Material: Zinc-coated (galvanized) steel sheet complying with ASTM A 653, G90 coating designation, or aluminum-zinc alloy-coated steel sheet complying with ASTM A 792, Class AZ50 coating designation; structural quality. Prepainted by the coil-coating process to comply with ASTM A 755.
   1. Surface: Manufacturer's standard stucco-embossed finish.
   2. Thickness: 0.028-inch (24-gauge), unless otherwise indicated.
   3. Finish: Coil-coated finish as specified.

B. Flashing and Flat Stock Material: Same material, gauge and finish as specified for panels.

C. Coil-Coated Finishes:
   1. Exposed Finish for Exterior Panel Surfaces: Manufacturer's two-coat fluoropolymer finish complying with AAMA 621 containing not less than 70 percent PVDF resin by weight in color coat.
      a. Coating Application: Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.

b. Color and Gloss: As selected by Architect from manufacturer's full range of choices for color and gloss.

2. Concealed Finish: Apply pretreatment and manufacturer's standard white or light-colored acrylic or polyester backer finish consisting of prime coat and wash coat with a minimum total dry film thickness of 0.5-mil.

2.2 STANDING-SEAM METAL ROOF PANEL SYSTEM:

A. Acceptable Products; subject to compliance with specified requirements:
1. Architectural Roofing and Siding, Inc.; Roof-Lok Standing Seam Roof System
2. Centria; SRS System
3. Merchant & Evans, Inc.; Zip-Rib
4. Petersen Aluminum Corporation; Tite-Loc Plus.
5. Innovative Metals Co. Inc.; Series 300
6. Morin Inc. Corp.; SSR System

B. Standing-Seam Roof Panels: Manufacturer's standard factory-formed, standing-seam roof panel assembly designed for concealed mechanical attachment of panels to roof deck.
1. Seam Type: Manufacturer's standard bulb seam, double-folded seam or tee-seam with separate cap in matching material and finish; designed for field seaming by use of manufacturer's mechanical machine seamer.
2. Seam Height: 2-inches minimum, 3-inches maximum.
3. Panel Width: 16-inches (1'-4"), nominal.
4. Panel Length: Provide in full continuous lengths without lap seams or joints.
5. Anchor Clips: Manufacturer's standard, floating type panel clips designed to meet wind-uplift resistance rating and accommodate thermal movement; fabricated from zinc-coated (galvanized) or aluminum-zinc alloy-coated steel.

2.3 UNDERLAYMENT MATERIALS:

A. Membrane Underlayment:
1. Acceptable Products; subject to compliance with specified requirements:
a. Carlisle Coatings & Waterproofing Inc., Div. of Carlisle Companies Inc.; CCW WIP 300HT.
b. Grace Construction Products; a unit of Grace, W. R. & Co.; Ultra.
c. Henry Company; Blueskin PE200 HT.
d. Metal-Fab Manufacturing, LLC; MetShield.
e. Owens Corning; WeatherLock Metal High Temperature Underlayment.
2. Characteristics: Self-adhering, high-temperature composite sheet membrane consisting of slip-resisting, polyethylene-film top surface laminated to layer of butyl or SBS-modified asphalt adhesive, with release-paper backing; cold applied. Provide primer when recommended by underlayment manufacturer.
a. Thickness: 30 to 40 mils, minimum.
b. Thermal Stability: Stable after testing at 240 deg F (116 deg C); ASTM D 1970.
c. Low-Temperature Flexibility: Passes after testing at minus 20 deg F (29 deg C); ASTM D 1970.
3. Accessory Products: Provide primer as recommended by underlayment manufacturer for substrate conditions encountered.

B. Slip Sheet: Manufacturer's recommended slip sheet, of type required for application.

2.4 ROOF SHEATHING:

A. Roof Sheathing: Plywood sheathing as specified in Division 6 Section "Rough Carpentry."

B. Roof Sheathing Fasteners: Factory-coated, corrosion-resistant, steel fasteners with metal fastening plates, designed for fastening roof sheathing to substrate and acceptable to roofing system manufacturer.
   1. Corrosion Resistance: Passing FM 4470 Corrosion Test, modified DIN 50018 standard, with a maximum of 15% red rust after 15 wet and dry acidic atmosphere cycles in Kesternich cabinet.
   2. Size: As recommended by manufacturer for board thickness required and specified wind-uplift resistance rating.

2.5 MISCELLANEOUS MATERIALS:

A. Panel Accessories: Provide components required for a complete, weathertight panel system including trim, copings, fasciae, mullions, sills, corner units, clips, flashings, sealants, gaskets, fillers, closure strips, and similar items. Match material and finish of metal panels unless otherwise indicated.
   1. Closures: Provide closures at eaves and ridges, fabricated of same metal as metal panels.
   2. Backing Plates: Provide metal backing plates at panel end splices, fabricated from material recommended by manufacturer.
   3. Closure Strips: Closed-cell, expanded, cellular, rubber or crosslinked, polyolefin-foam or closed-cell laminated polyethylene; minimum 1-inch thick, flexible closure strips; cut or premolded to match metal panel profile. Provide closure strips where indicated or necessary to ensure weathertight construction.

B. Flashing and Trim: Provide flashing and trim formed from same material as metal panels as required to seal against weather and to provide finished appearance. Locations include, but are not limited to, eaves, rakes, corners, bases, framed openings, ridges, fasciae, and fillers. Finish flashing and trim with same finish system as adjacent metal panels.

C. Gutters and Downspouts:
   1. Gutters: Formed from same material as roof panels, complete with end pieces, outlet tubes, and other special pieces as required.
      a. Fabricate in minimum 96-inch (8-ft.) long sections, of size and metal thickness according to SMACNA's "Architectural Sheet Metal Manual."
      b. Furnish gutter supports spaced a maximum of 36 inches (3-ft.) on center, fabricated from same metal as gutters.
      c. Provide wire ball strainers of compatible metal at outlets.
      d. Finish gutters to match metal roof panels.
   2. Downspouts: Formed from same material as roof panels.
      a. Fabricate in 10-foot long sections, complete with formed elbows and offsets, of size and metal thickness according to SMACNA's "Architectural Sheet Metal Manual."
      b. Finish downspouts to match gutters.

D. Panel Fasteners: Self-tapping stainless steel screws designed to withstand design loads.

E. Panel Sealants: Provide sealant type recommended by manufacturer that are compatible with panel materials, are nonstaining, and do not damage panel finish.

1. Sealant Tape: Pressure-sensitive, 100 percent solids, gray polyisobutylene compound sealant tape with release-paper backing. Provide permanently elastic, nonsag, nontoxic, nonstaining tape 1/2-inch wide and 1/8-inch thick.
2. Joint Sealant: ASTM C 920; elastomeric polyurethane or silicone sealant; of type, grade, class, and use classifications required to seal joints in metal panels and remain weathertight; and as recommended in writing by metal panel manufacturer.
3. Butyl-Rubber-Based, Solvent-Release Sealant: ASTM C 1311.

F. Bituminous Coating: Cold-applied asphalt emulsion according to ASTM D 1187; compounded for 15-mil dry film thickness per coat, unless otherwise indicated.

2.6 FABRICATION:

A. General: Fabricate and finish metal panels and accessories at the factory, by manufacturer's standard procedures and processes, as necessary to fulfill indicated performance requirements demonstrated by laboratory testing. Comply with indicated profiles and with dimensional and structural requirements.

B. Provide panel profile, including major ribs and intermediate stiffening ribs, if any, for full length of panel.

C. Fabricate metal panel joints with factory-installed captive gaskets or separator strips that provide a weathertight seal and prevent metal-to-metal contact, and that minimize noise from movements.

D. Sheet Metal Flashing and Trim: Fabricate flashing and trim to comply with manufacturer's recommendations and recommendations in SMACNA's "Architectural Sheet Metal Manual" that apply to design, dimensions, metal, and other characteristics of item indicated.
1. Form exposed sheet metal accessories that are without excessive oil canning, buckling, and tool marks and that are true to line and levels indicated, with exposed edges folded back to form hems.
2. Seams for Aluminum: Fabricate nonmoving seams with flat-lock seams. Form seams and seal with epoxy seam sealer. Rivet joints for additional strength.
3. Seams for Other Than Aluminum: Fabricate nonmoving seams in accessories with flat-lock seams. Tin edges to be seamed, form seams, and solder.
4. Sealed Joints: Form nonexpansion, but movable, joints in metal to accommodate sealant and to comply with SMACNA standards.
5. Conceal fasteners and expansion provisions where possible. Exposed fasteners are not allowed on faces of accessories exposed to view.
6. Fabricate cleats and attachment devices from same material as accessory being anchored or from compatible, noncorrosive metal recommended in writing by metal panel manufacturer. Provide in sizes as recommended by SMACNA's "Architectural Sheet Metal Manual" or metal panel manufacturer for application, but not less than thickness of metal being secured.

E. Protect mechanical and painted finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

F. Appearance of Finished Work: Variations in appearance of abutting or adjacent pieces are acceptable if they are within one-half of the range of approved Samples. Noticeable variations in same piece are unacceptable. 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 substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances, metal panel supports, and other conditions affecting performance of the Work.

B. Examine solid roof sheathing to verify that sheathing joints are supported by framing or blocking and that installation is within flatness tolerances required by metal roof panel manufacturer.

C. Examine roughing-in for components and systems penetrating metal panels to verify actual locations of penetrations relative to seam locations of metal panels before installation.

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

3.2 ROOF SHEATHING INSTALLATION:

A. Install roof sheathing over roof decking in accordance with final reviewed shop drawings and manufacturer's product data.

B. Attach sheathing to roof deck using specified mechanical fasteners and spaced as indicated to achieve wind-uplift resistance rating.

C. Lay sheathing panel parallel with eaves with end joints staggered from subsequent panels at least 12-inches (1'-0"). Allow approximately 1/8-inch gap between panel edges and ends for expansion.

D. Install preservative treated wood nailers and blocking along eaves, rakes and cut-outs and as required. Install nailers and blocking in accord with provisions specified in Division 6 section "Rough Carpentry."

3.3 MEMBRANE UNDERLAYMENT INSTALLATION:

A. Install specified membrane underlayment over entire installed roof sheathing surface area in accordance with manufacturer's product data.

B. Prime surfaces as required by underlayment manufacturer’s recommendation for substrate conditions. Apply materials only to clean, dry and sound surfaces as directed by manufacturer’s instructions.

C. Install underlayment beginning at lower edge or eave of deck assembly and working up; removing backing release paper and adhering membrane firm to substrate.
   1. Apply membrane, wrinkle free, in shingle fashion to shed water.
      a. Lap each course over lower course with 4-inches minimum side laps and 6-inches minimum end laps. Roll laps with roller.
      b. Stagger end laps at least 24-inches (2-ft.) away from laps in adjacent courses.

2. Install full width underlayment sheet centered along valleys and ridges; extending equal distance each side with membrane pressed firm in place.
   a. Apply membrane to valleys before application of underlayment at eaves and subsequent courses.
   b. Where roofing meets walls and similar vertical surfaces, extend underlayment up vertical surfaces, minimum 6-inches.

D. Do not allow installed underlayment to be exposed to the weather for prolong periods; cover with specified metal roof panels as soon as possible, within 14 days following membrane application.

3.4 METAL PANEL INSTALLATION:

A. General: Install metal panels according to manufacturer's written instructions in orientation, sizes, and locations indicated. Install panels perpendicular to supports unless otherwise indicated. Anchor metal panels and other components of the Work securely in place, with provisions for thermal and structural movement.
1. Shim or otherwise plumb substrates receiving metal panels.
2. Flash and seal metal panels at perimeter of all openings. Fasten with self-tapping screws. Do not begin installation until air- or water-resistive barriers and flashings that will be concealed by metal panels are installed.
3. Install screw fasteners in predrilled holes.
4. Locate and space fastenings in uniform vertical and horizontal alignment.
5. Install flashing and trim as metal panel work proceeds.
6. Locate panel splices over, but not attached to, structural supports. Stagger panel splices and end laps to avoid a four-panel lap splice condition.
7. Align bottoms of metal panels and fasten with blind rivets, bolts, or self-tapping screws. Fasten flashings and trim around openings and similar elements with self-tapping screws.
8. Provide weathertight escutcheons for pipe- and conduit-penetrating panels.

B. Fasteners: Use stainless-steel fasteners for surfaces exposed to the exterior; use galvanized-steel fasteners for surfaces exposed to the interior.

C. Anchor Clips: Anchor metal roof panels and other components of the Work secured in place, using manufacturer's approved fasteners according to manufacturers' written instructions.
1. Install panel anchor clips positioned over membrane underlayment and roof sheathing.
2. Attach panel clips using fasteners of size and length required by manufacturer's design to extend through membrane underlayment and roof sheathing, penetrating through roof deck to provide ample anchorage to meet specified wind uplift requirements.

D. Metal Protection: Where dissimilar metals contact each other or corrosive substrates, protect against galvanic action as recommended in writing by metal panel manufacturer.

E. Standing-Seam Metal Roof Panel Installation: Fasten metal roof panels to supports with concealed clips at each standing-seam joint at location, spacing, and with fasteners recommended in writing by manufacturer.
1. Install clips to supports with self-tapping fasteners.
2. Install pressure plates at locations indicated in manufacturer's written installation instructions.
3. Seamed Joint: Crimp standing seams with manufacturer-approved, motorized seamer tool so clip, metal roof panel, and factory-applied sealant are completely engaged.

F. Accessory Installation: Install accessories with positive anchorage to building and weathertight mounting, and provide for thermal expansion. Coordinate installation with flashings and other components.
   1. Install components required for a complete metal panel system including trim, copings, corners, seam covers, flashings, sealants, gaskets, fillers, closure strips, and similar items.
   2. Provide types indicated by metal roof panel manufacturers; or, if not indicated, types recommended by metal roof panel manufacturer.

G. Flashing and Trim: Comply with performance requirements, manufacturer's written installation instructions, and SMACNA's "Architectural Sheet Metal Manual." Provide concealed fasteners where possible, and set units true to line and level as indicated. Install work with laps, joints, and seams that will be permanently watertight and weather resistant.
   1. Install exposed flashing and trim that is without buckling and tool marks, and that is true to line and levels indicated, with exposed edges folded back to form hems. Install sheet metal flashing and trim to fit substrates and achieve waterproof and weather-resistant performance.
   2. Expansion Provisions: Provide for thermal expansion of exposed flashing and trim. Space movement joints at a maximum of 10-feet with no joints allowed within 24-inches of corner or intersection. Where lapped expansion provisions cannot be used or would not be sufficiently weather resistant and waterproof, form expansion joints of intermeshing hooked flanges, not less than 1-inch deep, filled with mastic sealant (concealed within joints).

H. Gutters: Join sections with riveted and soldered or lapped and sealed joints. Attach gutters to eave with gutter hangers spaced not more than 36-inches on center using manufacturer's standard fasteners. Provide end closures and seal watertight with sealant. Provide for thermal expansion.

I. Downspouts: Join sections with telescoping joints. Provide fasteners designed to hold downspouts securely 1-inch away from walls; locate fasteners at top and bottom and at approximately 60 inches on center in between.
   1. Provide elbows at base of downspouts to direct water away from building.
   2. Connect downspouts to underground drainage system indicated.

J. Pipe Flashing: Form flashing around pipe penetration and metal roof panels. Fasten and seal to metal roof panels as recommended by manufacturer.

3.5 ERECTION TOLERANCES:

A. Installation Tolerances: Shim and align metal panel units within installed tolerance of 1/4-inch in 20-feet on slope and location lines as indicated and within 1/8-inch offset of adjoining faces and of alignment of matching profiles.

3.6 FIELD QUALITY CONTROL:

A. Manufacturer's Field Service: Engage a factory-authorized service representative to test and inspect metal roof panel installation, including accessories. Report results in writing.

B. Remove and replace applications of metal roof panels where tests and inspections indicate that they do not comply with specified requirements.

C. Additional tests and inspections, at Contractor's expense, are performed to determine compliance of replaced or additional work with specified requirements.

D. Prepare test and inspection reports for submittal to Architect.

3.7 CLEANING AND PROTECTION:

A. Remove temporary protective coverings and strippable films, if any, as metal panels are installed, unless otherwise indicated in manufacturer's written installation instructions.
   1. On completion of metal panel installation, clean finished surfaces as recommended by metal panel manufacturer.
   2. Maintain in a clean condition during construction.

B. Replace metal panels that have been damaged or have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.

END OF SECTION STANDING-SEAM METAL ROOF PANELS

SECTION 074646

FIBER-CEMENT SIDING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS:

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

1.2 SUMMARY:

A. Section Includes:
   1. Fiber-cement siding and soffits including trim boards and accessories.
   2. Building wrap air barrier.

B. Related Sections:
   1. Division 5 Section – "Cold-Formed Metal Framing."
   2. Division 6 Section – "Rough Carpentry."
   3. Division 7 Section – "Thermal Insulation."
   4. Division 7 Section – " Flashing and Sheet Metal."
   5. Division 7 Section – "Joint Sealants"
   6. Division 9 Section – "Painting"

1.3 SUBMITTALS:

A. Product Data: Submit manufacturer's product literature for siding indicating material descriptions, textures, thickness, and compliance with specified requirements. Include installation instructions and construction details.

B. Samples: Submit actual siding material in the following sizes for each type fiber-cement product indicating thickness, surface texture and appearance to be expected in completed work.
   1. Lap Siding: 12-inch length by actual-width.
   2. Soffit Panel: 12-inch square.
   3. Trim Board: 12-inch length by actual-width.

C. Qualification Data: Submit for installer to demonstrate their capabilities and experience; include documentation indicating compliance with specified qualification requirements. (Submit for Architect's information only.)

D. Product Test Reports: Submit reports based on evaluation of comprehensive tests performed by a qualified testing agency, for fiber-cement siding. (Submit for Architect's information only.)

E. Research/Evaluation Reports: Submit ICC-ES reports for each type of fiber-cement siding required. (Submit for Architect's information only.)

F. Maintenance Data: Submit manufacturer's care and maintenance instructions for each type of product, including related accessories, to include in maintenance manuals. Submit as part of closeout documents.

1.4 QUALITY ASSURANCE:

A. Installer Qualifications: An entity that employs installers and supervisors who have minimum Three (3) years' experience in the in the successful installation of fiber-cement siding products of similar type and complexity as required for this Project.

B. Source Limitations: Obtain fiber cement siding products, including related accessories, from a single manufacturer and from a single source.

C. Job Mock-up: Construct minimum 100 sq. ft. sample panels of each type fiber-cement siding installed over masonry wall substrates indicating pattern, texture and workmanship of finished work.

1. Construct sample panels on a portion of the building in areas designated by Architect.
2. Build mockups to demonstrate aesthetic effects and to set quality standards for fabrication and installation. Sample panel shall indicate the following:
   a. Siding pattern spacings.
   b. Typical corner conditions.
   c. Trim conditions around window units.
   d. Building wrap air barrier installation and flashing with adjacent materials.
   e. Insulation installation behind siding.
3. Do not proceed with installation work until sample panels have been accepted by Architect.
4. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
5. Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion, subject to compliance with requirements.

D. Pre-installation Conference: Conduct conference at Project site.

1.5 DELIVERY, STORAGE, AND HANDLING:

A. Deliver and store packaged materials in original containers with labels intact until time of use.

B. Store materials on elevated platforms, under well-ventilated cover, and in a dry location.

1. Stack siding and trim on edge or lay flat on a smooth level surface off ground or floor.
2. Protect edges and corners from chipping.

1.6 PROJECT CONDITIONS:

A. Environmental Requirements: Install materials only when forecasted weather conditions is suitable and substrates are dry. Do not attempt to install siding in inclement weather conditions or if forecasted to occur during installation.

B. Sequencing, Scheduling and Coordination:
   1. Schedule installation of siding materials to occur in sequence after insulation installation so as to minimize prolong exposure of uncovered surfaces to weather conditions.
   2. Coordinate siding installation with flashings and other adjoining construction to ensure proper sequencing.
   3. Coordinate and sequence siding application with building wrap air barrier and window installation.

1.7 WARRANTY:

A. Installation Warranty: Warrant work in this section to be free of defects in materials and workmanship for a period of Two (2) Years beginning at Date of Substantial Completion.

B. Material Warranties: Endorse and forward to Owner fiber-cement product manufacturer's limited warranty covering material defects, resistance to hail damages and against cracking, rotting or delamination. Manufacturer agrees to repair or replace products that fail in materials or workmanship within specified warranty period.
   1. Failures include, but are not limited to, the following:
      a. Structural failures including cracking and deforming.
      b. Deterioration of materials beyond normal weathering.
   2. Warranty Periods:
      a. Siding and Soffit Panels: Not less than Thirty (30) Years.
      b. Trim Boards: Not less than Fifteen (15) Years.

PART 2 - PRODUCTS

2.1 MANUFACTURERS:

A. Acceptable Manufacturers; subject to compliance with specified requirements:
   1. James Hardie Building Products Inc.
   2. Plycem USA, LLC.

2.2 FIBER-CEMENT LAP SIDING:

A. Acceptable Products; subject to compliance to specified requirements:
   1. James Hardie Building Products Inc.; HardiPlank® Lap Siding.
   2. Plycem USA, LLC.; Allura™ Lap Siding.

B. Lap Siding Characteristics: Siding fabricated from non-asbestos fiber-cement sheet material complying with ASTM C 1186, Grade II, Type A.

1. Fire Performance:
   a. Combustibility: Non-combustible when tested according to ASTM E 136.
   b. Surface Burning Behavior: Flame spread index of 0 and smoke developed index of 5, maximum, when tested according to ASTM E 84.
2. Pattern and Texture: Manufacturer's wood grain texture as specified.
   a. Hardiplank® Select Cedar Mill.
   b. Allura™ Cedar Lap.
3. Thickness: 5/16-inch.
4. Width: 9-1/4 inch (8-inch exposure).
5. Length: Manufacturer's standard maximum lengths.
6. Finish: Manufacturer's factory-applied acrylic primer finish for field painting.

2.3 FIBER-CEMENT VERTICAL SIDING:

A. Acceptable Products; subject to compliance to specified requirements:

1. James Hardie Building Products Inc.; HardiPanel® Vertical Siding.
2. Plycem USA, LLC.; Allura™ Vertical Panel Siding.

B. Siding Panel Characteristics: Panels fabricated from non-asbestos fiber-cement sheet material complying with ASTM C 1186, Grade II, Type A.

1. Fire Performance:
   a. Combustibility: Non-combustible when tested according to ASTM E 136.
   b. Surface Burning Behavior: Flame spread index of 0 and smoke developed index of 5, maximum, when tested according to ASTM E 84.
2. Panel Surface Texture: Manufacturer's wood grain texture as specified.
   a. Hardiplank® Select Cedar Mill.
   b. Allura™ Cedar No Groove.
3. Thickness: 5/16-inch.
4. Panel Size: Manufacturer's 48-inch (4-ft.) standard width by 8-ft. length or greater standard lengths as required by project conditions.
5. Finish: Manufacturer's factory-applied acrylic primer finish for field painting.

C. Batten Boards: Provide with manufacturer's standard size trim to simulate board and batten style installation pattern.

1. Material Composition and Fire Performance: Same as specified for siding.
2. Thickness: 3/4-inch (4/4).
3. Width: 2-1/2 inch.
4. Surface Texture: Manufacturer's wood grain texture.
5. Length: Manufacturer's standard maximum lengths available to minimize joints when installed.
6. Finish: Same as specified for siding.

2.4 FIBER-CEMENT SOFFIT PANELS:

A. Acceptable Products; subject to compliance to specified requirements:
   1. James Hardie Building Products Inc.; Hardisoffit®.
   2. Plycem USA, LLC.; Allura™ Soffit.

B. Soffit Panel Characteristics: Soffit panels fabricated from non-asbestos fiber-cement sheet material complying with ASTM C 1186, Grade II, Type A.
   1. Fire Performance:
      a. Combustibility: Non-combustible when tested according to ASTM E 136.
      b. Surface Burning Behavior: Flame spread index of 0 and smoke developed index of 5, maximum, when tested according to ASTM E 84.
   2. Panel Construction: Solid, non-perforated.
   3. Panel Surface Texture: Manufacturer's cedar grain texture.
   4. Thickness: 1/4-inch.
   5. Panel Size: Manufacturer's standard maximum size widths and lengths as required for project conditions to minimize number of joints when installed.
   6. Finish: Manufacturer's factory-applied acrylic primer finish for field painting.

2.5 TRIM BOARDS:

A. Acceptable Products; subject to compliance to specified requirements:
   1. James Hardie Building Products Inc.; HardiTrim®.
   2. Plycem USA, LLC.; Allura™ Plycem Trim.

B. Trim Board Characteristics: Manufacturer's fiber-cement board trim material complying with ASTM C1186, Grade II, Type A.
   1. Fire Performance: Same as specified for siding.
   2. Thickness: 3/4-inch (4/4).
   3. Width: Manufacturer's standard widths as indicated on drawings.
   4. Surface Texture: Manufacturer's wood grain texture.
   5. Length: Manufacturer's standard maximum lengths available to minimize joints when installed.
   6. Finish: Same as specified for siding.

2.6 BUILDING WRAP AIR BARRIER:

A. Water-Resistive Air Barrier:
   1. Acceptable Products; subject to compliance to specified requirements:
      a. E.I. DuPont de Nemours & Company; Tyvek® CommercialWrap.
      b. Fiberweb p.l.c. / Berry Plastics Corp.; Typar® MetroWrap.
      c. James Hardie Building Products Inc.; HardieWrap®.
      d. Kingspan Insulation, LLC; GreenGuard® C2000 Building Wrap.

2. Characteristics: Breathable, ultraviolet stabilized, woven or non-woven polyolefin, air and weather-resistive barrier sheet material complying with ASTM E 1677, Type I.
   a. Surface Burning Behavior Performance: Meeting Class A, less than 25 flame-spread and 450 smoke-developed indexes when tested according to ASTM E 84.
   b. Water-Vapor Permeance: Not less than 10 perms when tested according to ASTM E 96, Desiccant Method (Procedure A).
   c. Air Permeance: Not more than 0.004 cfm/sq. ft. under a pressure differential of 0.3-inch water gauge (wg) when tested according to ASTM E 2178.

2.7 ACCESSORIES:

A. Building-Wrap Accessories:
   1. Tape: Building-wrap manufacturer's pressure-sensitive tape constructed of oriented polypropylene or plastic film coated with special formulated permanent adhesive; designed for use with building-wrap to seal joints and penetrations.
   2. Adhesives and Primers: Types as recommended by building-wrap manufacturer to assist in adhesion of materials to substrate.
   3. Fasteners: Corrosion-resistant screws with 2-inch diameter plastic disks; type, size and length as recommended by building-wrap manufacturer.

B. Metal Flashing and Trim: Provide prefinished sheet metal flashing and trim as specified in Division 7 Section "Sheet Metal Flashing and Trim" for applications at window and door heads, sills, horizontal wall panel and where indicated.

C. Siding Fasteners:
   1. For Attaching to Metal: AISI type 300 series stainless steel or co-polymer corrosion-resistant coated, self-tapping, HD Hi-Lo Type S or S-12 ribbed Phillips waferhead screws of types and sizes recommended by fiber-cement siding manufacturer. Provide in lengths sufficient to penetrate minimum 1/4-inch, or three screw-threads, through metal substrate.
   2. For Attaching to Wood: Hot-dipped galvanized or stainless steel siding nails or common nails in sizes as recommended by fiber-cement siding manufacturer complying with building code requirements. Provide in lengths sufficient to penetrate into framing minimum 1-1/4 inch.

D. Sealant: As specified in Division 7 Section "Joint Sealants."

PART 3 - EXECUTION

3.1 EXAMINATION:

A. Examine substrates for compliance with requirements for installation tolerances and other conditions affecting performance of fiber-cement siding and soffit and related accessories.

B. Verify that substrate surfaces to receive siding are smooth and sound. Ensure that insulation and sub-girt framing are attached to substrates without protrusions or misalignment to provide a flat plane for application of siding materials.

C. Correct deficient or unsatisfactory conditions as required. Remove projections and substances detrimental to application from substrates.

D. Proceed with installation only after deficient or unsatisfactory conditions have been corrected is acceptable to installer.

3.2 BUILDING WRAP AIR BARRIER INSTALLATION:

A. Install water-resistive air barrier building wrap over in-place wall insulation and sub-girt framing complying with manufacturer's written installation instructions.

B. Begin installation at building corners. Lap material around corners minimum 12-inches (1'-0").

1. Unroll material pulled taut against insulation and sub-girt framing; secure in place with specified fasteners.
2. Attach material from top to bottom, smoothing out wrinkles towards base of wall as work progresses.

C. Install subsequent rolls of material overlapping horizontal and vertical edges of adjacent installed building wrap minimum 12-inches (1'-0"); lap horizontal edges in direction of drainage.

D. Lap over flashing materials minimum 4-inches allowing for positive drainage.

E. Install building wrap material covering door and window openings. Seal building wrap around opening according to manufacturer's installation requirements.

1. Flush cut building wrap at edge of wall substrate around full perimeter of opening.
2. Seal jambs and head of openings with specified seam tape after sill flashing has been installed.

F. Do not permit seams to align over joints in wall panel construction; ensure that building wrap overlaps joints minimum 18-inches (1'-6").

G. Seal horizontal and vertical seams with specified building wrap tape. Repair punctures in weather resistant barrier by sealing with seam tape.

3.3 SIDING INSTALLATION:

A. Comply with siding manufacturer's written installation instructions applicable to products and conditions indicated unless more stringent requirements apply.

1. Do not install damaged fiber-cement materials.
2. Install siding materials to dry substrates only. If substrates are wet or damp allow it to dry-out before starting installation.

B. Install siding to insulated wall surfaces covered with water-resistive air barrier building wrap.

C. Install trim, flashings and accessories before starting siding installation.

D. Lap Siding Installation: Install horizontal lap siding to provide exposure as specified.

1. Begin installation at low edge of wall by attaching minimum 1/4-inch thick lath starter strip positioned at bottom course to support lower edge of siding.
   a. Bottom edge of first plank shall overlap starter strip.
   b. Maintain minimum 6-inch clearance between siding and finished grades.
2. Install succeeding courses overlapping upper edge of previous installed siding minimum 1-1/4 inch attached to supporting wall sub-girt framing.
3. Attach siding by blind fastening method using specified fasteners with heads driven snug against surface. Locate fasteners 1-inch away from side edges and 3/8-inch from ends; attached to each framing member not exceeding 16-inches on center.
4. Install siding in longest practicable lengths, where splices are required locate joints over framing members and staggered from adjacent courses.
   a. Locate splices a minimum of 12-inches (1'-0") from window and door openings.
   b. Stagger end joints in adjacent siding boards 16-inches (1'-4"), minimum.
5. Continuous lengths shall be visually straight and uniform, without gaps, voids or waviness.

E. Vertical Siding Installation: Install vertical panel siding to simulate board and batten style installation pattern.

1. Install siding panels with long edge vertical and perpendicular to sub-girt framing.
   a. Position and layout panels with ends to occur over supports.
   b. Butt vertical panel edges together with moderate contact and seal joints with sealant that will be covered with batten boards.
2. Attach panels to metal sub-girt framing using specified fasteners spaced at maximum 6-inches on center along panel ends and 12-inches (1'- 0") on center at intermediate supports. Drive fastener heads flush with surface of panels.
3. Install panels with horizontal joints aligned and weatherproofed according to manufacturer's installation detail.
   a. Leave 3/8-inch joint gap between panel ends and install continuous length sheet metal z-shaped flashing covering top edge of panel to allow water to weep-out from behind siding panels. Tape vertical flange of flashing to seal against building wrap.
   b. Set subsequent top panels installed above flashing with 1/4-inch joint gap to allow for weeping.
   c. Do not caulk horizontal joints.
4. Install vertical batten boards centered over panel edge joints and spaced at 12-inches horizontal centers, plumbed and aligned. Install batten boards with consistent spacings throughout each building façade.
   a. Where batten boards are required to be spliced, construct by using scarf (bevel cut) joints and installed with beveled cut portion sloping away

from wall. Seal scarfed joints with sealant applied to cut ends.

b. Paint all cut ends of batten boards, including scarfed joints, before installing.

c. Attach battens with specified fasteners spaced at 16-inches (1"-4") on center, staggered along alternate sides of board.

1) Position fasteners no closer than 1-inch from sides of batten and no closer than 2-inches from ends.

2) Fasteners shall be of length to extend through batten board and siding panel to engage into each sub-girt framing support.

5. Maintain minimum 6-inch clearance at wall base between siding bottom edge and finished grades.

F. Soffit Panel Installation: Install panels with longest dimension perpendicular to framing.

1. Install panels attached to supporting framing at spacings not exceeding 24-inches on center.

2. Attach with specified fasteners spaced along supports at 12-inches (1'- 0") on center.

3. Locate fasteners 3/8-inch from panel edges, 3/4 from side edges and 2-inch from corners.

4. Butt panels to form joints with moderate contact not exceeding 1/8-inch gap for caulking with sealant.

G. Trim Installation: Install trim boards complying with manufacturer's fastening instructions.

1. Install trim in full continuous lengths without splices where practicable. Construct splices with scarfed joints (bevel cut) sloped away from wall. Seal scarfed joints with sealant applied to cut ends.

2. Attach trim with fasteners located no closer than 1-inch from ends and not less than 3/4-inch from edges.

3. Space fasteners at 16-inches (1'-4") on center, maximum, to engage into supporting framing member.

4. If finishing nails are used, locate nails no closer than 1/2-inch from edges.

H. Leave 1/8-inch gap between siding and trim members or other abutting materials. Butt siding at splices with moderate contact not exceeding 1/8-inch gap for caulking.

I. Cut and fit fiber cement siding, soffit and trim materials to provide a finished installation that is neat, uniform and consistent in appearance.

3.4 PATCHING, CAULKING AND FINISHING:

A. Patch dents and chips with cementitious patching compound as recommended by siding and trim manufacturer.

1. Patch dents and chips with cementitious patching compound as recommended by siding and trim manufacturer.

2. Patched repair work shall be acceptable to Architect.

3. Siding units which cannot be patched to Architects satisfaction shall be replaced with new material at no additional cost to Owner.

B. Caulk all joints, including splice joints, panel joints and joints between siding and trim with specified sealant. Install joint sealants as specified in Division 7 Section "Joint Sealants" to produce a weathertight installation.

C. Caulk all joints, including splice joints, panel joints and joints between siding and trim, with sealant specified in Sealants and Caulking section.

D. Field paint fiber cement siding, soffit and trim complying with Division 9 Painting section.

3.5 ADJUSTING, CLEANINGAND PROTECTION:

A. Upon completion of installation, remove debris and scrap materials as a result of siding work from Project site.

B. Remove damaged, improperly installed, or otherwise defective materials and replace with new materials complying with specified requirements.

C. Clean finished surfaces according to manufacturer's written instructions and maintain in a clean condition during construction until time for field painting.

D. Protect finished materials from soils, stains and from damages until Date of Substantial Completion.

END OF FIBER-CEMENT SIDING

SECTION 076000

FLASHING AND SHEET METAL

PART 1 - GENERAL

1.1 RELATED DOCUMENTS:

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

1.2 SUMMARY:

A. Section Includes:

1. Prefinished gutters and downspouts with related accessories.
2. Exposed prefinished metal trim/fascia units, and other items as indicated on the Drawings.
3. Miscellaneous sheet metal accessories as indicated and as required by project conditions.

B. Exposed metal flashing are to be prefinished as specified, in manufacturer's standard non-metallic color(s) selected by Architect after bidding.

C. Related work specified elsewhere includes:

1. Division 6 Section – "Rough Carpentry."
2. Division 7 Section – "Standing Seam Metal Roof Panels."
3. Division 7 Section – "Fiber-Cement Siding."

1.3 DESIGN AND PERFORMANCE REQUIREMENTS:

A. Performance Requirements: Sheet metal flashing and trim assemblies shall withstand wind loads, structural movement, thermally induced movement, and exposure to weather without failure due to defective manufacture, fabrication, installation, or other defects in construction. Completed sheet metal flashing and trim shall not rattle, leak, or loosen, and shall remain watertight.

B. Design Requirements: Design, fabricate and install roof edges flashings to comply with ANSI/SPRI ES-1 and requirements of governing building code, based on wind loading conditions for the Project.

C. Sheet Metal Standard for Flashing and Trim: Comply with NRCA "The NRCA Roofing Manual" and SMACNA "Architectural Sheet Metal Manual" requirements for dimensions and profiles shown unless more stringent requirements are indicated.

D. Thermal Movements: Allow for thermal movements from indicated ambient and surface temperature changes to prevent buckling, opening of joints, overstressing of components, failure of joint sealants, failure of connections, and other detrimental effects.

1. Temperature Change: 120-deg F, ambient; 180-deg F, material surfaces.

2. Base calculations on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.

1.4 SUBMITTALS:

A. Product Data: Manufacturer's technical data, installation instructions and general recommendations for each specified sheet metal flashing material, fabricated product, coating system, and color selection data.

B. Samples of the following flashing, sheet metal, and accessory items:

1. 12-inch-long samples of factory-fabricated products exposed as finished work. Provide complete with specified factory finish.
2. Physical samples for color selections, where color selection is required.

C. Shop Drawings: Show layout, profiles, methods of joining, and anchorages details, including gutters and downspouts, counterflashings, trim/fascia units, and other fabricated work. Provide layout drawings at 1/4-inch scale and details at 3-inch scale.

1. Show fabrication details and installation layouts, expansion-joint locations, and keyed details. Distinguish between shop- and field-assembled work.
2. Indicate material types, metal thickness and finish.
3. Include details for forming, including profiles, shapes, seams, and dimensions.
4. Indicate compliance with design and performance requirements for roof edge securement.

1.5 QUALITY ASSURANCE:

A. Fabricator Qualifications: Fabricator's shop shall employ skilled workers who custom fabricate sheet metal flashing and trim similar to that required for this Project and whose fabrication work have a record of successful in-service performance with minimum Five (5) years' experience. Shop shall be listed as able to fabricate roof edge flashings that are SPRI ES-1 tested and approved.

B. Installer Qualifications: Engage an experience Installer who has completed sheet metal flashing and trim work similar in material, design, and extent to that indicated for this Project and with a record of successful in-service performance.

C. Regulatory Requirements: Comply with roof edge securement requirements of the International Building Code, 2012 edition, with State of Georgia amendments.

1.6 DELIVERY, STORAGE, AND HANDLING:

A. Do not store sheet metal flashing and trim materials in contact with other materials that might cause staining, denting, or other surface damage. Store sheet metal flashing and trim materials away from uncured concrete and masonry.

B. Protect strippable protective covering on sheet metal flashing and trim from exposure to sunlight and high humidity, except to the extent necessary for the period of sheet metal flashing and trim installation.

1.7 PROJECT CONDITIONS:

A. Coordinate work of this section with interfacing and adjoining work for proper sequencing of each installation. Ensure best possible weather resistance and durability of work and protection of materials and finishes.

1.8 WARRANTY:

A. Finish Warranty: Warrant fluoropolymer coating to remain free of checking, crazing, peeling, chalking or fading. Coating manufacturer agrees to repair finish or replace sheet metal flashing and trim that shows evidence of deterioration of factory-applied finishes within specified warranty period.

1. Deterioration includes, but is not limited to, the following:
   a. Color fading more than 5 Hunter units when tested according to ASTM D 2244.
   b. Chalking in excess of a No. 8 rating when tested according to ASTM D 4214.
   c. Cracking, checking, peeling, or failure of paint to adhere to bare metal.
2. Finish Warranty Period: Twenty (20) years commencing on date of Substantial Completion.

PART 2 - PRODUCTS

2.1 SHEET METAL MATERIALS AND FINISHES:

A. Sheet Metal Material: Minimum 24-gauge (0.028-inch) thickness sheet metal, unless otherwise specified, having minimum 50,000 psi yield strength; coil-coated with specified two-coat fluoropolymer finish system.

1. Provide one of the following base metals:
   a. ASTM A 792 aluminum-zinc alloy coated steel sheet (“Galvalume”), or
   b. ASTM A 653, G-90 (galvanized) zinc-coated steel sheet.
2. Use the same base metal material throughout project for sheet metal fabricated applications and systems.

B. Coil-Coated Finishes for Sheet Metal Material:

1. Exposed Finish: Two-coat fluoropolymer finish system complying with AAMA 621, with a total dry film thickness of not less than 1.0-mils. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.
   a. Coating Material: Fluoropolymer coating containing not less than 70-percent polyvinylidene fluoride (PVDF) resin by weight in color coat.
   b. Color: As selected by Architect from manufacturer’s standard full range non-metallic colors.
2. Concealed Finish: Manufacturer's standard white or light-colored acrylic or polyester backer finish applied to pretreated metal surface. Coating system shall consist of prime coat and wash coat with minimum total dry film thickness of 0.5 mil.

2.2 GUTTERS AND DOWNSPOUTS:

A. Gutters:

1. Style: Style F per SMACNA Figure 1-2.
2. Material: Prefinished aluminum-zinc alloy coated or zinc-coated steel sheet as specified; 24-gauge (0.028-inch) minimum thickness.
3. Finish: Two-coat fluoropolymer finish as specified.

B. Downspouts:

1. Style: Rectangular shape per SMACNA Figure 1-32B.
2. Hanger Design: SMACNA Figure 1-35H.
3. Material: Prefinished aluminum-zinc alloy coated or zinc-coated steel sheet as specified; 24-gauge (0.028-inch) minimum thickness.
4. Finish: Two-coat fluoropolymer finish as specified.

C. Gutter and Downspout Accessories: Provide prefabricated accessories in matching finish, including corner sections, elbows, slip joint connectors, end caps, outlets, hangers, bracket supports and fasteners for complete installation.

D. Eave Flashing: Furnish drip edge eave flashing fabricated per SMACNA Figure 4-22D for installation with gutters at shingled roof applications.

2.3 MISCELLANEOUS MATERIALS AND ACCESSORIES:

A. Solder:

1. For use with steel or copper: Provide 50 - 50 tin/lead solder (ASTM B 32), with rosin flux.
2. For use with stainless steel: Provide 60 - 40 tin/lead solder (ASTM B 32), with acid-chloride type flux, except use rosin flux over tinned surfaces.

B. Fasteners: Same metal as flashing/sheet metal or other non-corrosive metal as recommended by sheet manufacturer. Match finish of exposed heads with material being fastened.

C. Membrane Subflashing: Minimum 40 mil thickness, non-reinforced, homogeneous vinyl sheet.

D. Bituminous Coating: Cold-applied asphalt emulsion according to ASTM D 1187.

E. Mastic Sealant: Polyisobutylene; nonhardening, nonskinning, non-drying, nonmigrating sealant.

F. Elastomeric Sealant: ASTM C 920, elastomeric silicone polymer sealant; of type, grade, class, and use classifications required to seal joints in sheet metal flashing and trim and remain watertight.

G. Paper Slip Sheet: 5-lb. rosin-sized building paper.

H. Drainage Pipe: Corrugated high density polyethylene (HDPE) tubing and fittings complying with ASTM F 667; heavy duty, unperforated. Provide for downspout

underground connection to existing storm water recovery system. Include pipe manufacturer's adapters designed for connecting to downspouts.

I. Metal Accessories: Provide sheet metal clips, straps, anchoring devices, and similar accessory units as required for installation of work, matching or compatible with material being installed, noncorrosive, size and gage required for performance.

2.4 FABRICATION:

A. General Sheet Metal Fabrication: Shop-fabricate work to greatest extent possible. Comply with details shown and with applicable requirements of SMACNA "Architectural Sheet Metal Manual" and other recognized industry practices. Fabricate for waterproof and weather-resistant performance, with expansion provisions for running work, sufficient to permanently prevent leakage, damage, or deterioration of the work.

1. Fabricate sheet metal flashing and trim in thickness or weight needed to comply with performance requirements, but not less than that specified for each application and metal.
2. Form work to fit substrates. Comply with material manufacturer instructions and recommendations for forming material.
3. Obtain field measurements for accurate fit before shop fabrication.
4. Form exposed sheet metal work without excessive oil-canning, buckling, and tool marks, true to line and levels indicated, with exposed edges folded back to form hems.
5. Conceal fasteners and expansion provisions where possible. Do not use exposed fasteners on faces exposed to view.
6. Provide matching materials and finish for fascia metal covering, flashing, counterflashing and trim.

B. Fabrication Tolerances: Fabricate sheet metal flashing and trim that is capable of installation to a tolerance of 1/4-inch in 20-feet on slope and location lines indicated on Drawings and within 1/8-inch offset of adjoining faces and of alignment of matching profiles.

C. Expansion Provisions: Form metal for thermal expansion of exposed flashing and trim.

1. Form expansion joints of interlocking hooked flanges, not less than 1-inch deep, filled with butyl sealant concealed within joints.
2. Use lapped expansion joints only where indicated on Drawings.

D. Sealant Joints: Where movable, non-expansion type joints are required, form metal to provide for proper installation of elastomeric sealant according to referenced sheet metal standard.

E. Cleats and Attachment Devices: Fabricate from same material as sheet metal component being anchored or from compatible, noncorrosive metal recommended by sheet metal manufacturer. Size shall be as recommended by referenced sheet metal standard for application but never less than thickness of metal being secured.

F. Seams: Fabricate nonmoving seams with flat-lock seams. Form seams and seal with elastomeric sealant unless otherwise recommended by sealant manufacturer for intended use. Pop-rivet joints for additional strength where required and at vertical faces

G. Separations: Provide for separation of metal from noncompatible metal or corrosive substrates by coating concealed surfaces at locations of contact, with bituminous coating or other permanent separation as recommended by manufacturer/fabricator.

H. Gutters: Fabricate to cross section required, complete with end pieces, outlet tubes, and other accessories as required. Furnish flat-stock gutter brackets and flat-stock gutter spacers and straps fabricated from same metal as gutters, of size recommended by referenced sheet metal standard but with thickness not less than twice the gutter thickness. Fabricate expansion joints, expansion-joint covers, and gutter accessories from same metal as gutters. Shop fabricate interior and exterior corners.

1. Lengths: Fabricate in longest lengths practicable for installation but not less than in minimum 120-inch (10-ft.) length sections.
2. Expansion Joints: Lap type or butt type with cover plate.

I. Downspouts: Fabricate downspouts to dimensions and profiles indicated, complete with mitered elbows. Furnish with metal hangers from same material as downspouts and anchors. Shop fabricate elbows.

PART 3 - EXECUTION

3.1 INSTALLATION:

A. General Requirements: Except as otherwise indicated, comply with manufacturer's current written installation instructions and recommendations, with SMACNA "Architectural Sheet Metal Manual," and reviewed submittals and shop drawings.

1. Install manufactured items in accordance with manufacturer's current written instructions and recommendations.
2. Anchor units of work securely in place by methods indicated, providing for thermal expansion of metal units; conceal fasteners where possible, and set units true to line and level as indicated.
3. Install work with laps, joints, and seams that will be permanently watertight and weatherproof.

B. Anchor sheet metal flashing and trim and other components of the Work securely in place, with provisions for thermal and structural movement. Use fasteners, protective coatings, separators, sealants, and other miscellaneous items as required to complete sheet metal flashing and trim system.

1. Install sheet metal flashing and trim true to line, levels, and slopes. Provide uniform, neat seams with minimum exposure of solder, welds, and sealant.
2. Install sheet metal flashing and trim to fit substrates and to result in watertight performance. Verify shapes and dimensions of surfaces to be covered before fabricating sheet metal.
3. Space cleats not more than 12-inches apart. Attach each cleat with at least two fasteners. Bend tabs over fasteners.
4. Install exposed sheet metal flashing and trim with limited oil canning, and free of buckling and tool marks.
5. Torch cutting of sheet metal flashing and trim is not permitted.
6. Do not use graphite pencils to mark metal surfaces.

C. Metal Protection: Where dissimilar metals contact each other, or where metal contacts pressure-treated wood or other corrosive substrates, protect against galvanic action or corrosion by painting contact surfaces with bituminous coating or by other permanent separation as recommended by sheet metal manufacturer or referenced sheet metal standard.

1. Coat concealed side of sheet metal flashing and trim with bituminous coating where flashing and trim contact wood, ferrous metal, or cementitious construction.
2. Underlayment: Where installing sheet metal flashing and trim directly on cementitious or wood substrates, install underlayment and cover with slip sheet.

D. Expansion Provisions: Provide for thermal expansion of exposed flashing and trim. Space movement joints at maximum of 10-feet with no joints within 24-inches of corner or intersection.

1. Form expansion joints of interlocking hooked flanges, not less than 1-inch deep, filled with sealant concealed within joints.
2. Use lapped expansion joints only where indicated on Drawings.

E. Fasteners: Use fastener sizes that penetrate substrate not less than recommended by fastener manufacturer to achieve maximum pull-out resistance.

F. Conceal fasteners and expansion provisions where possible in exposed work and locate to minimize possibility of leakage. Cover and seal fasteners and anchors as required for a tight installation.

G. Seal joints as required for watertight construction.

1. Use sealant-filled joints unless otherwise indicated. Embed hooked flanges of joint members not less than 1-inch into sealant. Form joints to completely conceal sealant.
2. When ambient temperature at time of installation is between 40-deg F. and 70-deg F., set joint members for 50-percent movement each way. Adjust setting proportionately for installation at higher ambient temperatures.
3. Do not install sealant-type joints at temperatures below 40-deg F.

H. Bed flanges of work in a thick coat of bituminous roofing cement where required for waterproof performance.

I. Flashing: Comply with manufacturer’s current written instructions and recommendations for installation of all systems components in all applications indicated on the Drawings, and as otherwise required by project conditions.

J. Gutters: Join sections with joints sealed with sealant. Provide for thermal expansion. Attach gutters at eave or fascia to firmly anchor them in position. Provide end closures and seal watertight with sealant. Slope to downspouts.

1. Fasten gutter spacers to front and back of gutter.
2. Anchor back of gutter that extends onto roof deck with cleats spaced not more than 24-inches (2-ft.) apart.

3. Anchor gutter with gutter brackets spaced not more than 36 inches (3-ft.) apart to roof edge nailers or deck, unless otherwise indicated, and loosely lock to front gutter bead.
4. Install gutter with expansion joints at locations indicated, but not exceeding, 40 feet apart. Install expansion-joint caps.

K. Downspouts: Join sections with 1-1/2-inch telescoping joints.

1. Install downspouts according to specified hanger design of referenced SMACNA standard.
2. Provide hangers with fasteners designed to hold downspouts securely to walls. Locate hangers at top and bottom and at approximately 60 inches (5-ft.) on center.
3. Connect downspouts to underground drainage system where indicated.

L. Roof-Edge Flashings: Secure metal flashings at roof edges according to ANSI/SPRI ES-1 requirements for Project wind load conditions complying with specified design calculations and final reviewed shop drawings.

1. Anchor to resist uplift and outward forces according to recommendations in referenced sheet metal standard unless otherwise indicated.
2. Interlock bottom edge of roof edge flashing with continuous cleat anchored to substrate at 3-inch staggered centers.
3. Provide slotted holes at fasteners to allow for movements

3.2 ERECTION TOLERANCES:

A. Installation Tolerances: Shim and align sheet metal flashing and trim within installed tolerance of 1/4-inch in 20-feet on slope and location lines indicated on Drawings and within 1/8-inch offset of adjoining faces and of alignment of matching profiles.

3.3 CLEANING AND PROTECTION:

A. Upon completion of sheet metal flashing and trim installation, remove unused materials and clean finished surfaces as recommended by sheet metal flashing and trim manufacturer. Maintain sheet metal flashing and trim in clean condition during construction.

B. Clean exposed metal surfaces, removing substances that might cause corrosion of metal or deterioration of finishes.

1. After cleaning, repair and restore damaged metal and metal finishes with prefinished paint manufacturer’s special air-drying touch-up paint, in manner such that touch-up is not apparent.
2. Replace damaged flashing and sheet metal work which cannot be repaired and when finish repair and restoration is not acceptable to Architect.

C. Remove temporary protective coverings and strippable films as sheet metal flashing and trim are installed unless otherwise indicated in manufacturer's written installation instructions.

D. Protection: Advise Contractor of required procedures for surveillance and protection of flashings and sheet metal work during construction to ensure that work will be without damage or deterioration other than natural weathering at time of Substantial Completion.

E. Replace sheet metal flashing and trim that have been damaged or that have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.

END OF FLASHING AND SHEET METAL

SECTION 07 84 00

FIRESTOPPING

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. Section Includes: Through-penetration firestop systems for penetrations through fire-resistance-rated constructions, including both empty openings and openings containing penetrating items.

1.3 PERFORMANCE REQUIREMENTS

A. General: For penetrations through fire-resistance-rated constructions, including both empty openings and openings containing penetrating items, provide through-penetration firestop systems that are produced and installed to resist spread of fire according to requirements indicated, resist passage of smoke and other gases, and maintain original fire-resistance rating of construction penetrated.

B. Through-Penetration Firestop System Ratings: Provide through-penetration firestop systems with the following ratings determined per ASTM E 814 or UL 1479:
   1. F-Rated Systems: Provide through-penetration firestop systems with F-ratings indicated, but not less than that equaling or exceeding fire-resistance rating of constructions penetrated.
   2. T-Rated Systems: For the following conditions, provide through-penetration firestop systems with T-ratings indicated, as well as F-ratings, where systems protect penetrating items exposed to potential contact with adjacent materials in occupiable floor areas:
      a. Penetrations located outside wall cavities.
      b. Penetrations located outside fire-resistance-rated shaft enclosures.

C. For through-penetration firestop systems exposed to view, traffic, moisture, and physical damage, provide products that, after curing, do not deteriorate when exposed to these conditions both during and after construction.
   1. For piping penetrations for plumbing and wet-pipe sprinkler systems, provide moisture-resistant through-penetration firestop systems.
   2. For penetrations involving insulated piping, provide through-penetration firestop systems not requiring removal of insulation.

1.4 SUBMITTALS

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

B. Shop Drawings: For each through-penetration firestop.
   1. Show each type of construction condition penetrated, including relationships to adjoining construction, and type of penetrating item.
   2. Include through-penetration firestop design designation of qualified testing and inspecting agency that evidences compliance with requirements for each condition indicated.
   3. Submit documentation, including illustrations, from a qualified testing and inspecting agency that is applicable to each through-penetration firestop system for construction and penetrating items.
   4. Where Project conditions require modification to a qualified testing and inspecting agency's illustration for a particular through-penetration firestop condition, submit illustration, with modifications marked, approved by through-penetration firestop system manufacturer's fire-protection engineer as an engineering judgment or equivalent fire-resistance-rated assembly.

C. Through-Penetration Firestop System Schedule: Indicate locations of each through-penetration firestop system, along with the following information:
   1. Types of penetrating items.
   2. Types of constructions penetrated, including fire-resistance ratings and, where applicable, thicknesses of construction penetrated.
   3. Through-penetration firestop systems for each location identified by assembly design designation of qualified testing and inspecting agency.

D. Qualification Data: For installer to demonstrate their capabilities and experience; include documentation indicating compliance with specified qualification requirements. Submit for Architect's information only.

E. Product Test Reports: Submit reports from a qualified testing agency indicating through-penetration firestop system complies with requirements, based on comprehensive testing of current products. Submit for Architect's information only.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: A firm experienced in installing through-penetration firestop systems similar in material, design, and extent to that indicated for this Project, whose work has resulted in construction with a record of successful performance.
   1. Qualifications include having the necessary experience, staff, and training to install manufacturer's products per specified requirements.
   2. Manufacturer's willingness to sell its through-penetration firestop system products to Contractor or to Installer engaged by Contractor does not in itself confer qualification on buyer.

B. Regulatory Requirements: : Comply with requirements of the International Building Code, 2012 edition for firestopping penetrations.

C. Fire-Test-Response Characteristics: Provide through-penetration firestop systems that comply with the following requirements and those specified in this section:
   1. Firestopping systems tests are performed by a qualified testing and inspecting agency acceptable to authorities having jurisdiction.

2. Through-penetration firestop systems are identical to those tested per referenced testing standard. Provide rated systems complying with the following requirements:
   a. Through-penetration firestop system products shall bear classification marking of qualified testing and inspecting agency.
   b. Through-penetration firestop systems shall correspond to those indicated by reference to through-penetration firestop system designations listed of the qualified testing and inspecting agency.
   c. Classification markings on penetration firestopping systems shall correspond to designations listed by the following:
      1) UL in its "Fire Resistance Directory."
      2) Intertek Group, plc in its "Building Products Directory."
      3) FM Global in its "Building Materials Approval Guide."

1.6 DELIVERY, STORAGE, AND HANDLING

A. Deliver through-penetration firestop system products to Project site in original, unopened containers or packages with intact and legible manufacturers' labels identifying product and manufacturer, date of manufacture, lot number, shelf life if applicable, qualified testing and inspecting agency's classification marking applicable to Project, curing time, and mixing instructions for multicomponent materials.

B. Store and handle materials to prevent their deterioration or damage due to moisture, temperature changes, contaminants, or other causes.

1.7 PROJECT CONDITIONS

A. Environmental Limitations: Do not install through-penetration firestop systems when ambient or substrate temperatures are outside limits permitted by system manufacturers or when substrates are wet due to rain, frost, condensation, or other causes.

B. Ventilate through-penetration firestop systems per manufacturer's written instructions by natural means or, where this is inadequate, forced-air circulation.

1.8 COORDINATION

A. Coordinate construction of openings and penetrating items to ensure that through-penetration firestop systems are installed according to specified requirements.

B. Coordinate sizing of sleeves, openings, core-drilled holes, or cut openings to accommodate through-penetration firestop systems.

C. Do not cover up through-penetration firestop system installations that will become concealed behind other construction until each installation has been examined by building inspector, if required by authorities having jurisdiction.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Acceptable Manufacturers; subject to compliance with requirements:
1. A/D Fire Protection Systems Inc.
2. W. R. Grace & Co. - Conn.
3. Hilti, Inc.
4. Johns Manville.
5. Nelson Firestop Products.
6. RectorSeal Corporation.
7. Specified Technologies Inc.
8. 3M; Fire Protection Products Division.
9. Tremco, Inc.; Sealant/Weatherproofing Division.
10. USG Corporation.

2.2 THROUGH-PENETRATION FIRESTOP SYSTEMS

A. Through-Penetration Firestop Systems: Field-constructed firestopping for penetrations through fire-rated walls and floors composed of materials and accessories assembled in accord with Through-Penetration Firestopping System designs meeting specified performance requirements.

B. Firestop Devices: Factory-assembled, self-contained firestopping devices for penetrations through fire-rated walls and floors meeting specified through-penetration firestop system performance requirements.
1. Cast-in-Place Devices: Designed for use in cast-in-place concrete floors and consisting of an outer metallic sleeve lined with an intumescent strip, a radial extended flange attached to one end of the sleeve for fastening to concrete formwork, and a neoprene gasket.
2. Collar Devices: Collars formed from galvanized steel and lined with intumescent material sized to fit specific diameter of penetrant.

C. Compatibility: Provide through-penetration firestop systems and devices that are compatible with one another; with the substrates forming openings; and with the items, if any, penetrating through-penetration firestop systems, under conditions of service and application, as demonstrated by through-penetration firestop system manufacturer based on testing and field experience.

D. Accessories: Provide components for each through-penetration firestop system that are needed to install fill materials and to comply with Part 1 "Performance Requirements" Article. Use only components specified by through-penetration firestop system manufacturer and approved by qualified testing and inspecting agency for firestop systems indicated. Accessories include the following items:
1. Permanent forming/damming/backing materials, including the following:
   a. Slag-/rock-wool-fiber insulation.
   b. Sealants used in combination with other forming/damming/backing materials to prevent leakage of fill materials in liquid state.
   c. Fire-rated form board.
   d. Fillers for sealants.

2. Temporary forming materials.
3. Substrate primers.
4. Collars.
5. Steel sleeves.

2.3 FILL MATERIALS

A. General: Provide through-penetration firestop systems containing the types of fill materials indicated in the Through-Penetration Firestop System. Fill materials are those referred to in directories of referenced testing and inspecting agencies as "fill," "void," or "cavity" materials.

B. Latex Sealants: Single-component latex formulations that after cure do not re-emulsify during exposure to moisture.

C. Intumescent Composite Sheets: Rigid panels consisting of aluminum-foil-faced elastomeric sheet bonded to galvanized steel sheet.

D. Intumescent Putties: Nonhardening dielectric, water-resistant putties containing no solvents, inorganic fibers, or silicone compounds.

E. Intumescent Wrap Strips: Single-component intumescent elastomeric sheets with aluminum foil on one side.

F. Mortars: Prepackaged dry mixes consisting of a blend of inorganic binders, hydraulic cement, fillers, and lightweight aggregate formulated for mixing with water at Project site to form a nonshrinking, homogeneous mortar.

G. Pillows/Bags: Reusable heat-expanding pillows/bags consisting of glass-fiber cloth cases filled with a combination of mineral-fiber, water-insoluble expansion agents, and fire-retardant additives.

H. Silicone Foams: Multicomponent, silicone-based liquid elastomers that, when mixed, expand and cure in place to produce a flexible, nonshrinking foam.

I. Silicone Sealants: Single-component, silicone-based, neutral-curing elastomeric sealants of grade indicated below:
   1. Grade: Pourable (self-leveling) formulation for openings in floors and other horizontal surfaces, and nonsag formulation for openings in vertical and other surfaces requiring a nonslumping, gunnable sealant, unless indicated firestop system limits use to nonsag grade for both opening conditions.
   2. Grade for Horizontal Surfaces: Pourable (self-leveling) formulation for openings in floors and other horizontal surfaces.
   3. Grade for Vertical Surfaces: Nonsag formulation for openings in vertical and other surfaces.

2.4 MIXING

A. For those products requiring mixing before application, comply with through-penetration firestop system manufacturer's written instructions for accurate proportioning of

materials, water (if required), type of mixing equipment, selection of mixer speeds, mixing containers, mixing time, and other items or procedures needed to produce products of uniform quality with optimum performance characteristics for application indicated.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and conditions, with Installer present, for compliance with requirements for opening configurations, penetrating items, substrates, and other conditions affecting performance of work.

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

3.2 PREPARATION

A. Surface Cleaning: Clean out openings and joints immediately before installing through-penetration firestop systems to comply with system manufacturer's written instructions and with the following requirements:
   1. Remove from surfaces of opening substrates and from penetrating items foreign materials that could interfere with adhesion of through-penetration firestop systems.
   2. Clean opening substrates including penetrating items to produce clean, sound surfaces capable of developing optimum bond with firestopping system materials. Remove loose particles remaining from cleaning operation.
   3. Remove laitance and form-release agents from concrete.

B. Priming: Prime substrates where recommended in writing by through-penetration firestop system manufacturer using that manufacturer's recommended products and methods. Confine primers to areas of bond; do not allow spillage and migration onto exposed surfaces.

C. Masking Tape: Use masking tape to prevent through-penetration firestop systems from contacting adjoining surfaces that will remain exposed on completion of Work and that would otherwise be permanently stained or damaged by such contact or by cleaning methods used to remove smears from firestop system materials. Remove tape as soon as possible without disturbing firestopping system's seal with substrates.

3.3 THROUGH-PENETRATION FIRESTOP SYSTEM INSTALLATION

A. General: Install through-penetration firestop systems to comply with specified performance requirements and with firestop system manufacturer's written installation instructions and published drawings for products and applications indicated.

B. Install forming/damming/backing materials and other accessories of types required to support fill materials during their application and in the position needed to produce cross-sectional shapes and depths required to achieve fire ratings indicated. After installing fill

materials and allowing them to fully cure, remove combustible forming materials and other accessories not indicated as permanent components of firestop systems.

C. Install fill materials for firestop systems by proven techniques to produce the following results:
   1. Fill voids and cavities formed by openings, forming materials, accessories, and penetrating items as required to achieve fire-resistance ratings indicated.
   2. Apply materials so they contact and adhere to substrates formed by openings and penetrating items.
   3. For fill materials that will remain exposed after completing Work, finish to produce smooth, uniform surfaces that are flush with adjoining finishes.

3.4 IDENTIFICATION

A. Identify through-penetration firestop systems with preprinted metal or plastic labels. Attach labels permanently to surfaces adjacent to and within 6-inches of edge of the firestop systems so that labels will be visible to anyone seeking to remove penetrating items or firestop systems.
   1. Use mechanical fasteners for metal labels.
   2. For plastic labels, use self-adhering type with adhesives capable of permanently bonding labels to surfaces on which labels are placed and, in combination with label material, will result in partial destruction of label if removal is attempted.
   3. Include the following information on labels:
      a. The words "Warning - Through-Penetration Firestop System - Do Not Disturb. Notify Building Management of Any Damage."
      b. Contractor's name, address, and phone number.
      c. Through-penetration firestop system designation of applicable testing and inspecting agency.
      d. Date of installation.
      e. Through-penetration firestop system manufacturer's name.
      f. Installer's name.

3.5 CLEANING AND PROTECTING

A. Clean off excess fill materials adjacent to openings as Work progresses by methods and with cleaning materials that are approved in writing by through-penetration firestop system manufacturers and that do not damage materials in which openings occur.

B. Provide final protection and maintain conditions during and after installation that ensure that through-penetration firestop systems are without damage or deterioration at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, cut out and remove damaged or deteriorated firestopping immediately and install new materials to produce systems complying with specified requirements.

END OF FIRESTOPPING

SECTION 079200

JOINT SEALANTS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Silicone weatherseal sealant.
2. One-part polyurethane sealant.
3. Traffic grade polyurethane sealant.
4. Mildew resistant silicone sealants.
5. Acrylic-latex caulking compound.

B. Related Sections:

1. Division 7 Section – "Firestopping."
2. Division 9 Section – "Gypsum Board Assemblies."
3. Division 9 Section – "Painting."

1.2 DEFINITIONS

A. Sealant: A weatherproof elastomer used in filling and sealing joints, having properties of adhesion, cohesion, extensibility under tension, compressibility and recovery; designed to make joints air and watertight. Material is designed generally for application in exterior joints and for joints subject to movement.

B. Caulking Compound: A material used in filling joints and seams, having properties of adhesion and cohesion; not required to have extensibility and recovery properties, generally for application in interior joints.

C. Caulk: The process of filling joints, without regard to type of material.

D. Joint Failure: A caulked joint exhibiting one or more of the characteristics listed below.

1. Air and/or water leakage.
2. Migration.
3. Loss of adhesion.
4. Loss of cohesion.
5. Failure to cure.
6. Discoloration.
7. Staining of adjacent work.
8. Development of bubbles, air pockets or voids.

1.3 SUBMITTALS

A. Product Data: Submit manufacturer's product literature, indicating conformance with specified requirements. Include installation instructions for each type sealant. Indicate preparation requirements for each substrate condition.

B. Color Samples: Submit samples for each type sealant specified. Samples shall be actual materials. Architect reserves the right to reject work not in conformance with selected colors, based upon samples submitted.

C. Adhesion Compatibility Tests: Submit letter from sealant manufacturer indicating that adhesion and compatibility testing have been performed on actual samples of aluminum-clad window framing components.

1. Test results shall determine if materials are compatible and that adhesion is acceptable.
2. Indicate requirements for primers or special preparation for adhesion.
3. Testing will not be required if sealant manufacturer has conducted previous testing on current sealant products for adhesion and compatibility with specified framing components, joint substrates and other materials identical to those required for this Project and submits joint preparation data that are based on these tests indicating acceptable adhesion. Test results shall be current within the past two (2) years.

1.4 QUALITY ASSURANCE

A. Single Source Requirements: Each type joint sealant used throughout the Project shall be the product of a single manufacturer.

1.5 DELIVERY, STORAGE AND HANDLING

A. Deliver materials to job site in manufacturer's original packaging.

B. Store materials in accordance with manufacturer's instructions complying with environmental conditions and recommended temperature ranges.

1.6 PROJECT CONDITIONS

A. Environmental Requirements:

1. Install no materials under adverse weather conditions, or when temperatures are below or above those recommended by manufacturer's product data, or when substrate moisture content is above recommended levels.
2. Proceed with work only when forecasted weather conditions are favorable for joint cure and development of high early bond strength.
3. Wherever joint width is affected by ambient temperature variations, install materials only when temperatures are in lower third of manufacturer's recommended installation temperature range.
4. Do not install sealant materials when substrate temperature is below 40 degrees F.

B. Protection of Adjacent Surfaces:

1. Protect by applying masking material or manipulating application equipment to keep materials in joint. if masking materials are used, allow no tape to touch cleaned surfaces to receive sealant. Remove tape immediately after caulking, before surface skin begins to form.
2. Remove misapplied materials from surfaces using solvents and methods recommended by manufacturer.
3. Restore surfaces from which materials have been removed to original condition and appearance.

1.7 WARRANTY

A. Warrant work to be free from defects in materials and workmanship, including joint failure, for a period of Two (2) years, beginning at Date of Substantial Completion.

PART 2 - PRODUCTS

2.1 SILICONE WEATHERSEAL SEALANT:

A. Acceptable Products; subject to compliance with specified requirements:

1. Dow Corning Corp.; 790 Silicone Building Sealant.
2. Pecora Corp.; 890NST.
3. Tremco, Inc.; Spectrum I.

B. Characteristics:

1. Type: One part low modulus silicone rubber; meeting ASTM C 920, Type S, Grade NS, Class 100/50.
2. Joint Movement Capability: Plus 100% extension, minus 50% compression, minimum.
3. Colors: As selected by Architect from manufacturer's standard full range color selection.

2.2 ONE-PART POLYURETHANE SEALANT:

A. Acceptable Products; subject to compliance with specified requirements:

1. BASF Corporation; MasterSeal NP1.
2. Pecora Corp., Dynatrol™ I-XL
3. Sika Corporation; Sikaflex-1a
4. Tremco, Inc., Dymonic 100.

B. Characteristics:

1. Type: One-part, non-sag, elastomeric polyurethane sealant meeting ASTM C920, Type S, Grade NS, Class 25; compatible for painting.
2. Color: As selected by the Architect from Manufacturer’s standard selection for compatibility with paint colors used.

2.3 TRAFFIC GRADE POLYURETHANE SEALANT:

A. Acceptable Products; subject to compliance with specified requirements:

1. BASF Corporation; MasterSeal SL-1 or SL-2.
2. Pecora Corp., Urexpan NR 200.
3. Sika Corporation; Sikaflex-2c SL.
4. Tremco, Inc.; Vulkem 45SSL or THC-901.

B. Characteristics:

1. Type: Single or multi-component, polyurethane sealant formulated for horizontal traffic bearing surfaces, meeting ASTM C920, Type S or M, Grade P or NS, Class 25; self-leveling for flat surfaces and non-sag for sloped surfaces.
2. Color: As selected by the Architect from Manufacturer's standard selection.

2.4 MILDEW RESISTANT SILICONE SEALANT:

A. Acceptable Products; subject to compliance with specified requirements:

1. Dow Corning Corp.; 786 Mildew-Resistant Silicone Sealant.
2. Momentive Performance Materials, Inc. (GE); SCS 1700 Sanitary Silicone Sealant.
3. Pecora Corp.; 898NST Sanitary Mildew Resistant Silicone Sealant.
4. BASF Corporation; Omniplus.

B. Characteristics:

1. Type: One part silicone rubber; mildew and stain resistant meeting ASTM C 920, Type S, Grade NS; USDA or FDA approved.
2. Color: White.

2.5 ACRYLIC-LATEX CAULKING COMPOUND:

A. Acceptable Products; subject to compliance with specified requirements:

1. C.R. Laurence Company, Inc.; CRL 321.
2. DAP, Inc.; Alex Plus
3. Momentive Performance Materials, Inc.; GE Max 2500 Caulk.
4. Pecora Corp.; AC-20 +Silicone.
5. Tremco, Inc.; Tremflex 834.

B. Characteristics: One-part, flexible, non-sag, non-staining, non-bleeding, paintable, siliconized acrylic-latex emulsion compound meeting ASTM C 834, Type OP, Grade NF or better.

2.6 ACCESSORY MATERIALS:

A. Joint Cleaner: Type recommended by material manufacturer for substrates indicated.

B. Joint Primer/Sealer: Type recommended by material manufacturer for conditions, exposures and substrates indicated.

C. Bond Breaker Tape: Plastic tape applied to contact surfaces where bond to substrate or joint filler must be avoided for material performance.

D. Sealant Backer Rod: Compressible rod stock polyethylene foam, polyethylene jacketed polyurethane foam, butyl rubber foam or neoprene foam as recommended by material manufacturer for compatibility with sealant. Provide size and shape or rod to control joint depth, break bond at bottom of joint, form optimum shape of bead on back side and minimize possibility of extrusion when joint is compressed.

E. Tooling Agent: Agent recommended by the material manufacturer to insure contact of material with inner joint faces.

F. Divider Strips: Synthetic rubber or closed cell synthetic foam not less than 1/16-inch thickness and full depth of sealant or caulking compound; approved by manufacturers of dissimilar materials as being compatible with each other.

PART 3 - EXECUTION

3.1 JOINT SURFACE PREPARATION:

A. Clean joint surfaces immediately before caulking joints. Remove dirt, insecure coatings, moisture and other substances which would interfere with bond.

B. Etch concrete and masonry joint surfaces to remove excess alkalinity, unless material manufacturer's product data indicates alkalinity does not interfere with bond and performance. Etch with 5% solution of muriatic acid; neutralize with dilute ammonia solution; rinse with clean water and allow to dry before caulking.

3.2 APPLICATION

A. Comply with sealant and caulking materials manufacturer's product data, except where more stringent requirements are specified.

B. Prime or seal joint surfaces where recommended by material manufacturer. Do not allow primer/sealer to spill or migrate onto adjacent surfaces.

C. Install backer rod for all sealant and caulking materials, except where recommended to be omitted by the material manufacturer for application indicated. Place backer rod to maintain recommended sealant thickness and profiles. Substitute bond breaker tape for shallow, closed joints.

D. Employ installation techniques which will ensure that materials are deposited in uniform, continuous ribbons without gaps or air pockets, with complete wetting of joint bond surfaces. Where horizontal joints are between a horizontal surface and a vertical surface, fill joint to form slight cove, so that joint will not trap moisture and debris.

E. Do not allow materials to overflow or spill onto adjacent surfaces. Use masking tape or other methods to prevent staining of adjacent surfaces.

F. Remove excess and misplaced materials as work progresses. Clean adjoining surfaces to eliminate evidence of misplaced materials, without damage to adjacent surfaces or finishes.

G. Tool joints of non-sag sealants to concave profile with smooth uniform surface, flush with edges of substrate. Maintain sealant depth-to-width ratio in accordance with manufacturer's product data.

H. Cure sealants and caulking compounds in accordance with manufacturer's product data to obtain high early bond strength, internal cohesive strength and surface durability. Protect uncured surfaces from contamination and physical damage.

3.3 SEALANTS AND CAULKING SCHEDULE

A. Exterior joints in cement board siding, soffits and trim: One-Part Polyurethane Sealant.

B. Exterior joints around perimeter of aluminum storefront framing: Silicone Weatherseal Sealant.

C. Bedding joints for thresholds: Silicone Weatherseal Sealant.

D. Interior horizontal (traffic-bearing) joints in concrete floor slabs and pavement; including control joints: Traffic Grade Polyurethane Sealant.

E. Typical interior joints and seams at abutting and adjacent materials: Acrylic-Latex Caulking Compound.

F. Interior joints in conjunction with vanities, plumbing fixtures and toilet room finishes: Mildew Resistant Silicone Sealant.

END OF JOINT SEALANTS

SECTION 081213

HOLLOW METAL FRAMES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS:

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

1.2 SUMMARY:

A. Section Includes: Hollow metal doors and frames.

B. Related work specified elsewhere includes:
1. Division 6 Section – "Rough Carpentry"
2. Division 8 Section – "Door Hardware"
3. Division 9 Section – "Gypsum Board Assemblies"
4. Division 9 Section – "Painting"

1.3 QUALITY ASSURANCE:

A. Provide doors and frames complying with Steel Door Institute "Recommended Specifications: Standard Steel Doors and Frames" (SDI-100) and as herein specified.

B. Performance Requirements:
1. Physical Endurance: Comply with performance requirements for specified level and model classification in accordance with ANSI/SDI-A250.8-2014 (SDI-100) and ANSI/SDI-A250.4-2011 for doors, frames, frame anchors and hardware reinforcing.
2. Finish: Comply with the standard performance criteria of ANSI A250.10-2011 for primed steel surfaces.
3. Thermal Performance: U=0.07 (R=14) or better for exterior doors, complying with SDI 113-13.

1.4 SUBMITTALS:

A. Product Data: Submit manufacturer's technical product data substantiating that products comply with requirements.

B. Shop Drawings: Submit for fabrication and installation of steel frames.
1. Include details of each frame type, conditions at openings, details of construction, location and installation requirements of finish hardware and reinforcements, and details of joints and connections.
2. Show anchorage and accessory items.

1.5 DELIVERY, STORAGE AND HANDLING:

A. Deliver hollow metal work cartoned or crated to provide protection during transit and job

storage. Provide additional sealed plastic wrapping for factory finished doors.

B. Inspect hollow metal work upon delivery for damage. Minor damages may be repaired provided finish items are equivalent in all respects to new work and acceptable to Architect; otherwise, remove and replace damaged items as directed.

C. Store frames at building site under cover. Place units on minimum 4-inch-high wood blocking. Avoid use of non-vented plastic or canvas shelters which could create humidity chamber.

PART 2 - PRODUCTS

2.1 MANUFACTURERS:

A. Acceptable Manufacturers; Subject to compliance with requirements, provide hollow metal frames by one of the following:
1. Amweld Building Products, LLC.
2. Ceco Door Products; an Assa Abloy Group company.
3. Curries Company; an Assa Abloy Group company.
4. Habersham Metal Products Company
5. Mesker Door Inc.
6. Pioneer Industries, Inc..
7. Republic Doors and Frames.
8. Steelcraft / Allegion, plc .

2.2 MATERIALS:

A. Cold-Rolled Steel Sheet: ASTM A 1008/A 1008M, Commercial Steel (CS), Type B; suitable for exposed applications.

B. Hot-Rolled Steel Sheet: ASTM A 1011/A 1011M, Commercial Steel (CS), Type B; free of scale, pitting, or surface defects; pickled and oiled.

C. Frame Anchors: ASTM A 879/A 879M, Commercial Steel (CS), Coating Designation 04Z; mill phosphatized.

D. Inserts, Bolts and Fasteners: Manufacturer's standard units, except hot-dip galvanize items to be built into exterior walls, complying with ASTM A 153, Class C or D as applicable.

E. Galvanizing Repair Paint: High zinc dust content paint for repair of galvanized surfaces damaged by fabrication or welding, complying with SSPC-Paint 20 and compatible with paints specified to be used over it.

F. Shop Applied Primer: Rust-inhibitive enamel or paint, either air drying or baking, suitable as a base for specified finish paints.

2.3 INTERIOR HOLLOW METAL FRAMES:

A. Frame Profile: All frames shall be of double rabbeted profile; except where single-rabbeted frames are specifically indicated on the Drawings.

B. Frame Classification: Level III (Extra Heavy Duty) per ANSI/SDI A250.8.

C. Frame Construction: Welded frames fabricated from minimum 16-gauge (0.053-inch) specified steel sheet material.

1. Corners: Mitered or coped and full profile welded. Welds shall be dressed and ground smooth with no visible seams.

2. Temporary Spreaders: Provide with removable temporary spreader bars welded to bottom of each jamb and maintain in place during shipping, storage and handling.

3. Hardware Reinforcement: Fabricate according to ANSI/SDI A250.6 with reinforcement plates from same material as frames. Reinforcement shall be provided for strikes, closers and brackets, and other surface applied hardware for field drilling and tapping.

D. Plaster Guards: Provide 26-gauge steel plaster guards or mortar boxes, welded to frame, at back of finish hardware cutouts where mortar or other materials might obstruct hardware operation.

E. Frame Anchors: Fabricated from not less than 18-gauge (0.042-inch) specified steel sheet for interior frames.

1. Floor anchors: Clip type with 5/16-inch holes holes provided to receive two fasteners per jamb; welded to inside of each jamb at frame bottom for securing to floor substrate.
2. Jamb Anchors: Provide anchors of minimum size and type required by applicable door and frame standard, and suitable for performance level indicated.

a. Stud-Wall Type Jamb Anchors: Designed to engage stud, welded to back of frames; not less than 18-gauge (0.042-inch) thickness.

b. Jamb Anchors for Frame Installation to In-Place Masonry: Post-installed expansion anchor assembly consisting of minimum 3/8-inch diameter countersunk, flat head, stove bolts with expansion shields, spaced 6-inch maximum from top and bottom of frame and 24-inches (2-ft) on center , maximum in between. Provide with 16-gauge steel shield and sleeve spacers at each bolt, fitted inside frames.

c. Quantity: Minimum of three anchors per jamb, with one additional anchor for frames with no floor anchor. Provide one additional anchor for each 24-inches of frame height above 7-feet.

F. Setting Bars: Furnish welded frames with setting bars for installation use.

2.4 FABRICATION:

A. Fabricate hollow metal frame units to be rigid, neat in appearance and free from defects, warp or buckle. Wherever practicable, fit and assemble units in manufacturer's plant. Clearly identify work that cannot be permanently factory assembled before shipment, to assure proper assembly at project site.

B. Fabricate frames, concealed stiffeners, reinforcement, edge channels, from either cold-rolled or hot-rolled steel (at fabricator's option).
   1. Frames shall be formed by press brake with corners sharp and true.
   2. Corners shall be mitered and accurately fitted, and shall be fully electrically welded and then ground smooth.

C. Exposed Fasteners: Unless otherwise indicated, provide countersunk flat Phillips heads for exposed screws and bolts.

D. Finish Hardware Preparation:
   1. Prepare frames to receive mortise and concealed finish hardware in accordance with final Finish Hardware Schedule and templates provided by hardware supplier. Comply with applicable requirements of ANSI A 115 series specifications for frame preparation for hardware.
   2. Reinforce frames to receive surface applied hardware. Drilling and tapping for surface-applied finish hardware may be done at project site.
   3. Frames shall be accurately mortised for hardware.
   4. Locate finish hardware as indicated on final shop drawings, or if not indicated, in accordance with "Recommended Locations for Builders' Hardware," published by Door and Hardware Institute.

E. Shop Painting:
   1. Clean, treat and paint exposed surfaces of metal frame units, including galvanized surfaces.
   2. Clean steel surfaces of mill scale, rust, oil, grease, dirt and other foreign materials before application of paint.
   3. Use galvanizing repair paint for galvanized surfaces damaged by fabrication or welding, prior to prime coat.
   4. Apply shop coat of prime paint of even consistency to provide a uniformly finished surface ready to receive finish paint.

PART 3 - EXECUTION

3.1 INSTALLATION:

A. Install hollow metal frames and accessories in accordance with final reviewed shop drawings and manufacturer's data, and as herein specified.

B. Placing Frames:
   1. Comply with provisions of ANSI/SDI A250.11 "Recommended Erection Instructions for Steel Frames," unless otherwise indicated.
   2. Set frames accurately in position, plumbed, aligned, and braced securely until permanent anchors are set. Remove temporary braces and spreaders leaving surfaces smooth and undamaged.

3. Check plumbness, squareness, and twist of frames as walls are constructed. Shim as necessary to comply with installation tolerances.
4. Pack mineral-fiber insulation solid behind frames in metal-stud partitions.
5. In masonry construction, locate a minimum of 3 wall anchors per jamb at hinge and strike levels. Add one (1) wall anchor per jamb at hinge and strike levels for each whole 1'-10" height increment over 6'-0"; similar at glazed and cased openings.
6. At in-place concrete or masonry construction, set frames and secure to adjacent construction with machine screws and masonry anchorage devices.
7. Field apply bituminous coating to backs of frames that will be filled with grout containing anti-freezing agents.

3.2 INSTALLATION TOLERANCES:

A. Adjust hollow metal door frames for squareness, alignment, twist, and plumb to the following tolerances:
   1. Squareness: Plus or minus 1/16-inch, measured at door rabbet on a line 90 degrees from jamb perpendicular to frame head.
   2. Alignment: Plus or minus 1/16-inch, measured at jambs on a horizontal line parallel to plane of wall.
   3. Twist: Plus or minus 1/16-inch, measured at opposite face corners of jambs on parallel lines, and perpendicular to plane of wall.
   4. Plumbness: Plus or minus 1/16-inch, measured at jambs at floor.

3.3 ADJUST AND CLEAN:

B. Prime Coat Touch-up:
   1. Immediately after erection, sand smooth any rusted or damaged areas of prime coat and apply touch-up of compatible air-drying primer.
   2. Use galvanizing repair paint for galvanized surfaces, prior to prime coat.

C. Final Adjustments: Check and readjust operating finish hardware items, leaving hollow metal frames undamaged and in sound condition for hanging doors.

END OF HOLLOW METAL DOORS AND FRAMES

SECTION 081416

FLUSH WOOD DOORS

PART 1 - GENERAL

1.1. RELATED DOCUMENTS:

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

1.2. SUMMARY:

A. Section Includes: Solid core flush wood doors with veneer faces.

B. Related work specified elsewhere includes:
1. Division 8 Section - "Hollow Metal Frames."
2. Division 8 Section - "Door Hardware."

1.3. SUBMITTALS:

A. Product Data: Submit door manufacturer's technical data for each type of door and frame, including details of core and edge construction, and trim for openings and louvers.

B. Shop Drawings: Submit shop drawings indicating location and size of each door, elevation of each kind of door, details of construction, location and extent of hardware blocking, and other pertinent data.

C. Samples:
1. For Initial Selection: Submit manufacturer's full range sample charts of factory-finished doors for selection.
2. For Verification: Submit sample of selected factory finish applied to actual door face materials, approximately 8 by 10 inches for each material and finish.

1.4. QUALITY ASSURANCE:

A. Quality Standards: Comply with the following standards:
1. WDMA Quality Standard: I.S. 1-A Series, "Industry Standard for Wood Flush Doors" of Window and Door Manufacturers Association (WDMA).
2. AWI Quality Standard: "Architectural Woodwork Standards", 1st Edition, including Section 9 "Doors", of Architectural Woodwork Institute (AWI) for grade of door, core construction, finish and other requirements exceeding those of NWWDA quality standard.

B. WDMA Quality Marking:
1. Mark each wood door with WDMA Wood Flush Door Certification Hallmark certifying compliance with applicable requirements of WDMA I.S. 1-A Series.
2. For manufacturers not participating in WDMA Hallmark Program, a certification of compliance may be substituted for marking of individual doors.

C. Single Source Limitations: Obtain doors from a single manufacturer, selecting from specified manufacturers listed herein.

1.5. DELIVER, STORAGE AND HANDLING:

A. Protect wood doors during transit, storage and handling to prevent damage, soiling and deterioration. Comply with requirements of referenced standards and recommendations of NWWDA pamphlet "How to Store, Handle, Finish, Install, and Maintain Wood Doors" as well as with manufacturer's instructions.

B. Package factory finished doors individually in opaque plastic bags or cardboard cartons.

C. Identify each door with individual opening numbers which correlate with designation system used on shop drawings for door, frames, and hardware, using temporary, removable or concealed markings.

1.6. PROJECT CONDITIONS:

A. Environmental Limitations: Do not deliver or install doors until spaces are enclosed and weathertight, wet work in spaces is complete and dry, and HVAC system is operating and maintaining ambient temperature and humidity conditions at occupancy levels during remainder of construction period.

1.7. WARRANTY:

A. Door Manufacturer's Warranty:
   1. Submit written agreement on door manufacturer's standard form signed by Manufacturer, Installer and Contractor, agreeing to repair or replace defective doors that have warped (bow, cup or twist), or that show telegraphing of core construction in face veneers, or do not conform to tolerance limitations of referenced quality standards.
   2. Warranty shall also include refinishing and reinstallation which may be required due to repair or replacement of defective doors where defect was not apparent prior to hanging.
   3. Warranty shall commence on date of Substantial Completion.
   4. Warranty Period for Solid-Core Interior Doors: Life of installation

B. Contractor's Responsibilities: Replace or refinish doors where Contractor's work contributed to rejection or to voiding of manufacturer's warranty.

PART 2 - PRODUCTS

2.1 MANUFACTURERS:

A. Acceptable Manufacturers; subject to compliance with requirements, provide doors by one of the following:
   1. Algoma Hardwoods, Inc.
   2. Eggers Industries, Architectural Door Division.
   3. Marshfield Door Systems, Inc.

4. Oshkosh Architectural Door Co.

2.2 INTERIOR FLUSH WOOD DOORS:

A. Solid Core Doors: Comply with the following requirements.
   1. Faces for Transparent Finish (typical unless specifically indicated otherwise): Select White Birch, Plain Sliced.
      a. Veneer Grade: Grade A faces.
      b. Veneer Matching: Book matched, center matched.
      c. Veneer face shall be consistent with similar color and appearance at both sides of doors, with no green or brown colored wood.
   2. Faces for Opaque Finish (if any): Birch, Red Oak, White Oak, or other close-grained hardwood permitted by referenced standards; Rotary cut.
   3. AWI Grade:
      a. Transparent Finish: Premium.
      b. Opaque Finish: Custom.
   4. Solid Core Construction: PC-5 (Particle board core, 5-ply, hot-pressed method).
      a. Particleboard: Meeting ANSI A208.1, Grade LD-2.
      b. Blocking: Provide wood blocking in particleboard-core doors as follows:
         1) 5-inch top-rail blocking, in doors indicated to have closers.
         2) 5-inch bottom-rail blocking, in doors indicated to have kick, mop, or armor plates.
         3) 5-inch midrail blocking, in doors indicated to have exit devices or provide doors with structural-composite-lumber cores instead of particleboard cores for doors indicated to receive exit devices.

2.3 FABRICATION

A. Factory fit doors to suit frame-opening sizes indicated.
   1. Comply with clearance requirements of referenced quality standard for fitting unless otherwise indicated.
   2. Comply with NFPA 80 requirements for fire-rated doors.

B. Factory machine doors for hardware that is not surface applied. Locate hardware to comply with DHI-WDHS-3.
   1. Comply with final hardware schedules, door frame Shop Drawings, BHMA-156.115-W, and hardware templates.
   2. Coordinate with hardware mortises in metal frames to verify dimensions and alignment before factory machining.

2.4 FACTORY FINISHING

A. Factory finish doors and frames that are indicated to receive transparent finish.

B. Comply with referenced quality standard for factory finishing. Complete fabrication, including fitting doors for openings and machining for hardware that is not surface applied, before finishing.

C. Finish faces, all four edges, edges of cutouts, and mortises. Stains and fillers may be

omitted on top and bottom edges, edges of cutouts, and mortises.

D. Transparent Finish:
1. Grade: Premium.
2. Finish: Manufacturer's standard finish with performance comparable to AWI System 5, conversion varnish.
3. Staining: As selected by Architect from manufacturer's full range.
4. Sheen: Satin.

PART 3 - EXECUTION

3.1 EXAMINATION:

A. Examine doors, frames and rough openings, with Installer present, before starting installation of frames and hanging doors.
1. Verify that doors and frames comply with indicated requirements for type, size, location, and swing characteristics.
2. Reject doors and frames with defects.

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

3.2 INSTALLATION:

A. Install doors complying with manufacturer's written instructions, referenced quality standard, and final reviewed shop drawings.

B. Factory-Fitted Doors: Align in frames for uniform clearance at each edge.

C. Factory-Finished Doors: Restore finish before installation if fitting or machining is required at Project site.

D. Hardware Installation: Comply with Divison 7 Section "Door Hardware."
1. Install doors using approved hardware as scheduled.
2. Use threaded-to-the-head wood screws furnished by hardware manufacturer to mount hardware to doors and frames. Drill pilot holes for all screws prior to installation.
3. Attach hardware secure in correct position and alignment for proper function.

3.3 ADJUSTING, CLEANING AND PROTECTION:

A. Upon door installation, verify for proper operation, fit and swing. Make adjustments as required to ensure for smooth, quiet operation. Re-hang or replace doors which bind or sag.

B. Replace doors that are damaged or do not comply with specified requirements. Doors may be repaired or refinished if Work complies with requirements and shows no evidence of repair or refinishing.

C. Provide protective measures to ensure that installed doors will be without damage, soils or stains throughout remainder of construction.

D. Clean finished door surfaces free of dust, smudges, soils and similar contaminations during final cleaning in accordance with finish manufacturer's recommendations.

END OF FLUSH WOOD DOORS

SECTION 084113

ALUMINUM-FRAMED ENTRANCES AND STOREFRONTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS:

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

1.2 SUMMARY:

A. Section Includes:
   1. Exterior and interior aluminum storefront system.
   2. Exterior and interior aluminum entrance doors.

B. Related Sections:
   1. Division 8 Section "Door Hardware. "
   2. Division 8 Section "Glazing."
   3. Division 7 Section "Joint Sealants."

1.3 DESIGN AND PERFORMANCE REQUIREMENTS:

A. System Design Requirements: Design exterior aluminum-framed entrances and storefront systems, including comprehensive engineering analysis by a qualified professional engineer, complying with specified design and performance requirements.

B. System Performance: Comply with performance requirements specified, as determined by testing of aluminum-framed entrances and storefronts representing those indicated for this Project without failure due to defective manufacture, fabrication, installation, or other defects in construction.
   1. Aluminum-framed entrances and storefronts shall withstand movements of supporting structure including, but not limited to, story drift, twist, column shortening, long-term creep, and deflection from uniformly distributed and concentrated live loads.
   2. Failure also includes the following:
      a. Thermal stresses transferring to building structure.
      b. Deflection exceeding specified limits.
      c. Framing members transferring stresses, including those caused by thermal and structural movements, to glazing.
      d. Glass breakage.
      e. Noise or vibration created by wind and thermal and structural movements.
      f. Loosening or weakening of fasteners, attachments, and other components.

g. Failure of operating units.

C. Structural Loads: Wind loads and other loads as indicated on Drawings.

D. Deflection of Framing Members: Not less than the following specified limits at design wind pressure.

1. Deflection Normal to Wall Plane: Limited to 1/175 of clear span for spans up to 13-feet 6-inches and to 1/240 of clear span plus 1/4-inch for spans greater than 13-feet 6-inches or an amount that restricts edge deflection of individual glazing lites to 3/4-inch, whichever is less.
2. Deflection Parallel to Glazing Plane: Limited to amount not exceeding that which reduces glazing bite to less than 75-percent of design dimension and that which reduces edge clearance between framing members and glazing or other fixed components to less than 1/8-inch, and minimum 1/16-inch clearance to operable units.

E. Structural Test Performance: Tested according to ASTM E 330 as follows:

1. When tested at positive and negative wind-load design pressures, assemblies do not evidence deflection exceeding specified limits.
2. When tested at 150-percent of positive and negative wind-load design pressures, assemblies, including anchorage, do not evidence material failures, structural distress, or permanent deformation of main framing members exceeding 0.2 percent of span.
3. Test Durations: As required by design wind velocity, but not less than 10 seconds.

F. Air Infiltration: Tested according to ASTM E 283 for infiltration maximum air leakage specified.

1. Fixed Framing and Glass Area: Maximum air leakage of 0.06 cfm/sq. ft. at a static-air-pressure differential of 6.24 lbf/sq. ft.
2. Entrance Doors:
   a. Pair of Doors: Maximum air leakage of 1.0 cfm/sq. ft. at a static-air-pressure differential of 1.57 lbf/sq. ft.
   b. Single Doors: Maximum air leakage of 0.5 cfm/sq. ft. at a static-air-pressure differential of 1.57 lbf/sq. ft.

G. Water Penetration under Static Pressure: No evidence of water penetration through fixed glazing and framing areas when tested according to ASTM E 331 at a minimum static-air-pressure differential of 20-percent of positive wind-load design pressure, but not less than 10 lbf/sq. ft.

1. No uncontrolled water penetrating assemblies or water appearing on assemblies' normally exposed interior surfaces from sources other than condensation shall be permitted.
2. Water leakage does not include water controlled by flashing and gutters, or water that is drained to exterior.

H. Energy Performance: Certify and label energy performance according to NFRC as follows:

1. Thermal Transmittance (U-factor): Fixed glazing and framing areas shall have U-factor of not more than 0.45 Btu/sq. ft. × h × deg F as determined according to NFRC 100.
2. Solar Heat Gain Coefficient: Fixed glazing and framing areas shall have a solar heat gain coefficient of no greater than 0.25 as determined according to NFRC 200.
3. Condensation Resistance: Fixed glazing and framing areas shall have an NFRC-certified condensation resistance rating of no less than 60 as determined according to NFRC 500.

I. Thermal Movements: Storefront and entrance systems shall be designed to allow for thermal movements resulting from ambient and surface temperature changes as specified.

1. Temperature Change: 120-deg F (67 deg C), ambient; 180-deg F (100 deg C), material surfaces.
2. Base engineering calculation on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.

1.4 SUBMITTALS:

A. Product Data: Submit manufacturer's technical data and specifications indicating material descriptions, dimensions of individual components and profiles, fabrication methods, finishes, hardware requirements and accessories. Include installation instructions.

B. Shop Drawings: Submit For aluminum-framed entrances and storefronts. Include plans, elevations, sections, full-size details, and attachments to other work.

1. Include details of provisions for assembly expansion and contraction and for draining moisture occurring within the assembly to the exterior.
2. Include full-size isometric details of each vertical-to-horizontal intersection of aluminum-framed entrances and storefronts, showing the following:
   a. Joinery, including concealed welds.
   b. Anchorage.
   c. Expansion provisions.
   d. Glazing.
   e. Flashing and drainage.
3. Show connection to and continuity with adjacent thermal, weather, air, and vapor barriers.
4. Indicate that the qualified professional engineer providing design analysis has reviewed shop drawings.

C. Design Analysis: Submit comprehensive engineering analysis for exterior aluminum-framed storefront and entrance systems indicating compliance with specified design and performance requirements signed and sealed by the qualified professional engineer responsible for their preparation.

D. Samples:

1. For Initial Selection: Submit for units with factory-applied color finishes.
2. For Verification: Submit for each type of exposed finish required, in manufacturer's standard sizes.

E. Fabrication Sample: Submit typical vertical-to-horizontal intersection of assembly, made from 12-inch lengths of full-size components and showing details of the following:

1. Joinery, including concealed welds.
2. Anchorage.
3. Expansion provisions.
4. Glazing.
5. Flashing and drainage.

F. Entrance Door Hardware Schedule: Submit schedule prepared by or under supervision of supplier, detailing fabrication and assembly of entrance door hardware, as well as procedures and diagrams. Coordinate final entrance door hardware schedule with doors, frames, and related work to ensure proper size, thickness, hand, function, and finish of entrance door hardware.

G. Qualification Data: Submit for installer, qualified Professional Engineer and field testing agency to demonstrate their capabilities and experience; include documentation indicating compliance with specified qualification requirements. (Submit for Architect's information only.)

H. Energy Performance Certificates: Submit for aluminum-framed storefronts, accessories, and components, from manufacturer. Basis for Certification shall be NFRC-certified energy performance values for each aluminum-framed storefront. (Submit for Architect's information only.)

I. Sealant Compatibility and Adhesion Test Reports: Submit reports from sealant manufacturer indicating that framing materials have been tested for compatibility and adhesion with sealants. Include sealant manufacturer's interpretation of test results for sealant performance and recommendations for primers and substrate preparation needed to obtain adhesion. (Submit for Architect's information only.)

J. Product Test Reports: Submit reports for aluminum-framed entrances and storefronts based on evaluation of comprehensive tests performed by a qualified testing agency. (Submit for Architect's information only.)

K. Field Quality-Control Reports: Submit inspection and field test reports indicating results of field testing. (Submit for Architect's information only.)

L. Maintenance Data: Submit cleaning and maintenance for aluminum-framed storefront and entrance systems to include in maintenance manuals. Include with closeout submittals.

1.5 QUALITY ASSURANCE:

A. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by manufacturer. Installer shall have at least five (5) years' verifiable experience and who has completed installations of aluminum storefront and entrances similar in design and extent to those required for the project with a record of successful in-service performance.

B. Professional Engineer Qualifications: A professional engineer who is legally qualified to practice in the jurisdiction where Project is located and who is experienced in providing engineering services of the kind indicated. Engineering services are defined as those performed for installation of aluminum-framed storefront and entrance systems that are similar in material, design, and extent to those indicated for this Project. Engineer's service shall include review of shop drawings.

C. Testing Agency Qualifications: Qualified according to ASTM E 699 for testing indicated and accredited by IAS or ILAC Mutual Recognition Arrangement as complying with ISO/IEC 17025.

D. Product Options: Information on Drawings and in Specifications establishes requirements for aesthetic effects and performance characteristics of assemblies.

1. Aesthetic effects are indicated by dimensions, arrangements, alignment, and profiles of components and assemblies as they relate to sightlines, to one another, and to adjoining construction.
2. Do not change intended aesthetic effects, as judged solely by Architect, except with Architect's approval. If changes are proposed, submit comprehensive explanatory data to Architect for review.

E. Source Limitations: Obtain all components of aluminum-framed entrance and storefront system, including framing and accessories, from a single manufacturer and from a single source.

1.6 MOCKUPS:

A. Job Mockup: Build mockups to verify selections made under Sample submittals and to demonstrate aesthetic effects and set quality standards for fabrication and installation.

1. Build mockup of typical storefront wall area at location on building as directed by Architect. Construct at least one full height by width of two glazed panels framed with vertical and horizontal mullions of exterior storefront system.
2. Mockup shall indicate the following:
   a. Mullion connections.
   b. Structural anchorage.
   c. Steel reinforcing, if required by design.
   d. Framing finish.
   e. Glazing materials.
   f. Flashing and weeping provisions
3. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.

4. Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion, subject to compliance with requirements.

1.7 PROJECT CONDITIONS:

A. Field Measurements: Verify actual locations of structural supports for aluminum-framed systems by field measurements before fabrication and indicate measurements on shop drawings.

B. Established Dimensions: Where field measurements cannot be made without delaying the Work, establish dimensions and proceed with fabricating aluminum-framed systems without field measurements. Coordinate construction to ensure that actual dimensions correspond to established dimensions.

1.8 WARRANTIES:

A. Manufacturer's Warranty: Manufacturer agrees to repair or replace components of aluminum-framed entrances and storefronts that do not comply with requirements or that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, the following:
   a. Structural failures including, but not limited to, excessive deflection.
   b. Noise or vibration created by wind and thermal and structural movements.
   c. Deterioration of metals and other materials beyond normal weathering.
   d. Water penetration through fixed glazing and framing areas.
   e. Failure of operating components.
2. Warranty Period: Two (2) years from date of Substantial Completion.

B. Finish Warranty: Standard form in which manufacturer agrees to repair finishes or replace aluminum that shows evidence of deterioration of factory-applied finishes within specified warranty period.

1. Deterioration includes, but is not limited to, the following:
   a. Color fading more than 5 Hunter units when tested according to ASTM D 2244.
   b. Chalking in excess of a No. 8 rating when tested according to ASTM D 4214.
   c. Cracking, checking, peeling, or failure of paint to adhere to bare metal.
2. Warranty Period: Ten (10) years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS:

A. Acceptable Manufacturers; subject to compliance with requirements, provide products by one of the following:

1. EFCO Corporation.
2. Kawneer North America; an Alcoa company.

3. Trulite Glass & Aluminum Solutions, LLC.
4. Tubelite, Inc.
5. United States Aluminum Corp.
6. Vistawall International / Oldcastle Building Envelope Group.
7. YKK AP America Inc.

2.2 MATERIALS:

A. Aluminum: Alloy and temper recommended by manufacturer for type of use and finish indicated.
   1. Sheet and Plate: ASTM B 209.
   2. Extruded Bars, Rods, Profiles, and Tubes: ASTM B 221.
   3. Extruded Structural Pipe and Tubes: ASTM B 429.
   4. Structural Profiles: ASTM B 308/B 308M.
   5. Welding Rods and Bare Electrodes: AWS A5.10/A5.10M.

B. Steel Reinforcement: Provide as required by manufacturer's engineering analysis.
   1. Materials:
      a. Structural Shapes, Plates, and Bars: ASTM A 36/A 36M.
      b. Cold-Rolled Sheet and Strip: ASTM A 1008/A 1008M.
      c. Hot-Rolled Sheet and Strip: ASTM A 1011/A 1011M.
   2. Finish: Provide with manufacturer's standard zinc-rich, corrosion-resistant primer complying with SSPC-PS Guide No. 12.00 applied immediately after surface preparation and pretreatment. Select surface preparation methods according to recommendations in SSPC-SP COM and prepare surfaces according to applicable SSPC standard.

2.3 STOREFRONT FRAMING SYSTEMS:

A. Basis of Design:
   1. Exterior Framing System:
      a. Vestibule Storefronts: YKK, YES 60 TU.
      b. Storefront Windows (Punched Openings): YKK, YES 45 TU.
   2. Interior Framing System: YKK, YES FS.
   3. Framing systems of similar design and construction by other acceptable manufacturers may be submitted for Architect's acceptance. Acceptance is subject to compliance with specified requirements as evidenced by submittal of manufacturer's product data, test reports and shop drawings.

B. Framing System Design:
   1. Exterior Framing Systems:
      a. Vestibule Storefront System: Offset center, flush glazed tubular framing system designed for dry glazing with roll-in top load elastomeric glazing gaskets on all sides. Thermal broken framing construction fabricated to accept insulated glass units.

b. Window Storefront System (Punched Openings): Center set, flush glazed tubular framing system designed for dry glazing with roll-in top load elastomeric glazing gaskets on all sides. Thermal broken framing construction fabricated to accept insulated glass units.

2. Interior Framing System: Center set, flush glazed tubular framing system designed for dry glazing with roll-in top load elastomeric glazing gaskets on all sides. Non-thermal construction fabricated to accept single pane glass units.

C. Framing Members: Manufacturer's standard extruded-aluminum framing members of thickness required and reinforced as required to support imposed loads.

1. Member Sizes:
   a. Exterior Framing Systems:
      1) Vestibule Storefront System: 2-inch face width by 6-inch depth.
      2) Window Storefront System (Punched Openings): 2-inch face width by 4-1/2 inch depth.
   b. Interior Framing System: 1-3/4 inch face width by 4-1/2 inch depth.
2. Thermal Barrier: Manufacturer's thermal break for exterior framing members consisting of a two-part chemical cured, high-density polyurethane material attached to aluminum framing by mechanical and adhesive joining methods.
3. Assembly Method: Shear–block or head-and-sill-receptor system with shear-blocks at intermediate horizontal members.
4. Finishes:
   a. Exterior Framing Systems: High-performance two-coat fluoropolymer finish as specified.
   b. Interior Framing System: Baked-enamel or powder-coat finish as specified.

D. Backer Plates: Manufacturer's standard, continuous backer plates for framing members, if not integral, where framing abuts adjacent construction.

E. Brackets and Reinforcements: Manufacturer's standard high-strength aluminum with nonstaining, nonferrous shims for aligning system components.

F. Head Deflection Receptors: Manufacturer's standard receptors at heads designed to compensate for excessive deflection of structure. Provide as required by manufacturer's engineering analysis for job conditions as indicated on final reviewed shop drawings.

G. Sill Flashing or Receptor: Fabricated from minimum 0.062-inch thickness aluminum; matching storefront framing finish of type with interior legs turned up minimum 1-inch against framing member and with end dams to form watertight gutter. Seal all aluminum to aluminum laps with sealant.

H. Trim and Closures: Provide exterior and interior trim and closure components in materials and finishes matching storefront framing for complete installation. Trim components shall be attached without use of exposed fasteners.

I. Framing System Gaskets and Sealants: Manufacturer's standard recommended by manufacturer for joint type.

2.4 ENTRANCE DOOR SYSTEMS:

A. Entrance Doors: Manufacturer's standard glazed entrance doors of design indicated for manual-swing operation.

1. Door Design: Wide stile, swing doors.
2. Stiles and Rails: Dimensions indicated are nominal sizes.
   a. Stiles: 5-inches width.
   b. Top rail: 5-inches width.
   c. Bottom rail: 10-inches width.
   d. Intermediate Rail: 5-inches width.
3. Door Construction: 1-3/4 inch overall thickness, with minimum 0.125-inch thick, extruded-aluminum tubular rail and stile members. Mechanically fasten corners with reinforcing brackets that are deeply penetrated and fillet welded or that incorporate concealed tie rods.
4. Glazing Stops and Gaskets: Square, snap-on, extruded-aluminum stops and preformed gaskets.
   a. Provide infill adapters to accept insulated glazing for exterior entrances.
   b. Provide non-removable glazing stops on exterior side of door.

B. Entrance Door Hardware: As specified in Division 8 Section "Door Hardware".

C. Weather Stripping: Manufacturer's standard replaceable components.

1. Compression Type: Made of ASTM D 2000, molded neoprene, or ASTM D 2287, molded PVC.
2. Sliding Type: AAMA 701, made of wool, polypropylene, or nylon woven pile with nylon-fabric or aluminum-strip backing.

2.5 GLAZING SYSTEMS:

A. Glazing: As specified in Division 8 Section "Glazing."

B. Glazing Gaskets: Manufacturer's standard compression types, replaceable, molded or extruded, black, resilient elastomeric glazing gaskets designed to maintain uniform pressure and watertight seal.

C. Setting Blocks and Spacers: Manufacturer's standard elastomeric types.

D. Glazing Sealants: Comply with Division 8 Section "Glazing."

2.6 ACCESSORIES:

A. Fasteners and Accessories: Manufacturer's standard corrosion-resistant, nonstaining, nonbleeding fasteners and accessories compatible with adjacent materials.

1. Use self-locking devices where fasteners are subject to loosening or turning out from thermal and structural movements, wind loads, or vibration.
2. Reinforce members as required to receive fastener threads.
3. Fasteners shall be concealed to the greatest extent practicable. Where exposed fasteners are required, use type with countersunk Phillips screw heads**,** finished

to match framing system. Limit exposed fasteners only to locations indicated on final reviewed shop drawings.

B. Anchors: Three-way adjustable anchors with minimum adjustment of 1-inch that accommodate fabrication and installation tolerances in material and finish compatible with adjoining materials and recommended by manufacturer.

C. Concrete and Masonry Inserts: Hot-dip galvanized cast-iron, malleable-iron, or steel inserts complying with ASTM A 123/A 123M or ASTM A 153/A 153M requirements.

D. Concealed Flashing: Manufacturer's standard corrosion-resistant, nonstaining, nonbleeding flashing compatible with adjacent materials.

E. Joint Sealants: For installation at perimeter of aluminum-framed systems, as specified in Division 7 Section "Joint Sealants."

F. Bituminous Paint: Cold-applied asphalt-mastic paint complying with SSPC-Paint 12 requirements except containing no asbestos, formulated for 30-mil thickness per coat.

2.7 FABRICATION:

A. Form or extrude aluminum shapes before finishing.

B. Weld in concealed locations to greatest extent possible to minimize distortion or discoloration of finish. Remove weld spatter and welding oxides from exposed surfaces by descaling or grinding.

C. Fabricate components that, when assembled, have the following characteristics:

1. Profiles that are sharp, straight, and free of defects or deformations.
2. Accurately fitted joints with ends coped or mitered.
3. Physical and thermal isolation of glazing from framing members.
4. Accommodations for thermal and mechanical movements of glazing and framing to maintain required glazing edge clearances.
5. Provisions for field replacement of glazing from [exterior] [interior] [interior for vision glass and exterior for spandrel glazing or metal panels].
6. Fasteners, anchors, and connection devices that are concealed from view to greatest extent possible.

D. Mechanically Glazed Framing Members: Fabricate for flush glazing without projecting stops.

E. Storefront Framing: Fabricate components for framing assembly method specified.

F. Entrance Door Frames: Reinforce as required to support loads imposed by door operation and for installing entrance door hardware.

1. Provide compression weather stripping at fixed stops at exterior doors,

2. Provide silencers at stops to prevent metal-to-metal contact at interior doors. Install three silencers on strike jamb of single-door frames and two silencers on head of frames for pairs of doors.

G. Entrance Doors: Reinforce doors as required for installing entrance door hardware.

1. Provide sliding-type weather stripping retained in adjustable strip and mortised into door edge at pairs of exterior doors.
2. Provide weather sweeps applied to door bottoms at exterior doors.

H. Entrance Door Hardware Installation: Factory install entrance door hardware to the greatest extent possible. Cut, drill, and tap for factory-installed entrance door hardware before applying finishes.

I. After fabrication, clearly mark components to identify their locations in Project according to shop drawings.

2.8 ALUMINUM FINISHES:

A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.

B. Exterior Entrance and Storefront Systems: Manufacturer's high-performance two-coat fluoropolymer finish complying with AAMA 2605. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.

1. Coating Material: Manufacturer's fluoropolymer coating containing not less than 70-percent PVDF resin by weight in color coat.
2. Color and Gloss: As selected by Architect from manufacturer's full range selection.

C. Interior Entrance and Storefront System: Manufacturer's standard baked-enamel or powder-coat finish meeting AAMA 2603 except with a minimum dry film thickness of 1.5 mils.

1. Surface Preparation and Application: Comply with coating manufacturer's written instructions for cleaning, conversion coating, and applying and baking finish.
2. Color and Gloss: As selected by Architect from manufacturer's full range.

PART 3 - EXECUTION

3.1 EXAMINATION:

A. Examine areas, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

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

3.2 INSTALLATION

A. Comply with manufacturer's written instructions.
   1. Do not install damaged components.
   2. Fit joints to produce hairline joints free of burrs and distortion.
   3. Rigidly secure nonmovement joints.
   4. Install anchors with separators and isolators to prevent metal corrosion and electrolytic deterioration and to prevent impeding movement of moving joints.
   5. Seal perimeter and other joints watertight unless otherwise indicated.

B. Metal Protection:
   1. Where aluminum is in contact with dissimilar metals, protect against galvanic action by painting contact surfaces with materials recommended by manufacturer for this purpose or by installing nonconductive spacers.
   2. Where aluminum is in contact with concrete or masonry, protect against corrosion by painting contact surfaces with bituminous paint.

C. Set continuous sill members and flashing in full sealant bed as specified in Division 7 Section "Joint Sealants" to produce weathertight installation.

D. Install components plumb and true in alignment with established lines and grades.

E. Install glazing as specified in Division 8 "Glazing."

F. Install perimeter joint sealants as specified in Division 7 Section "Joint Sealants."

G. Entrance Doors: Install doors to produce smooth operation and tight fit at contact points. Install door units to prepared openings level and plumb, anchored secured in position and without distortion.
   1. Exterior Doors: Install to produce weathertight enclosure and tight fit at weather stripping.
   2. Field-Installed Entrance Door Hardware: Install surface-mounted entrance door hardware according to entrance door hardware manufacturers' written instructions using concealed fasteners to greatest extent possible.

3.3 ERECTION TOLERANCES

A. Erection Tolerances: Install aluminum-framed entrances and storefronts to comply with the following maximum tolerances:
   1. Plumb: 1/8-inch in 10-feet; 1/4-inch in 40-feet.
   2. Level: 1/8-inch in 20-feet; 1/4-inch in 40-feet.
   3. Alignment:
      a. Where surfaces abut in line or are separated by reveal or protruding element up to 1/2-inch wide, limit offset from true alignment to 1/16-inch.
      b. Where surfaces are separated by reveal or protruding element from 1/2 to 1-inch wide, limit offset from true alignment to 1/8-inch.

c. Where surfaces are separated by reveal or protruding element of 1-inch wide or more, limit offset from true alignment to 1/4-inch.

4. Location: Limit variation from plane to 1/8-inch in 12-feet; 1/2-inch over total length.

3.4 FIELD QUALITY CONTROL

A. Testing Agency: Engage a qualified testing agency to perform field quality-control tests and inspections, including preparing reports.

B. Water-Spray Test: Before installation of interior finishes has begun, representative areas of aluminum-framed entrances and storefronts designated by Architect shall be tested according to AAMA 501.2 and shall not evidence water penetration.

1. Test Area: Perform tests on minimum area of at least 10 feet length, by one story of aluminum storefront system.
2. Perform test in areas as directed by Architect.
3. Test shall be performed in the presence of the Architect.

C. Aluminum-framed entrances and storefronts will be considered defective if they do not pass tests and inspections.

1. Repair or remove work where test results and inspections indicate that it does not comply with specified requirements.
2. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.

D. Prepare test and inspection reports for submittal to Architect.

3.5 ADJUSTING AND CLEANING:

A. Entrance Door Adjustments:

1. Adjust operating hardware for smooth operation according to hardware manufacturers' written instructions.
2. Adjust installed weatherstripping to provide weathertight seal around perimeter of door opening.
3. Doors accessible to people with disabilities, shall have closers adjusted to provide a 3-second closer sweep period for doors to move from a 70-degree open position to 3-inches from the latch measured to the leading door edge.

B. General Cleaning: Maintain aluminum storefront assembly in clean condition during construction period. Immediately remove stains or materials having adverse effect on storefront materials and finishes. Remove excess glazing and sealant compounds.

C. Final Cleaning: Just prior to Date of Substantial Completion, clean entire storefront assembly and each exposed face side of metal framing.

1. Clean using pre-tested detergent and water. Flush with clean water.

2. Repair or replace work which cannot be cleaned or which has been damaged during construction operations.

END OF ALUMINUM-FRAMED ENTRANCES AND STOREFRONTS

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 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes commercial door hardware for the following:

1. Swinging doors.
2. Other doors to the extent indicated.

B. Door hardware includes, but is not necessarily limited to, the following:

1. Mechanical door hardware.
2. Cylinders specified for doors in other sections.

C. Related Sections:

1. Division 08 Section “Door Hardware Schedule”.
2. Division 08 Section “Hollow Metal Doors and Frames”.
3. Division 08 Section “Flush Wood Doors”.

D. Codes and References: Comply with the version year adopted by the Authority Having Jurisdiction.

1. ANSI A117.1 - Accessible and Usable Buildings and Facilities.
2. ICC/IBC - International Building Code.
3. NFPA 70 - National Electrical Code.
4. NFPA 80 - Fire Doors and Windows.
5. NFPA 101 - Life Safety Code.
6. NFPA 105 - Installation of Smoke Door Assemblies.
7. State Building Codes, Local Amendments.

E. Standards: All hardware specified herein shall comply with the following industry standards:

1. ANSI/BHMA Certified Product Standards - A156 Series
2. UL10C – Positive Pressure Fire Tests of Door Assemblies

1.3 SUBMITTALS

A. Product Data: Manufacturer's product data sheets including installation details, material descriptions, dimensions of individual components and profiles, operational descriptions and finishes.

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

1. Format: Comply with scheduling sequence and vertical format in DHI's "Sequence and Format for the Hardware Schedule."

2. Organization: Organize the Door Hardware Schedule into door hardware sets indicating complete designations of every item required for each door or opening. Organize door hardware sets in same order as in the Door Hardware Sets at the end of Part 3. Submittals that do not follow the same format and order as the Door Hardware Sets will be rejected and subject to resubmission.

3. Content: Include the following information:

    a. Type, style, function, size, label, hand, and finish of each door hardware item.
    b. Manufacturer of each item.
    c. Fastenings and other pertinent information.
    d. Location of door hardware set, cross-referenced to Drawings, both on floor plans and in door and frame schedule.
    e. Explanation of abbreviations, symbols, and codes contained in schedule.
    f. Mounting locations for door hardware.
    g. Door and frame sizes and materials.
    h. Warranty information for each product.

4. Submittal Sequence: Submit the final Door Hardware Schedule at earliest possible date, particularly where approval of the Door Hardware Schedule must precede fabrication of other work that is critical in the Project construction schedule. Include Product Data, Samples, Shop Drawings of other work affected by door hardware, and other information essential to the coordinated review of the Door Hardware Schedule.

C. Keying Schedule: After a keying meeting with the owner has taken place prepare a separate keying schedule detailing final instructions. Submit the keying schedule in electronic format. Include keying system explanation, door numbers, key set symbols, hardware set numbers and special instructions. Owner must approve submitted keying schedule prior to the ordering of permanent cylinders/cores.

D. Informational Submittals:

1. Product Test Reports: Indicating compliance with cycle testing requirements, based on evaluation of comprehensive tests performed by manufacturer and witnessed by a qualified independent testing agency.

E. Operating and Maintenance Manuals: Provide manufacturers operating and maintenance manuals for each item comprising the complete door hardware installation in quantity as required in Division 01, Closeout Submittals.

1.4 QUALITY ASSURANCE

A. Manufacturers Qualifications: Engage qualified manufacturers with a minimum 5 years of documented experience in producing hardware and equipment similar to that indicated for this Project and that have a proven record of successful in-service performance.

B. Installer Qualifications: A minimum 3 years documented experience installing both standard and electrified door hardware similar in material, design, and extent to that indicated for this Project and whose work has resulted in construction with a record of successful in-service performance.

C. Door Hardware Supplier Qualifications: Experienced commercial door hardware distributors with a minimum 5 years documented experience supplying both mechanical and electromechanical hardware installations comparable in material, design, and extent to that indicated for this Project. Supplier recognized as a factory direct distributor by the manufacturers of the primary materials with a warehousing facility in Project's vicinity. Supplier to have on staff a certified Architectural Hardware Consultant (AHC) available during the course of the Work to consult with Contractor, Architect, and Owner concerning both standard and electromechanical door hardware and keying.

D. Source Limitations: Obtain each type and variety of door hardware specified in this section from a single source unless otherwise indicated.

E. Each unit to bear third party permanent label demonstrating compliance with the referenced standards.

F. Keying Conference: Conduct conference to comply with requirements in Division 01 Section "Project Meetings." Keying conference to incorporate the following criteria into the final keying schedule document:

1. Function of building, purpose of each area and degree of security required.
2. Plans for existing and future key system expansion.
3. Requirements for key control storage and software.
4. Installation of permanent keys, cylinder cores and software.
5. Address and requirements for delivery of keys.

G. Pre-Submittal Conference: Conduct coordination conference in compliance with requirements in Division 01 Section "Project Meetings" with attendance by representatives of Supplier(s), Installer(s), and Contractor(s) to review proper methods and the procedures for receiving, handling, and installing door hardware.

1. Prior to installation of door hardware, conduct a project specific training meeting to instruct the installing contractors' personnel on the proper installation and adjustment of their respective products. Product training to be attended by installers of door hardware (including electromechanical hardware) for aluminum, hollow metal and wood doors. Training will include the use of installation manuals, hardware schedules, templates and physical product samples as required.
2. Inspect and discuss electrical roughing-in, power supply connections, and other preparatory work performed by other trades.
3. Review sequence of operation narratives for each unique access controlled opening.
4. Review and finalize construction schedule and verify availability of materials.

5. Review the required inspecting, testing, commissioning, and demonstration procedures

H. At completion of installation, provide written documentation that components were applied to manufacturer's instructions and recommendations and according to approved schedule.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Inventory door hardware on receipt and provide secure lock-up and shelving for door hardware delivered to Project site. Do not store electronic access control hardware, software or accessories at Project site without prior authorization.

B. Tag each item or package separately with identification related to the final Door Hardware Schedule, and include basic installation instructions with each item or package.

C. Deliver, as applicable, permanent keys, cylinders, cores, access control credentials, software and related accessories directly to Owner via registered mail or overnight package service. Instructions for delivery to the Owner shall be established at the "Keying Conference".

1.6 COORDINATION

A. Templates: Obtain and distribute to the parties involved templates for doors, frames, and other work specified to be factory prepared for installing standard and electrified hardware. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing hardware to comply with indicated requirements.

B. Door and Frame Preparation: Doors and corresponding frames are to be prepared, reinforced and pre-wired (if applicable) to receive the installation of the specified electrified, monitoring, signaling and access control system hardware without additional in-field modifications.

1.7 WARRANTY

A. General Warranty: Reference Division 01, General Requirements. Special warranties specified in this Article shall not deprive Owner of other rights Owner may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by Contractor under requirements of the Contract Documents.

B. Warranty Period: Written warranty, executed by manufacturer(s), agreeing to repair or replace components of standard and electrified door hardware that fails in materials or workmanship within specified warranty period after final acceptance by the Owner. Failures include, but are not limited to, the following:

1. Structural failures including excessive deflection, cracking, or breakage.
2. Faulty operation of the hardware.
3. Deterioration of metals, metal finishes, and other materials beyond normal weathering.
4. Electrical component defects and failures within the systems operation.

C. Standard Warranty Period: One year from date of Substantial Completion, unless otherwise indicated.

D. Special Warranty Periods:
1. Seven years for heavy duty cylindrical (bored) locks and latches.

2. Five years for exit hardware.
3. Twenty five years for manual surface door closer bodies.

1.8 MAINTENANCE SERVICE

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

PART 2 - PRODUCTS

2.1 SCHEDULED DOOR HARDWARE

A. General: Provide door hardware for each door to comply with requirements in Door Hardware Sets and each referenced section that products are to be supplied under.

B. Designations: Requirements for quantity, item, size, finish or color, grade, function, and other distinctive qualities of each type of door hardware are indicated in the Door Hardware Sets at the end of Part 3. Products are identified by using door hardware designations, as follows:

C. Named Manufacturer's Products: Product designation and manufacturer are listed for each door hardware type required for the purpose of establishing requirements. Manufacturers' names are abbreviated in the Door Hardware Schedule.

D. Substitutions: Requests for substitution and product approval for inclusive mechanical and electromechanical door hardware in compliance with the specifications must be submitted in writing and in accordance with the procedures and time frames outlined in Division 01, Substitution Procedures. Approval of requests is at the discretion of the architect, owner, and their designated consultants.

2.2 HANGING DEVICES

A. Hinges: ANSI/BHMA A156.1 certified butt hinges with number of hinge knuckles as specified in the Door Hardware Sets.

1. Quantity: Provide the following hinge quantity, unless otherwise indicated:

    a. Two Hinges: For doors with heights up to 60 inches.
    b. Three Hinges: For doors with heights 61 to 90 inches.
    c. Four Hinges: For doors with heights 91 to 120 inches.
    d. For doors with heights more than 120 inches, provide 4 hinges, plus 1 hinge for every 30 inches of door height greater than 120 inches.

2. Hinge Size: Provide the following, unless otherwise indicated, with hinge widths sized for door thickness and clearances required:

    a. Widths up to 3’0”: 4-1/2” standard or heavy weight as specified.
    b. Sizes from 3’1” to 4’0”: 5” standard or heavy weight as specified.

3. Hinge Weight and Base Material: Unless otherwise indicated, provide the following:

    a. Exterior Doors: Heavy weight, non-ferrous, ball bearing or oil impregnated bearing hinges unless Hardware Sets indicate standard weight.
    b. Interior Doors: Standard weight, steel, ball bearing or oil impregnated bearing hinges unless Hardware Sets indicate heavy weight.

4. Hinge Options: Comply with the following where indicated in the Hardware Sets or on Drawings:

    a. Non-removable Pins: Provide set screw in hinge barrel that, when tightened into a groove in hinge pin, prevents removal of pin while door is closed; for the all out-swinging lockable doors.

5. Acceptable Manufacturers:

    a. Hager Companies (HA).
    b. McKinney Products (MK).

B. Continuous Geared Hinges: ANSI/BHMA A156.26 Grade 1-600 certified continuous geared hinge. with minimum 0.120-inch thick extruded 6060 T6 aluminum alloy hinge leaves and a minimum overall width of 4 inches. Hinges are non-handed, reversible and fabricated to template screw locations. Factory trim hinges to suit door height and prepare for electrical cut-outs.

1. Acceptable Manufacturers:

    a. McKinney Products (MK).
    b. Pemko Manufacturing (PE).

2.3 DOOR OPERATING TRIM

A. Door Push Plates and Pulls: ANSI/BHMA A156.6 certified door pushes and pulls of type and design specified in the Hardware Sets. Coordinate and provide proper width and height as required where conflicting hardware dictates.

1. Push/Pull Plates: Minimum .050 inch thick, size as indicated in hardware sets, with beveled edges, secured with exposed screws unless otherwise indicated.
2. Door Pull and Push Bar Design: Size, shape, and material as indicated in the hardware sets. Minimum clearance of 2 1/2-inches from face of door unless otherwise indicated.
3. Offset Pull Design: Size, shape, and material as indicated in the hardware sets. Minimum clearance of 2 1/2-inches from face of door and offset of 90 degrees unless otherwise indicated.
4. Fasteners: Provide manufacturer's designated fastener type as indicated in Hardware Sets.

5. Acceptable Manufacturers:

    a. Hiawatha, Inc. (HI).
    b. Rockwood Manufacturing (RO).
    c. Trimco (TC).

2.4 CYLINDERS AND KEYING

A. General: Cylinder manufacturer to have minimum (10) years experience designing secured master key systems and have on record a published security keying system policy.

B. Source Limitations: Obtain each type of keyed cylinder and keys from the same source manufacturer as locksets and exit devices, unless otherwise indicated.

C. Cylinders: Original manufacturer cylinders complying with the following:

1. Mortise Type: Threaded cylinders with rings and cams to suit hardware application.
2. Rim Type: Cylinders with back plate, flat-type vertical or horizontal tailpiece, and raised trim ring.
3. Bored-Lock Type: Cylinders with tailpieces to suit locks.
4. Mortise and rim cylinder collars to be solid and recessed to allow the cylinder face to be flush and be free spinning with matching finishes.
5. Keyway: Manufacturer's Standard.

D. Patented Cylinders: ANSI/BHMA A156.5, Grade 1, certified cylinders employing a utility patented and restricted keyway requiring the use of patented controlled keys. Provide bump resistant, fixed core cylinders as standard with solid recessed cylinder collars. Cylinders are to be factory keyed where permanent keying records will be established and maintained.

1. Provide a 6 pin multi-level master key system comprised of patented controlled keys and security and high security cylinders operated by one (1) key of the highest level. Geographical exclusivity to be provided for all security and high security cylinders and UL437 certification where specified.

    a. Level 1 Cylinders: Provide utility patented controlled keyway cylinders that are furnished with patented keys available only from authorized distribution.

2. Acceptable Manufacturers:
    a. Sargent Manufacturing (SA) - Degree Series.
    b. Corbin Russwin (RU) – Access 3 Series.

E. Keying System: Each type of lock and cylinders to be factory keyed.

1. Conduct specified "Keying Conference" to define and document keying system instructions and requirements.
2. Furnish factory cut, nickel-silver large bow permanently inscribed with a visual key control number as directed by Owner.
3. New System: Key locks to a new key system as directed by the Owner.

F. Key Quantity: Provide the following minimum number of keys:

1. Change Keys per Cylinder: Two (2)
2. Master Keys (per Master Key Level/Group): Five (5).
3. Construction Keys (where required): Ten (10).

G. Construction Keying: Provide construction master keyed cylinders.

H. Key Registration List (Bitting List):

1. Provide keying transcript list to Owner's representative in the proper format for importing into key control software.
2. Provide transcript list in writing or electronic file as directed by the Owner.

2.5 MECHANICAL LOCKS AND LATCHING DEVICES

A. Cylindrical Locksets, Grade 1 (Heavy Duty): ANSI/BHMA A156.2, Series 4000, Grade 1 certified.

1. Furnish with solid cast levers, standard 2 3/4” backset, and 1/2" (3/4" at rated paired openings) throw brass or stainless steel latchbolt.

2. Locks are to be non-handed and fully field reversible.

3. Acceptable Manufacturers:

a. Corbin Russwin Hardware (RU) – CL3300 Series.
b. Sargent Manufacturing (SA) – 10 Line.

2.6 LOCK AND LATCH STRIKES

A. Strikes: Provide manufacturer's standard strike with strike box for each latch or lock bolt, with curved lip extended to protect frame, finished to match door hardware set, unless otherwise indicated, and as follows:

1. Flat-Lip 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: Provide manufacturer's special strike box fabricated for aluminum framing.
4. Double-lipped strikes: For locks at double acting doors. Furnish with retractable stop for rescue hardware applications.

B. Standards: Comply with the following:

1. Strikes for Mortise Locks and Latches: BHMA A156.13.
2. Strikes for Bored Locks and Latches: BHMA A156.2.
3. Strikes for Auxiliary Deadlocks: BHMA A156.36.
4. Dustproof Strikes: BHMA A156.16.

2.7 CONVENTIONAL EXIT DEVICES

A. General Requirements: All exit devices specified herein shall meet or exceed the following criteria:

1. At doors not requiring a fire rating, provide devices complying with NFPA 101 and listed and labeled for "Panic Hardware" according to UL305. Provide proper fasteners as required by manufacturer including sex nuts and bolts at openings specified in the Hardware Sets.

2. Where exit devices are required on fire rated doors, provide devices complying with NFPA 80 and with UL labeling indicating "Fire Exit Hardware". Provide devices with the proper fasteners for installation as tested and listed by UL. Consult manufacturer's catalog and template book for specific requirements.

3. Except on fire rated doors, provide exit devices with hex key dogging device to hold the pushbar and latch in a retracted position. Provide optional keyed cylinder dogging on devices where specified in Hardware Sets.

4. Devices must fit flat against the door face with no gap that permits unauthorized dogging of the push bar. The addition of filler strips is required in any case where the door light extends behind the device as in a full glass configuration.

5. Lever Operating Trim: Where exit devices require lever trim, furnish manufacturer's heavy duty escutcheon trim with threaded studs for thru-bolts.

    a. Lock Trim Design: As indicated in Hardware Sets, provide finishes and designs to match that of the specified locksets.
    b. Where function of exit device requires a cylinder, provide a cylinder (Rim or Mortise) as specified in Hardware Sets.

6. Vertical Rod Exit Devices: Where surface or concealed vertical rod exit devices are used at interior openings, provide as less bottom rod (LBR) unless otherwise indicated. Provide dust proof strikes where thermal pins are required to project into the floor.

7. Narrow Stile Applications: At doors constructed with narrow stiles, or as specified in Hardware Sets, provide devices designed for maximum 2" wide stiles.

8. Dummy Push Bar: Nonfunctioning push bar matching functional push bar.

9. Rail Sizing: Provide exit device rails factory sized for proper door width application.

10. Through Bolt Installation: For exit devices and trim as indicated in Door Hardware Sets.

B. Conventional Push Rail Exit Devices (Heavy Duty): ANSI/BHMA A156.3, Grade 1 certified panic and fire exit hardware devices furnished in the functions specified in the Hardware Sets. Exit device latch to be stainless steel, pullman type, with deadlock feature.

1. Acceptable Manufacturers:

    a. Corbin Russwin Hardware (RU) - ED4000 / ED5000 Series.
    b. Sargent Manufacturing (SA) - 80 Series.

2.8 DOOR CLOSERS

A. All door closers specified herein shall meet or exceed the following criteria:

1. General: Door closers to be from one manufacturer, matching in design and style, with the same type door preparations and templates regardless of application or spring size. Closers to be non-handed with full sized covers including installation and adjusting information on inside of cover.

2. Standards: Closers to comply with UL-10C for Positive Pressure Fire Test and be U.L. listed for use of fire rated doors.

3. Cycle Testing: Provide closers which have surpassed 15 million cycles in a test witnessed and verified by UL.

4. Size of Units: Comply with manufacturer's written recommendations for sizing of door closers depending on size of door, exposure to weather, and anticipated frequency of use. Where closers are indicated for doors required to be accessible to the physically handicapped, provide units complying with ANSI ICC/A117.1.

5. Closer Arms: Provide heavy duty, forged steel closer arms unless otherwise indicated in Hardware Sets.

6. Closers shall not be installed on exterior or corridor side of doors; where possible install closers on door for optimum aesthetics.

7. Closer Accessories: Provide door closer accessories including custom templates, special mounting brackets, spacers and drop plates as required for proper installation. Provide through-bolt and security type fasteners as specified in the hardware sets.

B. Door Closers, Surface Mounted (Heavy Duty): ANSI/BHMA A156.4, Grade 1 surface mounted, heavy duty door closers with complete spring power adjustment, sizes 1 thru 6; and fully operational adjustable according to door size, frequency of use, and opening force. Closers to be rack and pinion type, one piece cast iron or aluminum alloy body construction, with adjustable backcheck and separate non-critical valves for closing sweep and latch speed control. Provide non-handed units standard.

1. Acceptable Manufacturers:

   a. Corbin Russwin Hardware (RU) – DC6000 Series.
   b. Sargent Manufacturing (SA) - 351 Series.
   c. Norton Door Controls (NO) - 7500 Series.

2.9 ARCHITECTURAL TRIM

A. Door Protective Trim

1. General: Door protective trim units to be of type and design as specified below or in the Hardware Sets.

2. Size: Fabricate protection plates (kick, armor, or mop) not more than 2" less than door width (LDW) on stop side of single doors and 1” LDW on stop side of pairs of doors, and not more than 1" less than door width on pull side. Coordinate and provide proper width and height as required where conflicting hardware dictates. Height to be as specified in the Hardware Sets.

3. Where plates are applied to fire rated doors with the top of the plate more than 16” above the bottom of the door, provide plates complying with NFPA 80. Consult manufacturer’s catalog and template book for specific requirements for size and applications.

4. Protection Plates: ANSI/BHMA A156.6 certified protection plates (kick, armor, or mop), fabricated from the following:

    a. Stainless Steel: 300 grade, 050-inch thick.

5. Options and fasteners: Provide manufacturer's designated fastener type as specified in the Hardware Sets. Provide countersunk screw holes.

6. Acceptable Manufacturers:

    a. Hiawatha, Inc. (HI).
    b. Rockwood Manufacturing (RO).
    c. Trimco (TC).

2.10 DOOR STOPS AND HOLDERS

A. General: Door stops and holders to be of type and design as specified below or in the Hardware Sets.

B. Door Stops and Bumpers: ANSI/BHMA A156.16, Grade 1 certified door stops and wall bumpers. Provide wall bumpers, either convex or concave types with anchorage as indicated, unless floor or other types of door stops are specified in Hardware Sets. Do not mount floor stops where they will impede traffic. Where floor or wall bumpers are not appropriate, provide overhead type stops and holders.

1. Acceptable Manufacturers:

    a. Hiawatha, Inc. (HI).
    b. Rockwood Manufacturing (RO).
    c. Trimco (TC).

C. Overhead Door Stops and Holders: ANSI/BHMA A156.6, Grade 1 certified overhead stops and holders to be surface or concealed types as indicated in Hardware Sets. Track, slide, arm and jamb bracket to be constructed of extruded bronze and shock absorber spring of heavy tempered steel. Provide non-handed design with mounting brackets as required for proper operation and function.

1. Acceptable Manufacturers:

    a. Rixson Door Controls (RF).
    b. Rockwood Manufacturing (RO).
    c. Sargent Manufacturing (SA).

2.11 ARCHITECTURAL SEALS

A. General: Thresholds, weatherstripping, and gasket seals to be of type and design as specified below or in the Hardware Sets. Provide continuous weatherstrip gasketing on exterior doors and provide smoke, light, or sound gasketing on interior doors where indicated. At exterior applications provide non-corrosive fasteners and elsewhere where indicated.

B. Smoke Labeled Gasketing: Assemblies complying with NFPA 105 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for smoke control ratings indicated, based on testing according to UL 1784.

1. Provide smoke labeled perimeter gasketing at all smoke labeled openings.

C. Fire Labeled Gasketing: Assemblies complying with NFPA 80 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire ratings indicated, based on testing according to UL-10C.

1. Provide intumescent seals as indicated to meet UL10C Standard for Positive Pressure Fire Tests of Door Assemblies, and NPFA 252, Standard Methods of Fire Tests of Door Assemblies.

D. Sound-Rated Gasketing: Assemblies that are listed and labeled by a testing and inspecting agency, for sound ratings indicated.

E. Replaceable Seal Strips: Provide only those units where resilient or flexible seal strips are easily replaceable and readily available from stocks maintained by manufacturer.

F. Acceptable Manufacturers:

1. National Guard Products (NG).
2. Pemko Manufacturing (PE).
3. Reese Enterprises, Inc. (RE).

2.12 FABRICATION

A. Fasteners: Provide door hardware manufactured to comply with published templates generally prepared for machine, wood, and sheet metal screws. Provide screws according to manufacturers recognized installation standards for application intended.

2.13 FINISHES

A. Standard: Designations used in the Hardware Sets and elsewhere indicate hardware finishes complying with ANSI/BHMA A156.18, including coordination with traditional U.S. finishes indicated by certain manufacturers for their products.

B. Provide quality of finish, including thickness of plating or coating (if any), composition, hardness, and other qualities complying with manufacturer's standards, but in no case less than specified by referenced standards for the applicable units of hardware

C. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine scheduled openings, with Installer present, for compliance with requirements for installation tolerances, labeled fire door assembly construction, wall and floor construction, and other conditions affecting performance.

B. Notify architect of any discrepancies or conflicts between the door schedule, door types, drawings and scheduled hardware. Proceed only after such discrepancies or conflicts have been resolved in writing.

3.2 PREPARATION

A. Hollow Metal Doors and Frames: Comply with ANSI/DHI A115 series.

B. Wood Doors: Comply with ANSI/DHI A115-W series.

3.3 INSTALLATION

A. Install each item of mechanical and electromechanical hardware and access control equipment to comply with manufacturer's written instructions and according to specifications.

1. Installers are to be trained and certified by the manufacturer on the proper installation and adjustment of fire, life safety, and security products including: hanging devices; locking devices; closing devices; and seals.

B. Mounting Heights: Mount door hardware units at heights indicated in following applicable publications, unless specifically indicated or required to comply with governing regulations:

1. Standard Steel Doors and Frames: DHI's "Recommended Locations for Architectural Hardware for Standard Steel Doors and Frames."
2. Wood Doors: DHI WDHS.3, "Recommended Locations for Architectural Hardware for Wood Flush Doors."
3. Where indicated to comply with accessibility requirements, comply with ANSI A117.1 "Accessibility Guidelines for Buildings and Facilities."
4. Provide blocking in drywall partitions where wall stops or other wall mounted hardware is located.

C. Retrofitting: Install door hardware to comply with manufacturer's published templates and written instructions. Where cutting and fitting are required to install door hardware onto or into surfaces that are later to be painted or finished in another way, coordinate removal, storage, and reinstallation of surface protective trim units with finishing work specified in Division 9 Sections. Do not install surface-mounted items until finishes have been completed on substrates involved.

D. Thresholds: Set thresholds for exterior and acoustical doors in full bed of sealant complying with requirements specified in Division 7 Section "Joint Sealants."

E. Storage: Provide a secure lock up for hardware delivered to the project but not yet installed. Control the handling and installation of hardware items so that the completion of the work will not be delayed by hardware losses before and after installation.

3.4 FIELD QUALITY CONTROL

A. Field Inspection: Supplier will perform a final inspection of installed door hardware and state in report whether work complies with or deviates from requirements, including whether door hardware is properly installed, operating 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.

3.6 CLEANING AND PROTECTION

A. Protect all hardware stored on construction site in a covered and dry place. Protect exposed hardware installed on doors during the construction phase. Install any and all hardware at the latest possible time frame.

B. Clean adjacent surfaces soiled by door hardware installation.

C. Clean operating items as necessary to restore proper finish. Provide final protection and maintain conditions that ensure door hardware is without damage or deterioration at time of owner occupancy.

3.7 DEMONSTRATION

A. Instruct Owner's maintenance personnel to adjust, operate, and maintain mechanical and electromechanical door hardware.

3.8 DOOR HARDWARE SETS

A. The hardware sets represent the design intent and direction of the owner and architect. They are a guideline only and should not be considered a detailed hardware schedule. Discrepancies, conflicting hardware and missing items should be brought to the attention of the architect with corrections made prior to the bidding process. Omitted items not included in a hardware set should be scheduled with the appropriate additional hardware required for proper application and functionality.

Hardware Sets

Set: 1.0
Doors: 100A, 100B
Description: Exterior Storefront Pair

2	Continuous Hinge	CFM83SLF-HD1		PE
1	Concealed Vert Rod Exit	DG1 16 AD8410 106 x 862	US32D	SA

1	Concealed Vert Rod Exit	DG1 16 AD8410 862	US32D	SA
2	Door Closer	351 CPS	EN	SA

Notes: During hours of operation, exit push bar to be cylindrically dogged for push-pull operation. Balance of hardware: threshold, door seals, door sweeps and mounting brackets furnished by storefront door manufacturer. Verify finish of hardware.

Set: 2.0
Doors: 101A
Description: Vestibule Storefront Pair

2	Continuous Hinge	CFM83SLF-HD1		PE
2	Push Bar & Pull	11047	US32D	RO
2	Door Closer	351 CPS	EN	SA

Notes: Balance of hardware: threshold, door seals, door sweeps and mounting brackets furnished by storefront door manufacturer. Verify finish of hardware.

Set: 3.0
Doors: 102A
Description: Office (SF)

1	Continuous Hinge	CFM83SLF-HD1		PE
1	Mortise Deadlock	MS1850S	628	AD
1	Cylinder	4066-01	335	AD
1	Cylinder	DG1 41 101	US32D	SA
1	Push Bar & Pull	11047	US32D	RO
1	Door Closer	351 UO	ED	SA
1	Door Stop	441	US26D	RO

Set: 4.0
Doors: 101B
Description: Waiting

3	Hinge	TA2714 4-1/2" x 4-1/2"	US26D	MK
1	Office Lock	DG1 10G05 LP	US26D	SA
1	Door Closer	351 UO	ED	SA
1	Kick Plate	K1050 10" x 2" LDW BEV CSK	US32D	RO
1	Wall Stop	409	US32D	RO
3	Silencer	608		RO

Set: 5.0
Doors: 103A
Description: Toilet (OH)

3	Hinge	TA2714 4-1/2" x 4-1/2"	US26D	MK
1	Privacy Set	10U65 LP	US26D	SA
1	Surf Overhead Stop	9-X36	630	RF
1	Mop Plate	K1050 4" x 1" LDW BEV CSK	US32D	RO
1	Kick Plate	K1050 10" x 2" LDW BEV CSK	US32D	RO

3	Silencer	608		RO
1	Coat Hook	802	US26D	RO

END OF SECTION 087100

SECTION 088000

GLAZING

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. Section Includes:

1. Glazing for installation to the following:
   a. Aluminum storefronts systems.
   b. Aluminum entrance doors.
2. Glazing accessories.

B. Extent of glass and glazing work is indicated on drawings and schedules.

C. Related Sections:

1. Division 7 Section – "Joint Sealants."
2. Division 8 Section – "Aluminum-Framed Entrances and Storefronts".

1.3 DESIGN AND PERFORMANCE REQUIREMENTS

A. Wind Loads: Comply with wind load design requirements specified in Division 8 Section "Aluminum-Framed Entrances and Storefronts."

B. Thermal Insulating Units: Units shall comply with the requirements of ASTM E2190-08 and certified by Insulating Glass Certification Council (IGCC) or Associated Laboratories, Inc. (ALI).

C. Tinted, Low-E, Thermal Insulating Glass Performance Characteristics: Values indicated based on *PPG Solarban 60 on Solargray;* 1-inch thickness insulated unit with 1/4-inch thickness lites; coating applied to #2 surface.

1. Thermal Transmittance ("U" value winter night): 0.29.
2. Solar Heat Gain Coefficient(SHGC): 0.25.
3. Visible Light Transmittance: 35-percent.

D. Tempered Glazing Materials: Complying with CPSC 16-CFR, Part 1201, Category II.

E. Heat Treatment: Glazing materials, whether in monolithic state or as a lite of a thermal insulating unit, shall be heat treated where required by glass manufacturer's design calculations to resist stress caused by glass orientations, sizes and configurations, heat

stress, inherent imperfections, wind loading, glazing conditions, temperature differential, inside window treatments or other conditions affecting breakage probability. Maximum allowable breakage probability at design loads shall be eight (8) lites per thousand for vertical glazing.

F. Glazing Orientation for Heat-Treated Glass: Orient lites with roll distortion parallel to head and sill members.

1.4 SUBMITTALS

A. Product Data:

1. Submit for each type glazing material and accessory product specified; indicating performance characteristics.
2. Include technical data and instructions for storage and handling procedures.

B. Framing Manufacturer's Approval: Indicate by letter prior to submission of shop drawings for storefront system that an authorized representative of selected storefront manufacturer has reviewed and approved details, including glass bite, clearances and glazing methods.

C. Samples: Submit minimum 12-inch (1'-0") by 12-inch (1'-0") samples of each type of glazing material proposed for use, if requested by Architect.

D. Glass Design Calculations: Submit calculations prepared by glazing material manufacturer indicating recommendations for glass thickness and heat treating of glazing materials as a result of heat stress, building orientation, inside window treatments, shading by exterior building elements or wind loading.

1. Identify factors affecting breakage probability which have been taken into consideration and anticipated by calculations.
2. Calculations are submitted for Architect's information only.

E. Maintenance Data: Include glazing material manufacturer's maintenance data for cleaning and care of each type of glazing material. Submit as part of contract closeout documents.

1.5 QUALITY ASSURANCE

A. Single Source Requirements: Tinted and low emissivity (Low-E) glass types, whether used in a monolithic state or as a lite of a thermal insulating unit, shall each be the products of a single manufacturer.

B. Labels:

1. Glazing shall bear manufacturer's label identifying type, quality and thickness of material. Labels for single thickness annealed float glass, if not available on each lite shall at least be factory applied to shipping crates. All other glazing materials shall be required to bear labels on each lite either temporary or permanent types as required by governing building codes or certification agency where specified.

2. Tempered glass shall have permanent etched or ceramic fired identification on each unit indicating compliance with safety glazing standard. Identification shall be visible in completed installation and oriented in an inconspicuous corner.

1.6 PRE-GLAZING CONFERENCE

A. Prior to beginning glass and glazing work, a pre-glazing conference will be held to review work to be accomplished.

B. Contractor, storefront and fire-rated storefront supplier and erector, a representative of glass manufacturer, including fire-rated glass manufacturer, a representative of sealant manufacturer, glazing subcontractor and Architect will be present.

C. Contractor shall notify Architect at least three days prior to time of conference.

D. Material submitted by Contractor, interfacing of glass and glazing and storefront work, dimensions and tolerances, sealant joint widths and depths will be reviewed.

1.7 DELIVERY, STORAGE AND HANDLING

A. Deliver glazing materials with manufacturer's identification, glass type, thickness and quality labeled on each piece. Remove no labels until final cleaning.

B. Store glazing materials indoors in cool, dry area, off floor, equally supported to prevent stress and breakage.

C. Do not move cases which have been partially unpacked. Unpack glazing materials in accordance with manufacturer's product data for type of material being handled. Stack individual lites as recommended by manufacturer's product data.

D. Utilize rolling blocks to rotate glazing materials.

E. Handle insulating units without rotating, warping or "cartwheeling" units. Prevent damage to glazing material or edge seal.

1.8 WARRANTY

A. Thermal Insulating Units: Warrant from failure due to loss of edge seal for a period of Ten (10) Years, beginning at Date of Substantial Completion.

B. Low Emissivity (Low-E) Glass: Low emissivity coating shall be warranted against peeling, cracking, discoloration or deterioration for a period of Ten (10) Years, beginning at Date of Substantial Completion.

C. Glass Replacement Warranty: Provide warranty covering replacement of damaged glazing materials for any reason other than natural disasters, vandalism or damage resulting from accident or abuse arising out of the Owner's operations for a period of Two (2) Years, beginning at Date of Substantial Completion. Warranty shall include labor and material costs for replacement of glazing.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Acceptable Float Glass Manufacturers; subject to compliance with specified requirements:

1. AGC Glass Company North America, Inc.
2. Guardian Industries Corp.
3. Pilkington / Nippon Sheet Glass Company Ltd.
4. PPG lndustries, Inc.
5. Viracon, Inc.

B. Acceptable Coated Glass Manufacturers; subject to compliance with specified requirements:

1. AGC Glass Company North America, Inc.
2. Cardinal Glass Industries, Inc.
3. Guardian Industries Corp.
4. Pilkington / Nippon Sheet Glass Company Ltd.
5. PPG Industries, Inc.
6. Viracon, Inc.

C. Acceptable Insulating Glass Unit Fabricators; subject to compliance with specified requirements:

1. AGC Glass Company North America, Inc.
2. Cardinal Glass Industries, Inc.
3. Guardian Industries Corp.
4. Oldcastle BuildingEnvelope / Oldcastle, Inc.
5. Pilkington / Nippon Sheet Glass Company Ltd.
6. Viracon, Inc.

2.2 PRIMARY AND PROCESSED GLAZING MATERIALS

A. Clear Float Glass: Meeting ASTM C1036, Type I, Class 1 (clear), Quality q3 (glazing select); minimum 1/4-inch thickness, or as determined by glazing manufacturer's analysis.

B. Heat-Strengthened Clear Float Glass: Meeting ASTM C 1048, Type I, (transparent), Class 1 (Clear), Quality q3 (Glazing Select), Kind HS (Heated Strengthened), Condition A (Uncoated Glass); thickness as specified or as determined by glazing manufacturer's analysis.

C. Tempered, Clear Float Glass: Meeting ASTM C 1048, Kind FT (fully tempered), Condition A, Type I, Class 1 (clear), Quality q^3 (glazing select); minimum 1/4-inch thickness, except as otherwise indicated.

D. Tinted, Low-E Float Glass:

1. Basis of Design: PPG Industries, Inc.; Solarban 60 on Solargray..
2. Material:: Low emissivity, pyrolytic-coated or sputter-coated, tinted, annealed, tempered or heat strengthened float glass meeting specified ASTM standards indicated and as determined by glazing manufacturer's analysis for application required.
   a. Annealed Float Glass: Meeting ASTM C1036, Type I, Class 2 (tinted), Quality q3 (Glazing Select).
   b. Heat Strengthen, Float Glass: Meeting ASTM C1048, Kind HS (heat strengthen), Condition C, Type I, Class 2 (tinted), Quality q3 (Glazing Select).
   c. Tempered, Float Glass: Meeting ASTM C1048, Kind FT (fully tempered), Condition C, Type I, Class 2 (tinted), Quality q3 (Glazing Select).
3. Thickness: As determined by glazing manufacturer's analysis.
4. Color: Gray.

2.3 FABRICATED GLAZING UNITS

A. Tinted, Low-E, Thermal Insulating Units:

1. Basis of Design: PPG Industries, Inc.; Solarban 60 on Solargray + clear glass.
2. Outboard Lite: Tinted, low-E, float glass as specified; heat strengthening and thickness as determined by glazing manufacturer's analysis. Low-E coating applied to No. 2 surface.
3. Inboard Lite: Clear float glass as specified; heat strengthening and thickness as determined by glazing manufacturer's analysis.
4. Spacer: Manufacturer's standard steel or aluminum spacer with welded, fused or bent corners and welded or fused splices and joints, filled with desiccant; to provide a 5/16-inch thickness, hermetically sealed, dehydrated air space.
5. Unit Thickness: 1-inch, minimum.

B. Tempered, Tinted, Low-E, Thermal Insulating Units:

1. Basis of Design: PPG Industries, Inc.; Solarban 60 on Solargray + clear glass.
2. Outboard Lite: Tempered, tinted, low-E, float glass as specified; thickness as determined by glazing manufacturer's analysis. Low-E coating applied to No. 2 surface.
3. Inboard Lite: Tempered, clear float glass as specified; thickness as determined by glazing manufacturer's analysis.
4. Spacer: Manufacturer's standard steel or aluminum spacer with welded, fused or bent corners and welded or fused splices and joints, filled with desiccant; to provide a 5/16-inch thickness, hermetically sealed, dehydrated air space.
5. Unit Thickness: 1-inch, minimum.

2.4 GLAZING ACCESSORIES:

A. Setting Blocks: Neoprene, 70-90 Shore A durometer hardness, meeting ASTM C 864.

B. Edge Blocks: Neoprene, 60-70 Shore A durometer hardness, meeting ASTM C 864.

C. Spacers: Neoprene, 40-60 Shore A durometer hardness, meeting ASTM C 864.

D. Glazing Gaskets for Storefront Systems: Glazing assembly manufacturer's standard extruded or molded neoprene or Ethylene Propylene Diene Monomer (EPDM) gaskets.

E. Interior Hollow Metal Partition Glazing: Manufacturer's standard resilient glazing beads.

F. Polyvinyl Chloride Foam Tape: Closed cell foam tape meeting ASTM D1667-05 with pressure-sensitive adhesive on one side.

2.5 SPEAK HOLES:

A. Acceptable Products; subject to compliance with specified requirements:

1. C.R. Laurence Co., Inc.; 834 Series.
2. Nissen & Company, Inc.; Model No. 444.

B. Characteristics: Circular, draftproof louvered design voice transmission speak-thrus for installation in glazing materials up to 1/4-inch thickness.

1. Material: Heavy wrought aluminum; alloy and temper as per manufactur’s design.
2. Size: 4-1/2 to 5-1/2 inch, nominal diameter.
3. Finish: As selected by Architect from manufacturer’s standard selection.

2.6 GLAZING SEALANT:

A. Acceptable Products; subject to compliance with specified requirements:

1. Dow Corning Corp.; 795 Silicone Building Sealant.
2. Pecora Corp.; 895NST.
3. Tremco, Inc.; Spectrum 2.

B. Characteristics: One part, neutral-curing silicone rubber glazing sealant complying with ASTM C920-05, Type S, Grade NS, Class 50, Use NT.

1. Joint Movement Capability: Minimum plus or minus 50-percent extension and compression.
2. Colors: As selected by Architect from manufacturer's standard full range color selection.

C. Accessories: Provide primers as required, backer rod and accessories acceptable to sealant manufacturer.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify compliance with the following requirements prior to beginning glazing work:

1. That framing is anchored in position, plumb and square within 1/8-inch of nominal dimensions indicated.
2. That fastener heads, and other projections are removed from glazing rabbets.
3. That corners and fabricated intersections are sealed and framing is weather-tight.
4. That rabbets at sills weep to outside and rabbets are of sufficient depth and width to receive glazing material and provide the required bite of the glazing material.
5. That wood frames have been prime painted or stained and finished as applicable in accordance with Painting section.
6. That hollow metal frames have received paint finish in accordance with Painting section.

3.2 PREPARATION

A. Clean glass edges and framing glazing channel of debris and protective coatings immediately prior to glazing. Use material acceptable to framing, glazing material and glazing sealant manufacturers.

B. Inspect glazing material prior to installation. Eliminate lites having face or edge damage.

C. Lites of tempered, heat-strengthened, laminated and insulating glass shall not be cut or otherwise altered in the field.

3.3 FABRICATION:

A. Fabricate glazing units in sizes required to fit openings indicated for Project, with edge and face clearances, edge and surface conditions, and bite complying with written instructions of product manufacturer and referenced glazing publications, to comply with system performance requirements.

B. Allow for thermal movements from ambient and surface temperature changes acting on glass framing members and glazing components.

C. Where speak holes are indicated to be installed in glazed openings, fabricate glass to accept device complying with manufacturer's written instructions. Mount device to glazing to provide tamperproof installation.

3.4 INSTALLATION REQUIREMENTS

A. Install glazing materials to obtain air-tight and water-tight installation and to withstand normal temperature changes and wind loads without failure.

B. Protect glazing material faces and edges during handling and installation.

C. Size glazing materials for each opening to ensure correct bite on glazing material, without imposing strain, in accordance with manufacturer's product data.

D. Maintain minimum 1/8-inch bed clearance between glazing material and sash, on both sides, except where greater clearances is required by either glazing material or framing manufacturer.

3.5 GLAZING INSTALLATION

A. Install glazing materials in accordance with manufacturer's product data and applicable standards, except where more stringent requirements are specified.

B. Install setting blocks for all glazing materials over six sq. ft. in area.

1. Install at sill rabbet located one quarter of glass width from each corner, but with edge nearest corner not closer than 6-inch from corner, unless otherwise required.
2. Size setting blocks in proportion to glass weight; minimum 4-inch length.

C. Shim all lites over 100 united inches, inboard and outboard, on all sides using continuous shims, except where gaskets accomplish shimming; unless otherwise specified.

D. Provide edge blocks at vertical jambs to limit lateral movement of glass. Provide edge blocks in 4-inch minimum lengths. Maintain 1/8-inch clearance between edge of glass and edge block.

E. Storefront Glazing:

1. Install continuous gasket to exterior side of rabbet with joints located at center and top of frame. Notch gasket at corners to form neat joints.
2. Set glazing material centered in rabbet. Apply gaskets to interior side of rabbet, with corners mitered.

Oversize gaskets to allow compressing of miter joints to provide positive seal.

F. Glazing Sealant Installation: Comply with applicable provisions of Joint Sealants section. Prevent filling of weep holes with sealant.

3.6 PROTECTION AND CLEANING

A. For glazing materials subject to damage during construction, protect from breakage by attachment of crossed streamers to framing. Do not mark on surfaces.

B. Remove and replace broken, cracked, chipped or otherwise damaged glazing materials and materials not meeting specified design requirements prior to Date of Substantial Completion.

C. Final cleaning: Just prior to Date of Substantial Completion, clean glass inside and out.

1. Clean using pre-tested detergent and water. Flush with clean water.

2. Repair or replace work which cannot be cleaned or which has been damaged during construction operations.

END OF GLAZING

SECTION 092116

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 interior gypsum board assemblies.
2. Gypsum board attached to steel framing including the following board types:
   a. Regular, gypsum board.
   b. Type X or type C gypsum board for fire rated assemblies.
   c. Moisture and mold-resistant gypsum board.
3. Suspended drywall furring system.
4. Sound Insulation.

B. Related Sections:

1. Division 6 Section - "Rough Carpentry."
2. Division 7 Section – "Firestopping."
3. Division 8 Section – Hollow Metal Frames.
4. Division 9 Section – "Acoustical Panel Ceilings."
5. Division 9 Section - "Painting."

1.3 DEFINITIONS:

A. Gypsum Board Terminology: Refer to ASTM C 11 for definitions of terms for gypsum board assemblies not defined in this Section or in other referenced standards.

1.4 DESIGN AND PERFORMANCE REQUIREMENTS:

A. Nonload-Bearing Steel Framing Members: Framing for interior gypsum board assemblies shall be in accord with manufacturer's product data for heights and conditions of use complying with the following maximum allowable deflection.

1. Framing supporting gypsum board receiving paint, wallcovering or similar flexible finishes: L/240.
2. Framing supporting gypsum board or cement board receiving ceramic tile, stone, plaster, and similar rigid finishes: L/360.

B. STC-Rated Assemblies: For STC-rated assemblies, provide materials and construction identical to those tested in assembly indicated according to ASTM E 90 and classified according to ASTM E 413 by an independent testing agency.

1.5 SUBMITTALS:

A. Product Data: Submit manufacturer's product literature, including installation instructions, indicating compliance with specified requirements.

1. Mark literature to indicate only those products proposed for use.
2. Include data for fire-rated and sound-rated partitions. Include details for acoustical sealant installation.
3. Include technical data and manufacturer's details for shaftwall system.
4. Include technical data and manufacturer's details for suspended drywall furring system.

B. Product Certificates: Submit certification signed by manufacturers of gypsum board assembly components certifying that their products comply with specified requirements.

1.6 QUALITY ASSURANCE:

A. Single-Source Limitations:

1. Steel Framing: Obtain steel framing members for gypsum board assemblies from a single manufacturer, unless otherwise indicated.
2. Panel Products: Obtain each type of gypsum board and other panel products from a single manufacturer.
3. 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.

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:

1. For nonadhesive attachment of gypsum board to framing, maintain not less than 40 deg F (4 deg C).

2. 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.
3. 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. Acceptable Manufacturers; subject to compliance with requirements, provide products for each of the indicated materials by one of the listed manufacturers:

1. Steel Framing and Furring:
   a. CEMCO / California Expanded Metal Products Co.
   b. ClarkDietrich Building Systems, LLC.
   c. Marino Ware / Div. Ware Industries, Inc.
   d. The Steel Network, Inc.
2. Gypsum Board and Related Products:
   a. CertainTeed Corporation.
   b. Continental Building Products, Inc.
   c. G-P Gypsum Corporation / Georgia-Pacific Company.
   d. National Gypsum Company.
   e. USG Corporation.

2.2 STEEL FRAMING FOR INTERIOR WALLS, PARTITIONS AND CEILINGS:

A. Metal Finish for Framing : Provide steel framing members with protective finish complying with the following requirements:

1. Manufacturer's standard corrosion-resistant coating for interior applications except as otherwise specified.
2. Protective coating meeting ASTM A 653, G 40 hot-dip galvanized coating for framing members attached to and within 10 feet of exterior walls and where supporting ceramic tile finishes.

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 wide minimum lip (return), and complying with the following requirements:

1. Thickness: Provide minimum thickness of base (uncoated) metal as specified below.
   a. 0.0179 inch (25 gauge), minimum, unless otherwise indicated.
   b. 0.0329 inch (20 gauge) minimum, for applications as follows:

1) For head runner, sill runner, jamb, and cripple studs at door and other openings.
2) In locations to receive glass-mat, water-resistant, gypsum backing board for tile finishes.

2. Depth: 3-5/8 inches, minimum, unless otherwise indicated.

C. Deflection Tracks: Either of the following types specified fabricated from runners meeting ASTM C 645.

1. Single Long-Leg Runner System: Top runner with 2-inch deep flanges fabricated from same material as studs, minimum 0.0329-inch (20-gauge) thickness, installed with studs friction fit into top runner and with continuous bridging located within 12-inches of the top of studs to provide lateral bracing.
2. Double-Runner System: Nested top runners fabricated from same material as studs with inner runners having 2-inch deep flanges, minimum 0.0269-inch (22-gauge); outer runner sized to friction fit over inner runner fastened to studs.

D. Steel Rigid Furring Channels: ASTM C 645, hat shaped section, complying with the following requirements:

1. Thickness: 0.0179 inch (25 gauge) minimum base (uncoated) metal thickness, unless otherwise indicated.
2. Depth: 7/8 inch unless otherwise indicated.

E. Z-Shaped Furring: With slotted or nonslotted web, face flange of 1-1/4 inches, wall attachment flange of 7/8 inch, minimum bare metal thickness of 0.0179 inch (25 gauge), and depth required to fit insulation thickness or as indicated.

F. Steel Resilient Furring Channels: Manufacturer's standard product designed to reduce sound transmission, fabricated from steel sheet complying with ASTM A 653 or ASTM A 568 to form 1/2-inch deep channel of the following configurations:

1. Single-Leg Configuration: Asymmetric-shaped channel with face connected to a single flange by a single-slotted leg (web); 1-1/2 inch face width.
2. Double-Leg Configuration: Hat-shaped channel, with 1-1/2 inch wide face connected to flanges by double-slotted or expanded-metal legs (webs).

G. Steel Channel Bridging: Cold-rolled steel, 0.0598-inch minimum thickness of base (uncoated) metal and 7/16-inch wide flanges, 1-1/2 inches deep, 475 lb/1000 lineal feet, unless otherwise indicated.

H. Steel Flat Strap and Backing Plate: Steel sheet for blocking and bracing complying with ASTM A 653 or ASTM A 568, length and width as indicated; 0.0598-inch (16 gauge) minimum base metal (uncoated) thickness.

2.3 STEEL FRAMING COMPONENTS FOR SUSPENDED AND FURRED CEILINGS:

A. General: Provide components of sizes indicated but not less than that required to comply with ASTM C 754 for conditions indicated.

B. Cast-in-Place and Post installed 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 five 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. 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, Class 1 zinc coating, soft temper, 0.062 inch thick.

E. Wire Hangers For Interior Ceilings: ASTM A 641, Class 1 zinc coating, soft temper, 0.162-inch diameter.

F. Rod Hangers: Minimum 1/4-inch diameter, galvanized, threaded cold-drawn mild steel.

G. Channels: Cold-rolled steel, 0.0598-inch minimum thickness of base (uncoated) metal and 7/16-inch wide flanges, and as follows:

1. Carrying Channels: 2 inches deep, 590 lb/1000 lineal feet, unless otherwise indicated.
2. Furring Channels: 3/4 inch deep, 300 lb/1000 lineal feet, unless otherwise indicated.
3. Finish For Interior Suspension System: Manufacturer's standard corrosion resistant zinc coating.

H. 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 wide minimum lip (return), and complying with the following requirements for minimum thickness of base (uncoated) metal and for depth:

1. Thickness: 0.0329 inch (20 gauge), unless otherwise indicated.
2. Depth: 2-1/2 inches, unless otherwise indicated.
3. Protective Coating: Manufacturer's standard corrosion-resistant coating unless indicated otherwise.

I. Steel Rigid Furring Channels: ASTM C 645, hat shaped, depth of 7/8-inch, and minimum thickness of base (uncoated) metal as follows:

1. Thickness: 0.0329 inch (20 gauge), unless otherwise indicated.
2. Protective Coating: Manufacturer's standard corrosion-resistant coating unless indicated otherwise.

2.4 SUSPENDED DRYWALL FURRING SYSTEM:

A. Acceptable manufacturers; subject to compliance with specified requirements:

1. Armstrong World Industries, Inc.
2. Chicago Metallic Corp.
3. USG Interiors, Inc.

B. Characteristics:

1. Structural Classification: Meeting ASTM C635, Heavy Duty classification.
2. System Performance: Suspension system components, hangers and fastening devices shall be capable of supporting loads of light fixtures, ceiling grilles and gypsum board with a maximum deflection of 1/360 of the span, tested in accord with ASTM C635.
3. Material: Components fabricated from minimum 0.020-inch thickness, galvanized cold-rolled steel.
4. Suspension System Components:
   a. Main Runners and Cross Tees: Double web tees with factory punched cross tee slots, hanger holes, and interlocking end tab couplings. Tees shall be of fabrication with either wide knurled metal face flanges or capped face flanges as per manufacturer's system designed for screw attachment of gypsum board panels.
   b. Cross Furring Channels: Manufacturer's hat-shaped section having knurled metal flange face with end tabs designed for interlocking with main runners.
   c. Edge Tracks: Channel or angle shaped tracks in manufacturer's standard size; same material as runners and tees.

C. Wire Hangers, Braces, and Ties: Provide wires complying with the following requirements:

1. Zinc-Coated, Carbon-Steel Wire: ASTM A 641, Class 1 zinc coating, soft temper.
2. Size: Select wire diameter so its stress at 3 times hanger design load (ASTM C 635, Table 1, "Direct Hung") will be less than yield stress of wire, but provide not less than 0.106-inch (12-gauge**)** diameter wire.

D. Accessories: Provide manufacturer's assorted clips, tees, struts, stabilizers, bracings and components to construct ceiling transitions, curves, offsets and bulkheads indicated.

2.5 GYPSUM BOARD PRODUCTS:

A. General:

1. Lengths: 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.
2. Widths: Provide gypsum board in widths of 48 inches.

B. Gypsum Wallboard: Meeting ASTM C 1396 and as follows:

1. Types:
   a. Regular Gypsum Board: Provide for vertical surfaces, unless otherwise indicated.
   b. Type X or Type C Gypsum Board: Provide as required by fire-resistance-rated assemblies indicated on Drawings.
   c. Sag-Resistant Gypsum Ceiling Board: Provide for ceiling applications.
2. Edges: Tapered.
3. Thickness: As indicated on drawings.

C. Moisture and Mold Resistant Gypsum Board: Meeting ASTM C 1396, with moisture- and mold-resistant core and paper surfaces.

1. Mold Resistance: No mold growth when tested per ASTM D 3273 and having a score of 10 as rated according to ASTM D 3274.
2. Long Edges: Tapered.
3. Thickness: As indicated on drawings.

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 of steel sheet zinc coated by hot-dip process or rolled zinc or plastic:
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.

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. 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. 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 exterior gypsum ceiling/soffit boards, use formulation recommended by gypsum board manufacturer.
4. For topping compound, use sandable formulation.

D. 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.

2.8 ACOUSTICAL JOINT SEALANTS

A. Acoustical Sealant:

1. Acceptable Products:
   a. Pecora Corp., AIS-919 Acoustical and Insulation Latex Sealant.
   b. Tremco, Inc., Acoustical Sealant.
   c. Specified Technologies, Inc.; SpecSeal Smoke N' Sound Acoustical Caulk.
   d. United States Gypsum Co.; SHEETROCK Acoustical Sealant.
2. Type: Manufacturer's standard nonsag, paintable, nonstaining latex sealant complying with ASTM C 83.
   a. Product shall effectively reduces airborne sound transmission through perimeter joints and openings in building construction as demonstrated by testing representative assemblies according to ASTM E 90.
   b. Provide sealants that have a VOC content of 250 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24)

2.9 SOUND INSULATION

A. Mineral Fiber Sound Attenuation Batts:

1. Acceptable Products; subject to compliance with specified requirements:
   a. Fibrex Insulations, Inc.; Sound Attenuation Fire Batt Insulation (SAFB)
   b. IIG MinWool, LLC; MinWool-1200 Sound Attenuation Fire Batt.
   c. Rockwool Manufacturing Co., Delta SA-Fire Board.

d. Thermafiber, Inc.; Thermafiber Sound Attenuation Fire Blankets (SAFB).

2. Type: Unfaced, mineral fiber blankets meeting ASTM C665, Type I and ASTM C612.
   a. Density: Minimum 2.5 pcf.
   b. Combustibility: Non-combustible when tested in accord with ASTM E136.
   c. Surface burning characteristics: Meeting flame spread and smoke developed index specified when tested in accord with ASTM E84.
   d. Flame spread index: Not less than 15.
   e. Smoke developed index: Not more than 5.
   f. Thickness: As indicated on drawings or as required to meet sound rated assembly design.
   g. Size: Manufacturer's standard widths to friction fit between framing members by lengths as required.

B. Fiberglass Sound Batts:

1. Acceptable Products; subject to compliance with specified requirements:
   a. CertainTeed Corporation; CertaPro AcoustaTherm Batts.
   b. Johns Manville Corporation/Building Insulation Division; Sound Control Batts.
   c. Knauf Insulation; QuietTherm QT Batts.
   d. Owens-Corning Fiberglas Corporation; Sonobatts Insulation.
2. Type: Unfaced, fiberglass blanket insulation meeting ASTM C665, Type I.
   a. Surface burning characteristics: Meeting flame spread and smoke developed index specified when tested in accord with ASTM E84.
      1) Flame spread index: Not less than 25.
      2) Smoke developed index: Not more than 50.
   b. Thickness: As indicated on drawings or as required to meet sound rated assembly design.
   c. Size: Manufacturer's standard width equal to spacing of framing members.

2.10 MISCELLANEOUS MATERIALS

A. General: Provide auxiliary materials for gypsum board construction that comply with referenced standards and recommendations of gypsum board manufacturer.

B. 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.

C. Track Fasteners: Power-driven fasteners of size and material required to withstand loading conditions imposed on shaft-wall assemblies without exceeding allowable design stress of track, fasteners, or structural substrates in which anchors are embedded.

D. Fasteners for Gypsum Board:

1. Provide steel drill screws complying with ASTM C 1002 for the following applications:
   a. Fastening gypsum board to steel members less than 0.033 inch (0.84 mm) thick.
   b. Fastening gypsum board to wood members.
   c. Fastening gypsum board to gypsum board.
2. Provide 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.

E. Laminating Adhesive: Special adhesive or joint compound as recommended by manufacturer for laminating gypsum panels. Use adhesives that have a VOC content of 50 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

F. Isolation Strip at Exterior Walls:

1. Asphalt-Saturated Organic Felt: ASTM D 226, Type I (No. 15 asphalt felt), nonperforated.
2. Foam Gasket: Adhesive-backed, closed-cell vinyl foam strips that allow fastener penetration without foam displacement, 1/8 inch (3.2 mm) thick, in width to suit steel stud size.

PART 3 EXECUTION

3.1 EXAMINATION

A. Examine substrates to which gypsum board assemblies attach or abut, with Installer present, including hollow-metal frames, elevator hoistway door frames, cast-in anchors, and structural framing. Examine for compliance with requirements for installation tolerances and other conditions affecting performance.

B. Examine panel products before installation. Reject panels that are wet, moisture damaged, or mold damaged.

C. Do not proceed with installation until unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. 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.

B. Furnish concrete inserts and other devices indicated to other trades for installation well in advance of time needed for coordination with other construction.

3.3 STEEL FRAMING INSTALLING, 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 manufacturer's recommended details.

1. Where building structure abuts ceiling perimeter or penetrates ceiling.
2. Where partition framing and wall furring abut structure, except at floor.

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. 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 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.

B. Sway-brace suspended steel framing with hangers used for support. Comply with building code requirements for seismic bracing.

C. 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 on center.
2. Carrying Channels (Main Runners): 48 inches on center.
3. Furring Channels (Furring Members): 16 inches on center.

D. 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 as measured both lengthwise on each member and transversely between parallel members.

E. Wire-tie or clip furring members to main runners and to other structural supports as indicated.

3.5 SUSPENDED DRYWALL FURRING SYSTEM INSTALLATION

A. Install suspension system in accord with manufacturer's product data and ASTM C754.

B. Space hangers at 48-inches (4-ft.) on center, maximum, in each direction. Secure to building structure by wire typing to structural framing members, fastener clip devices or inserts.

C. Tie hanger wires wrapped minimum three time tight around itself, turning ends upwards.

D. Install additional hangers at end of each suspension member and at each corner of lighting fixtures.

E. Locate hangers plumb in relation to main tees and to avoid contact with insulation covering ducts and pipes. Do not pass hangers through ducts. Alter spacing of hangers or splay hangers to avoid ducts and other obstructions, but do not exceed maximum allowable ceiling areas to be supported by each hanger. Offset horizontal forces of splayed hangers by counter-splaying or bracing. Splay wires no more than 5-inches in 4-ft. vertical drop.

F. Space main tees at 48-inches (4-ft.) on center, maximum perpendicular to structural framing. Space cross tees at 2-ft. (24-inches) on center., perpendicular to main tees to form 24-inch by 48-inch (2-ft by 4-ft) grid system.

G. Level and square suspension system within specified tolerances.

H. Where grid system exists in an unrestrained condition, brace back to building structure

using hanger wire, main tee or carrying channel braces spaces at 48-inches (4-ft.) on center, maximum.

I. Construct offsets, bulkheads and ceiling transitions using manufacturer's clips, struts, bracing and devices designed to provide for a secure rigid and stable installation.

J. Install edge tracks where suspension components intersects with vertical surfaces. Attach to substrates with mechanical fasteners. Cut suspension members as required to fit into tracks.

K. Do not load suspension system to exceed specified deflection limit.

3.6 INSTALLING STEEL FRAMING FOR INTERIOR WALLS, PARTITIONS AND SOFFITS

A. Install runners (tracks) at floors, ceilings, and structural walls and columns where gypsum board stud assemblies abut other construction. 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 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 short of full height to provide perimeter relief.
2. For sound insulated 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 (1'-4") on center, unless otherwise indicated.
2. Multilayer Construction: Space studs 24-inches (2'-0") on center, unless otherwise indicated.
3. Moisture and Mold Resistant Gypsum Board Construction: Space studs 16-inches (1'-4") on center, unless otherwise indicated.
4. Glass-Mat, Water-Resistant, Gypsum Backing Board Construction: Space studs 16-inches (1'-4") on center, 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. 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 two (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 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.

H. 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.

3.7 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 insulation , where indicated, prior to installing gypsum panels unless insulation is readily installed after panels have been installed on one side. Refer to the "Sound Insulation" article in this specification section.

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 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. Spot grout hollow metal door frames for solid-core wood doors, hollow metal doors, and doors over 32-inches (2'-8") wide. Apply spot grout at each jamb anchor clip and immediately insert gypsum panels into frames.

I. 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.

J. 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. 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-inch to 3/8-inch wide joints to install sealant.

K. Isolate perimeter of nonload-bearing gypsum board partitions at structural abutments, except floors, as detailed. Provide 1/4-inch to 1/2-inch 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.

L. Where sound insulated 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.

M. Space fasteners in gypsum panels according to referenced gypsum board application and finishing standard and manufacturer's recommendations.

N. Space fasteners in panels that are tile substrates a maximum of 8-inches on center.

3.8 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.
    a. Stagger abutting end joints not less than one framing member in alternate courses of board.
    b. At high walls, install panels horizontally.

B. 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.

C. Single-Layer Fastening Methods: Apply gypsum panels to supports fastened with screws.

D. Multilayer Fastening Methods: Apply base layers of gypsum panels and face layer to base layers by fastening base layers with screws and face layer with adhesive and supplementary fasteners.

E. 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.

3.9 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. Install LC-bead where gypsum panels are tightly abutted to other construction and back flange can be attached to framing or supporting substrate.
2. Install L-bead where edge trim can only be installed after gypsum panels are installed.
3. Install U-bead where indicated.

D. Install control joints according to ASTM C 840 and manufacturer's recommendations and in specific locations approved by Architect for visual effect.

3.10 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. Levels of Gypsum Board Finish: Finish panels to levels indicated below, according to ASTM C 840, for locations indicated.

1. Level 1 for ceiling plenum areas and concealed areas, unless a higher level of finish is required for sound-rated assemblies. Embed tape at joints.
2. Level 2 where gypsum board panels form substrates for ceramic tile and where indicated. Embed tape and apply separate first coat of joint compound to tape, fasteners, and trim flanges.
3. Level 4 for gypsum board to receive flat paint finish, at surfaces that will be exposed to view, and for all other locations not otherwise specified. Embed tape and apply separate first, fill, and finish coats of joint compound to tape, fasteners, and trim flanges.
4. Level 5 for gypsum board to receive gloss or semi-gloss paint finish, including epoxy paints. Embed tape and apply separate first, fill, and finish coats of joint compound to tape, fasteners, and trim flanges, and apply skim coat of joint compound over entire surface

3.11 SOUND INSULATION

A. Install to gypsum drywall partitions after first layer of gypsum board is installed.

B. Install sound insulation with snug joints in accord with manufacturer's instructions to secure insulation in place.

C. Where installed above ceilings, lay insulation flat. Install unfaced batts over suspended ceilings at partitions in width that extends on either side of partition as indicated.

3.12 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.

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.

B. Do not proceed with installation of gypsum board to ceiling support framing until deficiencies have been corrected.

3.13 CLEANING AND PROTECTION

A. Promptly remove any residual joint compound from adjacent surfaces.

B. Protect installed products from damage from weather, condensation, direct sunlight, construction, and other causes during remainder of the construction period.

C. Remove and replace panels that are wet, moisture damaged, or mold damaged.

1. Indications that panels are wet or moisture damaged include, but are not limited to, discoloration, sagging, and irregular shape.
2. Indications that panels are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

D. 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 GYPSUM BOARD ASSEMBLIES

SECTION 099100

PAINTING

PART 1 GENERAL

1.1 RELATED DOCUMENTS:

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

1.2 1.2 SUMMARY:

A. This Section includes surface preparation, painting, and finishing of exposed interior and exterior items and surfaces, except where noted otherwise.

1. Surface preparation, priming, and finish coats specified in this section are in addition to shop priming and surface treatment specified under other sections.
2. Painting includes field painting exposed steel and iron work, and primed metal surfaces.

B. Paint exposed surfaces whether or not colors are designated in "schedules," except where a surface or material is specifically indicated not to be painted or is to remain natural. Where an item or surface is not specifically mentioned, paint the same as similar adjacent materials or surfaces. If color or finish is not designated, the Architect will select from standard colors or finishes available.

C. Painting is not required on prefinished items, finished metal surfaces, concealed surfaces, operating parts, and labels.

1. Examples of prefinished items not to be painted include, in part, the following factory-finished components:
   b. Acoustic materials.
   c. Plastic laminate casework.
   d. Finished mechanical and electrical equipment.
   e. Light fixtures.
   f. Switchgear.
   g. Distribution cabinets.
   h. Signage, Plaques, Directories, and Bulletin Boards.
   j. Finish Hardware.
2. Examples of concealed surfaces not to be painted include, in part, wall or ceiling surfaces in the following generally inaccessible areas:
   a. Foundation spaces.
   b. Furred areas.
   c. Utility tunnels.
   d. Pipe spaces or chases.
   e. Duct shafts.
3. Examples of Finished metal surfaces not to be painted include, in part, the following:
   a. Anodized aluminum.
   b. Stainless steel.

c. Chromium plate.
d. Copper.
e. Bronze.
f. Brass.
g. Prefinished aluminum-cladding on wood windows and trim.

4. Examples of operating parts not to be painted include, in part, moving parts of operating equipment such as the following:

a. Valve and damper operators.
b. Linkages.
c. Sensing devices.
d. Motor and fan shafts.

5. Labels: Do not paint over Underwriter's Laboratories, Factory Mutual or other code-required labels or equipment name, identification, performance rating, or nomenclature plates.

D. Related Sections: The following sections contain requirements that relate to this section:

1. Divisions 5 Sections, for shop priming metal work.
2. Division 6 Sections, for shop finishing woodwork.

1.3 SUBMITTALS:

A. Product Data: Manufacturer's most current technical information, label analysis, and application instructions for each material proposed for use.

1. List each material and cross-reference to scheduled paint types, and including each specific coating, finish system, and application.
2. Identify each material by the manufacturer's catalog number and general classification.

B. Samples:

1. For Initial Selection: For each type of finish-coat material indicated, submit manufacturer's color chips for surfaces to be coated.
2. For Verification: For each color and material to be applied, with texture to simulate actual conditions, on representative samples of the actual substrate.

a. Provide stepped Samples, defining each separate coat, including block fillers and primers. Use representative colors when preparing samples for review. Resubmit until required sheen, color, and texture are achieved.

b. Provide a list of materials and applications for each coat of each sample. Label each sample for location and application.

c. Submit samples on the following substrates for Architect's review of color and texture only.

1) Gypsum Board: 6-by-10-inch samples on gypsum board, of each type finish and representative color. Apply primer, other base coats and final coats.
2) Concrete Unit Masonry: 4-by-8-inch samples of masonry, with mortar joint in the center, for each finish and color.
3) Painted Wood: 8-inch square samples for each color and material on hardboard.

4) Ferrous Metal: 3-inch square samples for each color and finish applied on flat metal.

1.4 QUALITY ASSURANCE:

A. Single-Source Responsibility: Provide primers and undercoat paint produced by the same manufacturer as the finish coats.

B. Coordination of Work: Review other sections in which primers are provided to ensure compatibility of the total systems for various substrates.

1. On request, furnish information on characteristics of finish materials to ensure use of compatible primers.
2. Notify the Architect of any problems anticipated using the materials specified, prior to proceeding with work.

C. Material Quality: Provide the manufacturer's best quality grade paint material of the various coating types specified.

1. Paint material containers not displaying manufacturer's product identification will not be acceptable.
2. Proprietary names used to designate colors or materials are not intended to imply that products named are required or to exclude approved equivalent products of other manufacturers.

D. Color Pigments: Pure, non-fading, applicable types to suite substrates and service indicated.

E. Lead content in pigments or other painting materials and components is not allowed.

1.5 DELIVERY, STORAGE, AND HANDLING:

A. Deliver materials to the job site in the manufacturer's original, unopened packages and containers bearing manufacturer's name and label, and the following information:

1. Product name or title of material.
2. Product description (generic classification or binder type).
3. Manufacturer's name, stock number, and date of manufacture.
4. Contents by volume, for pigment and vehicle constituents.
5. Thinning instructions.
6. Application instructions.
7. Color name and number.

B. Store materials not in use in tightly covered containers in a well- ventilated area at a minimum ambient temperature of 45 deg F. Maintain containers used in storage in a clean condition, free of foreign materials and residue.

1. Protect from freezing. Keep storage area neat and orderly. Remove oily rags and waste daily.
2. Take necessary measures to ensure that workers, others present or passing through or inspecting work areas (painting or any other work), and the work areas themselves are protected from fire and health hazards resulting from handling, mixing, and application of materials.

1.6 JOB CONDITIONS:

A. Apply water-based paints only when the temperature of surfaces to be painted and surrounding air temperatures are between 50 deg F and 90 deg F, unless otherwise permitted by paint manufacturer's printed instructions.

B. Apply solvent-thinned paints only when the temperature of surfaces to be painted and surrounding air temperatures are between 45 deg F and 95 deg F, unless otherwise permitted by paint manufacturer's printed instructions.

C. Do not apply paint in snow, rain, fog, or mist, or when the relative humidity exceeds 85-percent, or at temperatures less than 5-degrees F above the dew point, or to damp or wet surfaces, unless otherwise permitted by paint manufacturer's printed instructions.

1. Apply no materials in spaces where dust is being generated.
2. Painting may continue during inclement weather if surfaces and areas to be painted are enclosed and heated within temperature limits specified by the manufacturer, during application, drying and curing periods.

PART 2 PRODUCTS

2.1 MANUFACTURERS:

A. Acceptable Manufacturers; subject to compliance with requirements, provide products of one of the following:

1. Benjamin Moore and Company.
2. PPG Industries, Inc.
3. The Sherwin-Williams Company.

2.2 PAINT MATERIALS:

A. Standard of Quality:

1. Except as otherwise noted, products specified as a standard of quality are manufactured by Sherwin-Williams Company. Products of other specified acceptable manufacturers listed, similar in type and quality, are acceptable for use, subject to approval of product list submitted for review.
2. Where products other than those of the manufacturer listed as the standard of quality are specified in Painting Schedule, such products have been selected to achieve specific results and substitutions will be allowed only in accordance with Conditions of the Contract.

B. Material Compatibility:

1. Materials for use within each paint system shall be compatible with one another and substrates indicated, under conditions of service and application as demonstrated by manufacturer, based on testing and field experience.
2. Paint thinners and tints shall be products of same manufacturer as paints or approved by manufacturer for use with their products. Use thinners only within the recommended limits if required.
3. For each coat in a paint system, products shall be recommended in writing by topcoat manufacturers for use in paint system and on substrate indicated.

C. Color Pigments: Pure, non-fading, applicable types to suite substrates and service indicated.

D. Hazardous Materials Prohibition: Lead content in pigments or other painting materials and components is not allowed.

E. Colors: As selected by Architect from manufacturer's full range, unless otherwise indicated on Drawings.

PART 3 EXECUTION

3.1 EXAMINATION:

A. Examine substrates and conditions under which painting will be performed for compliance with requirements for application of paint.

1. Do not begin paint application until unsatisfactory conditions have been corrected.
2. Start of painting will be construed as the Applicator’s acceptance of surfaces and conditions within a particular area.

3.2 PREPARATION:

A. General Procedures: Remove hardware and hardware accessories, plates, machined surfaces, lighting fixtures, and similar items in place that are not to be painted, or provide surface-applied protection prior to surface preparation and painting. Remove these items if necessary for complete painting of the items and adjacent surfaces. Following completion of painting operations in each space or area, have items reinstalled by workers skilled in the trades involved.

1. Clean surfaces before applying paint or surface treatments. Remove oil and grease prior to cleaning.
2. Schedule cleaning and painting so that dust and other contaminants from the cleaning process will not fall on wet, newly painted surfaces.

B. Surface Preparation: Clean and prepare surfaces to be painted in accordance with the manufacturer’s instructions for each particular substrate condition and as specified.

1. Provide barrier coats over incompatible primers or remove and reprime. Notify Architect in writing of problems anticipated with using the specified finish-coat material with substrates primed by others.
2. Cementitious Materials: Prepare concrete, concrete masonry block, cement plaster, and mineral-fiber-reinforced cement panel surfaces to be painted. Remove efflorescence, chalk, dust, dirt, grease, oils, and release agents. Roughen as required to remove glaze. If hardeners or sealers have been used to improve curing, use mechanical methods of surface preparation.
    a. Use abrasive blast-cleaning methods if recommended by the paint manufacturer.
    b. Determine alkalinity and moisture content of surfaces by performing appropriate tests. If surfaces are sufficiently alkaline to cause blistering and burning of finish paint, correct this condition before application. Do

not paint surfaces where moisture content exceeds that permitted in manufacturer's printed directions.

3. Concrete Floor Surfaces to be Sealed or Painted:
   a. Surface shall be free of curing compounds and contaminants.
   b. Clean concrete surfaces with a 5-percent solution of muriatic acid or other etching cleaner. Flush the floor with clean water to remove acid, neutralize with ammonia, rinse, allow to dry, and vacuum before applying coating materials.
   c. If required, abrasive blast clean concrete surfaces as recommended by paint manufacturer, removing laitance and foreign matter, to produce open face texture finish similar to 100 grit fine sandpaper. Repeat procedure if sandpaper texture finish is not achieved. Surface preparation shall be acceptable to paint manufacturer.
   d. Remove debris and vacuum surfaces clean before application of coating materials.
4. Wood: Clean surfaces of dirt, oil, and other foreign substances with scrapers, mineral spirits, and sandpaper, as required. Sand surfaces exposed to view smooth and dust off.
   a. Scrape and clean small, dry, seasoned knots and apply a thin coat of white shellac or other recommended knot sealer before application of primer. After priming, fill holes and imperfections in finish surfaces with putty or plastic wood filler. Sand smooth when dried.
   b. Prime, stain, or seal unfinished wood to be painted immediately upon delivery. Prime edges, ends, faces, undersides, and backsides of wood, including cabinets, counters, cases, and paneling.
   c. When transparent finish is required, backprime with spar varnish.
   d. Backprime paneling on interior partitions where masonry, plaster, or other wet wall construction occurs on backside.
   e. Seal tops, bottoms, and cutouts of unprimed wood doors with a heavy coat of varnish or sealer immediately upon delivery.
5. Ferrous Metals: Clean nongalvanized ferrous-metal surfaces that have not been shop coated; remove oil, grease, dirt, loose mill scale, and other foreign substances. Use solvent or mechanical cleaning methods that comply with recommendations of the Steel Structures Painting Council.
   a. Treat bare, sandblasted, or pickled clean metal with a metal treatment wash coat before priming.
   b. Touch up bare areas and shop-applied prime coats that have been damaged. Wire-brush, clean with solvents recommended by the paint manufacturer, and touch up with the same primer as the shop coat.
6. Galvanized Surfaces: Clean galvanized surfaces with non- petroleum-based solvents so that the surface is free of oil and surface contaminants. Remove pretreatment from galvanized sheet metal fabricated from coil stock by mechanical methods.

C. Materials Preparation: Carefully mix and prepare paint materials in accordance with manufacturer's directions.
   1. Maintain containers used in mixing and application of paint in a clean condition,

free of foreign materials and residue.

2. Stir material before application to produce a mixture of uniform density; stir as required during application. Do not stir surface film into material. Remove film and, if necessary, strain material before using.
3. Use only thinners approved by the paint manufacturer, and only within recommended limits.

D. Tinting: Tint each primer and undercoat a lighter shade to facilitate identification of each coat where multiple coats of the same material are applied.

1. Tint undercoats to match the color of the finish coat(s), but provide sufficient differences in shade of undercoats to distinguish each separate coat.
2. Finish coats as scheduled, shall be same color for each coat required.

3.3 APPLICATION:

A. Apply paint in accordance with manufacturer's directions. Use applicators and techniques best suited for substrate and type of material being applied

1. Do not paint over dirt, rust, scale, grease, moisture, scuffed surfaces, or conditions detrimental to formation of a durable paint film.
2. Paint surface treatments and finishes are indicated on the Drawings and in Specifications.
3. Finish colors will be selected after Bidding, unless indicated otherwise.
4. Provide finish coats that are compatible with primers used.
5. The number of coats and film thickness required is the same regardless of the application method. Do not apply succeeding coats until the previous coat has cured as recommended by the manufacturer. Sand between applications where sanding is required to produce an even smooth surface in accordance with the manufacturer's directions.
6. Apply additional coats when undercoats, stains, or other conditions show through final coat of paint until paint film is of uniform finish, color, and appearance. Give special attention to ensure that surfaces, including edges, corners, crevices, welds, and exposed fasteners, receive a dry film thickness equivalent to that of flat surfaces.
7. The term "exposed surfaces" includes areas visible when permanent or built-in fixtures, connector covers, covers for finned tube radiation, grilles, and similar components are in place. Extend coatings in these areas as required to maintain the system integrity and provide desired protection.
8. Paint surfaces behind movable equipment and furniture same as similar exposed surfaces. Paint surfaces behind permanently fixed equipment or furniture with prime coat only before final installation of equipment.
9. Paint interior surfaces of ducts, where visible through registers or grilles, with a flat, non-specular black paint.
10. Finish doors on tops, bottoms, and side edges same as faces.
11. Sand lightly between each succeeding enamel or varnish coat.

B. Primers:

1. Omit primer on metal surfaces that have been shop-primed and touch-up painted,

only after verifying full compatibility of shop primers with materials specified for the next coat and finish coats.

2. Primer may be omitted at previously painted existing surfaces in good condition, except at interior concrete, plaster and drywall surfaces, after repairs to any existing damaged substrates and after spot priming of existing damaged paint finish, followed by cleaning and preparation recommended in writing by paint manufacturer.

C. Scheduling Painting: Apply first coat to surfaces that have been cleaned, pretreated, or otherwise prepared for painting as soon as practicable after preparation and before subsequent surface deterioration.

1. Allow sufficient time between successive coats to permit proper drying.
2. Do not recoat until paint has dried to where it feels firm, and does not deform or feel sticky under moderate thumb pressure and where application of another coat of paint does not cause lifting or loss of adhesion of the undercoat.

D. Minimum Coating Thickness: Apply materials at not less than the manufacturer's recommended spreading rate. Provide a total dry film thickness of the entire system as recommended by the manufacturer.

E. Block Fillers: Apply block fillers to new or previously unpainted concrete masonry block at a rate to ensure complete coverage with pores filled.

F. Prime Coats: Before application of finish coats, apply a prime coat of material, as recommended by the manufacturer, to material that is required to be painted or finished and has not been prime coated by others. Recoat primed and sealed surfaces where evidence of suction spots or unsealed areas in first coat appears, to assure a finish coat with no burn through or other defects due to insufficient sealing.

G. Pigmented (Opaque) Finishes: Completely cover to provide an opaque, smooth surface of uniform finish, color, appearance, and coverage. Cloudiness, spotting, holidays, laps, brush marks, runs, sags, ropiness, or other surface imperfections will not be acceptable.

H. Transparent (Clear) Finishes: Use multiple coats to produce a glass-smooth surface film of even luster.

1. Provide a finish free of laps, cloudiness, color irregularity, runs, brush marks, orange peel, nail holes, or other surface imperfections.
2. Provide satin finish for final coats.

I. Completed Work: Match approved samples for color, texture, and coverage. Remove, refinish, or repaint work not in compliance with specified requirements.

3.4 CLEANING:

A. Cleanup: At the end of each work day, remove empty cans, rags, rubbish, and other discarded paint materials from the site.

B. Upon completion of painting, clean glass and paint-spattered surfaces. Remove spattered paint by washing and scraping, using care not to scratch or damage adjacent finished surfaces.

3.5 PROTECTION:

A. Protect work of other trades, whether to be painted or not, against damage by painting. Correct damage by cleaning, repairing or replacing, and repainting, as acceptable to Architect.

B. Provide "wet paint" signs to protect newly painted finishes. Remove temporary protective wrappings provided by others for protection of their work after completion of painting operations.

C. At completion of construction activities of other trades, touch up and restore damaged or defaced painted surfaces.

3.6 EXTERIOR PAINT SCHEDULE:

A. The quantities of coats specified are minimums. Contractor is responsible for application of any additional coats necessary to achieve required coverage and color uniformity.

B. Ferrous Metal Surfaces: Sherwin-Williams (Full-Gloss Acrylic Enamel)

Primer (one coat): Kem Kromik Universal Metal Primer B50NZ6/B50WZ1.
Finish (two coats): DTM Acrylic Coating B66-100 Series Gloss.

C. Galvanized Steel Surfaces: Sherwin-Williams (Full-Gloss Acrylic Enamel)

Primer (one coat): Pro Industrial Pro-Cryl Universal Primer B66-310 Series.
Finish (two coats): DTM Acrylic Coating B66-100 Series Gloss.

D. Aluminum Surfaces: Sherwin-Williams (Full-Gloss Acrylic Enamel)

Primer (one coat): Pro Industrial Pro-Cryl Universal Primer B66-310 Series.
Finish (two coats): DTM Acrylic Coating B66-100 Series Gloss.

E. Concrete Surfaces: Sherwin-Williams (Flat Acrylic Enamel)

Primer (one coat): Loxon Concrete and Masonry Primer, Interior/Exterior Latex A24W8300.
Finish (two coats): A-100 Exterior Latex Flat A6-100 Series.

3.7 INTERIOR PAINT SCHEDULE:

A. The quantities of coats specified are minimums. Contractor is responsible for application of any additional coats necessary to achieve required coverage and color uniformity.

B. Ferrous Metal Surfaces: Sherwin-Williams (Semi-Gloss Acrylic Enamel)

Primer (one coat): Kem Kromik Universal Metal Primer B50NZ6/B50WZ1.
Finish (two coats): ProMar 200 Zero VOC Interior Latex Semi-Gloss B31-2600 Series

C. Galvanized Steel Surfaces: Sherwin-Williams (Semi-Gloss Acrylic Enamel)

Primer (one coat): Pro Industrial Pro-Cryl Universal Primer B66-310 Series.
Finish (two coats): ProMar 200 Zero VOC Interior Latex Semi-Gloss B31-2600 Series.

D. Galvanized Steel Surfaces: Sherwin-Williams (Semi-Gloss Acrylic Enamel)

Primer (one coat): Pro Industrial Pro-Cryl Universal Primer B66-310 Series.

Finish (two coats): ProMar 200 Zero VOC Interior Latex Semi-Gloss B31-2600 Series.

E. Gypsum Board Surfaces: Sherwin-Williams (Flat Acrylic Paint)

Primer (one coat): ProMar 200 Zero VOC Interior Latex Primer B28W02600.
Finish (two coats): ProMar 200 Zero VOC Interior Latex Flat B30-2600 Series.

F. Gypsum Board Surfaces: Sherwin-Williams (Eggshell Latex Acrylic Enamel)

Primer (one coat): ProMar 200 Zero VOC Interior Latex Primer B28W02600.
Finish (two coats): ProMar 200 Zero VOC Interior Latex Eg-Shel B20-2600 Series.

G. Wood Surfaces for Paint Finish: Sherwin-Williams (Semi-Gloss Waterbased Acrylic-Alkyd Enamel)

Primer (one coat): Premium Wall & Wood Primer, B28W8111.
Finish (two coats): ProMar 200 WB Acrylic-Alkyd Semi-Gloss B34-8200 Series.

H. Wood Surfaces for Transparent Finish: Sherwin-William (Alkyd/Oil Stain and Waterborne Polyurethane-Satin Gloss)

First Coat: Alkyd Interior Paste Wood Filler, fully compatible with other finish system products below. (Provide for open-grain wood species only)
Second Coat: WoodClassics 250 Interior Oil Stain, A49-800 Series.
Third Coat: Wood Classics Waterborne Polyurethane, Satin A68 Series
Fourth Coat: Wood Classics Waterborne Polyurethane, Satin A68 Series
Fifth Coat: Wood Classics Waterborne Polyurethane, Satin A68 Series

I. Concrete Floor Surfaces: Sherwin-Williams (Semi-Gloss Epoxy Sealer)

First Coat: Armorseal Floor-Plex 8100 Water Based Epoxy Floor Coating B70-8160.
Second Coat: Armorseal Floor-Plex 8100 Water Based Epoxy Floor Coating B70-8160

END OF PAINTING

SECTION 102813

TOILET ACCESSORIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS:

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

1.2 SUMMARY:

A. Section Includes: Toilet room accessories. The extent of toilet and other accessory items are indicated on the Drawings, and include the following:

1. Paper towel dispensers and waste receptacle units.
2. Toilet tissue dispensers.
3. Grab bars.
4. Soap dispensers.
5. Sanitary napkin/tampon disposal units.
6. Coat hooks.
7. Baby-changing station.

B. Related work specified elsewhere includes:

1. Division 6 Section - "Rough Carpentry" (concealed P.T. 2 x 10 wood blocking at stud wall anchorages).
2. Division 9 Section – "Gypsum Board Assemblies."

1.3 SUBMITTALS:

A. Product Data: Submit for each toilet accessory item specified, including details of construction relative to materials, dimensions, gauges, profiles, method of mounting, specified options, and finishes.

B. Setting Drawings: Where cutouts are required in other work, provide templates, substrate preparation instructions, and directions for preparing cutouts and for installation of anchorage devices.

1.4 QUALITY ASSURANCE:

A. Single-Source Responsibility: Provide products of same manufacturer for each type of accessory unit and for units exposed to view in same areas, unless otherwise acceptable to Architect.

B. Regulatory Requirements: Comply with applicable provisions of the following regulations and standards for toilet and shower accessories installed at locations designated as accessible.

1. Code of Federal Regulations (CFR), Americans with Disabilities Act (ADA), 2010 ADA Standards for Accessible Design.
2. ICC/ANSI A117.1, "Accessible and Usable Buildings and Facilities.

C. Inserts and Anchorages: Furnish inserts and anchoring devices that must be set in concrete or built into masonry; coordinate delivery with other work to avoid delay.

1.5 PROJECT CONDITIONS:

A. Coordination: Coordinate accessory locations, installation, and sequencing with other work to avoid interference and to assure proper installation, operation, adjustment, cleaning, and servicing of toilet accessory items.

PART 2 - PRODUCTS

2.1 MANUFACTURERS:

A. Acceptable Manufacturers; subject to compliance with specified requirements, provide products by one of the following:

1. AJW Architectural Products (AJW).
2. American Specialties, Inc. (ASI).
3. Bobrick Washroom Equipment, Inc.
4. Bradley Corporation.

2.2 MATERIALS, GENERAL:

A. Stainless Steel: AISI Type 302/304, with polished No. 4 finish, 22-gauge (.034-inch) minimum thickness, unless otherwise indicated.

B. Brass: Leaded and unleaded, flat products, ASTM B 19; rods, shapes, forgings, and flat products with finished edges, ASTM B 16, Castings, ASTM B-30.

C. Sheet Steel: Cold-rolled, commercial quality ASTM A 366, 20-gauge (.040-inch) minimum, unless otherwise indicated. Surface preparation and metal pretreatment as required for applied finish.

D. Galvanized Steel Sheet: ASTM A 527, G60.

E. Chromium Plating: Nickel and chromium electro-deposited on base metal, ASTM B 456, Type SC 2.

F. Baked Enamel Finish: Factory-applied, gloss white, baked acrylic enamel coating.

G. Galvanized Steel Mounting Devices: ASTM A 153, hot-dip galvanized after fabrication.

H. Fasteners: Screws, bolts, and other devices of same material as accessory unit or of galvanized steel where concealed.

I. Keys: Unless otherwise indicated, provide universal keys for access to toilet accessory units requiring internal access for servicing, resupply, etc. Provide minimum of 6-keys to Owner's representative and obtain receipt.

2.3 COMBINATION PAPER TOWEL DISPENSER AND WASTE RECEPTACLE UNITS:

A. Acceptable Products; subject to compliance with requirements:

1. AWJ; Model No. U659EA.
2. ASI; Model No. 046924A.
3. Bobrick; Model No. B-3974.

B. Semi-Recessed Combination Automatic Roll Paper Towel Dispenser and Waste Receptacle: Minimum 24-gauge stainless steel welded cabinet construction with full continuous backs and sides.

1. Towel Dispenser: Automatic dispensing with battery powered electronic sensor having paper towel roll capacity of 8-inch diameter, 800 ft. length; housed in enclosed stainless steel cabinet. Door shall be equipped with tumbler lockset.
2. Waste Receptacle: 12-gallon, minimum capacity; container fabricated from minimum 22-gauge stainless steel welded construction.
3. Liner: Equip with manufacturer's reusable, heavy duty vinyl liner designed to fit inside waste receptacle.
4. Lockset: Tumbler type for towel-dispenser compartment and waste receptacle; keyed alike to other specified accessories.

C. Mounting Height: Not more than 3'-8" A.F.F. to towel dispensing opening.

2.4 TOILET TISSUE DISPENSERS:

A. Toilet Paper Dispenser -- Surface-Mounted

1. Acceptable Products; subject to compliance with requirements:
   a. AWJ; Model No. U840.
   b. ASI; Model No. 0030.
   c. Bobrick; Model No. B-2888.
   d. Bradley; Model No. 5402.
2. Description: Surface- mounted toilet tissue dispenser; holds two tissue rolls housed in cabinet with lockable service door.
   a. Material and Finish: Type 304 stainless steel, No. 4 satin finish.
   b. Cabinet Body: Minimum 22-gauge (0.031-inch) thickness, welded construction.
   c. Door: Minimum 22-gauge (0.031-inch) thickness, one-piece seamless construction; fitted with keyed tumbler lock.

d. Spindles: Theft-resistant, molded polyethylene spindles with heavy duty internal springs.

2.5 GRAB BARS:

A. Manufacturer/Series No. - Straight Bars:

1. AWJ; UG3-A Series.
2. ASI; Series 3800 P.
3. Bobrick; Series B-6806.99.
4. Bradley; Series 812-2.

B. Stainless Steel Type: Provide 1-1/2-inches outside diameter heavy-duty grab bars with wall thickness not less than 18-gauge (.050-inch) and as follows:

1. Mounting: Concealed type, manufacturer's standard snap-on flange covers and anchorage with concealed mounting plate.
2. Clearance: 1-1/2-inches clearance between wall surface and inside face of bar.
3. Gripping Surfaces: Manufacturer's standard nonslip texture.
4. Locations, Size, and Configurations: As indicated on the Drawings.

C. Mounting Height:

1. Horizontal Bars: 33-inches A.F.F. to horizontal centerline.
2. 18-inch Vertical Bars At Toilets: 39-inches A.F.F. and 41-inches from wall behind toilet fixture to vertical centerline, and as otherwise required by ANSI A 117.1.

2.6 SOAP DISPENSERS:

A. Automatic Soap Dispenser – Countertop-Mounted:

1. Acceptable Products; subject to compliance with requirements:
   a. AWJ; Model No. U136EA.
   b. ASI; Model No. 0391-6-1A.
   c. Bobrick; Model No. B-826.
   d. Bradley: Model No. 6315.
2. Description: Deck-mounted (countertop-mounted) soap dispenser with sensor-activated valve designed to dispense liquid or lotion soaps.
   a. Operation: Automatic soap dispensing with battery powered electronic infrared sensor. Equip with LED in sensor to indicate function and battery status.
   b. Valve and Pump: Hands-free sensor-activated motorized pump connected to corrosion-resistant type valve designed to dispense specified soap solution.
   c. Spout Body and Shank: High-impact resistant plastic; designed for mounting to countertop with spout of length to project over lavatory bowl edge
   d. Spout Finish: Bright polished, chrome-plated finish.

e. Container: Rigid, translucent, polyethylene. Equip with each soap dispenser unit.

f. Capacity: Minimum 54 fluid ounce (1.6 liter).

2.7 SANITARY NAPKIN DISPOSAL UNITS:

A. Surface-Mounted Units:

1. Acceptable Products; subject to compliance with requirements:
   a. AWJ; Model No. U582.
   b. ASI; Model No. 0473-A.
   c. Bobrick; Model No. B-254.
   d. Bradley; Model No. 4722-15
2. Description: Surface mounted sanitary napkin disposal unit.
   a. Material and Finish: Type 304 stainless steel, No. 4 satin finish.
   b. Cabinet Body: Minimum 22-gauge (0.031-inch) thickness, welded construction.
   c. Door: Where required by manufacturer's design, fabricated from minimum 22-gauge (0.031-inch) thickness, one-piece seamless construction attached with full length stainless steel multi-staked continuous hinge and fitted with keyed tumbler lock.
   d. Flap Door: Minimum 22-gauge (0.031-inch) thickness with hemmed bottom edge and spring-loaded, self-closing, full length stainless steel continuous hinge.
   e. Waste Container: Minimum 22-gauge (0.031-inch) thickness welded stainless steel container or rigid molded polyethylene receptacle housed in lockable cabinet per manufacturer's design. Container shall be of removable design for servicing.
   f. Capacity: 1.2-gallon, minimum.
   g. Liners: Provide each unit with one (1) box of disposable liners. Deliver to Owner and obtain a receipt.

B. Mounting Height:

1. Standard Toilet Fixtures: 34-inches A.F.F., to top of unit
2. Accessible (H.C.) Toilet Fixtures: 30-inches A.F.F. to top of unit, unless otherwise required to comply with accessibility requirements.
3. Coordinate exact location related to door swing, toilet fixture and other accessories with Architect and Owner prior to installation.

2.8 COAT HOOKS:

A. Acceptable Products; subject to compliance with requirements:

1. AWJ; Model No. UX110-BF.
2. ASI; Model No. 7340.
3. Bobrick: Model No. B-671.

4. Bradley: Model No. 9115.

B. Design: Rectangular projecting tubular post hook with wall flange cover and concealed fastener mounting bracket.

1. Material and Finish: Type 304 stainless steel, bright polished finish.
2. Size: 2-inch by 2-inch flange with 2-inch approximate length projecting post hook.

C. Mounting Height: 54-inches A.F.F. to top of horizontal projection of robe hook; 48-inches A.F.F. at accessible stalls and toilet rooms for the disabled and handicapped.

D. Locations: One each at back of each individual/single toilet room door, one each at back of each individual toilet stall door; centered on door width.

2.9 BABY-CHANGING STATION

A. Acceptable Products; subject to compliance with requirements:

1. ASI; Model No. 9012.
2. Bobrick; Koala Model No. KB200-01.
3. Bradley; Model No. 9631.

B. Description: Surface-mounted horizontal design unit complying with ASTM F2285; opens by folding down from stored position, equipped with child-protection strap. Unit shall project not more than 4 inches (100 mm) from wall when closed.

1. Construction: Injection-molded polypropylene with embedded antimicrobial additive on formed contoured changing surface. Bed shall be hinged to wall chassis with concealed steel pin.
2. Load Capacity: Engineered to support a minimum of 250-lbs (113-kg) static load when opened.
3. Operation: By pneumatic shock-absorbing mechanism.
4. Liner Dispenser: Built-in to wall mounting chassis.
5. Color: Grey.

2.10 FABRICATION:

A. Manufacturer's Identification: Only a maximum 1-1/2-inch diameter, unobtrusive stamped logo of manufacturer, as approved by Architect, is permitted on an inconspicuous face of toilet or bath accessory units. Identification mark shall be located on either interior surface not exposed to view or back surface, provide additional identification by means of either a printed, waterproof label or a stamped nameplate, indicating manufacturer's name and product model number.

B. Surface-Mounted Toilet Accessories: Except where otherwise indicated, fabricate units with tight seams and joints, exposed edges rolled. Hang doors or access panels with continuous stainless steel piano hinge. Provide concealed anchorage wherever possible.

C. Recessed Toilet Accessories: Except where otherwise indicated, fabricate units of all welded construction, without mitered corners. Hang doors or access panels with full-length stainless steel piano hinge. Provide anchorage that is fully concealed when unit is closed.

PART 3 - EXECUTION

3.1 INSTALLATION:

A. Install toilet accessory units in accordance with manufacturers' current written instructions, using fasteners appropriate to substrate and recommended by manufacturer of unit.

B. Install units plumb and level, firmly anchored in locations and at heights indicated.

3.2 ADJUSTING AND CLEANING:

A. Adjust toilet accessories for proper operation and verify that mechanisms function smoothly. Replace damaged or defective items.

B. Clean and polish all exposed surfaces in strict accordance with manufacturer's recommendations after removing temporary labels and protective coatings.

END OF TOILET ACCESSORIES